
FM
SUPERNOTES

FM SUPERNOTES 2025
FITE EDITION

About The FM Super Notes

The FM SuperNotes is your all-in-one digital guide for the Family Medicine Examinations. Designed specifically for the Filipino Family Medicine resident, it is the ultimate tool to streamline your review, combining high-yield clinical notes, essential foundational principles, and practice questions into a single, easy-to-navigate resource.

How to Use the FM SuperNotes

To get the most out of this reviewer, here are a few suggestions:

- **Active Learning:** This is not just a book to be read; it's a tool to be used. Use it alongside your primary textbooks and the latest clinical practice guidelines to reinforce your learning.
- **Navigate by Topic:** The notes are organized by core topics in Family Medicine. Use the table of contents to jump to specific areas you need to focus on—from foundational principles like the Family Life Cycle and Medical Ethics to key clinical subjects like Diabetes , Hypertension , and Burn Injuries.
- **Test Your Knowledge:** After studying a section, try answering the sample questions provided. Reviewing the rationales will help solidify key concepts for your exam.
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Family Medicine Principles and Family Practice

Family as a Unit of Care

- **The Family As The Social Context For Health Care**
  - transmission of infectious / communicable diseases
  - health behavior requirements in the unit
  - resource utilization / source of support
  - health and illness definitions
  - health decisions / approaches and strategies
- **The patient's Problem Is The Family's problem**
  - Doherty and McCubbin, 1985: Important ways in which the family plays a role in the health of its members:
    - health promotion / maintenance and illness / injury prevention
    - coping with stressful life events
    - family based health and illness appraisal
    - family interaction and level of functioning in response to specific illness
    - help seeking or deciding on the issue of seeking medical support
    - family adaptation / coping with illness including care giving, strict adherence to prescribe treatment and lifestyle modification
- **The Family Is The Greatest Ally In The Patient's Treatment**
  - 90% of cases are ambulatory / out-patient consultations with home confinement / prescriptions
- **Presence Of The Family In The Interview / Consultation**
  - family's influence on the patient's personality, values, beliefs and experiences
  - Family's influence on the physician's personality, values, beliefs and experiences

Basic Concepts On The Family

- Family as a group of persons united by ties of **marriage, blood** or **adoption** consisting a **single household** interacting and communicating with each other in their respective social roles of husband and wife, mother and father, son and daughter, brother and sister creating and maintaining a common culture (Burgess and Locke)
- Family as a small social system made up of individuals related to each other by reason of strong reciprocal affections and loyalties and comprising a permanent household (Berman)
- Family as a semi-closed system of actors occupying inter-related positions defined by society of which the family system is a part as unique to that system with respect to the role content of the positions and to the ideas of kinship relatedness (Rogers)
- In the Philippine setting, the typical Filipino family is characterized by a strong family orientation where **authority is equalitarian**.
- Filipino family remains **child-centered**
- The members place a high value on education.

Types Of Families: Structure

- **Nuclear Family**
  - ***also known as elementary or traditional families***
  - The members of the nuclear family, consisting of parents and their still Dependent children, ordinarily occupying a separate dwelling not shared with members of the family of origin / orientation of either spouse
  - The nuclear family typically consists of a **married man and woman with their children**.
    - they may be **biological or adopted**
  - It is the basic unit from which all other forms evolve.
  - The household is **economically independent** subsisting on the occupational earnings of the husband or father.
- **Extended family**
  - This type of family is linked together by **virtue of kinship bond** between parents and children and/or between siblings.
    - This means the family unit extends beyond the nuclear family (parents and their children) to include other relatives like grandparents, aunts, uncles, and cousins.
  - It includes **three generations** - the family of procreation merged with the family of origin
    - Family of origin: The family you were born into (your parents, siblings, etc.)
    - Family of procreation: The family you create (your spouse/partner and children)
    - could be unilaterally or bilaterally extended.
- **Blended Family**
  - This family type includes step-parents and step-children brought about by annulment, with separation and remarriage.
- **Communal Family**
  - This is composed of a group of individuals who are formed for specific ideological or societal purposes.
  - It is considered as an alternative lifestyle for people who feel alienated from the predominantly economically-oriented society.
  - vary within social context
- **Single Parent Family**
  - children < 17 years of age living in a family unit with a single parent, another relative, or a non-relative
  - may result from the loss of spouse by death, divorce, separation, desertion
  - out-of-wedlock birth of a child
  - from an adoption
  - One parent is working outside the Philippines (OCWs, DHWs, etc.)
- **Joint families**
  - consisting of two or more married couples (or divorced persons, widows, or widowers) of the same generation
- **Lineal families**
  - consisting of two or more generations with each generation composed of one married couple (or a divorced person, widow, or widower).
- **Adoptive family**
  - where the child is not related by blood to the parent, but has been adopted legally.
- **Foster family**
  - where one or more of the children are not the natural children of the parents. The child may stay with the family for an extended period through special government agencies.

Basic Areas Of Family Function

BEEPS

Biologic	• Reproduction • Child rearing / caring • Nutrition • Health maintenance • Recreation
Economic	• Provision of adequate financial Resources • Resources allocation • Ensure financial security of Members
Educational	• Teach skills, attitudes and skills relating to other functions
Psychologic / Affection	• Promotes the natural development of personalities • Offer optimum psychological Protection • Promotes ability to form relationship with people in the family circle
Socio-Cultural	• Socialization of children • Promotion of status and Legitimacy

Ordinal Position (Differences In Behaviors)

First Born	• generally persevering ○ serious ○ more responsive to adults ○ achievement oriented
Middle Child	• optimistic ○ sociable ○ aggressive ○ competitive ○ occasionally manipulative
Youngest	• demanding ○ outgoing ○ occasionally narcissistic ○ by nature are affectionate

Family Social Class Patterns

Upper Class	• much more closely-knit • Greater concern for maintaining family Name and prestige
Middleclass	• believes in hard-work, initiative, Independence, responsibility, economic security and self-improvement through Education / schooling
Lower Class	• sees life as a continual struggle for Survival • Resigned to a life of frustration and Defeat

Family Typology

- A family typology is the family's typical, predictable or habitual pattern of behavior, which is established over time.
- McCubbins described **3 types of typologies**.

The Regenerative Family

- is high in **family hardiness** and high in **family coherence**.
  - **Family hardiness** is defined as "the family's internal strengths and durability.
  - **Family coherence** is the family's emphasis on acceptance, loyalty, pride, faith, trust, respect, caring, and shared values in the management of tension and strain.
- Regenerative families cope by working together to solve problems.
  - Additionally, these families feel in control and have a sense that they can influence both good and bad things which happen; they are not victims of circumstances.
- **Vulnerable, Secure and Durable families make up the other four in this, typology,**
  - **Vulnerable families** are more complacent, less likely to try new and exciting things, tending to do the same things over and over, and are less likely to encourage each other to be active and to learn new things.
  - **Secure families** are active, in control, but when faced with difficulties are also less supportive of each other, less caring and loyal, and less tolerant of hardships.
  - **Durable families** have lesser basic internal strength, but they appear to compensate for this deficiency by having a strong coping repertoire characterized by caring, respect, trust reduced tension and calmness

The Rhythmic Family

- is high on **family time and routines** and high on **valuing of family time and routines**.
  - **Family time and routines** the degree by which the family maintains continuity and stability through specific family activities which are repeated on a routine basis.
  - **Valuing of family time and routines** is the meaning and importance families attach to the value of such practices designed to promote family unity.
- Rhythmic families shared sense of purpose and meaning of family togetherness, regularity, and predictability.
- **Unpatterned families**
  - neither value not implement family routines.
- **Intentional families**
  - value routines and recognize their importance but are unable or unwilling to implement family routines
- **Structuralized families**
  - implement family routines rigorously but fail to perceive the value of routine for family wellness.

The Versatile Family

- is high on **family flexibility** and high on **family bonding**
  - **Family flexibility** is the degree to which the family unit is able to change its rules, boundaries, and roles to accommodate to changing pressures from within and outside the family unit.
  - **Family bonding** is the degree to which the family is bonded together in a meaningful and integral family unit.
- Versatile families **view themselves as being able to say what they want, as having input into major decisions, being able to shape rules and practices in the family, as well as being able to compromise**; they are experienced in shifting responsibilities in the family unit, and willing to experiment with new ways of dealing with problems and issues.
- **Fragile families**
  - lack emotional bonding between members and are unable to deal with stress in flexible, participatory way.
- **Bonded families**
  - tend to rely on their closeness as a family unit, as well as their resistance to change, when faced with stress.
- **Pliant families**
  - feel **emotionally disconnected** from each other and prefer to rely on the support of people outside the family, but are able to handle stress in a flexible way, shifting roles, making decisions, compromising and altering family patterns, as needed

SUMMARY

Regenerative	Rhythmic	Versatile
high in **family hardiness** and high in **family coherence**	high on **family time and routines** and high on **valuing of family time and routines**	high on **family flexibility** and high on **family bonding**
cope by working together to solve problems	shared sense of purpose and meaning of family togetherness, regularity, and predictability	view themselves as being able to say what they want, as having input into major decisions, being able to shape rules and practices in the family, as well as being able to compromise experienced in shifting responsibilities in the family unit, and willing to experiment with new ways of dealing with problems and issues
Vulnerable families Secure families Durable families	Unpatterned families Intentional families Structuralized families	Fragile families Bonded families Pliant families

Circumplex Model

- The Circumplex Model is comprised of three key concepts for understanding family functioning.
- **Cohesion** is the emotional bonding that family members have toward one another.
- **Flexibility** is the quality and expression of leadership and organization, role relationships, and relationships rules and negotiations.
- **Communication** is the positive communication skills utilized by the couple or family system.
- The main hypothesis of the Circumplex Model is:
  - Balanced levels of **cohesion and flexibility** (low to high levels) are most conducive to healthy family functioning, while unbalanced levels of cohesion and flexibility (very low or very high levels) associated with problematic family functioning.

Parenting Styles

- Diana Baumrind (1995) has done considerable research on parenting styles and has identified four styles of parenting: democratic (authoritative), authoritarian, permissive, and rejecting.

Democratic Parenting

- The democratic style is represented by the **"balanced"** type of system on the Circumplex Model.
- In democratic parenting, **parents establish clear rules and expectations and discuss them with the child**.
- Although they acknowledge the child's perspective, they use both reason and power to enforce their standards.
  - Democratic parenting is represented by higher scores on balanced cohesion and balanced flexibility and lower scores on the four unbalanced scales.
    - Children of democratic parenting exhibit what Baumrind describes as energetic-friendly behavior.
    - These children are very self-reliant and cheerful they cope well with stress, and they are achievement oriented

Authoritarian Parenting

- In authoritarian parenting, parents have more rigid rules and expectations and strictly enforce them.
- These parents expect and demand obedience and loyalty from their children.
- ***As the authoritarian style becomes more intense, the family moves toward the unbalanced style called "rigidly enmeshed"***
- This type of family system is particularly problematic for adolescents, who tend to rebel against it.
- In Baumrind's reviews (1955), children of authoritarian-style parents are often conflicted-irritable in behavior, they tend to be moody, unhappy, vulnerable to stress, and unfriendly.

Permissive Parenting

- In permissive parenting, parents **let the child's preferences take priority over their ideals** and rarely, force the child to conform to their standards
- The children are in control of the family rather than the parents. As the permissive style becomes more extreme, the family moves toward the **"chaotic enmeshed"** style.

- The chaotic enmeshed style is problematic for parenting because the constant change and forced togetherness is not healthy for children.

- Baumrind (1995) observed that children of Permissive-style parents generally exhibit impulsive-aggressive behavior.
- These children are often rebellious, domineering, and low achievers.

Rejecting Parenting

- In rejecting parenting, parents do not pay much attention to their child's needs and seldom have expectations regarding how the child should behave.
- As the rejecting style becomes more extreme, the family moves toward the "**rigidly disengaged**" style.
- This style makes it difficult for children to feel cared for, yet they are expected to behave because there are many rules.
  - As a result, children from these homes are often immature and have psychological problems.

Uninvolved Parenting

- In uninvolved parenting, parents often ignore the child, letting the child's preferences prevail as long as those preferences do not interfere with the parents activities.
- As the uninvolved style becomes more extreme, It moves toward the "**chaotic disengaged**" pattern.
- This pattern is problematic for children because they are left on their own without emotional support and a lack of consistent rules and expectations.
  - Children of uninvolved parents are often with drawn loners and low achievers.

Parenting Styles And Children's Behavior

Parenting Style	Children's Behavior
Democratic	Energetic-friendly, Self-reliant and cheerful, Achievement oriented
Authoritarian	Unfriendly, Conflicted and irritable, Unhappy and unstable
Permissive	Impulsive and rebellious, Low achieving
Rejecting	Immature, Psychologically troubled
Uninvolved	Lonely and Withdrawn, Low Achieving

Sample Questions - Family as a Unit of Care

1. When interviewing a family, you note that all members are able to say what they want, able to give inputs into major decisions, able to shape rules and practices in the family and able to compromise and find new ways of dealing with problems and issues. They show that they are this type of family:
A. Regenerative
B. Rhythmic
C. Versatile
D. Bonded

2. Brandon, a 38 year old carpenter, has been working in UAE for the past 10 years. Gwen, his 33 year old housewife, is left to care for their 13 and 11 year old sons in the Philippines. What is their family structure?
A. Blended
B. Nuclear
C. Single
D. Extended

3. Liezel is a 13 year old female, known asthmatic, and was admitted due to complications of PTB. Part of the management of TB is to diagnose and treat the other members of the household. Her father died 2 years ago due to COPD. She currently lives with her mother, 2 younger siblings, her maternal aunt, her aunt's husband, and their 18 year old son. What type of family does Anna belong to?
A. Nuclear family
B. Joint family
C. Extended family
D. Blended family

4. Von and his wife MM are rather conservative having been brought up by strict parents. They let their 14 years old daughter's preferences take priority over their ideals not wanting to force her to conform to their standard. What type of parenting style do they demonstrate?
A. Authoritarian
B. Democratic
C. Permissive
D. Rejecting

5. Ferdie, a 31 year businessman, and Suzy, his 24 year old wife, have been married for 5 years, and have not yet been blessed with a child despite several consults with a fertility specialist. They decided to adopt a 6-month old baby. Ferdie passes away after 4 years due to CA. What is the family structure?
A. Nuclear
B. Extended
C. Single
D. Blended

6. Families consisting of two or more married couples (or divorced persons, widows, or widowers) of the same generation:
A. Joint
B. Lineal
C. Blended
D. Extended

7. Based on the FAMILY SOCIAL CLASS PATTERNS, what is general trait of those who are in the MIDDLE CLASS?
A. greater concern for maintaining family name and prestige
B. resigned to a life of frustration and defeat
C. sees life as a continual struggle for survival
D. believes in hard-work, initiative and self-improvement

8. Kurdapya and Procopio have been married for seven years already, and they are both successful professionals at the age of 34 years. Kurdapya, G3P0 (0030), is suffering from ANTIPHOSPHOLIPID ANTIBODY SYNDROME (APAS). Last year, the Department of Social Welfare and Development granted the couple to legally adopt a baby boy, Asyong. Kurdapya, Procopio, and Asyong now live independently in their four-bedroom home in Bilibid Village, Mandaluyong Loob City. What is the FAMILY STRUCTURE?
A. Communal family
B. Blended family
C. Nuclear family
D. Extended family

9. Jasmine graduated magna cum laude with a degree in BS in Business Administration and Accountancy and later on pursued her Juris Doctor degree, graduating as rank 12 of her batch. In 2000, she took the bar and topped the said exam given by the Supreme Court. Recently, Jasmine was named Senior Vice President of a multi-national company, where is serves as the General Counsel. All of these achievements have been balanced with Jasmine's love for her 85-year-old father, who is also a retired accountant-lawyer. In terms of BIRTH ORDER, Jasmine is mostly probably the:
A. Middle child
B. First-born child
C. Youngest child
D. Only child

10.The Burgos clan is described as a family who capable of CHANGING ITS RULES, BOUNDARIES, AND ROLES to accommodate CHANGING PRESSURES FROM WITHIN AND OUTSIDE THE FAMILY UNIT. They can be described also as having a HIGH DEGREE OF BONDING TOGETHER in a meaningful and integral family unit. What is their FAMILY TYPOLOGY?
A. versatile family
B. secure family
C. rhythmic family
D. regenerative family

11. The Garcia family makes sure that they always have dinner together, with a rule to leave their mobile phones inside their respective bedrooms during meal times. They also find time to go out as a family at least once a month. This describes which FAMILY TYPOLOGY?
A. secure family
B. versatile family
C. rhythmic family
D. regenerative family

12. Gem is a SINGLE MOTHER and is the SOLE BREADWINNER of the family; thus, she RARELY PAYS ATTENTION to her daughter Gillian's requests for them to play, help with her homework, and to join her in some recreational activities. Consequently, she does not correct certain "BAD MANNERS" that Gillian does during weekends and holidays when they are both at home. This describes:
A. permissive parenting
B. authoritarian parenting
C. uninvolved parenting
D. rejecting parenting

Answers & Rationale - Family as a Unit of Care

1. Answer D

- **Versatile families** view themselves as being able to say what they want, as having input into major decisions, being able to shape rules and practices in the family, as well as being able to compromise; they are experienced in shifting responsibilities in the family unit, and willing to experiment with new ways of dealing with problems and issues.

2. Answer C

- Single Parent Family
  - children < 17 years of age living in a family unit with a single parent, another relative, or a non-relative
  - may result from the loss of spouse by death, divorce, separation, desertion
  - out-of-wedlock birth of a child
  - from an adoption
  - One parent is working outside the Philippines (OCWs, DHWs, etc.)

3. Answer C

- Extended family
  - This means the family unit extends beyond the nuclear family (parents and their children) to include other relatives like grandparents, aunts, uncles, and cousins

4. Answer C

- permissive parenting, parents let the child's preferences take priority over their ideals and rarely, force the child to conform to their standards

5. Answer C

- Single Parent Family
  - children < 17 years of age living in a family unit with a single parent, another relative, or a non-relative
  - may result from the **loss of spouse by death**, divorce, separation, desertion
  - out-of-wedlock birth of a child
  - **from an adoption**
  - One parent is working outside the Philippines (OCWs, DHWs, etc.)

6. Answer A

- Joint families
  - consisting of two or more married couples (or divorced persons, widows, or widowers) of the same generation

7. Answer D

Upper Class	• much more closely-knit • Greater concern for maintaining family Name and prestige
Middleclass	• believes in hard-work, initiative, Independence, responsibility, economic security and self-improvement through Education / schooling
Lower Class	• sees life as a continual struggle for Survival • Resigned to a life of frustration and Defeat

8. Answer C

- Nuclear Family
  - also known as elementary or traditional families
  - The members of the nuclear family, consisting of parents and their still Dependent children, ordinarily occupying a separate dwelling not shared with members of the family of origin / orientation of either spouse
  - The nuclear family typically consists of a married man and woman with their children.
  - they may be biological or adopted
  - It is the basic unit from which all other forms evolve.
  - The household is economically independent subsisting on the occupational earnings of the husband or father.

9. Answer B

First Born	• generally persevering o serious o more responsive to adults o achievement oriented
Middle Child	• optimistic o sociable o aggressive o competitive o occasionally manipulative
Youngest	• demanding o outgoing o occasionally narcissistic o by nature are affectionate

10. Answer A

- Versatile Family as one that is high on both family flexibility and family bonding. Family flexibility is described as the ability to "change its rules, boundaries, and roles to accommodate changing pressures," and family bonding is the "degree to which the family is bonded together in a meaningful and integral family unit

11. Answer C

- A Rhythmic Family is defined as being "high on family time and routines" and values these practices to promote family unity

12. Answer C

- Uninvolved Parenting, which states that "parents often ignore the child" and there is a "lack of consistent rules and expectations

Family Assessment Tools

- Designed for family physicians to have a systematic way of understanding the family and to aid them in evaluating the impact of illness on a person and on his/her role in the family
- The relationship between families and their physician is a powerful vehicle for influencing patients about issues regarding health and illness.
- A good family assessment is needed in order to promote a working alliance with them.
  - There are various tools in Family assessment currently being used.
  - only a few of them have been validated in the Philippine setting.
- Each assessment tool must be correlated with one another

Genogram

- The uses of the genogram are threefold:
  - as a quick overview of the interrelationships between family members
  - as a way of looking at the family medical and psychosocial problems
  - and as a tool for understanding the multigenerational family systems
- a scheme or graphic chart representation of both the genetic pedigree of family and key psychosocial and interactional data using standardized symbols
- a graphic representation of the following components of a family

Functional Chart

- This gives a more dynamic image of the family, especially of relationship of members.
- It allows one to judge the totality of the family unit
  - its strengths (as in strong bond between the husband and wife)
  - and weaknesses (as in the presence of marital discord or separation of the parents)
  - and its ability to withstand future stressful situations (as knowing those who are actually living together in the household)

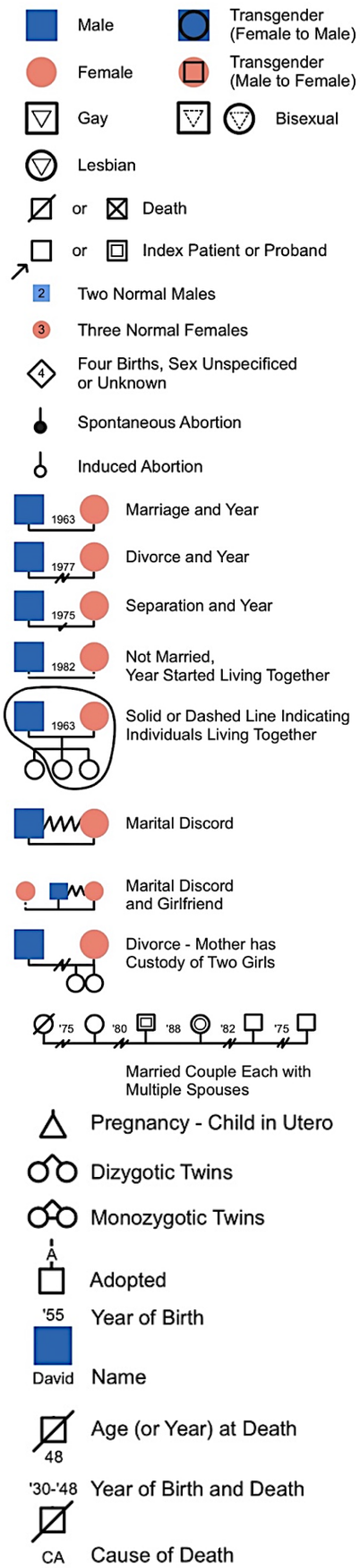
Family Illness/History

- This denotes the presence of inherited diseases or familial tendencies indicating potential problems in the family

How to Construct a Family Genogram

- The **family name** is placed above each major family unit.
- **Address** of the family should be placed below the family name.
- **Date** when the chart was developed follows the address so that ages would be adjusted over time.
- Given **names and ages** are placed below each symbol.
- One member of the family is of greater medical significance because of an illness and he is known as the **index patient** and is identified with an **arrow**.
- Persons living in the **same household are enclosed with a heavy line**.
- Significant **diseases** in the family can be illustrated using symbols which must appear in the **legend**.
  - This is important since it also denotes the presence of inherited diseases or familial tendencies indicating potential problems in the family.
- **Death including date** and cause is illustrated with a bar line.
- Dates of **marriages** and **separation** are indicated.
- It must consist of **3 or more generations** and each generation is identified by **Roman numerals**.
- The first-born of each generation is farthest to the left, with siblings following to the right in order of birth.
- If the children have spouses, connect the spouse to them using a horizontal line.
- The male should be on the left. If they have children, connect the children to them using a vertical line

Genogram Symbols



Family Map

- This tool facilitates the communication of information about the family system and its dynamics in order to address psychosocial issues.

The following family processes are involved:

- **Enmeshment** – one has to explore whether family members seldom act independently or **get overinvolved** with each other
  - characterizes a system in which members have few interpersonal boundaries, limited individual autonomy, and a high degree of emotional reactivity.
  - When families are caring for young children, it is appropriate for them to be highly responsive, and to appear very enmeshed with one another.
  - At later stages of the life cycle, enmeshment can inhibit individual development and growth
    - (e.g., when a mother insists on remaining with her adolescent son during his physical and answers questions for him).
- Symbol: ═══

- **Disengagement** – one has to explore whether family members are isolated from each other or **have little emotional response from each other**.
  - characterizes a family system in which members are **emotionally distant and unresponsive to each other**
    - (e.g., a husband who does not tell his wife or children about any of his health problems)
  - Symbol: - - - - - - - - - -

- **Triangulation** – one has to explore whether the family members talk directly to each other about personal matters.
  - occurs when a third person is drawn into a two-person system in order to diffuse anxiety or intimacy conflicts in the two-person system
    - (e.g., rather than arguing with each other about personal issues, a mother and father express their marital discontent by arguing over parenting their son)
    - Symbol: ⟶

- **Coalition** – one has to explore whether one member of the family is siding with another member.
  - which family members "side" with one another without diverting their attention to a third party
    - (e.g., A daughter sides with her mother regarding her problem with the father. They accuse their father of having another woman)

SYMBOL	MEANING
⟋ ⟍	Dysfunctional or Conflict
═══	Functional
═══	Enmeshed or Over-involved
}	Coalition
⟶	Triangulation
.....	Disengagement
- - - - - -	Clear Boundaries
———	Rigid Boundaries
.....	Diffused Boundaries

SYMBOL	MEANING
	Conflictual Relationship
	Distant Relationship
	Close Relationship
	Overly Close Relationship
	Dominant Relationship
	Very Close
	Estranged
	Friendship
	Sexual Abuse
	Neglect
	Physical Abuse
	Emotional Abuse

Family APGAR

- This assessment tool was originally described by Smilkstein and consists of 5 questions to assess family function.
- The Family APGAR is a rapid screening instrument for **family dysfunction**.
- It has adequate reliability and validity to measure the **individual's level of satisfaction about family relationships**.
  - This particular assessment tool requires the family physician little time to complete.
  - helps the family physician to decide which families need more careful assessment.

APGAR stands for acronyms of:

- **Adaptation** is the capability of the family to **utilize and share inherent resources**, which are either Intra-familial or extra-familial.
- **Partnership** is the **sharing of decision-making**. This measures the satisfaction attained in solving problems by **communicating**.
- **Growth** refers to both physical and emotional growth. This measures the satisfaction of the available **freedom to change**.
- **Affection** is how, emotions like love, anger, and hatred are shared between members. This measures the members' satisfaction with the **intimacy and emotional interaction** that exist in the family.
- **Resolve** refers to how **time, space, money** are shared. This measures the members' satisfaction with the commitment made by other members of the family.

4 basic situations where the Family APGAR is needed:

1. **When the family will be directly involved in caring for the patient.**
   - e.g. Post MI/CVA patients with specific disabilities that will require rehabilitation therapy.
2. **When treating a new patient in order to get information to serve as general view of family function.**
   - All Family Health Care Programs shall have the initial APGAR scoring of families enrolled in their clinic.
3. **When treating a patient whose family is in crisis e.g. family therapy for drug addicts.**
4. **When a patient's behavior makes you suspect a psychosocial problem possibly due to family dysfunction.**

- Generally, patients who have high clinic utilization (greater than 9 visits per year) have significantly lower APGAR SCORES (more dysfunctional family)

Family APGAR is also valuable in the following conditions or situations:

- Difficult patients
- Drug or alcohol abuse
- Marital or sexual difficulties
- Multiple presentations by multiple family members
- Evidence of sexual and physical abuse on wife or a child
- Symptoms that manifest themselves as psychosomatic disorders.
- Multiple presentations of a family member - **"The thick file syndrome"**

FAMILY APGAR I

	FAMILY APGAR	Almost Always (2)	Some of the time (1)	Hardly ever (0)
A	I am satisfied that I can turn to my family for help when something is troubling me			
P	I am satisfied with the way my family talks over things with me and shares problems with me			
G	I am satisfied that my family accepts and supports my wishes to take on new activities or directions			
A	I am satisfied with the way my family expresses affection and responds to my emotions, such as anger, sorrow, and love			
R	I am satisfied with the way my family and I share time together			
	TOTAL			

FILIPINO FAMILY APGAR I

	Sagutin ang mga sumusunod ayon sa relasyon ninyong mag-anak
A	Ako'y nasisiyahan dahil nakakaasa ako ng tulong sa aking pamilya sa oras ng problema.
P	Ako'y nasisiyahan sa paraang nakikipagtalakayan sa akin ang aking pamilya tungkol sa aking problema.
G	Ako'y nasisiyahan at ang aking pamilya ay tinatanggap at sinusuportahan ang aking mga nais na gawin patungo sa mga bagong landas para sa aking ikauunlad.
A	Ako'y nasisiyahan sa paraang ipinadadama ng aking pamilya ang kanilang pagmamahal at nauunawaan ang aking damdamin katulad ng galit, lungkot at pag-ibig.
R	Ako'y nasisiyahan dahil sa ang aking pamilya at ako ay nagkakaroon ng panahon sa isa't isa

Scoring:

- 8-10 points denotes highly **functional** family
- 4-7 points: moderately ***dysfunctional*** family
- 0-3 points: severely ***dysfunctional*** family

FAMILY APGAR II

- Part II delineates relationship with other members. Also, it identifies persons who can give assistance to the patient. And lastly, it indicates conflict not revealed in Part I

Who lives in your home?			How you get along?		
Name	Relation	Age/ Sex	Well	Fairly	Poor
If you don't live with your own family, list the persons to whom you turn to for help?			How you get along?		
Name	Relation	Age/ Sex	Well	Fairly	Poor

Limitations of the Tool

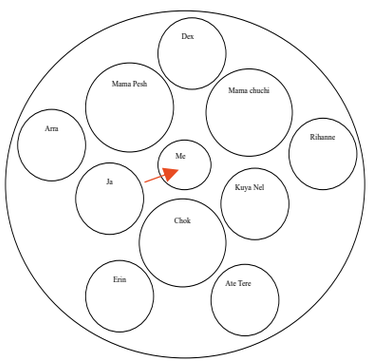
- The data obtained is restricted to what the patient is willing to disclose about himself/herself and his family.
- The tool measures the **patient's satisfaction** with his family's functioning but not the family functioning itself (Lisordra-krings, 1995)

Family Circle

- This is a brief, graphic method for disclosing, gathering and discussing family dynamics as discussed by one or more family members
- Family circles are often used on **individuals**, but they can be applied to **small groups** as well.
- The **family physician draws a large circle** on a piece of paper and **instructs the patient** as follows:
  - As a family physician, I am interested in you, your family, and what is important to you.
  - Let this **circle stand for your family** as it is now.
  - Draw in some **smaller circles** to represent yourself and all the people important to you --family and others.
  - Remember, people can be **inside or outside**, touching or far apart.
  - They can be **large or small** depending on their significance or influence.
  - If there are **other people** important enough in your life to be in your circle, put them in.
  - **Initial each circle** for identification.
  - There are **no right or wrong circles**.
- The advantage of this particular tool is the fact that the family physician can see another patient during the time the other patient is busy completing the Family Circle technique.
- Actual assessment of the family occurs when the **patient explains the diagram** he or she made.
- A **disadvantage** of this tool is the **difficulty** one encounters in **standardizing and interpreting** this particular assessment instrument.
- Through this tool one can assess **openness, boundaries, support, function, triangulation and interdependence** in the family.
- Some exploratory questions can help

Exploratory Questions

- What if you remove a significant member of the circle?
- Who do you run to for support?
- How would you like things to be different?
- Who is missing? Why?
- Why are there inside or outside the circle?
- What is the communication pattern?
- Who is in the power position?
- What does the distance mean?
- Who are grouped together?
- What is the fluidity within the circle?



Family Lifeline

- A tool that **summarizes the history** of the family's significant experiences over a period of time in a **chronologically-sequenced manner**.
- Useful when anticipating a long-term illness, the presence of difficult caregiving, non-adherence to treatment strategies
- Interpretation is based on the **most significant event that affected the health of each member,** or influenced the health-seeking behavior or perception on health of the individual or the family.
- It includes **normative and non-normative crisis**
  - **Normative** - These are **predictable**, age-related challenges and transitions that are considered "normal" parts of development.
  - They are expected to occur within a certain timeframe, and most people experience them.
    - Starting school
    - Puberty
    - Graduating from school
    - Getting married
    - Having children
    - Retirement
    - Death of elderly parents
  - **Non-normative** - These are **unpredictable**, unexpected events that disrupt a person's life. They are not tied to a particular stage of development and can happen at any time.
    - Sudden job loss
    - Serious illness or injury
    - Death of a child or young spouse
    - Natural disasters
    - Accidents
    - Winning the lottery (yes, even positive events can be non-normative and require adjustment!)
- It is sometimes placed side by side with the illness history
- It helps process how flexible a family is when dealing with these changes

YEAR	AGE	LIFE EVENT	SEVERITY OF HEADACHE
1964	17	Mother died	
1965	18	Graduation from highschool	
1966	19	To college - lived at home	
1967	20	Arguments with father	
1968	21	Difficulties with grades	
1969	22	Graduation from college	
1970	23	Graduate studies away from home	
1971	24	Happy - enjoying school	
1972	25	Married	
1973	26	Began working - difficulties with employer	
1974	27	Changed jobs	
1975	28	Marital difficulty	

Family SCREEM

- assessment of the family as to its capacity to participate in **provision of health care** or to **cope with crisis**
- SCREEM is an acronym that stands for Social, Cultural, Religious, Economic, Educational & Medical factors affecting health.
- It is commonly used when the need for care is long or lasts a lifetime such as in the case of chronically-ill, terminally-ill, and hospice care patients.
- It can also be used to assess resources of difficult and non-compliant patients.
- If there is a lack of resources, it can also serve as a kind of pathology in certain situations

	Resources	Pathology
Social	• Social interaction is evident among family members. • Family members have well-balanced lines of communication with extra-familial social groups such as friends, sports, clubs, and other community groups	• isolated from extra-familial • problem of over-commitment
Cultural	• Cultural pride or satisfaction can be identified, especially in distinct ethnic groups	• The family has feelings of cultural-ethnic inferiority or shame.
Religion	• Religion offers satisfying spiritual experiences, as well as contacts with an extra-familial support group	• Dogma and rituals are so rigid that they limit the family's problem-solving capacity.

Economic	• Economic stability is sufficient to provide both reasonable satisfaction with financial status and an ability to meet economic demands of normative life events.	• Financial problems make it difficult for the family to meet monetary demands of crisis or illness. • Economic deficiency • Inappropriate economic plan •
Education	• Education of the family members is adequate to allow members to solve or comprehend most of the problems that arise within the format of the life style established by the family	• Limit the ability of family members to comprehend the problem or recommend solution.
Medical	• Health care is available through channels that are easily established and have previously been experienced in a satisfactory manner	• Inaccessible and under-utilized

SCREEM FAMILY RESOURCES SURVEY (SCREEM-RES)

- This is a 12-item self-administered family resources questionnaire in Filipino based on SCREEM

SCREEM FAMILY RESOURCES SURVEY (SCREEM-RES) - FILIPINO					
Kapag may nagkakasakit sa aming pamilya…		**3**	**2**	**1**	**0**
S1	Kami ay nagtutulungan sa isa't isa sa aming pamilya.				
S2	Nagtutulungan kami ng aming mga kaibigan at kasamahan sa komunidad				
C1	Ang aming kultura ay nagpapatatag ng loob ng aming pamilya				
C2	Ang kultura ng pagtutulungan at pagmamalasakit sa aming komunidad ay nakatutulong sa aming pamilya.				
R1	Ang aming pananampalataya at relihiyon ay nakatutulong sa aming pamilya				
R2	Natutulungan kami ng aming mga kasamahan sa simbahan o mga grupong relihiyosos				
E1	Sapat ang naipong pera ng aming pamilya para sa aming mga pangangailangan				
E2	Sapat ang kinikita ng aming pamilya para sa aming mga pangangailangan				
E1	Sapat ang aming kaalaman upang maintindihan ang mga impormasyon tungkol sa sakit.				
E2	Sapat ang aming kaalaman upang maalagaan ang may sakit.				
M1	Madaling makakuha ng tulong medical sa aming komunidad.				
M2	Natutulungan kami ng mga doctor, nars, at "health workers" sa aming komunidad.				

(3) Matinding Sumasang-ayon (2) Sumasang-ayon (1) Hindi Sumasang-ayon (0) Matinding Hindi Sumasang-ayon	13-18 Adequate family resources 7- 12 moderately inadequate family resources 0- 6 severely inadequate family resources

FACES

Family Adaptability and Cohesion Evaluation Scales (FACES)

- **FACES IV** is the latest version of a family self-report assessment designed to assess family cohesion and family flexibility which are the two central dimensions of the Circumplex Model of Marital and Family Systems.
- The **six family types** range from the most healthy and happy to the least healthy and most problematic. They are:
  - Balanced
  - Rigidly Cohesive
  - Midrange
  - Flexibly Unbalanced
  - Chaotically Disengaged
  - Unbalanced
- The previous version of the Circumplex model allows for analysis of families who could be categorized as balanced, unbalanced or midrange.
- This new typology will allow for the comparison of the six different family types regarding a wide variety of criteria and variables.

Cluster 1

- **Balanced**, is characterized by the highest scores on the balanced subscales of Cohesion and Flexibility, and the lowest scores on all of the unbalanced scales except rigidity, where the scores are near the lowest.
- This combination of high balanced and low unbalanced scores indicates a family type with high levels of healthy functioning and low levels of problematic functioning.
- These families are hypothesized to be able to best handle the stressors of daily living and the relational strains of changes in the family over time.
- This family type is the least likely to be seen in therapy.

Cluster 2

- **Rigidly Cohesive**, is characterized by high closeness and rigid scores, moderate change and enmeshed scores, and low disengaged and chaos scores.
- This family type has as its hallmark high degrees of emotional closeness and high degrees of rigidity.
- This family type would be hypothesized to function well at times given their high degree of closeness.
- However, they may have difficulty making the changes required by situational or developmental changes due to their high rigidity.

Cluster 3

- **Midrange**, is characterized by moderate scores on all of the subscales with the exception of the rigid subscale.
- This family type would be hypothesized to function adequately, displaying neither the high levels of strength and protective factors tapped by the balanced subscales, nor the high levels of difficulties or risk factors tapped by the unbalanced subscales.

Cluster 4

- **Flexibly Unbalanced**, cluster is characterized by high scores on all of the subscales other than Cohesion, where moderate to low scores are characteristic.
- The high scores on the unbalanced subscales combined with the low to moderate scores on Cohesion, would seem to indicate problematic functioning, however the high scores on the Flexibility subscale may indicate that these families are able to alter these problematic levels when necessary.
- Of all family clusters, this one is the **hardest to characterize clearly**.

Cluster 5

- **Chaotically Disengaged**, is characterized by low scores on the balanced subscales, low scores on the enmeshed and rigid subscales, and high scores on the chaotic and disengaged subscales.
- These are hypothesized to be high problem families based on the lack of emotional closeness, indicated by the low closeness and high disengaged scores, and the high degree of problematic change indicated by the high chaos and low change scores.

Cluster 6

- **Unbalanced**, is almost an exact mirror image of the balanced family type.
- The unbalanced family type is characterized by high scores on all four of the unbalanced scales, and low scores on the two balanced scales.
- These families are hypothesized to be the most problematic in terms of their overall functioning.

Draw-A-Family Test

- DRAFT is a projective technique that can be administered individually or in-group test. It does not only provide clues on individual family members with regards to their personalities but also serve as a diagnostic device.
- Here, members of the family (Father, Mother and Siblings) find opportunity for self- expression consequently revealing and relieving innate difficulties within the family system.
- After interview, the family will be informed of the purpose of the assessment tool, which was to gain more insights into family situations in order to have a better understanding of the nature of their problems.

- The family can be seated around a table where each family member can be provided with a blank, clean unruled bond paper and a lead pencil with an eraser.
- Subjects are to be instructed as follows: "Kindly draw your family and its members, the whole body, you may include and exclude anybody you wish.
- There's no right or wrong, you can draw any member of your family who comes first into your mind.
- Take your time, there are no hard and fast rules."

- The examiner notes subject's comments, sequence in which the parts are drawn and other procedural details.
- Drawings will be analyzed using the **interpretations made by a Clinical Psychologist** based on Draw-A-person Test and Kinetic Family Drawing

Projective drawing like DRAFT has been found to be useful and revealing because of the following reasons:

- Patients exhibiting evasiveness and guardedness seem more likely to reveal their underlying traits and psychodynamics in the drawing because subjects are more intellectually aware of what they might expose through verbal communications.
- Drawing can be an expression of the unconscious label that represents an adultered basic needs.
- Drawings are first to show incipient psychopathology and the last to loose signs of illness after patient recovers.

FES (Family Environment Scale)

- This tool is a 90-item questionnaire developed by Moos.
- Separate scales of Family Parameters are included in the results. It is being used as a research tool to compare health care results with family variables.

Clinical Biographies And Life Chart

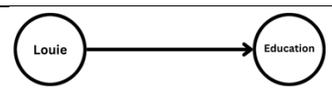
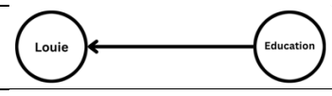
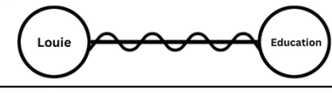
- We know that illness is not randomly distributed within or among population. Some people get sick more often than others.
- The individual's experiences with health and sickness are connected with his personal life.
  - If doctors understand the life story and the connections between a person's experiences of health and illness, they might be better doctors.
  - Clinical biographies and life charts are valuable tools, which can facilitate analysis of connection.
    - If life events and clinical events are put side by side according to dates of occurrence, we will be able to show the correlation between the two.

Family Ecomap

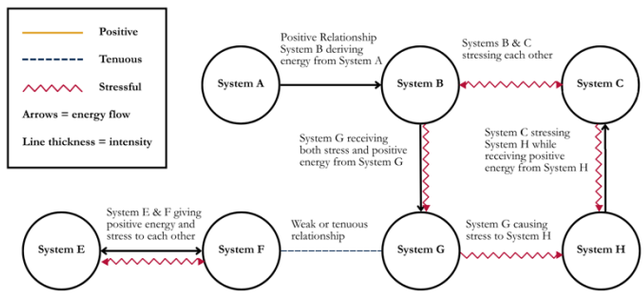
- Pictorial representation of the elements of patients' environment and of the nature and quality of the interactions between elements
- Highlights the supports and conflict
- A tool designed to reflect family relationships and interaction patterns
- **It can illustrate 3 separate dimensions for each** connection
  - **STRENGTH** of connection(weak, tenuous/uncertain, strong)
  - **IMPACT** of connection (none, draining resources or energy, providing resources or energy)
  - **QUALITY** of connection (stressful, not stressful)
- Important for the physician in obtaining therapeutic ally for the delivery of care
- Schematic description whom to ask for assistance in making decisions for the patient
- The purpose of an ecomap is to support classification of family needs and decision making about potential interventions.
- it is to create shared awareness (between a family and their social workers) of the family's significant connections, and the constructive or destructive influences those connections may be having.

Ecomaps are necessary and valuable as part of Family Assessment because it:

- Enables a structured, consistent process for gathering specific, valuable information related to the current state of a family or individual being assessed.
- Supports the engagement of the family in a dialogue. Identifies and illustrates *strengths that can built upon* and *weaknesses that can be addressed*
- Summarizes complex data and information into a visual, easy to see and understand format to support understanding and planning.
- Illustrates the nature of connectedness and the impact of interactions in pre-defined "domain" areas.
- Provides a consistent base of information to inform and support intervention decisions
- Allows objective evaluation of progress - workers can observe impact of interventions, both on the family and on other elements of their environment
- Helps support integration of the concept of family assessment as an ongoing process.
- Reduces narrative in other parts of the family assessment process.
- Integrates the values and concepts - and the real power of System Theory in a practical way.

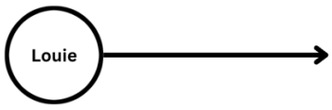
Weak connection, draining energy/resources, not stressful	
Strong connection, Providing energy/resources, not stressful	
Weak connection, no impact on energy/resources, stressful	
Tenuous/Uncertain connection, Providing energy/resources, not stressful	

STANDARD ECOMAP SYMBOLS

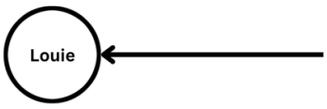


RULES IN DRAWING THE ECOMAP

- At the **center of the ecomap**, a simplified view of the **target family members** in the household should be depicted, using **genogram symbols and conventions**.
  - The intent is for each individual in the household to be addressed.
- There are **some domains** that will, for some families, apply at the **household level**, or for all **individuals** in the family.
  - **These can be charted at the household level** and do not need to be charted for each individual.
- Each individual can be "brought out of the center" into its own circle and then domains that need to be addressed for that individual can be.
- The "Household" can be brought out of the center into its own circle for clarity if needed.
- If a family or an individual is so **complex** that the eco-map becomes messy, you can **illustrate any individual** or the household **on its own**, separate page.
  - On the front page simply note, "Refer to Page X" for the individual in question.
- To illustrate the existence of a connection, and the strength of it, use one of the following **3 types of lines**.
- No line indicates no connection.
  - Strong ——————
  - Tenuous/Uncertain ·····
  - Weak – – – – – –
- If no connection exists for an individual or a household, you may omit the domain altogether, indicating no connection exists, or you may draw in the domain and not connect it to indicate no connection.
- To illustrate the impact of a connection, **place an arrow** on the end of the line indicating whether resources and energy are flowing to a person or away from a person.
  - No arrow indicates no impact, no flow of energy or resources either way.



Resources being drained from Louie.



Resources being provided to Louie.

- If a connection is stressful, illustrate with a **jagged line** superimposed on the connection line.
  - No jagged line = not stressful.
- Brief summary comments may be written inside the domain circles - but they should not be very detailed.
  - The details should be in the risk assessment.
- Domains should be identified on the ecomap.
  - If you are using color, you may not feel the need to also write name of the domain.
  - If you are using black and white, the domain should be labeled.

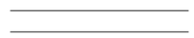
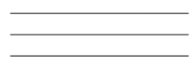
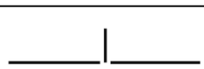
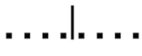
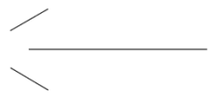
Connections/Domains that are commonly included in a family ecomap

- Schooling
- Friends
- Extended family members
- Religious connection, i.e., place of worship
- Social services
- Medical health services
- Community engagement
- Sports team
- Social clubs
- Place of work
- Hobbies

Guiding Questions for Ecomap by Domain

Neighborhood • How well do you know your neighborhood? • What neighborhood activities do you attend? • Do your children play with other neighborhood children? • How long have you lived there? • What do you get from your neighborhood?	**Community services** • What community organizations or agencies are you involved? • How long have you been involved? What frequency? • With whom do you have a relationship? Who gives you support? • What services work best for you? • How do you feel about your involvement?
Social Groups • With which social groups are you involved? • How long have you been involved? What frequency? • With whom do you have a relationship? Who gives you support? • What services work best for you? • How do you feel about your involvement?	**Education** • Who in your family goes to school? • How long? What is their status? What is their goal? • How do they feel about it? • With whom do you have a relationship? Who gives you support?
Significant Personal Relationships • With whom do you have significant personal relationship? Includes extended family members, friends, etc? • How long has your relationship lasted? • What do you do together? • How do you feel about it? • What do you get from it?	**Employment** • Who in your family works? • How long? What is their status? • How do they feel about it? • With whom do they have a relationship? Who gives them support?

Family Mapping: symbols commonly used

SYMBOL	MEANING
	DOUBLE LINE between two people indicates afunctional relationship
	SINGLE LINE WITH A BREAK IN THE MIDDLE indicates dysfunction
	THREE PARALLEL LINES between two people denotes an over-involved relationship where there is plenty of intrusion
	SOLID LINE PERPENDICULAR TO RELATIONSHIP LINE symbolizes rigid boundary where rules are clear but non-negotiable
	BROKEN LINE PERPENDICULAR TO RELATIONSHIP LINE symbolizes a boundary that is clear but negotioable
	DOTTED LINE PERPENDICULAR TO RELATIONSHIP LINE symbolizes a boundary that is unclear and with plenty of intrusion
	BRACKET encompassing several people signifies the presence of a COALITION or ALLIANCE between these people
	ARROW POINTING AWAY FROM SYSTEM signifies escape from the system
	OPEN ENDED ARROW WITH OPEN END EMBRACING TWO INDIVIDUALS AND POINTED END POINTING TO A THIRD signifies that the third is being triangulated by the conflict between the other two

Sample Questions - Family Assessment Tools

1. Joel is a 72-year old known hypertensive, who recently suffered from a cerebrovascular accident, with left-sided residuals, making him dependent on his wife and children for all activities in his daily living. What family assessment tool in this period of medical crisis may help in identifying the LEVEL OF SATISFACTION Joel gets from his family in terms of EMOTIONAL SUPPORT?

A. Family Genogram
B. Family Map
C. Family S.C.R.E.E.M.
D. Family A.P.G.A.R.

2. What family assessment tool identifies SOCIOCULTURAL FACTORS that may pose as either RESOURCE or PATHOLOGY, in terms of holistic management of patients and coping mechanisms?

A. Family Circle
B. Family S.C.R.E.E.M.
C. Draw a Family Test (D.R.A.F.T.)
D. Family Adaptability and Cohesion Evaluation Scale (F.A.C.E.S.)

3. Aling Ana asked you if her present condition is hereditary, which family assessment tool would be more appropriate to probe for it?

A. Family APGAR
B. Family genogram
C. Family SCREEM
D. Family timeline

4. Unfortunately, over time Mr. Arlo has several more strokes and now he has dementia and is bedridden at home. You have been visiting Mr. Arlo for several months and you notice that his bed sores have been increasing in number and severity despite your efforts to educate the family about how to care for Mr. Arlo. The family's APGAR is 8 (highly functional). Which statement might be the most likely explanation for what is happening?

A. The APGAR is not a useful tool.
B. The family answered the APGAR based on what they thought would please the doctor.
C. APGAR has limited utility for chronic illnesses.
D. The family may have misunderstood the questions in the APGAR.

5. Mang Krenz, 65 y/o male, was diagnosed with mature cataract on both eyes. He was scheduled for operation; however, he claims that he cannot afford the operation. He also feels that he cannot ask help from his children to help him fund his operation. Which aspect of the family APGAR is compromised?

A. Adaptation
B. Partnership
C. Growth
D. Affection

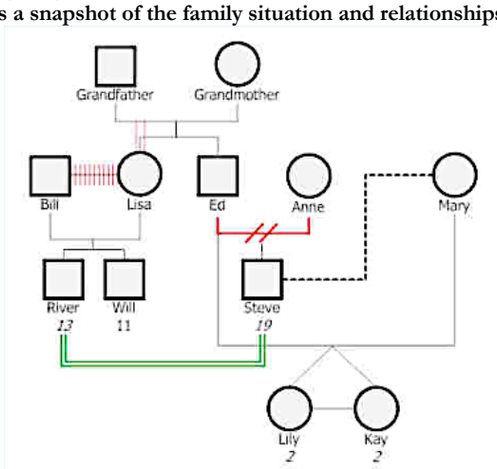
6. A couple is in your clinic for tuberculosis screening after their child was found to be positive for primary infection. In the course of your interview, the husband intimated that he is only sometimes satisfied on how they as a couple spend their time together. What part of the APGAR would this get a lower score from him?

A. Affection
B. Partnership
C. Growth
D. Resolve
E. Adaptation

7. 15/F consulted to inquire about joining a marathon. You inquired if her parents are aware of this . She informed you that they will most likely approve since they allow her to make her own decisions. You then asked her about the APGAR questions and she gave you the following scores: A=2 P- 1 G = 2 A=1 R= 0 This score is indicative of

A. Highly functioning family
B. Functional family
C. Moderately dysfunctional family
D. Severely dysfunctional family

8. The genogram is a valuable tool for family physicians because it gives a snapshot of the family situation and relationships.



From this genogram you are able to recognize that :

A. Ed and Anne are separated
B. Ed and Mary had fraternal twins
C. Bill and Lisa have a strong relationship
D. Steve is having an affair with Mary

9. 17/M homosexual diagnosed with HIV gave this APGAR score for his family when asked by his family doctor. A = 1 P = 1 G = 0 A= 1 R = 1
What is the perception of this patient of his family?

A. Highly Functional
B. Dysfunctional
C. Moderately dysfunctional
D. Severely dysfunctional

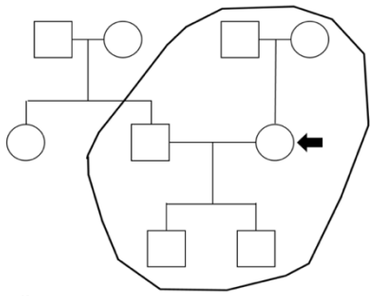
10. JM, works as an OFW and asked his wife Vi to stay with his parents so he will not worry so much about her and their child. While Vi is rather happy with the way she was welcomed by her husband's parents, she has difficulty with disciplining her son on toilet training and even feeding against traditional ways of child rearing being imposed by her mother-in-law. Her APGAR score will most likely be low in which aspect?

A. Affection
B. Growth
C. Adaptation
D. Partnership

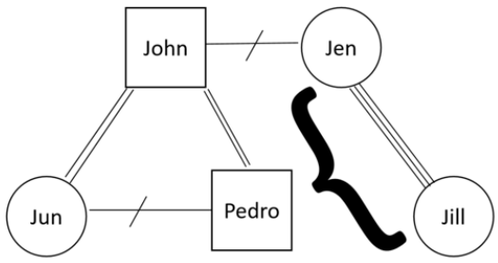
11. In order to better understand the available resources for the family to solve their own problem, which family assessment tool is best to use?

A. Family Map
B. Genogram
C. APGAR
D. SCREEM

12. Based on the Genogram of this patient, what is the structure of the family?



A. Blended family
B. Step family
C. Extended family
D. Nuclear family



13. Based on the family mapping above, which among the following is TRUE?

A. John has over-enmeshed relationship with Jen
B. Jen has a dysfunctional relationship with Jill
C. There is coalition between Pedro and Jun
D. Jun and John has a functional relationship

14. Which among the following is a second order task?

A. Differentiation of the self in relation to the family of origin.
B. Realignment of relationship with extended families and friends to include spouse
C. Maintaining contact with younger generations
D. Accepting marital system to make space for children

15. A 12/F was brought to your clinic by her mother due to recurrent headaches and inability to sleep. As you reviewed her record, you noticed that the patient has been brought to your clinic for the 4th time this year due to the same problem. To further assess the cause of the symptoms, you wanted to know the patient's relationship with the other members of the family as well as her level of satisfaction with her relationship with other family members. What family assessment tool will you use?

A. Family APGAR
B. SCREEM-RES
C. Family Genogram
D. Family Map

16. If you want to further assess a family's relationship and interaction pattern in order to establish a therapeutic ally for the delivery of care, which would be the best family assessment tool to use?

A. Family circle
B. Family genogram
C. Family Ecomap
D. Family lifeline

17. "Thick file syndrome" equates to which of the following family assessment tools?

A. Family genogram
B. Family APGAR
C. Family circle
D. Family map

18. This occurs when boundaries in a family are diffuse, members are overly reactive to stress on one member, and there is lack of individual autonomy:

A. Triangulation
B. Disengagement
C. Enmeshment
D. Coalition

19. Dr. Mann is conducting a comprehensive family assessment for a patient. Which family assessment tool is designed to evaluate family functioning and communication patterns?

A. Genogram
B. Family Systems Assessment
C. Ecomap
D. Family APGAR

20. Dr. Louie is conducting a family assessment for a new patient. He wants to gather comprehensive information about the family's structure, roles, and communication patterns. Which family assessment tool is most appropriate for this purpose?

A. Ecomap
B. Family Circumplex Model
C. Genogram
D. Family APGAR

21. Dr. Mann is working with a family to assess their social support network and community resources. Which family assessment tool might be most appropriate for this purpose?

A. Genogram
B. Ecomap
C. Family Systems Assessment
D. Family APGAR

22. In family mapping, when a dotted line perpendicular to the relationship line is drawn. This means_____.

A. The relationship signifies escape from the system.
B. The relationship signifies a boundary that clear but negotiable.
C. The relationship signifies a boundary that is diffuse or clear.
D. The relationship signifies that is unclear and the presence of intrusion.

23. During your counseling session, you found out that MM, 45 years old housewife has an over involved relationship with Laling, her 16 year old eldest daughter. In family mapping, what symbol is being written?

A. double line
B. single line with a break in the middle
C. three parallel lines
D. solid line perpendicular to the relationship between AB and RT

24. The father is frequently away from home and leaves the parenting responsibilities of their children exclusively to his wife. This situation shows:

A. Enmeshment
B. Coalition
C. Triangulation
D. Disengagement

25. On interview, your patient said that he is able to talk with his partner regarding their problems and always ends up with solutions together. Based on the Family APGAR, you know that his family shows good:

A. Adaptation
B. Growth
C. Partnership
D. Resolve

26. During one of your Family Health Care visits, you utilized the APGAR tool on one of your enrolled families because of concerns about drug abuse. Your index patient answered the following: A-some of the time; P- almost always; G-hardly ever; A-Hardly ever; R-almost always. What is your interpretation?

A. Severely dysfunctional
B. Moderately dysfunctional
C. Moderately functional
D. Highly functional

27. This tool provides clues on the significant psychological issues within the family system and interpretation is made by a psychologist.

A. DRAFT
B. APGAR
C. SCREEM
D. Family circle

28. Dr. MaLou is assessing a family's overall well-being and functioning. She wants to evaluate the family's satisfaction with their relationships and support systems. Which family assessment tool can help her with this?

A. Family APGAR
B. Genogram
C. Family Circumplex Model
D. Ecomap

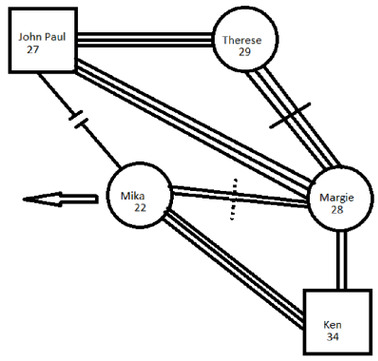
29. Chorva, a 35-year-old woman, has been diagnosed with a chronic condition that requires daily medication and lifestyle changes. Her teenage children are resistant to these changes and often argue with her about treatment. What term best describes this family dynamic?

A. Family cohesion
B. Family resilience
C. Family conflict
D. Family isolation

30. There are many precepts to be learned in family-oriented primary care. This is one of them and is considered a necessary and valuable part of family assessment because it summarizes complex data and information into a visual, easy to see, and understand format to support understanding and planning.

A. Genogram
B. Ecomap
C. Family Map
D. Family Circle

31. Interpret the Family Map below.



Which of the following statements is true?

A. John Paul has a functional relationship with Therese and Margie
B. Margie and Mika have a functional relationship but with rigid boundaries
C. Ken and Mika have a functional relationship and wants to escape from the system
D. John Paul and Mika have a dysfunctional relationship and Mika wants to escape from the system

32. An eight-year-old "only child" grade 2 student is ACTING OUT IN SCHOOL. The school physician discovers during the recent parent-teacher conference that PARENTAL ROLES ARE BLURRED, and the CHILD IS OFTEN INVOLVED IN PARENTAL DECISIONS. How would this appear in a FAMILY MAP?

A. a dotted line showing diffuse boundaries between parents and child
B. a thick solid line between the parents and child
C. a dashed line showing clear boundaries between parents and child
D. a circle around all family members equally

33. Which of the following Family Assessment tool is used t elicit the patient's perception of the current state of family relationships and function?

A. Family Genogram
B. Family Map
C. APGAR
D. SCREEM-RES

34. Jo Garrids is 62 years old, single, retired sexy star, known hypertensive-diabetic, who recently suffered from a cerebrovascular accident, with left-sided residuals, making him dependent on his nephews / nieces for all activities of daily living. What FAMILY ASSESSMENT TOOL in this period of MEDICAL CRISIS may help in identifying the loving or caring relationship of the next of kin / relatives?

A. Family Genogram
B. Family S.C.R.E.E.M.
C. Family Lifeline
D. Family A.P.G.A.R.

35. Mr. and Mrs. Pagolan consult at the Family and Community Medicine out-patient clinic for wellness purposes. Both of them are government employees, nearly of retiring age. They have two adult children; one is working as a nurse in New Zealand, and the other one is an international beauty queen . Mrs. Pagolan claims that she gets emotional sometimes because she misses her children. She wants to spend more time with them, but she cannot do so because her children are busy with their work. Which part of the FAMILY APGAR will Mrs. Pagolan be NOT SATISFIED WITH?

A. Growth
B. Partnership
C. Resolve
D. Adaptation

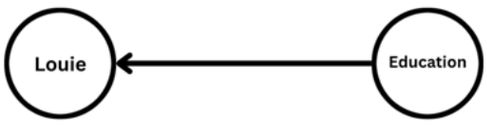
36. A 55-year old female was diagnosed with DIABETIC KIDNEY DISEASE, STAGE 4 and was advised for regular HEMODIALYSIS, three sessions per week. She was hesitant to continue with the treatment because aside from the financial burden, she was unsure if anyone in her family could accompany her during the hemodialysis sessions. What FAMILY ASSESSMENT TOOL can be used by the attending physician in order to holistically address the needs of the patient?

A. Family A.P.G.A.R.
B. Family S.C.R.E.E.M.
C. Family Ecomap
D. Family Map

37. The Rosas family is currently having a financial problem since Sampaguita, the primary provider for the family, needs an urgent surgical procedure. DIFFICULTY IN DECISION-MAKING arises because Sampaguita expressed that she can rarely turn for help from family members; she can hardly ever have satisfaction with the way the family talks over things; she rarely has satisfaction with the family's acceptance and support in taking on new activities; she rarely has satisfaction with the way the family members express affection; and she rarely has satisfaction with the way the family shares time together. Based on the data gathered, what is the FAMILY APGAR score of Sampaguitas' family as she sees it?

A. 5
B. 7
C. 4
D. 6

38. Based on the ECOMAP below, what INTERPRETATION can be made?



A. weak connection, no impact on resources, stressful
B. uncertain connection, providing resources, not stressful
C. weak connection, draining resources, not stressful
D. strong connection, providing resources, not stressful

39. Victor and Joana have been living in together for ten years already, and they have a six-year old son, Kyle, a known asthmatic. Victor and Joana often have heated arguments, which make the relationship quite problematic. Often, when the two adults have verbal confrontations, Kyle would experience ACUTE ASTHMATIC EXACERBATIONS, prompting his parents to stop the argument and to attend to his medical needs. Based on Dr. Salvador Minuchin's FAMILY MAP, what is being demonstrated in the above scenario?

A. Triangulation
B. Coalition
C. Rigid boundaries
D. Diffuse boundaries

40. You were conducting a group interview at the Family and Community Medicine Out-Patient Clinic. Upon probing, you noted that each individual family member seemed to have contradicting points of view towards their own family dynamics. You picked up verbal indicators of TRIANGULATION and COALITION WITHIN THE FAMILY. Which of the following FAMILY ASSESSMENT TOOLS is best used to analyze the family's dynamics?

A. Family Genogram
B. Family APGAR
C. Family Map
D. Family Lifeline

41. Chester and Ellaine are having marital issues, and they often fight a lot, sometimes, even in front of their teen son, Milo. During verbal disputes at home, Milo always sides with his mother, regardless of the topic of the argument between the couple. The appropriate symbol to use in the FAMILY MAP to illustrate the FAMILY DYNAMICS would be:

A. a dotted line between Ellaine and Chester
B. a bracket connecting Ellaine and Milo
C. three parallel lines between the Ellaine and Milo
D. an arrow pointing from both Ellaine and Milo to Chester

42. " Wala naman naitutulong ang mga kapit bahay namin na mga maledukado! Puro tsismis lang sila palagi at panay paninira ang dulot nila sa pamilya ko." In the Family S.C.R.E.E.M., what ASPECT is being assessed with the above statement of an index patient?

A. social
B. relational
C. cultural
D. economic

43. Roscoe is a 48-year old Grab driver, married to housewife Jane, with two adolescent children, and their nuclear family resides in Los Baños, Laguna. Unfortunately, Roscoe was hit by a speeding truck, which inadvertently resulted in BELOW THE KNEE AMPUTATION of Roscoe's left leg (S/P BKA, left lower extremity). Which of the following statements is TRUE?

A. If the average FAMILY APGAR score of Roscoe and Jane is 7, then it means they have a MODERATELY FUNCTIONAL FAMILY.
B. If Jane becomes the MAIN BREADWINNER now that Roscoe is unable to continue being a Grab driver, this is an example of a FIRST ORDER CHANGE.
C. In the FAMILY LIFE CYCLE, the main emotional process of transition for this stage will be ACCEPTING THE SHIFTING OF GENERATIONAL GOALS.
D. If Roscoe experiences PHANTOM LIMB PHENOMENON, then this refers to the RECOVERY PHASE in the ILLNESS TRAJECTORY.

44. Patient M.M., a 55-year old janitor with TYPE 2 DIABETES MELLITUS, has been diagnosed with END STAGE RENAL DISEASE (ESRD) and was advised emergency HEMODIALYSIS to manage his condition. Which of the following FAMILY ASSESSMENT TOOLS allows the identification of FAMILY RESOURCES to cope with the long-term need for regular hemodialysis?

A. Family Map
B. Family A.P.G.A.R.
C. Family Genogram
D. Family S.C.R.E.E.M.

45. A Family and Community Medicine resident physician trainee is evaluating a young adult patient who reports that their family often has conflicts but is very close-knit and supportive. The FAMILY A.P.G.A.R. score shows HIGH "AFFECTION" and LOW "RESOLVE." What does this indicate?

A. The family is adaptable but has low emotional support.
B. The family is supportive but struggles with conflict resolution.
C. The family has poor communication and lacks emotional closeness.
D. The family has strong problem-solving skills and high emotional support.

46. During one family counseling session, the resident physician trainee picked up cues of DYSFUNCTIONALITY since some of the family members appeared ENMESHED or OVER-INVOLVED with the index patient. Which of the following FAMILY ASSESSMENT TOOLS may be utilized to identify possible THERAPEUTIC ALLIES among the family members since family relationships and dynamics are often assessed by this tool?

A. Family Adaptability and Cohesion Evaluation Scale (FACES-IV)
B. Family S.C.R.E.E.M.
C. Family Map
D. Family A.P.G.A.R.

47. Juan Carlos recently underwent below the knee amputation because of neuroischemic ulcers in his left foot. Prior to surgery, he was non-compliant with his anti-hypertensive, anti-diabetic, anti-dyslipidemic medications, and blood thinners. At present, he seems to experience "phantom limb" neuropathic pain despite being given high doses of Pregabalin. His attending Family Medicine – Diabetologist is suggesting acupuncture, as adjunct to his current insulin and other maintenance medications. He is apprehensive to undergo acupuncture due to financial constraints, and he is still waiting for the approval of his wife (i.e., the main breadwinner) who is working abroad as a factory worker in Taipei. In the Family A.P.G.A.R., this decision-making behavior of Juan Carlos represents:

A. partnership
B. resolve
C. growth
D. adaptation

48. Joselito is a 62-year-old known hypertensive, who recently suffered from a CEREBROVASCULAR ACCIDENT, with LEFT-SIDED RESIDUALS, making him DEPENDENT on his wife and children for all activities in his daily living. What FAMILY ASSESSMENT TOOL in this period of medical crisis may help in identifying the loving or caring relationship of the family?

A. Family Genogram
B. Family S.C.R.E.E.M. Resource Survey
C. Ecomap
D. Family A.P.G.A.R.

49. During one home visit, the Family and Community Medicine practitioner used the S.C.R.E.E.M. tool and noted significant deficits in a family's ECONOMIC and MEDICAL domains. Given this scenario, what is your MOST APPROPRIATE ACTION?

A. Focus and improve on patient's medication compliance and lifestyle medication.
B. Focus only on history-taking, physical examination, and diagnostic tests but no so much on pharmacologic intervention.
C. Re-assess S.C.R.E.E.M. score after two weeks from initial home visit.
D. Assess access and coordinate with available institutions offering financial aid and health services.

50. What is the benefit of using genogram in family medicine?

A. Documenting individual medical histories
B. Tracking the genetic history of the family
C. Visualizing family relationships and health patterns
D. Identifying family members' ages and genders

51. A school physician is evaluating a 6-year-old boy with BEHAVIORAL ISSUES, which include POOR IMPULSE CONTROL and FREQUENT FIGHTS with classmates. Which FAMILY ASSESSMENT TOOL would best help identify FAMILY DYNAMICS influencing the child's UNRULY BEHAVIOR?

A. Ecomap
B. Family S.C.R.E.E.M.
C. Family Map
D. Patient Health Questionnaire (PHQ-9)

52. During a brief family meeting, the attending Family and Community Medicine resident physician trainee notices that the family members DID NOT EXPRESSIVELY SHOW EMOTIONAL SUPPORT FOR EACH OTHER, and they generally LACKED SHARED DECISION-MAKING SKILLS. What FAMILY ASSESSMENT TOOL can be employed to assess these elements in the family dynamics?

A. S.C.R.E.E.M. Resource Survey
B. Family Circle
C. Family Health Belief Model
D. Family A.P.G.A.R.

53. A doctor-to-the-barrio conducted a home visit because a 49-year-old fisherman (i.e., sole breadwinner) suffered a major stroke two weeks ago that left him bedridden and unable to visit the health center. What FAMILY ASSESSMENT TOOL may be employed to determine the COPING MECHANISMS of the family members, given this new onset chronic debilitating medical condition (i.e., S/P cerebrovascular accident)?

A. Family Lifeline
B. Family Adaptability and Cohesion Evaluation Scale (F.A.C.E.S.)
C. Family Genogram
D. Family Map

54. A family presents with a 12-year-old ONLY CHILD exhibiting PSYCHOSOMATIC SYMPTOMS. The parents are OVERLY INVOLVED in the child's life, rarely allowing INDEPENDENCE, and constantly SPEAKING FOR THE CHILD. According to Salvador Minuchin's FAMILY DYNAMICS, what TYPE OF BOUNDARY is likely present among the members of this NUCLEAR FAMILY?

A. rigid boundaries
B. clear boundaries
C. diffuse boundaries
D. healthy boundaries

55. A Family and Community Medicine resident physician trainee probed into the family of patient Bianca, a 22-year-old college student diagnosed with GENERALIZED ANXIETY ORDER, and discovered that her parents are experiencing MARITAL CONFLICT. Her parents' RAISED VOICES during disagreements trigger her PALPITATION, NUMBNESS OF EXTREMITIES, and DIFFICULTY OF BREATHING. Bianca prefers to stay at her grandmother's house to avoid this trigger. What FAMILY DYNAMICS describes the relationship between patient Bianca and her parents?

A. alliance
B. coalition
C. triangulation
D. disengagement

56. Mika, 10 years old, presents with PEDIATRIC COMMUNITY ACQUIRED PNEUMONIA (PCAP), HIGH RISK with history of BRONCHIAL ASTHMA, and is consequently advised for HOSPITAL ADMISSION. The mother, worried about who will take care of the kids left at home and the amount needed for the hospitalization, requested for an OUT-PATIENT MANAGEMENT. Since the patient had OXYGEN SATURATION of 98%, with NO history of CONVULSION and NO CHEST X-RAY FINDINGS of effusion, lung abscess, air leak or multi-lobar consolidation, a SIGNED WAIVER was secured and close follow-up was advised. What FAMILY ASSESSMENT TOOL can be used to explore the SOCIAL SUPPORT NETWORK and the FINANCIAL FACTORS that would help the family cope with this crisis?

A. Family Circle
B. Family A.P.G.A.R.
C. Family Genogram
D. Family S.C.R.E.E.M.

Answers & Rationale - Family Assessment Tools

1. Answer D

- The Family APGAR is a rapid screening instrument that "measure[s] the individual's level of satisfaction about family relationships."
- The "Affection" component of the APGAR specifically "measures the members' satisfaction with the intimacy and emotional interaction that exist in the family."
- One of the key situations where the Family APGAR is needed is "When the family will be directly involved in caring for the patient. e.g. Post MI/CVA patients with specific disabilities that will require rehabilitation therapy," which perfectly describes Joel's situation

2. Answer B

- The Family S.C.R.E.E.M. is the correct answer because it is an acronym designed specifically to assess key factors, including the Social and Cultural ones mentioned in the question.
- this tool explicitly evaluates these factors to determine if they serve as a Resource (a strength the family can use for coping) or a Pathology (a weakness that hinders coping and management).
- The other tools listed focus on different aspects: Family Circle on perceived relationships, D.R.A.F.T. on projective psychodynamics, and F.A.C.E.S. on cohesion and adaptability.

3. Answer B

- The Family Genogram is the most appropriate tool to investigate whether a condition is hereditary.
- a genogram is a graphic representation of a family's "genetic pedigree" and is used to look at "family medical...problems" across "3 or more generations."
- It is specifically designed to illustrate "inherited diseases or familial tendencies," making it the ideal tool to answer Aling Ana's question about her condition.

4. Answer B

- The Family APGAR measures a person's perception or satisfaction with family function, not the actual function itself. A high score (like 8) means the family members feel satisfied, but this can conflict with reality, as seen with Mr. Arlo's worsening condition.
- The most likely reason for this discrepancy is self-reporting bias, where the family provides socially desirable answers to please the doctor or to avoid appearing dysfunctional.
- "The data obtained is restricted to what the patient is willing to disclose."

5. Answer A

- Adaptation is defined as the "capability of the family to utilize and share inherent resources, which are either Intra-familial or extra-familial." Mang Krenz's inability to seek financial help from his children represents a failure to utilize and share the family's internal resources to cope with a medical crisis.

6. Answer D

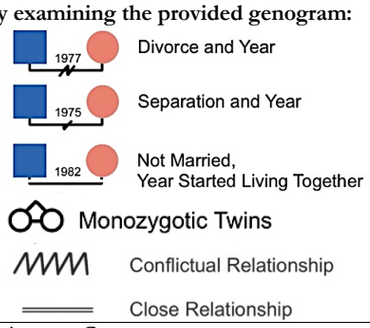
- The definition of Resolve includes how "time, space, money are shared" and measures the "members' satisfaction with the commitment made by other members of the family." The husband's dissatisfaction with how they share their time together directly corresponds to this component.

7. Answer C

- To determine the family's functional level, you must sum the scores: 2 (A) + 1 (P) + 2 (G) + 1 (A) + 0 (R) = **6**.
  - 8-10 points: Highly functional family
  - 4-7 points: Moderately dysfunctional family
  - 0-3 points: Severely dysfunctional family
- A score of 6 falls into the **moderately dysfunctional** range

8. Answer D

By examining the provided genogram:



9. Answer C

- The total APGAR score is calculated as: 1 (A) + 1 (P) + 0 (G) + 1 (A) + 1 (R) = 4. a score of 4 falls within the 4-7 range, indicating a perception of a moderately dysfunctional family.

10. Answer B

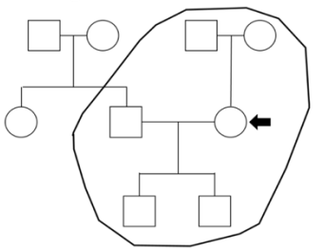
- The Growth component of the APGAR measures "the satisfaction of the available freedom to change" and supports members' wishes "to take on new activities or directions." Vi's struggle is with her mother-in-law imposing traditional child-rearing methods, which directly infringes on Vi's freedom to develop and implement her own parenting style.
- This restriction on her personal and parental autonomy would lead to a low score in the Growth aspect

11. Answer D

- The SCREEM tool is specifically designed to assess a family's capacity to cope with crises by evaluating their **resources** across six key areas: **S**ocial, **C**ultural, **R**eligious, **E**conomic, **E**ducational, and **M**edical. It is the only tool listed that has the primary purpose of inventorying resources for problem-solving

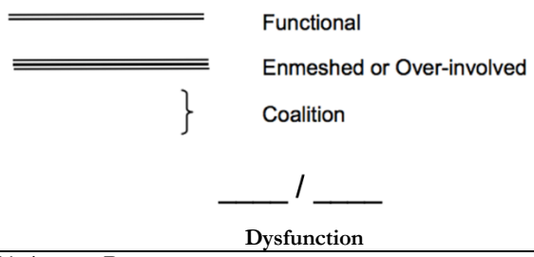
12. Answer C

- The genogram depicts three generations of a family (grandparents, their children, and their grandchildren).



- an **Extended family** is one that "extends beyond the nuclear family... to include other relatives" and often includes "three generations

13. Answer D



Dysfunction

14. Answer B

- While the term "second order task" it refers to tasks that fundamentally alter the family system's rules and structure.
- In the typical family life cycle, the first stage is the unattached adult differentiating from their family of origin (A).
- The **second stage** is the formation of a new marital system, where the primary task is to realign relationships with family and friends to make space for the spouse, as described in option B

15. Answer A

- The scenario describes a patient with multiple visits for a potentially psychosocial problem (a "thick file").
- The physician wants to assess both relationships and the patient's **level of satisfaction**.
- The Family APGAR is the ideal tool as its primary purpose is to "measure the individual's level of satisfaction about family relationships.

16. Answer C

- The Family Ecomap is the best tool for this specific purpose.
- Ecomap is "Important for the physician in obtaining [a] therapeutic ally for the delivery of care" and provides a "Schematic description whom to ask for assistance."
- Its primary function is to visually map the family's relationships and interaction patterns with external systems like friends, school, work, and community services, which is essential for identifying sources of support and potential allies

17. Answer B

- in the section detailing the uses of the Family APGAR, directly states that the tool is valuable for "Multiple presentations of a family member - 'The thick file syndrome'".

18. Answer C

- This is the textbook definition of enmeshment.
- **enmeshment** as a system where members "seldom act independently or get overinvolved," have "few interpersonal boundaries, limited individual autonomy, and a high degree of emotional reactivity."

19. Answer D

- While several tools assess family life, the Family APGAR is specifically designed as a quick yet effective screening tool to evaluate an individual's perception of family **functioning** across five key parameters (Adaptation, Partnership, Growth, Affection, Resolve), which are all forms of **communication patterns** and functional interactions.
- The genogram shows structure, and the ecomap shows external connections.

20. Answer C

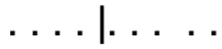
- The **Genogram** is the most comprehensive foundational tool for this purpose. It provides a detailed, multi-generational map of the family **structure** (who is in the family and how they are related).
- This structural map is the essential first step for understanding **roles** (e.g., mother, son, grandfather) and visualizing the primary relationship lines that dictate **communication patterns**

21. Answer E

- The **Ecomap** is specifically designed for this purpose.
- "Pictorial representation of the elements of patients' environment" and lists common domains to assess, including "Friends," "Social services," and "Community engagement." Its goal is to highlight the family's connections to their social support network and community resources

22. Answer D

- a **dotted line perpendicular to the relationship line** symbolizes "a boundary that in unclear and with plenty of intrusion."



DOTTED LINE PERPENDICULAR TO RELATIONSHIP LINE symbolizes a boundary that in unclear and with plenty of intrusion

23. Answer C

three parallel lines **between two people denotes "an over-involved relationship where there is plenty of intrusion**

24. Answer D

- The father's absence and lack of involvement in parenting show emotional and functional distance from the family system.
- **disengagement** as a state where "family members are isolated from each other or have little emotional response from each other

25. Answer C

- The Family APGAR component of **Partnership** is defined as "the sharing of decision-making. This measures the satisfaction attained in solving problems by communicating." The patient's description perfectly matches this definition

26. Answer B

- First, calculate the score based on the provided key (Almost always=2, Some of the time=1, Hardly ever=0):
  - A = 1
  - P = 2
  - G = 0
  - A = 0
  - R = 2
    - **Total Score = 5** A score of 5 falls within the 4-7 range, which is interpreted as a **moderately dysfunctional** family.

27. Answer A

- The **DRAFT (Draw-A-Family Test)** "projective technique" used to reveal underlying psychological issues. Crucially, the text specifies that the drawings are analyzed "using the interpretations made by a **Clinical Psychologist**.

28. Answer A

- The primary purpose of the **Family APGAR** is to be a rapid screening instrument that "measure[s] the individual's level of **satisfaction** about family relationships" and their support system within the family

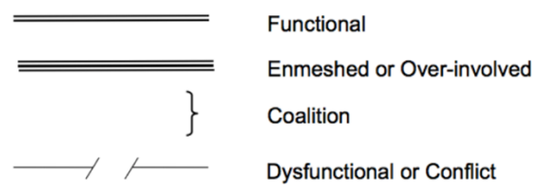
29. Answer C

- The scenario describes resistance, arguments, and disagreements surrounding the mother's treatment plan. This dynamic is most accurately and directly described as **family conflict**.

30. Answer B

- While several tools are visual, the phrase "summarizes complex data and information into a visual, easy to see and understand format to support understanding and planning" is a description of the **Family Ecomap**

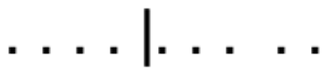
31. Answer D



- Strong
- Tenuous/Uncertain
- Weak
- Clear:
- Rigid:
- Diffuse:

ARROW POINTING AWAY FROM SYSTEM signifies escape from the system

32. Answer A



DOTTED LINE PERPENDICULAR TO RELATIONSHIP LINE symbolizes a boundary that in unclear and with plenty of intrusion

33. Answer C

- The Family APGAR is specifically designed as a screening tool to measure an individual's subjective **perception** of and **satisfaction** with their family's functioning across five key areas. The other tools measure structure (Genogram), dynamics visually (Map), or resources (SCREEM-RES).

34. Answer D

- The Family APGAR is the most appropriate tool to gauge the patient's satisfaction with the "loving or caring" nature of the support he receives.
- The "Affection" component of the APGAR directly assesses satisfaction with how love and emotions are shared.
- post-CVA patients requiring family care as a key indication for using the APGAR.

35. Answer C

- The **Resolve** component of the APGAR measures satisfaction with how **time**, space, and money are shared among family members. Mrs. Pagolan's specific dissatisfaction is with the lack of shared **time** with her children, which falls directly under this category.

36. Answer B

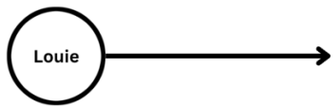
- The patient's concerns are about resources: **financial** burden and lack of **social support** (accompaniment). The Family SCREEM is the ideal tool as it is designed to assess a family's resources across multiple domains, specifically including **E**conomic and **S**ocial/**M**edical factors, to determine their capacity to cope with a health crisis

37. Answer C

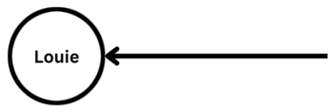
	FAMILY APGAR	Almost Always (2)	Some of the time (1)	Hardly ever (0)
A	I am satisfied that I can turn to my family for help when something is troubling me		1	
P	I am satisfied with the way my family talks over things with me and shares problems with me			0
G	I am satisfied that my family accepts and supports my wishes to take on new activities or directions		1	
A	I am satisfied with the way my family expresses affection and responds to my emotions, such as anger, sorrow, and love		1	
R	I am satisfied with the way my family and I share time together		1	
	TOTAL	4		

38. Answer D

- No line indicates no connection.
  - Strong
  - Tenuous/Uncertain
  - Weak



Resources being drained from Louie.



Resources being provided to Louie.

- If a connection is stressful, illustrate with a **jagged line** superimposed on the connection line.
  - No jagged line = not stressful.

39. Answer A

- This is a classic example of triangulation.
- **triangulation** as occurring when a "third person is drawn into a two-person system in order to diffuse anxiety or intimacy conflicts."
- Here, Kyle (the third person) is drawn into his parents' conflict, and his medical crisis serves to diffuse their argument

40. Answer C

- Family Map is the classic tool for showing these dynamics,

41. Answer B

- The scenario describes a dynamic where "Milo always sides with his mother" against his father. In family systems theory, this is known as a **coalition**.
  - **BRACKET encompassing several people:** signifies the presence of a **COALITION** or **ALLIANCE** between these people.
  - Therefore, a bracket connecting Ellaine and Milo is the appropriate symbol to illustrate that they have formed a coalition.

42. Answer A

- The patient's statement ("Our neighbors don't help at all! They just gossip...") is a direct complaint about their relationship with their extra-familial community and neighbors.
- The **Social** component of the SCREEM tool assesses a family's interaction with friends, community groups, and neighbors

43. Answer D

- (A) is false: An APGAR score of 7 indicates a **moderately dysfunctional** family, not functional.
- (B) is false: A fundamental shift in family roles (like the wife becoming the sole breadwinner) is a **second-order change**, not a first-order change.
- (C) is false: This family is in the "Families with Adolescents" stage. The main task is managing independence, not shifting generational goals (which is for later in life).
- (D) is true: Phantom limb pain is a common and expected neuropathic phenomenon that occurs during the **recovery and rehabilitation phase** following an amputation.

44. Answer D

- The situation requires identifying **family resources** to cope with a long-term, resource-intensive illness.
- The **Family SCREEM** is the tool specifically designed to assess a family's resources across Social, Cultural, Religious, Economic, Educational, and Medical domains.

45. Answer B

- High **Affection** indicates emotional closeness and support.
- Low **Resolve** indicates dissatisfaction with how time, space, and money are shared, which often manifests as poor problem-solving or conflict resolution. Therefore, the family feels supportive emotionally but struggles with the practical aspects of resolving disagreements.

46. Answer C

- The **Family Map** is the tool designed to visually represent internal family dynamics, including enmeshment (over-involvement), coalitions, and boundaries.
- By diagramming these relationships, a physician can analyze the structure of the dysfunction and identify individuals who may be less enmeshed and could serve as therapeutic allies

47. Answer A

- The core issue is the need for spousal agreement to make a healthcare decision. The **Partnership** component of the APGAR is defined as "the sharing of decision-making" and measures satisfaction with "solving problems by communicating." Juan Carlos's need to wait for his wife's approval is a direct reflection of this shared decision-making process

48. Answer D

- To assess a patient's perception of a "loving or caring relationship," the **Family APGAR** is the most appropriate tool. Its "Affection" component specifically measures satisfaction with the way love and emotions are expressed and shared within the family.

49. Answer D

- The purpose of the SCREEM tool is to identify resource deficits so they can be addressed. If the family lacks economic and medical resources, the most appropriate and effective action is to try and connect them with those resources. This involves identifying and coordinating with social services, government programs (like PhilHealth or Malasakit Centers), or other institutions that can provide financial and healthcare assistance. The other options fail to address the root problem identified by the assessment.

50. Answer C

- While the other options are components of a genogram, option C is the most comprehensive answer describing its overall benefit.
- The power of the genogram is its ability to integrate a vast amount of information—family structure, relationships, and multi-generational health patterns (both medical and psychosocial)—into a single, easy-to-understand visual format.

51. Answer C

- The goal is to understand the internal **family dynamics** (like boundaries, coalitions, and hierarchies) that may be influencing a child's behavior. The **Family Map** is the tool specifically designed to diagram these internal interactional patterns, making it the most appropriate choice to explore the root cause of the child's issues within the family system.
- The Ecomap looks at external factors, SCREEM assesses resources, and the PHQ-9 is an individual depression screener

52. Answer D

- The Family APGAR is the ideal tool for this scenario. The observed deficits directly correspond to two of its core components:
  - **Affection:** Measures satisfaction with emotional support and expression.
  - **Partnership:** Measures satisfaction with shared decision-making and problem-solving.
    - The APGAR provides a quick, standardized way to assess the family's own perception of these specific functions

53. Answer B

- Coping mechanisms are fundamentally about how a family adapts to stress and change.
- The **FACES** tool is specifically designed to assess "family cohesion and family **flexibility**," with flexibility being defined as the ability to change rules, boundaries, and roles to accommodate pressure. This direct measurement of adaptability makes it the most suitable tool among the choices for determining the family's inherent coping style in the face of a major crisis.

54. Answer C

- According to Minuchin's family dynamics, diffuse boundaries exist when there is a lack of clarity and intrusion by one family subsystem into another. This leads to members becoming "too dependent on one another" and losing their individual identity.
- This lack of clear boundaries results in enmeshment, which is characterized by members being "overly involved" with each other and demonstrating a "lack of individual autonomy". The scenario of parents being "overly involved," "rarely allowing independence," and "constantly speaking for the child" is a classic description of enmeshment, which arises from diffuse boundaries.

55. Answer C

- Based on Minuchin's family dynamics, triangulation occurs when a third person (in this case, Bianca) is drawn into a two-person system (the parents) to diffuse anxiety or conflict.
- In this scenario, the parents have a primary conflict (marital conflict). Bianca is drawn into this conflict, and her body responds with psychosomatic symptoms (palpitations, numbness, difficulty breathing) that are triggered by their fighting. Her anxiety and physical distress become a central problem, which (dysfunctionally) diverts focus and diffuses the tension from the original marital conflict. Bianca's avoidance by going to her grandmother's house is a direct response to being trapped in this uncomfortable role

56. Answer D

- The mother's primary concerns are explicitly stated as social ("who will take care of the kids left at home") and economic ("the amount needed for the hospitalization").
- The Family S.C.R.E.E.M. is the most appropriate tool because it is specifically designed to assess a family's resources and its "capacity to... cope with crisis". The acronym directly corresponds to the mother's concerns:
  - S (Social): This component assesses the family's social support network, such as friends or community groups, who could potentially help with childcare.
  - E (Economic): This component assesses the family's economic stability and their ability to meet the "monetary demands of crisis or illness".
- The other tools are less appropriate for this specific task:
  - Family A.P.G.A.R. measures the patient's satisfaction with internal family function.
  - Family Genogram illustrates the family's structure, relationships, and medical history.
  - Family Circle is a graphic method to assess perceived family dynamics and emotional closeness.

Family Systems Theory

- Family-oriented medical care involves assessing how a family's functioning plays a part in both the illness and health of its members.
- In the systems concept of Minuchin (1978), the family is a ***continuous interlocking human relationship***, organized in such a way that when there is a change in one family member, the other family members are affected.
- The concept emphasizes the interconnectedness of human beings in their intimate environment, and is based on the following axioms:
  - The family is more than a collection of individuals.
  - Families have *repeating interaction patterns* that regulate member behavior.
  - An individual's symptoms may have a function within the family.
  - The **ability to adapt to change** is the **hallmark** of **healthy family functioning**.
  - There are no victims and victimizers in families.
- Through the application of the systems concept, we see the family as **more than the sum of its parts**.
- It is organized by interpersonal structures and processes that enable it to be both stable and adaptable over time.
- In a family system, there are various changes which occur as related to illness.
  - How each member copes can lead to either dysfunction or adaptability.
- The family system is influenced by its psychodynamics and life cycle.

FAMILY-CENTERED CARE (FCC)

Family-centered care	Family-focused care

• sees the family as active participants in all aspects of services and involved in the decision-making about care
• Everyone works collaboratively in addressing needs and concerns
• Families are included at every level of the process, and services are collaborative, integrated and provided in the least restrictive settings possible
• Family-centered care (FCC) is a collaborative approach to health care decision-making between the family and the physician.
  ○ The general principles include
  ▪ **P**artnership
  ▪ **R**espect
  ▪ **I**nformation sharing
  ▪ **N**egotiation
  ▪ **C**ontext of the family and community
  ▪ **E**quity
	• places families at the center of services, but the goals are externally imposed, almost dictated to families as subordinate to the expert professionals
	• This methodology informs parents that 'this is what we need you to do' as opposed to 'tell us what you need us to help you do'
	• It remains an 'us vs. them' paradigm, and not a 'we' model

Sample Questions – Family Systems Theory

1. Mr. Bato-Bato Roque, 50-year-old sea farer, breadwinner of the family has been diagnosed with CHRONIC KIDNEY DISEASE and is currently on regular HEMODIALYSIS. His three children are now providing FINANCIAL SUPPORT to the family. What is the HALLMARK of a HEALTHY FAMILY FUNCTIONING?

A. strong communication
B. ability to adapt to change
C. mutual respect and affection
D. commitment and support to the family in times of crisis

2. What is the fundamental difference in GOAL SETTING between FAMILY-FOCUSED CARE and FAMILY-CENTERED APPROACH?

A. FAMILY-FOCUSED CARE involves externally imposed goals, while FAMILY-CENTERED APPROACH requires families to set their own goals.
B. FAMILY-FOCUSED CARE views families as subordinates, whereas FAMILY-CENTERED APPROACH requires views them as experts.
C. FAMILY-FOCUSED CARE goals are externally imposed, while in FAMILY-CENTERED APPROACH, families are active participants in setting goals together with the physician.
D. FAMILY-FOCUSED CARE places families at the center of services, while FAMILY-CENTERED APPROACH requires place experts at the center.

3. If a family is experiencing significant STRESS due to the eldest child moving away for university, how would FAMILY SYSTEMS THEORY predict the IMPACT on the REMAINING FAMILY MEMBERS?

A. The theory suggests that the eldest child's individual well-being would be affected.
B. It would predict that the parents would experience noticeable changes in their relationship.
C. It implies that the family system is resilient and would naturally adjust without significant impact.
D. The theory states that if one family member changes, all other members are affected due to their interconnectedness.

Answers & Rationale - Family Systems Theory

1. Answer B

- The ability to adapt to change is the hallmark of healthy family functioning.

2. Answer C

- In family-focused care, the healthcare professional acts as the expert. The goals are "externally imposed" or "almost dictated" to the family, who are viewed as subordinates. This approach is an "us vs. them" paradigm, where the professional informs the family, "'this is what we need you to do'".
- In a family-centered approach, the process is a "collaborative approach to health care decision-making between the family and the physician". Families are "active participants" and are "involved in the decision-making about care". This creates a "we" model where goals are set together.

3. Answer D

- Family Systems Theory is based on the concept that a family is a "continuous interlocking human relationship". A core axiom of this theory is that the family is "organized in such a way that when there is a change in one family member, the other family members are affected". The theory emphasizes the "interconnectedness of human beings in their intimate environment".
- Therefore, the departure of the eldest child is a significant change in one part of the system, which, due to this interconnectedness, will inevitably affect all other members and their relationships.

Family Dynamics Assessment Using Minuchin's Family Map

FAMILY PSYCHODYNAMICS

- Problems in our families of origin often repeat themselves in the families we create ourselves, however much we may wish it were not so.
- Learning about past family members and their relationships (including where people got stuck) can free one to change his or her future (McGoldrick, 1995).
- In order to understand the family psychodynamics, one must get data on family structure, processes and typology.

Family Structure

- Family structure is the **behavioral skeleton** around which family life is built.
- Minuchin's has **four basic notions** in the theory of family dynamics:
- **Transactional Patterns**
  - are the repeating sequences of interaction: in who relates to whom, when and how.
  - It takes the role of family rules developed over time.
  - Rules may be overt or covert.
    - Overt rules - clearly stated
    - Covert rules - not stated but everyone agrees to conform to
- **Adaptation**
  - refers to the availability of alternative transactional patterns and to the family's ability to mobilize these alternatives when necessary.
- **Subsystems**
  - in a family are the **smaller units** such as the **couple and siblings**.
  - Subsystems are the ways in which system differentiates and carries out its function support, nurturance, regulation, and socialization of it's members.
- **Boundaries**
  - of a subsystem are the rules defining who participates in the subsystem and how they participate.
  - The boundaries must be clear enough to prevent interferences but flexible enough to allow contact across subsystems.
- A family who is not open to negotiation in spite of the fact that circumstances render the old boundaries no longer appropriate is considered rigid.
- Rigid boundaries
  - exist if couple spend little time together, have separate bedrooms or completely separate lives,
  - Rigid boundaries create dysfunctional families when members fail to adjust during phase transitions.
  - Rigid boundaries may lead to disengagement.
- Diffuse boundaries
  - exists when there is lack of clarity and by intrusion by one subsystem into another.
  - Diffuse boundaries exists if they tend to lose their identity or **become too dependent on one another** (i.e. I don't exist without you… no separate friends or interests, must always agree on everything.
  - Diffuse boundaries may lead to enmeshment.
- Symbols for boundaries are as follows:
  - Clear: - - - - - - - - -
  - Rigid: ———————
  - Diffuse: ·····

Family Processes

- **Enmeshment**
  - occurs when boundaries are diffuse, when the parents have no privacy from their children.
  - It occurs when members are overly reactive to stress on one member and demonstrate a lack of individual autonomy
- **Disengagement**
  - is characterized by boundaries that are too rigid, as when the mother-child subsystem excludes the father's involvement in parenting.
- **Triangulation**
  - occurs when a third person in drawn into a two-pair system so as to diffuse anxiety or conflict.
  - This tendency to triangulate is a frequent occurrence and appears to be a part of normal family functioning.
  - However, if this pattern of involving a third party in order to negotiate a relationship becomes a part of the regular family functioning over a longer period of time, then it is seen as symptomatic or unhealthy
  - Such a pattern will cause a family system to become more rigid in its way of functioning and will cause problems.
- **Coalition**
  - is the relationship between at least three people, where two collude against the other.

The five basic functions performed by all families

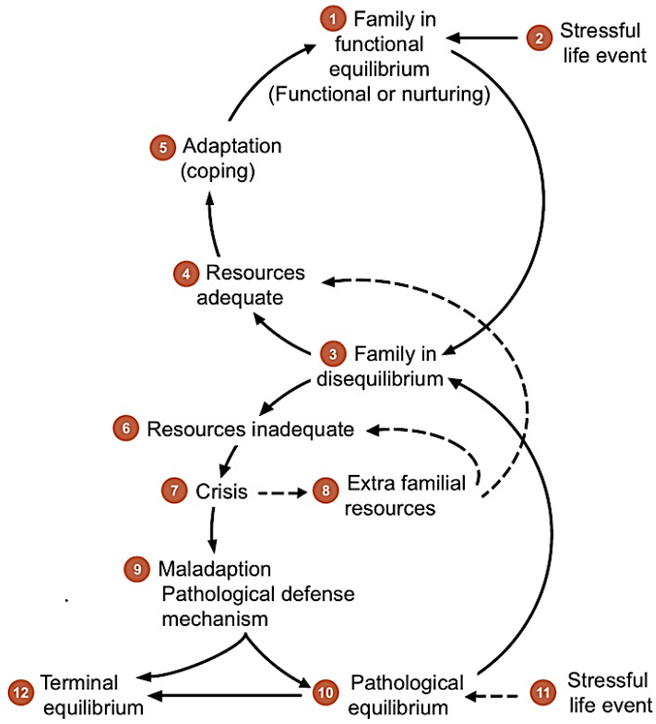
- Families provide support to each other.
  - Support can be physical, financial, social, and emotional. Families do a lot of things together as a unit and have a sense of belonging to on another.
- Families establish autonomy and independence for each person in the system, which enhance personal growth of individuals within the family.
  - Each individual in the family has defined roles to play within and outside the limits of the family. Thus, while families do a lot of things together, they do other things separately. The essence of the autonomy function is the ability to maintain the integrity of each individual member.
- Families create rules that govern the conduct of the family and of the individuals within the family.
  - These rules often deal with interaction patterns, privacy, authority, and decision-making. These are rules of behaviors that are mostly unwritten and become apparent when an outsider visits the family.
- Families adapt to change in the environment.
  - It is essential that the family adapts changes and grows in order to progress from one stage to another in the family's life cycle.
  - There are two types of changes.
    - The first order change involves adaptation to environment change that requires minimal change in the family structure. An example is a change that is present when a family moves to a new locality.
    - The second order change involves fundamental change in the family structure. A good example is when a family moves into the stage of the birth of the first child.
- Families communicate with each other.
  - These are mostly verbal, non-verbal, and implied messages. Other functions become impossible without communication.

A Dysfunctional Family

- is defined as a family with chronic inability to respond to the needs of the members or to cope with changes and stresses in the environment.
- Imbalances from basic function of families (over-emphasis or under-emphasis)

SMILKSTEIN'S CYCLE OF FAMILY FUNCTION
The cycle of Family Function: A model for family response to stressful life event.

- A stressful life event, which occurs in a family in functional equilibrium, puts the family in Disequilibrium.
- If the resources are adequate adaptation or coping are utilized to bring back the family into a functional equilibrium.
- However, if the resources are inadequate, crisis ensues. But, if the extra-familial resources are adequate, adaptation will occur to bring back the family into a functional state. If still extra-familial resources are inadequate, some forms of maladaptation of the family members are seen. Here, pathologic defense mechanisms such as denial, repression, somatization and projection are employed.
- A maladapted family either goes to terminal disequilibrium in which the family disintegrates or to pathologic equilibrium in which interaction is impaired due to some unresolved crisis. Members utilize abnormal defense mechanisms such as depression, isolation, delinquency, school failure or running away from home



First Order and Second Order Changes

TWO LEVELS OF ORDERS OF MAGNITUDE OF CHANGE	
1ST ORDER CHANGES	**2ND ORDER CHANGES**
• **Involve Increments Of Mastery And Adaptation** • a **"NEED TO DO"** • **do not** involve change in the main *structure* of the family • **do not** involve a change in an individual's *identity and self-image* • additions to existing state of the individual's self and family • Tasks that must be accomplished by the family and family members working **within a stage of the Family Life Cycle**. ○ E.g.: A change that is present when a family moves to a new residence. ○ 3-year old child learns to ride a three-wheeled bike for the very first time. While an important milestone for the child, it doesn't fundamentally alter the family structure or require a major reorganization of roles and relationships.	• **Involve Transformation Of An Individual's State And Meaning** • a **"NEED TO BE"** • Change in the very basic attributes of the family system • Change in the **role and identity** of family members • Occur **between stages** of the Family Life Cycle • One characteristic intergenerational connectedness. ○ E.g.: A change that is present when a family moves into the stage of the birth of the first child. Husband becomes the father and wife becomes the mother of a dependent sibling. • **involve significant shifts in family dynamics, roles, and often the overall structure**

- 15-year old boy turns his bed-ridden father (i.e., S/P cerebrovascular accident) to prevent formation of pressure ulcers. This is a second-order change. **The son is taking on a caregiving role, significantly altering the family dynamics and responsibilities.**
- 17-year old girl left their house to live in a dorm within the school premises for her senior high school track. This is also a second-order change. **The daughter moving out represents a shift in family structure and requires adjustments in roles and boundaries.**
- 13-year old boy is slowly showing secondary sexual characteristics, such as facial and body hair. This is a second-order change. **Puberty brings significant physical and emotional changes, impacting family interactions and requiring adjustments in parenting approaches.**

Sample Questions - First Order and Second Order Changes

1. The following are SECOND ORDER CHANGES, EXCEPT:

A. After receiving testosterone injections, Jesse undergoes prophylactic mastectomy to enhance the phenotypic transition to become a transman.
B. Upon completing her Doctor of Public Health (DrPH) degree, 30-year-old Portia leaves her nuclear family in Benguet for the very first time to become a consultant at the Singaporean Ministry of Health and a Professor at the National University of Singapore.
C. After graduating magna cum laude with a degree of Bachelor of Science in Physical Therapy, Dustin is accepted to the UST Faculty of Medicine and Surgery – Learning Enhanced Accelerated Program for Medicine (UST LEAPMed) for Academic Year 2025-2026.
D. Timothy convinces his 58-year-old jeepney driver father to have early retirement and promises to be the new main breadwinner of their family.

2. Mr. Tim Tam, 45 years old, male, visited the clinic for his ANNUAL PHYSICAL EXAMINATION. The physician noted that his family life cycle is LAUNCHING FAMILY. Which among the following is the FIRST ORDER CHANGE in this stage?

A. renegotiation of marital system as a dyad
B. adjusting to physiologic changes of middle age
C. support for a more central role of midline generation
D. differentiation of the self in relation to the family of origin

3. The following are examples of FIRST ORDER CHANGES, EXCEPT:

A. A 15-year-old teen turns his bed-ridden father (i.e., S/P cerebrovascular accident) to prevent formation of pressure ulcers.
B. A 17-year-old adolescent left their house to live in a dorm within the school premises for her senior high school track.
C. A 13-year-old boy is slowly showing secondary sexual characteristics, such as facial and body hair.
D. A 3-year-old toddler learns to ride a three-wheeled bike for the very first time.

Answers & Rationale - First Order and Second Order Changes

1. Answer C

- Second-Order Changes involve a fundamental transformation of the family's structure, roles, and the identity of its members.
- First-Order Changes are tasks or adaptations accomplished within an existing stage of the family life cycle, without changing the core structure.

2. Answer B

- Based on the "THE STAGES OF THE FAMILY LIFE CYCLE" table provided in the documents, the tasks for each stage are divided into First Order Changes and Second Order Changes.
  - Correct: Option (b) "adjusting to physiologic changes of middle age" is explicitly listed as a First Order Change for the "Launching Family" stage.
  - Incorrect: Option (a) "renegotiation of marital system as a dyad" is listed as a Second Order Change for the "Launching Family" stage.
  - Incorrect: Option (c) "support for a more central role of midline generation" (middle generation) is listed as a Second Order Change for the "Family in Later Years" stage.
  - Incorrect: Option (d) "differentiation of the self in relation to the family of origin" is listed as a Second Order Change for the "Unattached Young Adult" stage.

3. Answer D

- First-order changes are increments of mastery or adaptation that do not change the family's main structure. A child learning a new motor skill, like riding a bike, is a new task, not a fundamental change in the family's roles.
- Second-order changes involve a transformation of an individual's identity or a change in the basic roles and structure of the family.
  - A son becoming a caregiver for his father (option a) is a major role change.
  - A daughter leaving home (option b) is a major change in the family's structure.
  - A boy entering puberty (option c) is a major transformation of his individual state and identity.

Family Illness Trajectory

- Normal course of the psychosocial aspects of disease for the patient and the family
- Indicates normal and pathologic responses thus enabling family physicians to formulate a therapeutic plan
- Knowledge of the trajectory allows the physician to predict, anticipate and deal with a family's response to illness

During the course of illness, the family passes through various stages

- **STAGE I Onset of Illness**
- **STAGE II Reaction to Diagnosis** - Impact Phase
- **STAGE III Major Therapeutic Efforts**
- **STAGE IV Recovery Phase** - Early Adjustment to Outcome
- **STAGE V Adjustment to the Permanency of the outcome.**

Mnemonic: ORM-RA

Stage I - ONSET OF ILLNESS

- The warning sign of malaise which initiates preliminary stage of the illness
- The stage experienced **prior to contact** with health care providers.
- Medical beliefs & previous experiences provide influence to meaning of illness.
- Nature of onset may play an important role on impact of illness on a family & some meaning of experiences are formulated here

Nature of illness	Nature of Onset	Characteristics of Experience	Impact on Family
Acute, rapid illness/ accident	Rapid, clear onset	provide little time for physical and psychological adjustment; short period between onset, diagnosis and management thereby leaving little time to remain in state of uncertainty	caught up in suddenness deal with immediate decision often with little support from within and outside the family unit if less threatening, may be dramatic but less crisis-oriented problem for the family
Chronic, especially debilitating	Gradual onset	suffer from state of uncertainty over meaning and symptom	Vague apprehension and anxiety fearful fantasies over denial of seriousness of symptoms and possible implications

RESPONSIBILITIES OF THE PHYSICIAN

- **explore routinely the explanatory model & fear** that patients bring to the clinic set-up
  - explanatory models
    - culturally determined beliefs that individuals hold about misfortune, suffering, illness and health.
    - These models are shaped by and shape societal expectations of the sick role, individual illness behavior and help-seeking
- With inappropriate label of illness, acknowledge & explore conflict the patient maybe experiencing
- Explore Several aspects of pre-diagnostic phase of patients & families

STAGE II - REACTION TO DIAGNOSIS-IMPACT PHASE

- The **physician** who **presents the diagnosis** is responsible for making a clinical judgment about the amount of information the patient can absorb, given his **present level of anxiety or shock**.
  - It is important that the physician elicits *explanatory model* of diagnosis to patient *if disease is not life threatening* and patient is liable to be unduly alarmed.
- Disease and appropriate treatment can be described **according to the patient's level of comprehension** and understanding.
  - Unnecessary frightening anxiety may occur if information is not understood.
- Give small doses of information over time if the diagnosis is particularly traumatic and the patient and his family may be unable to receive so much.

- If diagnosis is confusing and stressful and shuttering, the family physician must:
  - **provide support, and continuity of care**
  - interpret findings which are misunderstood
  - **offer advice and encouragement**
  - and clarify meaning of specialist's message & outcome of illness and operation

2 PLANES OR AREAS BY WHICH FAMILY & PATIENT REACT AND ADJUST	
EMOTIONAL PLANE	**COGNITIVE PLANE**
• During onset of illness, initially there is denial, disbelief and anxiety. o protest diffuse directly over unfairness (minutes to hours) • this is followed by emotional upheaval characterized by strong emotions such as anger, anxiety and depression o depends on disrupted roles and channels (period of weeks) • The **last phase** is **accommodation** during which the patient and the family learn to accommodate and accept the diagnosis. o This is very important for the implementation of therapeutic plans.	• PHASE **I:** Initially there is **tension & confusion** with probable lack of capacity for problem solving o threat sets in motion tension reduction mechanism • **PHASE II:** repeated failure in deriving the diagnosis may lead to **exacerbation of tension & increase distress** o resort to prayers o still earn capacity to problem solve • **PHASE III:** increasing assessment and receptivity of family to new approach for relief of distress o some go doctor shopping o some are willing and capable for active participation o time for real opportunity for the physician and other health workers to assist family in realigning roles and expectations, learn new skills and make adjustment o willing to accept responsibility • **PHASE IV: eventual acceptance of diagnosis** will enable them to mobilize resources & recognize the family. o quality of family reorganization o if there is no movement towards this phase, family will be inefficient in achieving healthy adaptation to the crisis and reorganize at more dysfunctional level

RESPONSIBILITIES OF THE PHYSICIAN

- Anticipate number of problems and help families to cope and adapt more through family conference, discussion with parents, etc. **Specifically:**
- The family should from the very beginning be encouraged to make clear to each other & to the patient the nature of the illness by helping family maintain openness that allows sharing & support.
  - Pattern of **non-sharing / silence** limit the openness & spontaneity of families and hampers their ability to share & openly support each other.
  - Process of **isolation** is more terrifying and may be perceived as abandonment by the patient.
- The physician should know that feeling of guilt is a natural response to stress of grief and loss.
- Family members may have the irrational feeling that they personally caused the patient's disease.
- The physician should help family members anticipate such feelings & make realistic efforts to relieve patient of self-blame through careful explanation of etiology.
- **The physician should help the family assess the likely effect of the illness on the family, predict problems likely to arise; develop plans for realistically coping with them; and assess the family capabilities to deal with such stress**.
- The physician should briefly help the family understand some of the problems
- The physician should briefly help the family understand some of the problems as well as benefits to be expected from family & friends who as well as benefits to be expected from family and friends who offer support
- Offer alternative interpretation of proposed therapeutics-bolster family's denial & inability to accept reality

STAGE III. MAJOR THERAPEUTIC EFFORTS

- Management / therapy represents one of the most challenging & rewarding part of medical practice
- The physician should deal with multiple variables, works in harmony of the wishes of the patient and family, and coordinates all aspects of the therapy, which involve specialist & others.

CRITICAL ISSUES IN CHOOSING THERAPEUTIC PLAN

- Psychological state and preparedness of the patient and family determine the choice of therapeutic plans as well as the alternative choices.
  - If the patient's belief system & trust in therapeutic modality is at variance with that of physician, he may resist attempt at education and reassurance. Thus, the physician should investigate for signs of non-compliance.
  - Some of patients' families are not emotionally equipped to undertake some form of therapy so other professional help should be obtained.
- Assumption of responsibility for care very early in the treatment plan. Thus, we have to establish & define responsibilities of each party. Give realistic role to everyone.
- Economy of Therapeutic plan → Of what good is therapy if family cannot afford it. The sickness will have devastating effects on the family economically speaking
  - Diligence on the part of physician in keeping costs down by involving family in all major decisions which affect the patient as in-request for tests/referrals which are really necessary
- Economic Impact of illness
  - emotional trauma
  - social dislocation
  - economic catastrophe - wipes out family savings
- Life style & cultural characteristics of a family are important in choosing a therapeutic plan.
- Effects of hospitalization, surgery and other major therapeutic method are emotionally stressful for the patient's family. There is fear & concern in the families who are still essentially helpless, unable to participate in the suffering or need to relieve the constant discomfort or anguish.
  - Hospitalization gives rise to stressful logistic problem
    - Father - special economic burden
    - Mother - greatest impact on other family members. It poses High risk of family dysfunction.
    - Children - special syndrome of emotional problems of families. - Hostility, abandonment
    - Parents - helpless, guilt, frustrated, or hurt
    - Geriatric - vulnerable to fears of death, rejection abandonment, loneliness & helplessness
- Hospitalization
  - Loss of member - reserve position upon return
  - Conflict between family and hospital staff - intrusion

RESPONSIBILITIES OF THE PHYSICIAN

- Remain open to the family, indicate they will not be abandoned, provide them information.
- Deal with multiple variables; consider all factors in planning.
- Work in harmony with patient & family.
- **Coordinate all aspects of therapy.**
- Anticipate pathologic response. Such responses of family members occur when there is severe emotional symptom of deep depression; psychological reaction and organic symptoms behavioral problem like addiction to alcohol, work inhibition and pathological acting out.

STAGE IV – RECOVERY PHASE- EARLY ADJUSTMENT TO OUTCOMES

- **Return from the hospital or major therapy** initiates a period of gradual movement from the role of being sick to some form of recovery or adaptation, with corresponding adjustments of relation within the family.
- Experience of recovery or adjustment to the illness outcome is an important phase for patients & families. It varies according to the type of outcome anticipated
  - Simplest outcome is return to full health
    - Gains from illness experience
    - Patient nurtured & allowed to take over the abandoned obligation, new responsibilities and privileges when sick.

- **Partial recovery** followed by a period of waiting to learn if disease will return or fear of death, because of long period of waiting. They maintain constant sense of vulnerability.
- Recovery is quite different if it requires acceptance of a known **permanent disability.**

RESPONSIBILITIES OF THE PHYSICIAN:

- Deal with immediate effects of trauma.
- Alleviate anxiety & assure adequate rest.
- Psychological support can be given through understanding and repeated reassurance.
- Explore level of understanding of patient & family. Call on other members of family for means of support. Try to find out how members understand what happened, what kind of labeling do they have. Do they label person as still ill or do they label him as once again well or has returned to health.

STAGE V. ADJUSTMENT TO THE PERMANENCY OF THE OUTCOME

- This points to the family's adjustment to crisis.
- The **second crisis** occurs as family realizes that they must accept & adjust to a permanent disability.
- *The whole family must begin & give up hope for the patient's full return to health.*
- They have to accept that life must go forward & pattern believed to be temporary must be accepted as permanent.
- The family physician should be aware that continued unwillingness to incorporate that reality of the permanency of the loss may be a sign of pathology.
- Coping mechanism is developed during earlier stage of family adjustment.
  - Person who is sick continued to be treated as sick & he is treated as patient & not reintegrated into the family
  - Treat patient as recovered, full, responsible person
- **For Acute Illness:** There is potential for crisis especially when family routines are suspended. Emotions are high & can lead to anger especially if the family perceives that the care given by the doctor is not satisfactory. Because of suddenness of illness, family may find it difficult to face the stress.
  - **What the family physician can do** is to facilitate healthy response or Acceptance of diagnosis & recognize danger signals such as delayed or Prolonged reaction.
- **For Chronic Illness:** Because of prolonged fear & anxiety, there is higher incidence of illness in other members of the family.
- If the chronic illness brings about additional burden & sometimes feeling of guilt especially if the sick member was previously neglected, then as a result of this feeling, the family becomes over-indulgent toward the sick member & this will later result into feeling of overwork.
- Thus, anger & resentment toward sick member sets in leading back to feeling of guilt later.
  - **What the physician can do** is to encourage ventilation of feelings, give reassurance and reinforcement for care
- **For Terminal Illness:** This is highly emotional & potentially devastating. The moment of diagnosis of a major debilitating or terminal disease is often remembered by patient in their families as the single most difficult time of the entire illness experience. As a reaction to shattering diagnosis, the patient & his family anticipate grief reaction. If the family is functional, members will be drawn close together to provide care & support to the patient & to each other. If the family is dysfunctional, it can be the seed for future family discord and breakdown.
- The initial response in diagnosis of terminal illness is that of shock & overwhelming anxiety. As they respond to the pain with denial
  - The Physician can:
    - Assist the patient and the family in relating to health care system
    - Aid the patient & the family in efficient & functional readjustment;
    - Provide quality care. Home care is the best & most accepted & the last demanding, thus it should be facilitated.
- Family Reaction to Death
  - In after prolonged severe illness and adaptation and reaction are already accomplished
  - Death comes swiftly & MD to assist family to cope.
  - Stage of Denial - few days to few weeks
  - If prolonged - premorbid pattern of abnormal behavior, Anger, Depression, Bargaining & Acceptance

Sample Questions - Family Illness Trajectory

1. It has been about five days since Paul started to have low back pain. He searched online about his symptom and read about the possibility of him having kidney stones. He planned on buying over-the-counter Sambong capsules to relieve his low back pain, according to his online research. Based on the ILLNESS TRAJECTORY, Andy is in which STAGE?

A. Onset of Illness to Diagnosis
B. Major Therapeutic Efforts
C. Impact Phase
D. Recovery Phase

2. 63 y/o father and bread winner is finally going home after having surgery for colon CA for almost 1 month. Before giving instructions for the home care, you would want to check at this time how the family is coping and how is the family when the patient finally returns to his former environment. At which stage of the trajectory is the family in?

A. Onset of illness
B. Reaction to diagnosis
C. Major therapeutic efforts
D. Early adjustment to outcome

3. The primary breadwinner of Borlongan Family suddenly had a stroke rendering him practically dependent on a family caregiver. The members of the family were pointing fingers to each other as to who will be caregiver and who will be assuming the role of breadwinner. Nobody seem able to come up with a workable solution. What stage in the trajectory if illness is the family going through?

A. Onset of illness
B. Reaction to the diagnosis
C. Major therapeutic efforts
D. Adjustment to permanency of outcome

4. With the appropriate test, Ms. Andeng was noted to be sobbing and her partner nearby was quiet the whole time trying to process everything. She asked you to give her the best medication possible to control her Diabetes Mellitus. Where are they in the in the Trajectory of Illness:

A. Stage I Onset of Illness to Diagnosis
B. Stage II Impact Phase – Reaction to Diagnosis
C. Stage III Major Therapeutic Effort
D. Stage IV Early Adjustment to permanency of the outcome

5. Which among the following is the responsibility of the family physician in the reaction to diagnosis illness trajectory stage?

A. Explore routinely the explanatory model & fear that patients bring to the Clinic set-up
B. Aid the patient & the family in efficient & functional readjustment
C. Coordinate all aspects of therapy and anticipate pathologic response
D. Help the family assess the likely effect of the illness on the family, predict problems likely to arise

6. Nataniel 46/M is diagnosed with pancreatic cancer stage IV. He decided not to undergo chemotherapy anymore and desires to just stay at home. The family must do the following during this stage of illness trajectory:

A. Choose a therapeutic plan appropriate for the patient
B. Accept and adjust to the permanency of the patient's illness
C. Maintain hope that patient will be able to return to full health
D. Believe that this phase is on temporary and will resolve in time

7. A 58 year old male, diabetic with good glycemic control, complained of cough associated with on and off fever for 10 days. He was brought to the emergency room due to dyspnea. His vital signs were as follows: BP=120/80, HR= 90 bpm, RR= 30 cpm and O2 saturation of 90% at room air. CXR- PA revealed pneumonia (localized infiltrates). Covid-19 RT-PCR and RAT showed negative results. Which stage of the Trajectory of Illness does this family belong to?

A. Impact Phase
B. Major Therapeutic Effort
C. Onset of symptoms /illness
D. Recovery phase

8. A 47 year old male patient is undergoing rehab due to a stroke which he suffered 4 weeks ago. What is the stage of the Trajectory of Illness?

A. Impact phase
B. Onset of illness
C. Major therapeutic efforts
D. Recovery phase – adjustment to outcome

9. What stage in the Family Illness Trajectory that the family physician must provide support and continuity of care, offer advice and encouragement and clarify meaning of specialist's message and outcome of illness and operation?

A. Reaction to Diagnosis
B. Adjustment to the Permanency of the outcome
C. Major Therapeutic Efforts
D. Early Adjustment to Outcome

10. Which of the following is the responsibility of a Family and Community Medicine specialist in the REACTION TO DIAGNOSIS STAGE in the ILLNESS TRAJECTORY?

A. help the patient assess the likely effect of the illness on the family, predict problems likely to arise
B. aid the patient and the family in efficient and functional re-adjustment
C. coordinate all aspects of therapy and anticipate pathologic response
D. explore routinely the explanatory model and fear that patients bring to the clinic set-up

11. Myrona Troyla complained of LOOSE BOWEL MOVEMENTS with associated episodes of crampy ABDOMINAL PAIN. She decided to take the unconsumed Metronidazole from the medicine cabinet since she remembered that this was the medication prescribed to her father when the latter was previously diagnosed with ACUTE GASTROENTERITIS. Myrona Troyla is in what stage of the ILLNESS TRAJECTORY?

A. Onset of Illness
B. Impact Phase
C. Major Therapeutic Efforts
D. Recovery Phase

12. Pedro, a 25-year-old Grab driver, is suffering from a 5-day history of undocumented moderate-grade fever with associated generalized pruritic papular rashes. He self-medicated with paracetamol for the febrile episodes and applied a home-made decoction of tawa-tawa leaves on his rashes. Using the FAMILY ILLNESS TRAJECTORY, what is your main task as of the moment?

A. Give psychological support to the patient through understanding and repeated reassurance.
B. Explore aspects of pre-diagnostic phase of patient and family.
C. Interpret findings which are misunderstood by the patient.
D. Work in harmony with the patient and his family.

13. A bus driver seeks assistance at the Malasakit Center at the Quirino Memorial Medical Center for the needed chemotherapy of his seven-year daughter diagnosed with ACUTE LYMPHOCYTIC LEUKEMIA. In the ILLNESS TRAJECTORY, the family is in which specific stage?

A. Onset of Illness
B. Impact Phase (i.e., Reaction to Diagnosis)
C. Major Therapeutic Efforts
D. Adjustment to Permanency of Outcome

14. Norberto, a 52-year-old construction worker, had intermittent ABDOMINAL PAIN and several episodes of PAINFUL RECTAL BLEEDING for one month. He was advised by his family to go to a faith healer in the province. Which of the following is the PRIMARY CONSIDERATION in the stage of the ILLNESS TRAJECTORY the patient is in?

A. Unwillingness to accept the outcome may be a sign of pathology.
B. Medical beliefs and previous experiences influence meaning of illness.
C. There may be initial denial followed by emotional upheaval and finally acceptance.
D. The assumption of responsibility for care and responsibilities of each party should be delineated.

15. Franz is a 50-year-old dentist who has been on anti-retroviral therapy (ART) since last week of November 2024. His domestic partner, Bruno, a 35-year-old firefighter is non-reactive to HIV. In January 2025, the latest CD4 count 3 of Franz went down to 275 cells / mm . The doctor at the treatment hub advised Franz to promptly start Cotrimoxazole prophylaxis against Pneumocystis jiroveci pneumonia and toxoplasmosis. Before agreeing to the said chemoprophylaxis, Franz conferred first with Bruno to explain the role of Cotrimoxazole. This serodiscordant couple is presently in which stage of the ILLNESS TRAJECTORY?

A. adjustment to permanency of outcome
B. reaction phase
C. major therapeutic efforts
D. recovery phase

16. Primitiva is a 47-year old fish vendor from Antique, who is complaining of GRADUAL ABDOMINAL ENLARGEMENT with note of FOUL-SMELLING VAGINAL DISCHARGE. She is a G3P2 (2012) widow, who has not been sexually active since 2018, and she admits her late husband was sexually promiscuous. Primitiva's neighbors opine she is being cursed by evil spirits, and they are highly suggesting for initial evaluation by a mambabarang . Which of the following is the PRIMARY CONSIDERATION in the stage of the ILLNESS TRAJECTORY Primitiva is in?

A. Unwillingness to accept the outcome may be a sign of pathology.
B. Medical beliefs and previous experiences influence meaning of illness.
C. There may be initial denial followed by emotional upheaval and finally acceptance.
D. The assumption of responsibility for care and responsibilities of each party must be delineated.

17. Mr. FMG was diagnosed with Stage IIA Prostate cancer. Few months after finishing his chemotherapy sessions, he sought consult with a faith healer despite being told that he is already cancer free by his attending physician. Which of the following Illness Trajectory best match the situation?

A. Onset of Illness
B. Reaction to Diagnosis
C. Major Therapeutic efforts
D. Adjustment to the permanency of the outcome

18. It has been about two weeks since Andy started to have LOW BACK PAIN. He has searched online sites about his symptoms and learned about the possibility of having UROLITHIASIS. He planned on buying over-the-counter sambong capsules to relieve his low back pain, according to his online Tiktok research. Based on the ILLNESS TRAJECTORY, Andy is in which STAGE?

A. Stage II: Reaction to Diagnosis
B. Stage I: Onset of Illness
C. Stage IV: Early Adjustment to Outcome
D. Stage III: Major Therapeutic Efforts

19. Christopher, 48 years old, corporate driver, and main breadwinner of his family was involved in a MOTOR VEHICULAR ACCIDENT / ROAD CRASH INJURY, which left him with an AMPUTATED LEFT LEG. After hospitalization, he is currently on the first month of PHYSICAL THERAPY and REHABILITATION, in preparation for the attachment of a PROSTHESIS. In this stage of ILLNESS TRAJECTORY, the attending physician should:

A. work in harmony with patient and family
B. alleviate anxiety of the patient and the family
C. explore level of understanding of patient and family
D. be aware that continued unwillingness to reality of loss is a sign of pathology

Answers & Rationale - Family Illness Trajectory

1. Answer A

- Paul is experiencing symptoms but has not yet consulted a healthcare provider.
- He is in the preliminary phase of interpreting his symptoms and considering self-treatment.
- **Stage I - Onset of Illness** as the period "prior to contact with health care providers."

2. Answer D

- The patient has completed major therapy (surgery and hospitalization) and is now returning home.
- This marks the beginning of **Stage IV - Recovery Phase**, which the text also calls **Early Adjustment to Outcome**.
- This stage involves the "gradual movement from the role of being sick to some form of recovery or adaptation

3. Answer B

- The family is in the immediate aftermath of a sudden, catastrophic diagnosis (stroke).
- Their response—conflict, finger-pointing, and an inability to problem-solve—is characteristic of the cognitive and emotional upheaval of **Stage II - Reaction to Diagnosis (Impact Phase)**.

4. Answer B

- The scenario describes the exact moment the diagnosis is delivered and the immediate emotional reaction ("sobbing," "trying to process everything").
- This is the hallmark of **Stage II - Reaction to Diagnosis**, also known as the Impact Phase

5. Answer D

- a key responsibility of the physician during **Stage II - Reaction to Diagnosis** is to "help the family assess the likely effect of the illness on the family, predict problems likely to arise; develop plans for realistically coping with them."
- The other options describe responsibilities for different stages

6. Answer B

- The patient has a terminal illness and has opted for palliative care over curative efforts.
- This places the family in **Stage V - Adjustment to the Permanency of the outcome.**
- The central task for this stage, especially with a terminal illness, is to "give up hope for the patient's full return to health" and accept the reality of the situation

7. Answer A

- Although symptoms began 10 days prior (Onset/Stage I), the family is now in the emergency room facing a crisis (dyspnea) and receiving a definitive diagnosis (pneumonia).
- This moment of crisis, contact with definitive care, and processing the diagnosis is **Stage II - Reaction to Diagnosis (Impact Phase)**.

8. Answer D

- The patient is past the acute event and major therapeutic efforts.
- He is now "undergoing rehab," which is the central activity of **Stage IV - Recovery Phase**.
- This stage is focused on adjusting to the outcome of the illness and moving from the sick role toward adaptation

9. Answer A

- The provided text lists these specific responsibilities under **Stage II - Reaction to Diagnosis**. It states that when a diagnosis is confusing or stressful, the physician must "provide support, and continuity of care... offer advice and encouragement; and clarify meaning of specialist's message & outcome of illness and operation."

10. Answer A

- This is a direct restatement of a key physician responsibility listed in the document for **Stage II - Reaction to Diagnosis**.
- The other options correspond to different stages: (D) is for Stage I, (C) is for Stage III, and (B) is for Stage V

11. Answer A

- Myrona is experiencing symptoms but has not consulted a healthcare professional.
- She is interpreting her illness and deciding on a treatment based on her "previous experiences," which is a key characteristic of **Stage I - Onset of Illness**, the period before professional medical contact.

12. Answer B

- Pedro is in **Stage I - Onset of Illness**, as he has not yet seen a physician.
- the physician's primary responsibility in this stage is to understand the patient's pre-consultation experience, which includes exploring their "explanatory model" (e.g., belief in tawa-tawa) and the "aspects of [the] pre-diagnostic phase."

13. Answer C

- The family has a diagnosis and is now actively engaged in managing the treatment plan, which includes arranging for chemotherapy and seeking financial assistance for it.
- This phase of active treatment is **Stage III - Major Therapeutic Efforts**.

14. Answer B

- Norberto is experiencing symptoms but has not sought professional medical care, placing him in **Stage I - Onset of Illness**.
- The defining characteristic of this stage is how the patient and family interpret the symptoms.
- The advice to see a faith healer is a direct example of how "Medical beliefs and previous experiences influence meaning of illness."

15. Answer C

- The couple is actively managing a chronic illness (HIV). The need to add a new medication (Cotrimoxazole prophylaxis) due to a change in clinical status (lower CD4 count) is part of the ongoing management of the disease.
- This falls under **Stage III - Major Therapeutic Efforts**, which covers not just the initial therapy but also the long-term coordination and adjustment of treatment plans

16. Answer B

- Primitiva is in **Stage I - Onset of Illness**, characterized by a gradual onset of symptoms and no contact yet with a medical professional.
- The primary consideration for the physician in this stage is understanding the patient's "explanatory model."
- The suggestion to see a *mambabarang* (a Filipino witch doctor) is a clear example of how cultural and folk "medical beliefs" are influencing the patient's understanding of her illness.

17. Answer D

- The patient has completed therapy and the outcome (cancer-free) has been determined.
- His continued search for treatment indicates a difficulty in accepting this new health status.
- This is the central challenge of **Stage V - Adjustment to the permanency of the outcome**, where the family and patient must come to terms with the final reality, whether it's recovery, disability, or a terminal state

18. Answer B

- The Family Illness Trajectory begins with Stage I, the Onset of Illness. This stage is defined as the period experienced "prior to contact with health care providers". During this time, the patient experiences initial symptoms and uses their own "Medical beliefs & previous experiences" to form a "meaning of illness".
- Andy is in this stage because he is experiencing symptoms (low back pain) and is attempting to self-diagnose (suspecting urolithiasis) and plan his own treatment (sambong capsules) based on online research, all before consulting a medical professional

19. Answer C

- The patient is in Stage IV (Recovery Phase - Early Adjustment to Outcome) of the Family Illness Trajectory, which begins after major therapy and involves adapting to the illness outcome.
- A key responsibility of the physician during this specific stage is to: "Explore level of understanding of patient & family... Try to find out how members understand what happened, what kind of labeling do they have. Do they label person as still ill or do they label him as once again well or has returned to health". This is crucial for guiding the rehabilitation process and preparing the family for the adjustment to a "permanent disability".
  - Option (a) is a responsibility listed under Stage III (Major Therapeutic Efforts).
  - Option (b) is also a responsibility in Stage IV, but exploring the family's understanding (c) is the primary step required to provide effective, targeted psychological support and alleviate anxiety.
  - Option (d) is a key task for Stage V (Adjustment to the Permanency of the outcome).

Family Life Cycle

- Families go through developmental processes
- represents composite of the individual developmental changes of family members
- shows the evolution of the marital relationship
- Presents cyclic development of the evolving family unit.
- The family life cycle is the normal process of family development.
- It involves a sequence of stressful changes that require compensating or reciprocal readjustment by the family to make it functional.
- Life events can profound impact on family and individual members.
- Each stage is associated with a certain developmental task in order to proceed to the next stage.
- Events of the family life cycle can be related to clinical events and health maintenance.
- It also allows us to analyze and predict how illness will affect family psychodynamics and give appropriate psychosocial support.

WHY DO WE STUDY THE FAMILY LIFE CYCLE?

- It provides a predictable, chronologically oriented sequence of events in family life with which family physicians and other health professionals are already familiar
- It involves a sequence of stressful changes that requires compensating or reciprocal readjustments by the family if it is to maintain viability.
- Events of Family Life Cycle can be related to clinical events and to health maintenance of the family

STAGES OF THE FAMILY LIFE CYCLE

Unattached Young Adult

- "Between Families." It is the start of the family life cycle wherein the unattached young adult has come to terms with the family of origin.
- At this stage, the young adult formulates personal goals in developing as an individual, including forming a new family.

Newly Married Couple

- "The Joining of Families through Marriage" is very true in the Philippines; thus Filipino families are bilaterally extended.
- This is the transition stage of the couple from their lives as an individual to life as couple.

Stages Of Marriage		
STAGES	**EMOTIONAL ISSUES**	**STAGE CRITICAL TASKS**
Honeymoon stage (0-2 years)	Commitment to the marriage	Differentiation from family origin Making room for spouse with family and friends **Adjusting career demands**
Early Marriage Stage (2-10 years)	Maturing of Relationship	**Keeping romance in the marriage** Balancing separateness and togetherness Renewing marriage commitment
Middle Marriage Stage (10-25 years)	Post-Care Review	Adjusting to mid-life changes Renegotiating relationship Renewing marriage commitment
Long-Term Marriage Stage (25 + years)	Farewells and Planning	Maintaining couple functioning Closing or adapting family home coping with death of spouse

Family with Young Children

- This stage starts with pregnancy for the first child to emergence of adolescents.
  - The coming of children defines a new family status, as the wife becomes the mother, the husband the father.
  - During this stage also, the child starts going to school, which is his first significant contact with people outside of the family.
  - Conflict with practices in the home and school regulations may occur during this stage.

Family with Adolescents

- A family with adolescents has generally reached a stage when the parents are approaching a middle life stage and the grandparents are in the later stage. Hence, it is not only teenagers but also their parents who are undergoing crisis (i.e. identity) at this stage.
- This stage starts when the first child reaches adolescent age
- In the Philippines adolescence starts at age 12
- Three hallmarks
  - Changes in the balance of responsibility along with overfunctioning and underfunctioning
  - Marked shifts in intensity of relationships
  - Surge of exchange with the community at large

Launching Family

- This stage **begins when the first child leaves home** and ends when the last child leaves home.
  - *In the Philippines, this is prolonged because unmarried children usually stay with parents.*
- Launched children start their own family life cycle.

Family in Later Years

This **begins with departure of last child** and continues through retirement of one or both of the couple and ends when both are dead

THE STAGES OF THE FAMILY LIFE CYCLE

Stage	Key Principle	Second Order Changes	First Order Change	Problems Encountered
Unattached Young Adult	• Accepting parent offspring separation	• **Differentiation of the self in relation to the family of origin** • Development of intimate peer relationship • Establishment of self in work	• Extend social contact outside of home includes dating clubs, and recreation • Job employment • Living accommodation	• Episodic medical problems • Sexually transmitted • Unwanted pregnancy • Pre-employment check up • Psychosomatic problems secondary to new job, role and peer group • Depression secondary to adjustment to life away from home, difficulty in finding employment suitable life partner parental expectation • Peer group pressure on acquiring vices, such as alcoholism, smoking • Fiancee pressure for marriage and premarital sex
Newly Married Couple	• Commitment to the new system	• Formation of marital system • **Realignment of relationship with extended families and friends to include spouse**	• Establishing a home base in a place to call their own • Establishing a mutually satisfying system for getting and spending money • Establishing mutually acceptable patterns of who does what and who is accountable to whom • Establishing a continuity of mutually satisfying sexual relationship • Establishing system of intellectual and emotional communication • Establishing a workable relationship with relatives • Establishing ways of interacting with friends and associates in the community • **Facing the possibility of children and planning for their coming**	• Episodic medical problems • Early pregnancy • STD • Job-related physical examination • Gynecologic problem • Infertility • Depression due to forced early marriage and unwanted pregnancy • Jealousy to job, friends, and previous fiancee • Emotional problems relating to new role as a spouse (communication, personalities and character differences in habits and background) • Problems relating to in- laws, friends, peers and money • Demands of new role • Problems of adjustment to office and work
Family with Young Children		• **Accepting marital system to make space for children** • Taking on parenting role • Realignment of relationship with extended family to include parenting and grandparenting roles	• **Supplying adequate space, facilities and equipment for the expanding family** • Meeting predictable and unexpected costs of family life with small children • Sharing responsibilities within the extended family and between members of the growing family. • Maintaining mutually satisfactory sexual relationship and planning for the future children • Creating and maintaining effective communication system in the family. • Cultivating the full potentials of relationship with relatives within the extended family. • Tapping resources, serving needs and enjoying contracts outside the family. • Facing dilemmas and reworking philosophies.	**CHILDREN** • Episodic medical problems • accidents • GOBI (Growth Monitoring, Oral Rehydration, Breastfeeding & Immunization) • Mental retardation • Poisoning • learning deficiencies • child abuse and neglect **PARENTS** • episodic medical problems • OB-Gyne problems • family planning • annual PE in the job • STD • peer pressure on alcoholism and other vices including drug abuse and extra-marital affair • sexual inadequacies • spouse abuse • job-related problems • problems on child rearing • communication problems • in-laws problems • taking care of the sick and old parents or in-laws • financial difficulties **GRANDPARENTS** • episodic medical problems • degenerative diseases • chronic debilitating diseases • psychosomatic problems related to illness and loneliness • financial difficulties

Stage	Key Principle	Second Order Changes	First Order Change	Problems Encountered
Family with Adolescents	• Increasing flexibility of boundaries to include children independence	• Shifting of parent-child relationships to permit the adolescent to move in and out of the system. • Refocus on mid- life, marital and career issues. • **Beginning shift towards concern for the older generation.**	• Providing facilities for widely different needs. • Working out money matters in the family with teenagers • Sharing the tasks of responsibilities of family living. • Putting the marriage relationship into focus. • Keeping the communications system open. • Maintaining contacts with the extended family. • Growing into the world as a family and as a person. • Reworking and maintaining a philosophy of life.	**ADOLESCENT** • drug and other substance abuse disorders • STD • acne, bad odor • gynecologic problems • menstrual problems • allergies and other skin diseases circumcision • sexual experimentation leading to teenage pregnancy • ***homosexuality*** • conflict with parents • juvenile delinquency • depression secondary to peer pressure, identity crisis and secondary sex characteristics • child prostitution • suicidal tendencies **PARENTS** • common medical problems • OB-Gyne problems • pre-menopausal symptoms • alcoholism and other vices • Middle life crisis • male climacteric • extra-marital affairs • insecurities secondary to changing appearance
Launching Family	• Accepting a multitude of **entries and exits to the family system**	• Renegotiating of marital system as a dyad • **Development of adult to adult relationship between grown- up children and their parents.** • Realignment of relationship to include in-laws and grandchildren. • Dealing with **disabilities and death of parents, grandparents.**	• Adjusting to the physiologic changes of middle age. • Discovering new satisfaction in relation with spouse. • Setting up a comfortable home for themselves that accommodate periodically other members of the family. • Helping their adolescent children to free themselves and become responsible and happy adults with families of their own. • Re-examining their living arrangement with their own parents. • Adjusting to the reality of their own work situation. • Assuring security for their later years. • Participating in community life. • Reaffirming the values of life that have real meaning esp. dependent newly married children. • Sexual relationship with spouse.	**CHILDREN** • Episodic medical problems • OB-Gyne problems • Medical problems of adolescence • independence and dependency problem • juvenile delinquency • peer group pressure on vices problems of old relatives • conflict with parents • problems on adjustment to married life **PARENTS** • episodic medical problems • OB-Gyne • Degenerative diseases • Depression due to: • career stagnation • emptiness syndrome • over-dependent married children • early retirement, financial problems • extra-marital affairs • taking care of the sick parent or in-law • Adjustment of new member of the family through marriage.
Family in Later Years	• Accepting the shifting of generational goals	• Maintaining own and or couple functioning and interest in the face of physiologic decline, exploration of new familial and social options. • ***Support for more central role for middle generation.*** • **Making room in the system for the wisdom and experience of the elderly generation without over-functioning them.** • Dealing with loss of spouse, siblings and other peers and preparation for own death, life review and integration.	• Adjusting to physiologic changes of later life. • Re-examining their living arrangements. • Participating in-group activities. • **Maintaining contact with younger generations.**	**CHILDREN** • Episodic medical problems • OB-Gyne problems • Menopausal problems **PARENTS & GRANDPARENTS** • degenerative diseases • episodic medical problems • gynecologic problems • urologic problems • Depression due to death of spouse and sickness • psychosomatic problems • secondary to children leaving the home • loneliness • financial adjustment

Sample Questions - Family Life Cycle

1. Mm and Von are married with a 10-year old daughter. They reside in Antipolo Rizal as an EXTENDED FAMILY with Mm's parents. In their present STAGE of the FAMILY LIFE CYCLE, they should be able to:

A. increase flexibility of boundaries
B. accept parent-offspring separation
C. accepting marital system to make space for children
D. accept shifting of generational goals

2. The following are examples of 2nd ORDER CHANGES, EXCEPT:

A. 15-year old boy turns his bed-ridden father (i.e., S/P cerebrovascular accident) to prevent formation of pressure ulcers.
B. 17-year old girl left their house to live in a dorm within the school premises for her senior high school track.
C. 13-year old boy is slowly showing secondary sexual characteristics, such as facial and body hair.
D. 3-year old child learns to ride a three-wheeled bike for the very first time.

3.Which family life cycle requires that the system be flexible enough for the entry and exit of new members?

A. Newly Married Couple
B. Family with young children
C. Family with adolescents
D. Launching family

4. A key task in this family life cycle is accepting the multitude of exits and entries in the family system and the development of adult-to-adult relationships between parents and children.

A. Launching Family
B. Newly Married couple
C. Family in Later years
D. Unattached young adult

5. A 4/F was brought to the clinic due to cough and fever. On family history, she is an only child. Her father is an OFW and her mother is a housewife. What would be the adaptive task that this family faces at this stage in the family life cycle?

A. Increasing flexibility of family boundaries to include independence of children
B. Making room in the system for the wisdom and experience of the elderly generation without over- functioning them.
C. Pregnancy and childbirth is an important clinical concern
D. Accepting new members into the system, adopting and developing parenting roles

7. One of the changes that happens in families at this stage of the family life cycle is dealing with the disabilities and death of grandparents.

A. The family in later life
B. Launching family
C. Family with adolescents
D. Unattached young adult

7. Dealing with gender identity and sexual orientation can be stressful to the family. At what stage in the family life cycle is this problem usually encountered?

A. The unattached young adult
B. Family with young children
C. Family with adolescents
D. Launching family

8. Mark and Louise, both in their mid-40s, visit your clinic. Their children have recently left home to attend college, and they are experiencing feelings of emptiness and a desire to rekindle their relationship. What stage of the Family Life Cycle are Mark and Louise likely in?

A. Families with adolescents and young adults
B. Launching children and moving on
C. Families in later life
D. Childbearing families

9. Erica, a 22-year-old woman, comes to your clinic for a contraceptive consultation with her boyfriend. She mentions that they plan to get married once they finish their education and establish their careers. What stage of the Family Life Cycle are Erica and her boyfriend likely in?

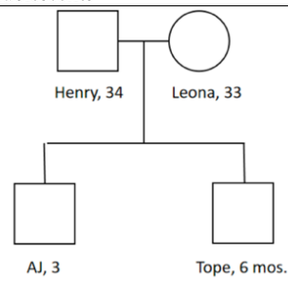
A. Unattached young adult
B. Families with adolescents and young adults
C. Families in later life
D. Launching children and moving on

10. Manuela , a 38-year-old single woman, visits your clinic with concerns about her future and the possibility of having a family. She expresses a desire to explore options for parenthood. What stage of the Family Life Cycle is Manuela likely in?

A. Unattached young adult
B. Families with adolescents and young adults
C. Launching children and moving on
D. Families in later life

11. Myron, a 26 year old with autism, was brought for consult due to rashes. She lives with her parents Julio and Dhang. Her brothers, 23 year old Denver, a nurse, and 21 year old Ian, an IT, are both already married and live separately. What is the stage of the family life cycle?

A. Unattached Young Adult
B. Launching Family
C. Family with Young Children
D. Family with Adolescents



12. Which first order task is applicable to this family?

A. Supplying adequate space, facilities and equipment for the expanding family.
B. Establishing a mutually satisfying system for getting and spending money
C. Extend social contact outside of home includes dating clubs, and recreation
D. Setting up a comfortable home for themselves that accommodate periodically other members of the family

13. For a family in later life, what change in family status is required to proceed developmentally?

A. Development of adult-to-adult relationships between grown-up offspring and their parents
B. Realignment of relationships with extended families and friends to include the spouse
C. Realignment of relationships with extended family to include parenting and grandparenting roles
D. Support for a more central role of middle generation

14. A.M., 16/F, is the only child of Mr. and Mrs. Mann. Her parents have been trying to conceive a child for 10 years now but did not succeed, so last year they decided to legally adopt a 2 year old boy. For the past six months, A.M. was found out to have been smoking cigarettes and secretly seeing her boyfriend after school hours. She was brought in to your clinic by her parents for their fear that she might have contracted an STD. During this stage, what is the emotional process of this transition?

A. Accepting a multitude of exits from and entries into the system
B. Accepting new members into the system
C. Commitment to the new system
D. Increasing flexibility of family boundaries to include children's independence and grandparent's frailties

15. N.B., 38/F, married, with two children aged 6 and 12. When doing family assessment, you know that the following are the first order changes her family needs to fulfill:

A. Sharing the tasks and responsibilities of family living
B. Help adolescents free themselves and become responsible adults
C. Meeting predictable and unexpected costs of family life
D. Establishing a system of intellectual and emotional communication

16. L.V. is a 34-year old newly married female physician. When doing family assessment, you know that the following are second order changes her family needs to fulfill:

A. Establishment of self in work
B. Realignment of relationships with extended family
C. Refocus on midlife, marital, and career issues
D. Realignment of the marital system as a dyad

17. Alyana, a 23 year old accountant, sought consult due to difficulty sleeping. On interviewing further, she claims that she and her husband Cardo are happily married. Despite their hectic schedules, they make sure that they have a "date night" once a month. Cardo also spends some time playing tennis with his friends while Alyana has her Zumba group. Which stage of marriage are they in?

A. Honeymoon Stage
B. Early Marriage Stage
C. Middle Marriage Stage
D. Long-Term Marriage Stage
E. Newly Married Couple Stage

18. Erica and Klein are married with a 2-year old son, residing as an EXTENDED FAMILY in Cebu with Klein's parents. In their present stage of the FAMILY LIFE CYCLE, they should be able to:

A. recognize shifting of generational goals
B. accept new members into the system
C. accept multitude of entries into and exits from the family system-
D. increase flexibility of boundaries

19. Mavelya and janelya were engaged for a year before they were married last year. which of the following changes in FAMILY STATUS will be required to PROCEED DEVELOPMENTALLY?

A. realignment of the relationships with extended families and friends, to include the spouse
B. beginning shift toward joint caring for the older generation
C. adjusting the marital system to make space for children
D. differentiation of the self in relation to the family of origin

20. All of the following represent FIRST ORDER CHANGES, in the context of the FAMILY LIFE CYCLE, EXCEPT:

A. A 19-year old teen gets his non-professional license and drives a car.
B. A 12-year old teen experiences her first menstrual period.
C. A new dad gives his newborn baby a full bath for the very first time.
D. A four-year old boy learns to write with pencil, using a tripod grasp.

21. Mew (33 years old, engineer) and Tul (32 years old, architect) recently got married. Which among these factors, if present, would make the ADJUSTMENT TO THIS FAMILY LIFE CYCLE STAGE more difficult for them?

A. One or both of them does / do not wish to distance from their family / families of origin.
B. The couple resides extremely close to or at a great distance from either family of origin.
C. The wedding occurred with family and friends present.
D. Marital patterns in either extended family are stable.

22. RR is a 46-year-old male diagnosed and managed for STAGE IV PANCREATIC CANCER. He has opted for HOSPICE AND PALLIATIVE MEDICINE at home, with the support of his nuclear family. As the attending Family and Community Medicine practitioner, you would do the following at this STAGE OF HIS ILLNESS:

A. Elicit the explanatory model of the patient about his stage IV pancreatic cancer.
B. Explore their understanding of the pancreatic cancer.
C. Explore the patient's reaction to therapeutic efforts offered by the Hospice and Palliative Medicine service.
D. Prepare the family for potential outcomes of his stage IV pancreatic cancer (i.e., death).

23. A 44-year-old single parent mother came into the barangay health center due to palpitations and irregularity of menses. Two months ago, her 17-year-old daughter eloped with her boyfriend, leaving her one high school daughter and two grade school sons behind. Which of the following statements is TRUE on the FAMILY LIFE CYCLE in this scenario?

A. This is a "launching family" stage because the first child has already left the house.
B. This is a "family with adolescents" because of the timing of perimenopausal symptoms and midlife crisis that is usually in this stage.
C. This is a "family with small children," as majority of those who are left are still young kids.
D. The elder daughter may be considered already in the "unattached young adult" stage because she has started a new life outside the family.

24. Which of the following represents SECOND ORDER CHANGES, based on the FAMILY LIFE CYCLE?

A. A father performs umbilical cord care to his first newborn child.
B. A resident physician trainee flies to Busan, South Korea for the very first time to present her research paper.
C. A four-year old kid rides his three-wheeled cycle for the first time.
D. A young couple invests on their memorial (i.e., death and burial) plans.

25. A 44-year-old single parent mother came into the barangay health center due to palpitations and irregularity of menses. Two months ago, her 17-year-old daughter eloped with her boyfriend, leaving her one high school daughter and two grade school sons behind. Which of the following statements is TRUE on the FAMILY LIFE CYCLE in this scenario?

A. This is a "family with small children," as majority of those who are left are still young kids.
B. This is a "launching family" stage because the first child has already left the house.
C. The elder daughter may be considered already in the "unattached young adult" stage because she has started a new life outside the family.
D. This is a "family with adolescents" because of the timing of perimenopausal symptoms and midlife crisis that is usually in this stage.

26. The Herrera family has been under your medical care for at least five years already. The middle child has been quite expressive about being a proud member of the LGBTQIA+ community, but has recently exhibited SUICIDAL TENDENCIES since the family started to experience FINANCIAL HARDSHIP. The father (main breadwinner) apparently has resorted to ALCOHOL BINGING after his business filed for bankruptcy due to a failed online multi-level marketing scheme. Such PSYCHOSOCIAL ISSUES are commonly encountered in which stage of the FAMILY LIFE CYCLE?

A. Family with Adolescents
B. Family with Young Children
C. Family in Later Years
D. Launching Family

27. After passing the Physician Licensure Examinations of the Philippine Board of Medicine, Roscoe (i.e., only child of a rich couple in Tagbilaran) decides to migrate to New Jersey, take the US Medicine Licensure Examination (USMLE), and pursue further clinical training in Family Medicine / Sports Medicine. Given this current scenario, what is the main EMOTIONAL PROCESS OF TRANSITION given this stage in the FAMILY LIFE CYCLE?

A. commitment to the new system
B. accepting a multitude of exits from and entries into the system
C. accepting new members into the system
D. accepting parent-offspring separation

Answers & Rationale - Family Life Cycle

1. Answer C
Family with Young Children
Second Order Changes

- Accepting marital system to make space for children
- Taking on parenting role
- Realignment of relationship with extended family to include parenting and grandparenting roles

A. increase flexibility of boundaries - **Family with Adolescents**
B. accept parent-offspring separation - **Unattached Young Adult**
C. accepting marital system to make space for children -
D. accept shifting of generational goals - **Family in Later Years**

2. Answer D

A. 15-year old boy turns his bed-ridden father (i.e., S/P cerebrovascular accident) to prevent formation of pressure ulcers. - **Change in the role and identity of family members – 2nd order**
B. 17-year old girl left their house to live in a dorm within the school premises for her senior high school track. **Change in the role and identity of family members –and** Occur **between stages** of the Family Life Cycle (Launching Family) **2nd order**
C. 13-year old boy is slowly showing secondary sexual characteristics, such as facial and body hair. - **involve a change in an individual's identity and self-image - 2nd order**
D. 3-year old child learns to ride a three-wheeled bike for the very first time. **Involve Increments Of Mastery And Adaptation – 1st Order**

- Second-order changes are fundamental shifts in the family's rules, roles, and structure. Options A (son becoming a caregiver), B (daughter leaving home), and C (son entering puberty) all represent or force major shifts in family roles and dynamics. Option D, a child learning a new motor skill, is a normal individual developmental milestone but is considered a first-order change as it does not fundamentally alter the family's rules or structure.

3. Answer D

A. Newly Married Couple - Commitment to the **new system**
B. Family with young children - Accepting **marital system** to make space for children
C. Family with adolescents - Increasing **flexibility of boundaries** to include children independence
D. Launching family - Accepting a multitude of **entries and exits to the family system**

- The key principle of the "Launching Family" stage is "Accepting a multitude of entries and exits to the family system," which includes children leaving home (exits) and the addition of in-laws and grandchildren (entries).

4. Answer A
Launching Family
- **Accepting a multitude of entries and exits to the family system (Key Principle)**
- **2nd Order Changes**
  - Renegotiating of marital system as a dyad
  - **Development of adult to adult relationship between grown-up children and their parents.**
  - Realignment of relationship to include in-laws and grandchildren.
  - Dealing with disabilities and death of parents, grandparents.

5. Answer D
Family with Young Children
- This stage starts with pregnancy for the first child to emergence of adolescents.

A. Increasing flexibility of family boundaries to include independence of children - **Family with Adolescents**
B. Making room in the system for the wisdom and experience of the elderly generation without over- functioning them. - **Family in Later Years**
C. Pregnancy and childbirth is an important clinical concern - **Family with Young Children**
D. Accepting new members into the system, adopting and developing parenting roles - **Newly Married Couple**

- A family with a 4-year-old child is in the "Family with Young Children" stage. The primary adaptive task for this stage, is adjusting to the presence of children, which involves "Accepting new members into the system" and developing effective parenting roles

6. Answer B
Launching Family
- Renegotiating of marital system as a dyad
- **Development of adult to adult relationship between grown- up children and their parents.**
- Realignment of relationship to include in-laws and grandchildren.
- **Dealing with disabilities and death of parents, grandparents.**
- Dealing with disabilities and death of parents, grandparents" is listed as a "Second Order Change" that occurs during the "Launching Family" stage, as the parents are in mid-life and their own parents (the grandparents) are aging.

7. Answer C
Family with Adolescents
- identity crisis and secondary sex characteristics
- homosexuality" and "identity crisis" under the "Problems Encountered" for the adolescent during the "Family with adolescents" stage. This is the period where issues of identity, including gender and sexuality, typically come to the forefront.

8. Answer B
Family in Later Years
- This begins with departure of last child and continues through retirement of one or both of the couple and ends when both are dead

9. Answer A
Unattached Young Adult
- At this stage, the young adult formulates personal goals in developing as an individual, **including forming a new family**.

10. Answer A
Unattached Young Adult
- At this stage, the young adult formulates personal goals in developing as an individual, including forming a new family.

11. Answer B
- The "Launching Family" stage begins when the first child leaves home and ends when the last one leaves.
- Since two of the three children have already left home, the parents' family system is in this stage.

12. Answer A
Nuclear Family
Family with Young Children

A. Supplying adequate space, facilities and equipment for the expanding family. - **Family with Young Children – 1st order**
B. Establishing a mutually satisfying system for getting and spending money - **Newly Married Couple – 1st order**
C. Extend social contact outside of home includes dating clubs, and recreation - **Unattached Young Adult - 1st order**
D. Setting up a comfortable home for themselves that accommodate periodically other members of the family - **Launching Family - 1st order**

13. Answer D
- The question asks for a required change for the "Family in Later Life" stage. The provided document lists "Support for more central role for middle generation" as a key "Second Order Change" for this stage, reflecting the shift of primary responsibility to the adult children

A. Development of adult-to-adult relationships between grown-up offspring and their parents **- Launching Family**
B. Realignment of relationships with extended families and friends to include the spouse **- Newly Married Couple**
C. Realignment of relationships with extended family to include parenting and grandparenting roles - **Family with Young Children**
D. Support for a more central role of middle generation - Family in Later Years

14. Answer D
- The family's primary developmental challenge presented in the scenario revolves around their 16-year-old daughter's behavior.
- This places them in the **"Family with Adolescents"** stage. The key principle or emotional process for this stage is "Increasing flexibility of family boundaries to include children's independence." A.M.'s secret activities are a classic example of an adolescent testing these boundaries

A. Accepting a multitude of exits from and entries into the system – **Launching Family**
B. Accepting new members into the system - **Family with Young Children**
C. Commitment to the new system – **Newly Married Couple**
D. Increasing flexibility of family boundaries to include children's independence and grandparent's frailties - **Family with Adolescents**

15. Answer A
- With the oldest child being 12, the family is entering the **"Family with Adolescents"** stage. According to the table, "Sharing the tasks of responsibilities of family living" is a key "First Order Change" for this stage, as the adolescent can now take on more duties. While they also have a younger child (making option C also relevant), the tasks of the most advanced stage typically define the family's current developmental focus.
- Family with Adolescents
  - This stage starts when the first child reaches adolescent age
  - In the Philippines adolescence starts at age 12

A. Sharing the tasks and responsibilities of family living - **Family with Adolescents – 1st order**
B. Help adolescents free themselves and become responsible adults - **Launching Family – 1st order**
C. Meeting predictable and unexpected costs of family life - **Family with Young Children- 1st order**
D. Establishing a system of intellectual and emotional communication - **Newly Married Couple – 1st Order**

16. Answer B
- The patient is in the **"Newly Married Couple"** stage. The provided table lists "Realignment of relationship with extended families and friends to include spouse" as a core "Second Order Change" for this stage

A. Establishment of self in work - Unattached Young Adult – **2nd order**
B. Realignment of relationships with extended family - Newly Married Couple – **2nd order**
C. Refocus on midlife, marital, and career issues - Family with Adolescents – **2nd order**
D. Realignment of the marital system as a dyad - Launching Family – **2nd order**

17. Answer B
- The scenario highlights two key tasks: "Keeping romance in the marriage" (date night) and "Balancing separateness and togetherness"

(separate hobbies). According to the "Stages of Marriage" table, these are the critical tasks of the **Early Marriage Stage (2-10 years)**.

STAGES OF MARRIAGE		
STAGES	**EMOTIONAL ISSUES**	**STAGE CRITICAL TASKS**
Honeymoon stage (0-2 years)	Commitment to the marriage	Differentiation from family origin Making room for spouse with family and friends Adjusting career demands
Early Marriage Stage (2-10 years)	Maturing of Relationship	Keeping romance in the marriage Balancing separateness and togetherness Renewing marriage commitment
Middle Marriage Stage (10-25 years)	Post-Care Review	Adjusting to mid-life changes Renegotiating relationship Renewing marriage commitment
Long-Term Marriage Stage (25 + years)	Farewells and Planning	Maintaining couple functioning Closing or adapting family home coping with death of spouse

18. Answer B

- A family with a 2-year-old son is in the **"Family with Young Children"** stage. The primary developmental task or "Second Order Change" for this stage is "Accepting new members into the system" and adopting parenting roles

Family with Young Children

A. recognize shifting of generational goals - **Family in Later Years**
B. accept new members into the system - **Family with Young Children**
C. accept multitude of entries into and exits from the family system- **Launching Family**
D. increase flexibility of boundaries - **Family with Adolescents**

19. Answer A

- As a couple that was "married last year," they are in the **"Newly Married Couple"** stage. To proceed developmentally, they must undergo the second-order changes for this stage, which include the "Realignment of relationships with extended families and friends to include the spouse."

20. Answer B

- **First-order changes** are tasks or adjustments within a stage (like learning a skill). Options A, C, and D are all examples of specific tasks or skills being learned.
- **Second-order changes** are fundamental shifts. Puberty (including a first menstrual period) is a major biological and psychosocial event that fundamentally changes the child's identity and forces the family system to adapt its rules and interactions.
- puberty as a driver of second-order change. Therefore, it is the exception

21. Answer A

- The key developmental task for the "Newly Married Couple" stage is the "Formation of marital system," which requires differentiation from one's family of origin.
- If a spouse is unable or unwilling to psychologically separate and prioritize the new marital system, it creates loyalty conflicts and boundary issues, making adjustment significantly more difficult

22. Answer D

- The patient has a terminal illness and is on hospice care. This places the family in **Stage V (Adjustment to the Permanency of the outcome)** of the Illness Trajectory. The primary role of the physician at this stage is to help the family manage the dying process and prepare them for the inevitable outcome, which is death. This includes providing support, ensuring quality care, and facilitating the grieving process

23. Answer A

- The "Launching Family" stage is defined as beginning when the first child leaves home. The 17-year-old daughter's elopement, while non-normative, constitutes the first "launch." Therefore, the family system has developmentally entered this stage, even while still dealing with tasks from the "Family with Adolescents" stage

24. Answer D

- Options A, B, and C all represent specific skills or tasks done *within* a life cycle stage (first-order changes). Option D, planning for one's own death, represents a profound psychological and philosophical shift. It corresponds to the "Farewells and Planning" emotional issue of the Long-Term Marriage stage and involves confronting mortality.
- This "Transformation of an individual's state and meaning" is the essence of a **second-order change.**

25. Answer B

- This is a repeat of question 23 with the options reordered. The "Launching Family" stage begins when the first child leaves home.
- As the 17-year-old has left, the family has entered this stage, making this statement the most accurate description of their current primary developmental task.

26. Answer A

- The provided reference document explicitly lists the problems described in the scenario under the **"Family with Adolescents"** stage. These include "suicidal tendencies" and identity issues (like "homosexuality") for the adolescent, and "alcoholism" and "job-related problems" for the parents who are often dealing with a "Middle life crisis."

27. Answer D

- Roscoe is a young adult establishing himself professionally and becoming independent from his family of origin by moving to another country. This places him and his family in the transition between the **"Unattached Young Adult"** and **"Launching"** stages.
- The key principle or emotional process for both the individual and the family system during this transition is "accepting parent-offspring separation."

Primary and Secondary Care - Use of the PFC Matrix

Non-Communicable Diseases in Primary and Secondary Care

Bronchial Asthma

- is described as a **heterogenous disease**, usually characterized by **chronic airway inflammation**.
- is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness and cough, that vary over time and in intensity, together with variable expiratory airflow limitation.
- It is common and affects 1-29% of the population in different countries.
- According to the World Health Organization, it is also in these countries that asthma is under-diagnosed and under-treated.
- *The symptoms and airflow limitation from asthma is described as varying over time and intensity.*
- Its features can resolve spontaneously, respond to medications or be absent for weeks or months.
  - However, asthma exacerbations can also occur which can lead to death.
  - In addition, the majority of deaths due to asthma happen in low- and middle-income countries.
- Asthma poses a threat to the productivity of individuals and to the economics of families and the community, hence, it is important that asthma recognition and management is strengthened at the primary care level.

Asthma Overview	
Risk Factors	• Tobacco smoke exposure • Occupational exposure to noxious aerosols • Allergic rhinitis • Obesity
Prevention	The development of asthma cannot be prevented but exacerbations can be prevented and symptoms can be controlled by the identification and avoidance of asthma "triggers" and respiratory irritants e.g. allergens, fumes, cigarette exposure (secondary and tertiary prevention)(See General Wellness and Preventive Measures for general guidance).
Screening	Not applicable
Diagnosis	**Minimum at primary care.** Consider probable asthma by clinical history among patients with typical symptoms. **Gold Standard.** Confirm the diagnosis of asthma through spirometry pre-and post-bronchodilator. **Additional laboratory tests depending on the clinical indication.** PEF with reversibility test, bronchial provocation test, allergy tests, Chest X-ray, sputum eosinophil count, FeNO.
Pharmacologic Treatment	**Reliever.** First-line reliever is inhaled corticosteroid (ICS)-formoterol. Second-line reliever is ICS-short acting beta-agonist (SABA). SABA alone treatment is not recommended. **Maintenance.** Stepwise approach depending on clinical presentation and asthma control is followed for maintenance therapy.
Non-pharmacologic management	• Patient education, written asthma plan • Smoking and vape use cessation • Weight reduction among overweight and obese patients • Mental health assessment for anxiety/panic attacks • Food allergen avoidance • Avoidance of occupational/domestic triggers • Influenza vaccination every year • Breathing exercises

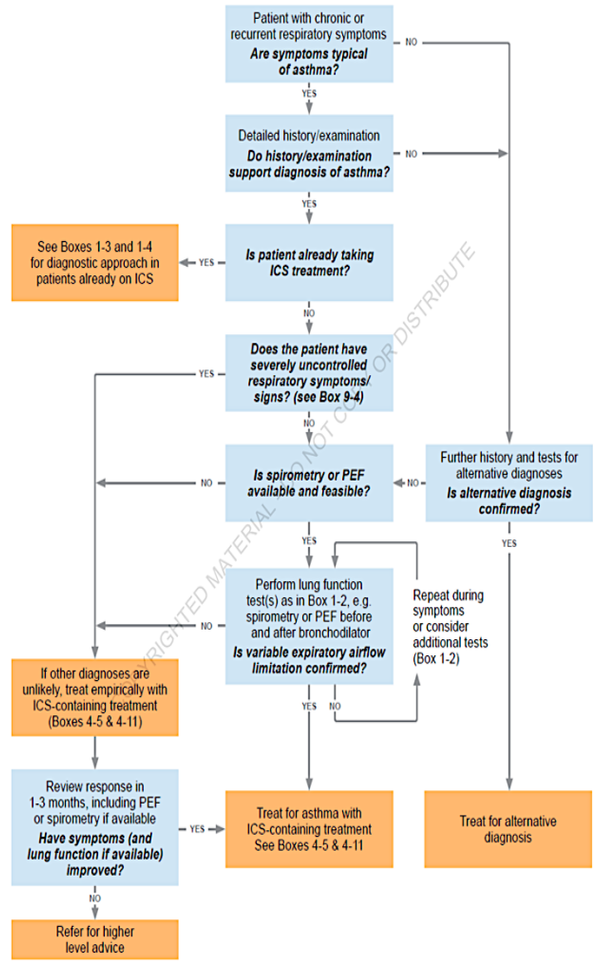
Signs and Symptoms

- Consider asthma among adults presenting with the following.
  - Wheezing, shortness of breath, chest tightness, and cough that vary over time, including in their frequency and intensity
  - Symptoms that are often worse at night or in the early morning
  - Symptoms that are triggered by viral infections (colds), exercise, allergen exposure, changes in weather, laughter, or irritants such as car exhaust fumes, strong smells, cigarette or vape smoke

Diagnostic Tests

- **Minimum at primary care.** Consider the diagnosis of probable asthma by clinical history among patients presenting with typical symptoms that respond promptly and completely to therapy
  - Consider classifying asthma severity into mild, moderate, and severe based on difficulty to treat or the level of treatment required to control the patient's symptoms and exacerbations after at least several months of treatment
  - Consider classifying asthma as well-controlled, partly controlled, or uncontrolled using the GINA symptom control tool
- **Gold standard.** Confirm the diagnosis of asthma among adults with clinical history of asthma symptoms through spirometry pre- and post-bronchodilator to demonstrate variable expiratory airflow limitation.
  - Excessive variability in lung function: increase in FEV1 of >12% and >200 ml compared with pre-bronchodilator values, AND
  - Expiratory airflow limitation: FEV1/FVC reduced compared with lower limit of normal (usually >0.75-0.80 in adults)
  - Many health professionals do not have access to spirometry. If so, peak expiratory flow (PEF) should be used, rather than relying on symptoms alone.
- **Other laboratory tests.** Additional laboratory tests may be requested depending on the clinical indication and the availability of the test:
  - May use peak expiratory flow (PEF) with reversibility test to confirm variable expiratory flow in diagnosing asthma. Consider PEF also for short and long-term monitoring of asthma.
  - May use bronchial provocation test to assess airway hyperresponsiveness.
  - Consider performing allergy tests to determine presence of atopy which increases the probability that a patient with respiratory symptoms has allergic asthma.
  - Consider performing imaging studies such as Chest X-ray to investigate the possibility of comorbid conditions or alternative diagnoses in those with difficult-to-treat asthma
  - Consider requesting for sputum eosinophil count among adult patients with moderate or severe asthma for adjusting ICS-containing maintenance.
  - Consider requesting for fractional concentration of exhaled nitric oxide (FeNO) among young adults with asthma for adjusting ICS-containing maintenance.

Diagnostic flowchart for adults, adolescents and children 6-11 years in clinical practice



Box 1-2. Criteria for initial diagnosis of asthma in adults, adolescents, and children 6–11 years

1. HISTORY OF TYPICAL VARIABLE RESPIRATORY SYMPTOMS	
Feature	*Symptoms or features that support the diagnosis of asthma*
Wheeze, shortness of breath, chest tightness and/or cough (Descriptors may vary between cultures and by age)	• Symptoms occur variably over time and vary in intensity • Symptoms are often worse at night or on waking • Symptoms are often triggered by exercise, laughter, allergens, cold air • Symptoms often appear or worsen with viral infections
2. CONFIRMED VARIABLE EXPIRATORY AIRFLOW LIMITATION	
Feature	*Considerations, definitions, criteria*
Excessive variability in expiratory lung function (one or more of the following):	The greater the variations, or the more occasions excess variation is seen, the more confident the diagnosis of asthma. If initially negative, tests can be repeated during symptoms or in the early morning. If spirometry is not possible, PEF† may be used, but it is less reliable.
Positive bronchodilator (BD) responsiveness (reversibility) test with spirometry (or PEF†)	*Adults*: increase from baseline in FEV_1 or FVC of ≥12% and ≥200 mL, with greater confidence if the increase is ≥15% and ≥400 mL; or increase in PEF† ≥20% if spirometry is not available. *Children*: increase from baseline in FEV_1 of ≥12% predicted (or in PEF† of ≥15%). Measure change 10–15 minutes after 200–400 mcg salbutamol (albuterol) or equivalent, compared with pre-BD readings. Positive test more likely if BD withheld before test: SABA ≥4 hours, long-acting bronchodilators 24–48 hours (see below).
Excessive variability in twice-daily PEF over 2 weeks*	*Adults*: average daily diurnal PEF variability >10%* *Children*: average daily diurnal PEF variability >13%*
Increase in lung function after 4 weeks of treatment	*Adults*: increase from baseline in FEV_1 by ≥12% and ≥200 mL (or PEF† by ≥20%) after 4 weeks of daily ICS-containing treatment *Children*: increase from baseline in FEV_1 of ≥12% predicted (or in PEF† of ≥15%).
Positive bronchial challenge test	*Adults*: Fall from baseline in FEV_1 of ≥20% with standard doses of methacholine, or ≥15% with standardized hyperventilation, hypertonic saline or mannitol challenge, or >10% and >200 mL with standardized exercise challenge. *Children*: fall from baseline in FEV_1 of >12% predicted (or fall in PEF† >15%) with standardized exercise challenge. If FEV_1 decreases during a challenge test, check that FEV_1/FVC ratio has also decreased, since incomplete inhalation, e.g., due to inducible laryngeal obstruction or poor effort, can result in a false reduction in FEV_1.
Excessive variation in lung function between visits (good specificity but poor sensitivity)	*Adults*: variation in FEV_1 of ≥12% and ≥200 mL (or in PEF† of ≥20%) between visits. *Children*: variation in FEV_1 of ≥12% (or ≥15% in PEF†) between visits

Box 1-4. Steps for confirming the diagnosis of asthma in a patient already taking ICS-containing treatment

Current status	Steps to confirm the diagnosis of asthma
Variable respiratory symptoms and variable airflow limitation	**Diagnosis of asthma is confirmed.** Assess the level of asthma control (Box 2-2A and Box 2-2B, p.37) and review ICS-containing treatment (Box 4-6, p.77; Box 4-12, p.96.)
Variable respiratory symptoms but no variable airflow limitation	**Consider repeating spirometry** (or PEF*) after withholding bronchodilator (4 hrs for SABA, 24–48 hrs for long-acting bronchodilators (see below) or during symptoms. Check between-visit variability of FEV_1, and bronchodilator responsiveness. If still normal, consider other diagnoses (Box 1-3, p.27). *If FEV_1 (or PEF*) is >70% predicted*: consider stepping down ICS-containing treatment (see Box 1-5, p.32) and reassess in 2–4 weeks, then consider bronchial provocation test or repeating bronchodilator responsiveness test. *If FEV_1 (or PEF*) is <70% predicted*: consider starting or stepping up maintenance ICS-containing treatment for 3 months (Box 4-6, p.77), then reassess symptoms and lung function. If no response, resume previous ICS dose and refer patient for diagnosis and investigation.
Few respiratory symptoms, normal lung function, and no variable airflow limitation	**Consider repeating BD responsiveness test** again after withholding bronchodilator as above or during symptoms. If normal, consider investigation for alternative diagnoses (Box 1-3, p.27). **Consider stepping down ICS-containing treatment** (see Box 1-5, p.32): • *If symptoms emerge and lung function falls*: asthma is confirmed. Step up ICS-containing treatment to previous lowest effective dose. • *If no change in symptoms or lung function at lowest controller step*: consider ceasing maintenance ICS-containing treatment, or switching to as-needed-only ICS-formoterol, and monitor patient closely for at least 12 months (Box 4-13, p.102).
Persistent shortness of breath and persistent airflow limitation	**Consider stepping up ICS-containing treatment for 3 months** (Box 4-6, p.77), then reassess symptoms and lung function. If no response, resume previous ICS dose and refer patient for further investigation and management, or manage as for patients with features of both asthma and COPD (Section 7, p.131).

Box 1-5. How to step-down ICS-containing treatment to help confirm the diagnosis of asthma

1. ASSESS

- Document the patient's current status including asthma symptom control and risk factors (Box 2-2, p.37) and lung function. If the patient has risk factors for asthma exacerbations (Box 2-2B), step down treatment only with close supervision.
- Choose a suitable time (e.g., no respiratory infection, not going away on vacation, not pregnant).
- Provide a written asthma action plan (Box 9-2, p.162) so the patient/caregiver knows how to recognize and respond if symptoms worsen. Ensure they will have enough medication to be able to resume their previous dose if their asthma worsens after stepping down.

2. ADJUST

- Show the patient/caregiver how to reduce their ICS dose by 25–50%, or stop other maintenance medication (e.g., LABA) if being used. See step-down options in Box 4-13, p.102. Schedule a review visit for 2–4 weeks.

3. REVIEW RESPONSE

- Repeat assessment of asthma control and lung function tests in 2–4 weeks (Box 1-2, p.26).
- If symptoms increase and variable expiratory airflow limitation is confirmed after stepping down treatment, the diagnosis of asthma is confirmed. The patient should be returned to their lowest previous effective treatment.
- If, after stepping down to a low-dose ICS-containing treatment, symptoms do not worsen and there is still no evidence of variable expiratory airflow limitation to confirm the diagnosis of asthma, consider ceasing ICS-containing treatment and repeating asthma control assessment and lung function tests in 2–3 weeks, but follow the patient for at least 12 months.[29]

Box 2-1. Summary of assessment of asthma in adults, adolescents, and children 6–11 years

1. Assess asthma control = symptom control AND future risk of adverse outcomes

- Assess symptom control over the last 4 weeks (Box 2-2A, p.37) or longer.
- Identify any other risk factors for exacerbations, persistent airflow limitation or side-effects (Box 2-2B).
- Measure lung function at diagnosis/start of treatment, 3–6 months after starting ICS-containing treatment, then periodically, e.g., at least once every 1–2 years, but more often in at-risk patients and those with severe asthma.

2. Assess treatment issues

- Document the patient's current treatment step (Box 4-6, p.77).
- Watch inhaler technique (Box 5-2, p.110), assess adherence (Box 5-3, p.112) and side-effects.
- Check that the patient has a written asthma action plan.
- Ask about the patient's attitudes and goals for their asthma and medications.

3. Assess multimorbidity

- Rhinitis, rhinosinusitis, gastroesophageal reflux, obesity, obstructive sleep apnea, depression and anxiety can contribute to symptoms and poor quality of life, and sometimes to poor asthma control (see Section 6, p.117).

Box 2-2. GINA assessment of asthma control at clinical visits in adults, adolescents and children 6–11 years

A. Recent asthma symptom control (but also ask the patient/caregiver about the whole period since last review#)

In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes☐ No☐			
• SABA* reliever for symptoms more than twice/week?	Yes☐ No☐			
• Any activity limitation due to asthma?	Yes☐ No☐			

B. Risk factors for poor asthma outcomes

Assess risk factors at diagnosis and periodically, particularly for patients experiencing exacerbations.

Measure FEV_1 at start of treatment, after 3–6 months of ICS-containing treatment to record the patient's personal best lung function, then periodically for ongoing risk assessment.

a. Risk factors for exacerbations

Uncontrolled asthma symptoms: Having uncontrolled symptoms is an important risk factor for exacerbations.[85]

Factors that increase the risk of exacerbations even if the patient has few asthma symptoms†

SABA over-use: High SABA use (≥3 x 200-dose canisters/year associated with increased risk of exacerbations, increased mortality particularly if ≥1 canister per month)[86-89]

Inadequate ICS: not prescribed ICS, poor adherence,[90] or incorrect inhaler technique[91]

Other medical conditions: Obesity,[92,93] chronic rhinosinusitis,[93] GERD,[93] confirmed food allergy,[94] pregnancy[95]

Exposures: Smoking,[96] e-cigarettes,[97] allergen exposure if sensitized,[96,98] air pollution[99-102]

Psychosocial: Major psychological or socioeconomic problems[103,104]

Lung function: Low FEV_1 (especially <60% predicted),[96,105] high bronchodilator responsiveness[93,106,107]

Type 2 inflammatory markers: Higher blood eosinophils,[93,108,109] high FeNO (adults with allergic asthma on ICS)[110]

Exacerbation history: Ever intubated or in intensive care unit for asthma;[111] ≥1 severe exacerbation in last year[112,113]

b. Risk factors for developing persistent airflow limitation

History: Preterm birth, low birth weight and greater infant weight gain,[114] chronic mucus hypersecretion[115,116]

Medications: Lack of ICS treatment in patient with history of severe exacerbation[117]

Exposures: Tobacco smoke,[115] noxious chemicals; occupational or domestic exposures[62]

Investigation findings: Low initial FEV_1,[116] sputum or blood eosinophilia[116]

c. Risk factors for medication side-effects

Systemic Frequent OCS, long-term, high-dose and/or potent ICS, P450 inhibitors[118]

Local: High-dose or potent ICS,[118,119] poor inhaler technique[120]

Treatment

- Test before treating, wherever possible, i.e., document the evidence for the diagnosis of asthma before starting inhaled corticosteroid (ICS)-containing treatment, as it is often more difficult to confirm the diagnosis once asthma control has improved.
- **Pharmacologic Therapy.** Follow a step-wise approach to pharmacologic therapy treatment to achieve control of asthma. Do not give short-acting beta-agonist (SABA)-only treatment in adults with asthma since those treated with SABA alone compared with inhaled corticosteroid (ICS) are at increased risk of asthma-related death and urgent asthma-related healthcare

- **Step 1.** I If patient has infrequent symptoms, e.g. less than twice a month and no risk factors for exacerbations, including no exacerbations in the last 12 months:
  - **First-line therapy.** As-needed low-dose ICS-formoterol [e.g. budesonide-formoterol combination metered dose inhaler (MDI) 160mcg-4.5mcg/inhalation or dry powder inhaler (DPI) 200 mcg-6 mcg/inhalation, 1 inhalation].
  - **Alternative therapy.** Low dose ICS taken whenever SABA is taken, in combination or separate inhaler.
- **Step 2.** If patient has symptoms or need for reliever twice a month or more:

- **First-line therapy.** As-needed low-dose ICS formoterol
- Alternative. May give any of the following:
  - Daily low-dose ICS plus as-needed SABA
  - As-needed low-dose ICS-SABA
  - Daily leukotriene receptor antagonist (LTRA) plus as-needed SABA, although LTRA were found to be less effective than ICS, particularly for exacerbations

- **Step 3.** If patient has troublesome symptoms on most days e.g. 4-5 days a week, or waking due to asthma once a week or more, especially if with risk factors for exacerbations (smoking, allergen exposure if sensitized, previous intubation or intensive care unit stay for asthma, low FEV1 esp. <60% predicted, obesity, food allergy, chronic rhinosinusitis, and poor adherence/inhaler technique):
  - **First Line.** Low-dose ICS-formoterol maintenance-and-reliever therapy (MART).
  - **Alternative. May give any of the following:**
    - Daily low-dose ICS-long acting beta-agonist (LABA) plus as-needed SABA (Evidence A) or plus as-needed ICS-SABA
    - Daily medium-dose ICS plus as-needed SABA (Evidence A) or plus as-needed ICS-SABA.
    - Daily low dose ICS and LTRA daily plus as needed- SABA
    - Daily low dose ICS and low-dose, sustained release theophylline daily plus as needed SABA
- **Step 4.** If patient initially presented with severely uncontrolled asthma, or with an acute exacerbation, daily symptoms, waking with asthma once a week or more, and low lung function:
  - **First Line.** May give medium-dose ICS-formoterol maintenance and reliever therapy (MART) and a short course of oral corticosteroids.
  - **Alternative. May give any of the following:**
    - Daily medium-high-dose ICS-LABA plus as-needed SABA or plus as-needed ICS-SABA
    - High-dose ICS plus as-needed SABA
    - Add-on long-acting muscarinic antagonist (LAMA) to ICS-LABA or switch to ICS-LAMA-LABA (Evidence A) plus as-needed SABA
    - Add-on LTRA to medium or high-dose ICS as controller
    - Add-on theophylline to medium or high-dose ICS as controller

- Consider stepping down gradually to find the patient's lowest treatment when good asthma control is achieved and maintained for 2-3 months.
- Consider stepping up when symptoms are confirmed to be due to asthma and not from common problems such as inhaler technique, adherence, allergen exposure, and multimorbidity

Non-pharmacologic therapy. Consider providing or teaching the following non-pharmacologic interventions to improve asthma control:
- Patient education to address the mentioned common problems.
- Written asthma action plan for patient use, including short-term changes to their treatment in response to changes in their symptoms and/or PEF and when to access medical care.
- Smoking cessation, including cessation of vape use through providing access to counseling and smoking cessation programs.
- Strategies for weight reduction among overweight and obese patients with asthma.
- Mental health assessment for patients with symptoms of asthma and anxiety. May also provide advice about management of panic attacks.
- Food allergen avoidance to reduce risk of asthma exacerbation.
- Exposure avoidance among those with occupational/domestic asthma triggers.
- Utilization of non-polluting heating and cooking sources of pollutants to be vented outdoors where possible.
- Influenza vaccination every year.

Treatment

- Breathing exercises to supplement pharmacotherapy for symptom relief and improvement of quality of life.

Box 4-3. Asthma treatment tracks for adults and adolescents

Asthma treatment for adults and adolescents is in two Tracks

For adults and adolescents, the main treatment figure (Box 4-6, p.77), shows the options for ongoing treatment as two treatment 'tracks'. The key difference is the medication that is used for symptom relief. In Track 1 (preferred), the reliever is as needed low-dose ICS formoterol, and in Track 2, as-needed SABA or as-needed ICS-SABA.

The reasons for showing treatment in two tracks are:

- to show clinicians how treatment can be stepped up and down using the same reliever at each step
- because ICS-formoterol cannot be used as the reliever in patients prescribed a combination ICS with non-formoterol LABA, due to lack of evidence about efficacy and safety (p.69).[14]

Track 1: The reliever is as-needed low-dose ICS-formoterol

This is the preferred approach recommended by GINA for adults and adolescents, because using low-dose ICS formoterol (an anti-inflammatory reliever; AIR) reduces the risk of severe exacerbations compared with regimens that use SABA as reliever, with similar symptom control. In addition, the treatment regimen is simpler, with patients using a single medication for reliever and for maintenance treatment if prescribed, across treatment steps.

- With this approach, when a patient at any treatment step has asthma symptoms, they use low-dose ICS-formoterol in a single inhaler for symptom relief. In Steps 1–2, this provides their anti-inflammatory therapy.
- In Steps 3–5, patients also take ICS formoterol as their daily maintenance treatment; together, this is called 'maintenance-and-reliever therapy' (MART).
- Medications and doses for GINA Track 1 are shown in Box 4-8 (p.84).

Track 2: The reliever is as-needed SABA or as-needed ICS-SABA

This is an alternative approach if Track 1 is not possible, or if a patient's asthma is stable with good adherence and no exacerbations on their current therapy. However, before prescribing a regimen with SABA reliever, consider whether the patient is likely to be adherent with their maintenance therapy, as otherwise they will be at higher risk of exacerbations.

- In Step 1, the patient takes a SABA and a low-dose ICS together for symptom relief when symptoms occur (in a combination inhaler, or with the ICS taken immediately after the SABA).
- In Steps 2–5, a SABA (alone) or combination ICS-SABA is used for symptom relief, and the patient takes maintenance ICS-containing medication regularly every day. If the reliever and maintenance medication are in different devices, make sure that the patient can use each inhaler correctly.
- If changing between steps requires a different inhaler device, train the patient how to use the new inhaler.

Stepping up and down

Treatment can be stepped up or down along one track, using the same reliever at each step, or it can be switched between tracks, according to the individual patient's needs and preferences. Before stepping up, check for common problems such as incorrect inhaler technique, poor adherence, and environmental exposures, and confirm that the symptoms are due to asthma (Box 2-4, p.47).

Additional controller options

The additional controller options, shown below the two treatment tracks, have either limited indications or less evidence for their safety and/or efficacy, compared with the treatments in Tracks 1 and 2.

Box 4-4. Initial asthma treatment for adults and adolescents with a diagnosis of asthma

These recommendations are based on evidence, where available, and on consensus.

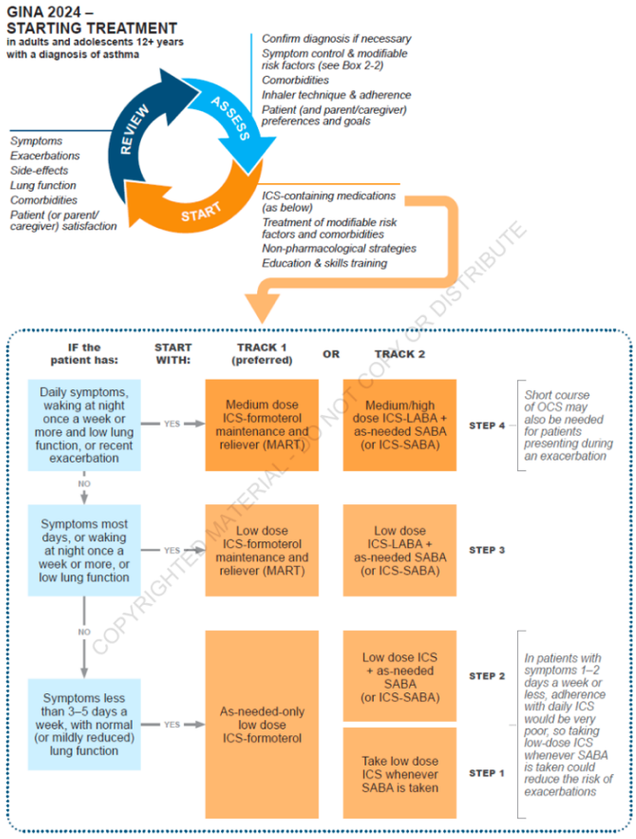
Presenting symptoms	Preferred INITIAL treatment (Track 1)	Alternative INITIAL treatment (Track 2)
Infrequent asthma symptoms, e.g., 1–2 days/week or less	**As-needed low-dose ICS-formoterol** (Evidence A)	**Low-dose ICS taken whenever SABA is taken**, in combination or separate inhalers (Evidence B). Such patients are highly unlikely to be adherent with daily ICS.
Asthma symptoms less than 3–5 days/week, with normal or mildly reduced lung function		**Low-dose ICS plus as-needed SABA** (Evidence A). Before choosing this option, consider likely adherence with daily ICS.
Asthma symptoms most days (e.g., 4–5 days/week or more); or waking due to asthma once a week or more, or low lung function. See p.80 for additional considerations for starting at Step 3.	**Low-dose ICS-formoterol maintenance-and-reliever therapy** (MART) (Evidence A)	**Low-dose ICS-LABA plus as-needed SABA** (Evidence A) or plus as-needed ICS-SABA (Evidence B), **OR** Medium-dose ICS plus as-needed SABA (Evidence A) or plus as-needed ICS-SABA (Evidence B). Consider likely adherence with daily maintenance treatment.
Daily asthma symptoms, waking at night with asthma once a week or more, with low lung function	**Medium-dose ICS-formoterol maintenance-and-reliever therapy** (MART) (Evidence D).	**Medium- or high-dose ICS-LABA** (Evidence D) plus as-needed SABA or plus as-needed ICS-SABA. Consider likely adherence with daily maintenance treatment. High-dose ICS plus as-needed SABA is another option (Evidence A) but adherence is worse than with combination ICS-LABA.
Initial asthma presentation is during an acute exacerbation	Treat as for exacerbation (Box 9-4, p.167 and Box 9-6, p171), including short course of OCS if severe; commence medium-dose MART (Evidence D).	Treat as for exacerbation (Box 9-4, p.167 and Box 9-6, p.171), including short course of OCS if severe; commence medium- or high-dose ICS-LABA plus as-needed SABA (Evidence D).

Before starting initial controller treatment

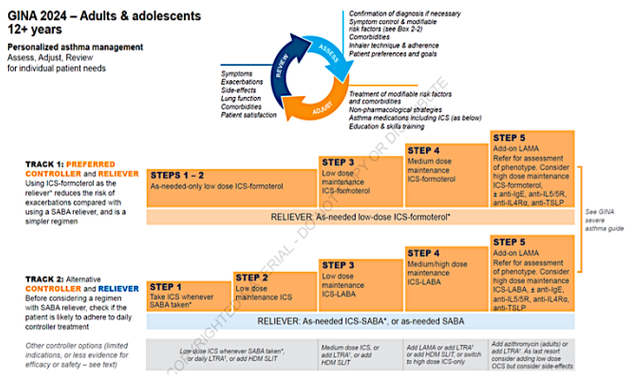
- Record evidence for the diagnosis of asthma.
- Record the patient's level of symptom control and risk factors, including lung function (Box 2-2, p.37).
- Consider factors influencing choice between available treatment options (Box 3-4, p.54), including likely adherence with daily ICS-containing treatment, particularly if the reliever is SABA.
- Choose a suitable inhaler (Box 5-1, p.109) and ensure that the patient can use the inhaler correctly.
- Schedule an appointment for a follow-up visit.

After starting initial controller treatment

- Review patient's response (Box 2-2, p.37) after 2–3 months, or earlier depending on clinical urgency.
- See Box 4-6 (p.77) for recommendations for ongoing treatment and other key management issues.
- Check adherence and inhaler technique frequently.
- Step down treatment once good control has been maintained for 3 months (Box 4-13, p.102).



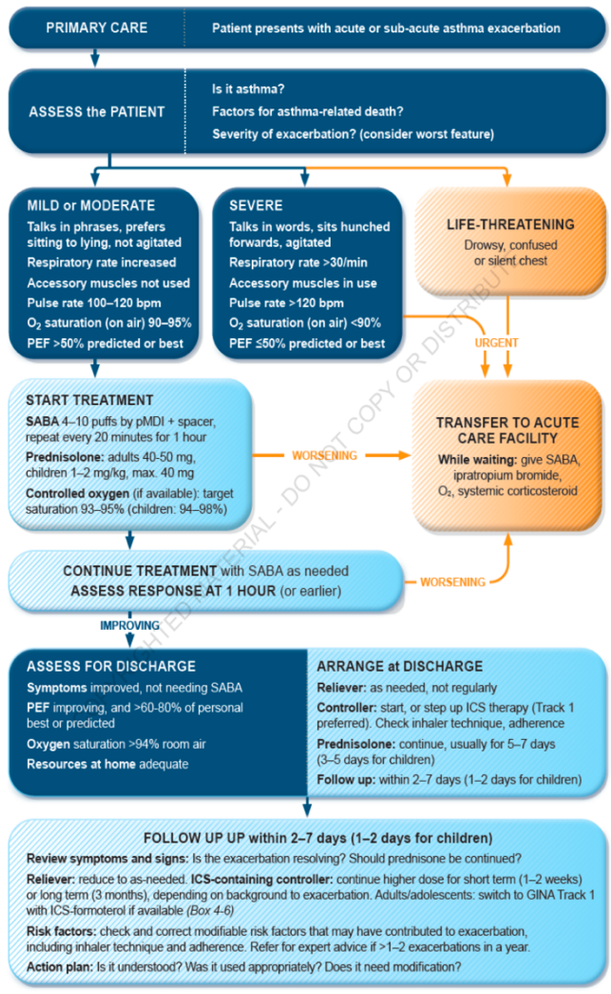
Box 4-6. Personalized management for adults and adolescents to control symptoms and minimize future risk



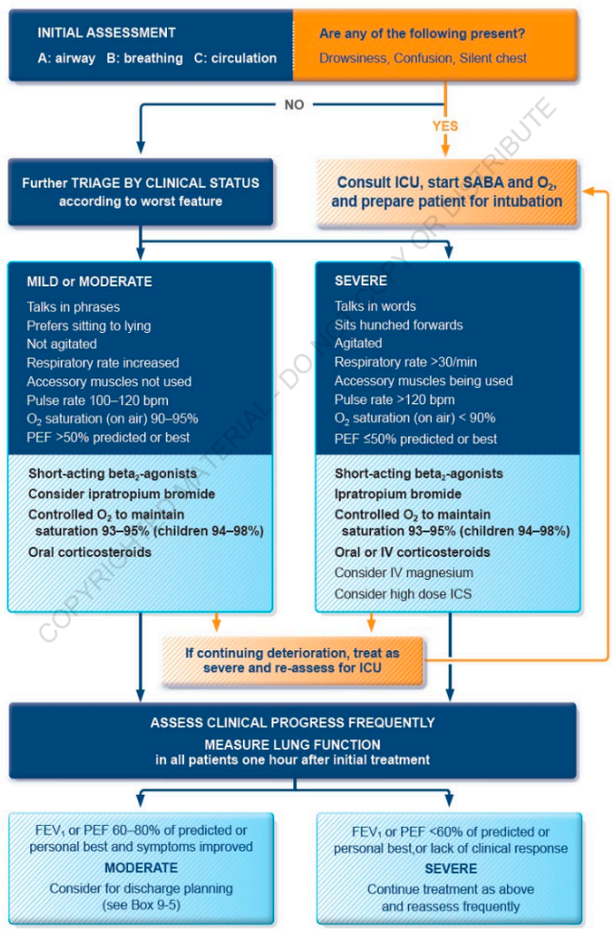
Box 4-1. Terminology for asthma medications

Term	Definition	Notes
Maintenance treatment	Asthma treatment that is prescribed for use every day (or on a regularly scheduled basis)	Medications intended to be used continuously, even when the person does not have asthma symptoms. Examples include ICS-containing medications (ICS, ICS-LABA, ICS-LABA-LAMA), as well as LTRA† and biologic therapy. The term 'maintenance' describes the prescribed frequency of administration, not a particular class of asthma medicine.
Controller	Medication targeting both domains of asthma control (symptom control and future risk)	In the past, 'controller' was largely used for ICS-containing medications prescribed for regular daily treatment, so 'controller' and 'maintenance' became almost synonymous. However, this became confusing after the introduction of combination ICS-containing relievers for as-needed use. To avoid confusion, 'ICS-containing treatment' and 'maintenance treatment' have been substituted as appropriate where the intended meaning was unclear.
Reliever	Asthma inhaler taken as needed, for quick relief of asthma symptoms	Sometimes called rescue inhalers. As well as being used for symptom relief, reliever inhalers can also be used before exercise, to prevent exercise-induced asthma symptoms. Includes SABAs (e.g., salbutamol [albuterol], terbutaline, ICS-salbutamol), as-needed ICS-formoterol, and as-needed ICS-SABA. SABA-containing relievers should not be used for regular maintenance use, or to be taken when the person does not have asthma symptoms (except before exercise).
Anti-inflammatory reliever (AIR)	Reliever inhaler that contains both a low-dose ICS and a rapid-acting bronchodilator	Includes budesonide-formoterol, beclometasone-formoterol and ICS-salbutamol combinations. Patients can also use AIRs as needed before exercise or allergen exposure to prevent asthma symptoms and bronchoconstriction. Non-formoterol LABAs in combination with ICS cannot be used as relievers. ICS-formoterol should not be used as the reliever with maintenance ICS-non-formoterol LABAs (p.69).[14] The anti-inflammatory effect of as-needed ICS-formoterol was demonstrated by reduction in FeNO in several studies.[187,188,294] Some anti-inflammatory relievers can be used as-needed at Steps 1–2 as the person's sole asthma treatment, without a maintenance treatment ('**AIR-only**' treatment). Almost all evidence for this is with ICS-formoterol. Some ICS-formoterol combinations can be used as both maintenance treatment and reliever treatment at Steps 3–5 (see **MART**, below). For medications and doses, see Box 4-8 (p.84).
Maintenance-and-reliever therapy (MART)	Treatment regimen in which the patient uses an ICS-formoterol inhaler every day (maintenance dose), and also uses the same medication as needed for relief of asthma symptoms (reliever doses)	**MART** (**M**aintenance-**A**nd-**R**eliever **T**herapy) can be used only with combination ICS-formoterol inhalers such as budesonide-formoterol and beclometasone-formoterol. Other ICS-formoterol inhalers can also potentially be used, but combinations of ICS with non-formoterol LABAs, or ICS-SABA, cannot be used for MART. MART is also sometimes called SMART (single-inhaler maintenance-and-reliever therapy); the meaning is the same. For medications and doses, see Box 4-8 (p.84).

Management of asthma exacerbations in primary care (adults, adolescents, children 6-11 years)



Management of asthma exacerbations in acute care facility (e.g., emergency department)



Box 3-2. Long-term goal of asthma management

The goal of asthma management is to achieve the best possible long-term asthma outcomes for the patient:

- Long-term asthma symptom control, which may include:
  - Few/no asthma symptoms
  - No sleep disturbance due to asthma
  - Unimpaired physical activity
- Long-term asthma risk minimization, which may include:
  - No exacerbations
  - Improved or stable personal best lung function
  - No requirement for maintenance systemic corticosteroids
  - No medication side-effects.

The patient's goals for their asthma may be different from these medical goals; ask the patient what they want from their asthma treatment.

When discussing the best possible asthma outcomes with a patient, consider their goals, their asthma phenotype, clinical features, multimorbidity, risk factors (including severity of airflow limitation), practical issues including the availability and cost of medications, and the potential adverse effects of treatment (Box 3-4, p.54).

Assessing symptom control is NOT enough: the patient's risk factors (Box 2-2B, p.37), including history of exacerbations, should always also be assessed.

Symptom control and risk may be discordant: patients with few or no symptoms can still have severe or fatal exacerbations, including from external triggers such as viral infections, allergen exposure (if sensitized) or pollution.

Box 3-6. Non-pharmacological interventions – summary (see following text for details)

Intervention	Advice/recommendation	Evidence
Cessation of smoking, environmental tobacco exposure (ETS) and vaping	• At every visit, strongly encourage people with asthma who smoke or vape to quit. Provide access to counseling and smoking cessation programs (if available).	A
	• Advise parents/caregivers of children with asthma not to smoke or vape, and not to allow smoking or vaping in rooms or cars that their children use.	A
	• Strongly encourage people with asthma to avoid environmental smoke exposure.	B
	• Assess smokers/ex-smokers for COPD or overlapping features of asthma and COPD (asthma+COPD, Section 7, p.131), as additional treatment strategies may be required.	D
Physical activity	• Encourage people with asthma to engage in regular physical activity for its general health benefits.	A
	• Provide advice about prevention of exercise-induced bronchoconstriction with low-dose ICS-formoterol used as needed and before exercise, or with regular daily ICS.	A/B
	• Provide advice about prevention of breakthrough exercise-induced bronchoconstriction with:	
	◦ warm-up before exercise	A
	◦ SABA (or ICS-SABA) before exercise	A
	◦ low-dose ICS-formoterol before exercise (see Box 4-8, p.84).	B
	• Regular physical activity improves cardiopulmonary fitness, and can have a small benefit for asthma control and lung function, including with swimming in young people with asthma.	B
	• Physical activity interventions in adults with moderate/severe asthma is associated with improved symptoms and quality of life.	A
	• There is little evidence to recommend one form of physical activity over another for people with asthma.	D
Pulmonary rehabilitation programs	• Structured outpatient pulmonary rehabilitation programs can improve functional exercise capacity (6-minute walk) and quality of life.	A
Avoidance of occupational or domestic exposures to allergens or irritants	• Ask all patients with adult-onset asthma about their work history and other exposures to irritant gases or particles, including at home.	D
	• In management of occupational asthma, identify and eliminate occupational sensitizers as soon as possible, and remove sensitized patients from any further exposure to these agents.	A
	• Patients with suspected or confirmed occupational asthma should be referred promptly for expert assessment and advice, if available.	A
Avoidance of medications that may make asthma worse	• Always ask about asthma before prescribing NSAIDs, and advise patients to stop using them if asthma worsens.	D
	• Always ask people with asthma about concomitant medications.	D
	• Aspirin and NSAIDs (non-steroidal anti-inflammatory drugs) are not generally contraindicated unless there is a history of previous reactions to these agents (see p.128).	A
	• Decide about prescription of oral or ophthalmic beta-blockers on a case-by-case basis. Initiate treatment under close medical supervision by a specialist.	D
	• If cardioselective beta-blockers are indicated for acute coronary events, asthma is not an absolute contra-indication, but the relative risks/benefits should be considered.	D
Healthy diet	• Encourage patients with asthma to consume a diet high in fruit and vegetables for its general health benefits.	A
Avoidance of indoor allergens	• Allergen avoidance is not recommended as a general strategy in asthma.	A
	• For sensitized patients, there is limited evidence of clinical benefit for asthma in most circumstances with single-strategy indoor allergen avoidance.	A
	• Remediation of dampness or mold in homes reduces asthma symptoms and medication use in adults.	A
	• For patients sensitized to house dust mite and/or pets, there is limited evidence of clinical benefit for asthma with avoidance strategies (only in children).	B
	• Allergen avoidance strategies are often complicated and expensive, and there are no validated methods for identifying those who are likely to benefit.	D
Weight reduction	• Include weight reduction in the treatment plan for obese patients with asthma.	B
	• For obese adults with asthma a weight reduction program plus twice-weekly aerobic and strength exercises is more effective for symptom control than weight reduction alone.	B
	• The greatest improvement in asthma outcomes with weight reduction is seen with bariatric surgery.	A
Breathing exercises	• Breathing exercises may be a useful supplement to asthma pharmacotherapy for symptoms and quality of life, but they do not reduce exacerbation risk or have consistent effects on lung function.	A
Avoidance of indoor air pollution	• Encourage people with asthma to use non-polluting heating and cooking sources, and for sources of pollutants to be vented outdoors where possible.	B
Avoidance of outdoor allergens	• For sensitized patients, when pollen and mold counts are highest, closing windows and doors, remaining indoors, and using air conditioning may reduce exposure to outdoor allergens.	D
Dealing with emotional stress	• Encourage patients to identify goals and strategies to deal with emotional stress if it makes their asthma worse.	D
	• There is insufficient evidence to support one stress-reduction strategy over another, but relaxation strategies and breathing exercises may be helpful.	B
	• Arrange a mental health assessment for patients with symptoms of anxiety or depression.	D
Addressing social risk	• In US studies, comprehensive social risk interventions were associated with reduced emergency department visits and hospitalizations for children. Studies from other countries and settings are needed.	A
Avoidance of outdoor air pollutants/weather conditions	• During unfavorable environmental conditions (very cold weather or high air pollution) it may be helpful, if feasible, to stay indoors in a climate-controlled environment, and to avoid strenuous outdoor physical activity; and to avoid polluted environments during viral infections, if feasible.	D
Avoidance of foods and food chemicals	• Food avoidance should not be recommended unless an allergy or food chemical sensitivity has been clearly demonstrated, usually by carefully supervised oral challenges.	D
	• For patients with confirmed food allergy, refer for specialist advice if available.	D
	• For patients with confirmed food allergy, food allergen avoidance may reduce asthma exacerbations.	D
	• If food chemical sensitivity is confirmed, complete avoidance is not usually necessary, and sensitivity often decreases when asthma control improves.	D

Referral

- Refer patients with any of the following to higher level facility or specialized care when patient has any of the following:
  - Difficulty confirming the diagnosis of asthma Persistent or severely uncontrolled asthma or frequent exacerbations, described as the following:
    - Symptoms remain uncontrolled or the patient has ongoing exacerbations or low lung function despite correct inhaler technique and good adherence with Step 4 treatment.
    - The patient frequently uses asthma-related health care (e.g. multiple emergency department visits or urgent primary care visits).
  - Severe or life-threatening exacerbations described as with symptoms of drowsiness, confusion, or silent chest
  - Low FEV1, especially if <60% predicted Suspected occupational asthma
  - Any risk factors for asthma-related death (near-fatal asthma attack at any time in the past, suspected or confirmed anaphylaxis or food allergy)
  - Evidence of, or risk of, significant treatment side-effects
  - Symptoms suggesting complication (e.g. allergic bronchopulmonary aspergillosis) or subtypes of asthma (e.g. aspirin-exacerbated respiratory disease/aspirin-induced asthma, perimenstrual/catamenial asthma)

Box 3-8. Indications for considering referral for expert advice, where available

Difficulty confirming the diagnosis of asthma

- Patient has symptoms of chronic infection, or features suggesting a cardiac or other non-pulmonary cause (Box 1-3, p.27) (immediate referral recommended).
- Diagnosis is unclear, even after a trial of therapy with ICS or systemic corticosteroids.
- Patient has features of both asthma and COPD, and there is doubt about priorities for treatment.

Suspected occupational asthma

- Refer for confirmatory testing and identification of sensitizing or irritant agent, and specific advice about eliminating exposure and pharmacological treatment. See specific guidelines[62] for details.

Persistent or severely uncontrolled asthma or frequent exacerbations

- Symptoms remain uncontrolled, or patient has ongoing exacerbations or low lung function despite correct inhaler technique and good adherence with Step 4 treatment (medium-dose ICS-LABA, Box 4-6, p.77). Before referral, depending on the clinical context, identify and treat modifiable risk factors (Box 2-2, p.37; Box 3-5, p.55) and comorbidities (Section 6, p.117).
- Patient frequently uses asthma-related health care, e.g., multiple ED visits or urgent primary care visits.
- For more information, see Section 8 (p.139) on difficult-to-treat and severe asthma, including a decision tree

Any risk factors for asthma-related death (see Box 9-1, p.160)

- Near-fatal asthma attack (ICU admission, or mechanical ventilation for asthma) at any time in the past
- Suspected or confirmed anaphylaxis or food allergy in a patient with asthma

Evidence of, or risk of, significant treatment side-effects

- Significant side-effects from treatment
- Need for long-term oral corticosteroid use
- Frequent courses of oral corticosteroids (e.g., two or more courses a year)

Symptoms suggesting complications or sub-types of asthma

- e.g., aspirin-exacerbated respiratory disease (p.128); allergic bronchopulmonary aspergillosis (ABPA) (p.129)

Additional reasons for referral in children 6–11 years

- Doubts about diagnosis of asthma e.g., respiratory symptoms are not responding well to treatment in a child who was born prematurely
- Symptoms or exacerbations that remain uncontrolled despite medium-dose ICS (Box 4-2B, p.71) with correct inhaler technique and good adherence
- Suspected side-effects of treatment (e.g., growth delay)
- Concerns about the child's welfare or well-being

First Aid Measures and Basic Emergency Care

- Assess patients for asthma exacerbations in patients presenting with progressive increase in symptoms of shortness of breath, cough, wheezing, or chest tightness and progressive decrease in lung function.
- Consider administering the following main initial therapies in patients suspected of having asthma exacerbation: repetitive administration of rapid-acting inhaled bronchodilators, early introduction of systemic corticosteroids, and controlled flow oxygen supplementation
  - **Mild to moderate exacerbation:**
    - Inhaled SABA 4-10 puffs by pMDI + spacer or nebulizer, repeat every 20 minutes for 1 hour.
    - Consider immediate transfer to higher facility if with worsening of symptoms or no relief despite 3 doses of SABA. After the first hour, consider giving additional SABA (can range from 4-10 puffs every 3-4 hours up to 6-10 puffs every 1-2 hours), ipratropium bromide, oxygen therapy, and systemic corticosteroid while waiting transfer to a higher facility
    - May give oral corticosteroids such as prednisolone 40-50mg (maximum of 50mg/day) and continue for 5-7 days.
    - May give controlled oxygen therapy to maintain oxygen saturation of 93-95%
    - Assess response to treatment after 1 hour or earlier then assess for discharge. May discharge the patient if with the following:
    - *Symptoms improved, not needing SABA*
    - *PEF improving, and >60-80% of personal best or predicted*
    - *Oxygen saturation >94% room air*
    - *Resources at home adequate*
  - **Severe or life-threatening exacerbation:** Facilitate immediate transfer to a higher level facility.
    - Give SABA, ipratropium bromide, oxygen therapy, and systemic corticosteroid while waiting transfer to a higher facility

Box 5-2. Choice and effective use of inhaler devices

CHOOSE

- Choose the most appropriate inhaler device for the patient before prescribing. Consider the preferred medication (Box 4-6, p.77 and Box 4-12, p.96), available devices, patient skills, environmental impact and cost (see Box 5-1, p.109).
- If different options are available, encourage the patient to participate in the choice.
- For pMDIs, use of a spacer improves delivery and (with ICS) reduces the potential for side-effects.
- Ensure that there are no physical barriers, e.g., arthritis, that limit use of the inhaler.
- Avoid use of multiple different inhaler types where possible, to avoid confusion.

CHECK

- Check inhaler technique at every opportunity.
- Ask the patient to show you how they use their inhaler (don't just ask if they know how to use it).
- Identify any errors using a device-specific checklist.

CORRECT

- Show the patient how to use the device correctly with a physical demonstration, e.g., using a placebo inhaler.
- Check technique again, paying attention to problematic steps. You may need to repeat this process 2–3 times within the same session for the patient to master the correct technique.[472]
- Consider an alternative device only if the patient cannot use the inhaler correctly after several repeats of training.
- Re-check inhaler technique frequently. After initial training, errors often recur within 4–6 weeks.[486]

CONFIRM

- Clinicians should be able to demonstrate correct technique for each of the inhalers they prescribe.
- Pharmacists and nurses can provide highly effective inhaler skills training.[478,479]

Box 7-1. Advice about primary prevention of asthma in children 5 years and younger

Parents/caregivers enquiring about how to reduce the risk of their child developing asthma can be provided with the following advice:

- Children should not be exposed to environmental tobacco smoke during pregnancy or after birth.
- Identification and correction of Vitamin D insufficiency in women with asthma who are pregnant, or planning pregnancy, may reduce the risk of early life wheezing episodes.
- Vaginal delivery should be encouraged where possible.
- The use of broad-spectrum antibiotics during the first year of life should be discouraged.

Breastfeeding is advised, not for prevention of allergy or asthma, but for its other positive health benefits.

Box 2-2. GINA assessment of asthma control in adults, adolescents and children 6–11 years

A. Asthma symptom control

In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes☐ No☐			
• SABA* reliever for symptoms more than twice/week?	Yes☐ No☐			
• Any activity limitation due to asthma?	Yes☐ No☐			

Box 3-6. Initial asthma treatment – recommended options for adults and adolescents

Presenting symptoms	Preferred INITIAL treatment (Track 1)	Alternative INITIAL treatment (Track 2)
Infrequent asthma symptoms, e.g., less than twice a month and no risk factors for exacerbations, including no exacerbations in the last 12 months (Box 2-2B, p.38)	**As-needed low-dose ICS-formoterol** (Evidence B)	**Low-dose ICS taken whenever SABA is taken**, in combination or separate inhalers (Evidence B)
Asthma symptoms or need for reliever twice a month or more	**As-needed low-dose ICS-formoterol** (Evidence A)	**Low-dose ICS plus as-needed SABA** (Evidence A). Before choosing this option, consider likely adherence with daily ICS.
Troublesome asthma symptoms most days (e.g., 4–5 days/week); or waking due to asthma once a week or more, especially if any risk factors exist (Box 2-2B, p.38)	**Low-dose ICS-formoterol maintenance and reliever therapy** (MART) (Evidence A)	**Low-dose ICS-LABA plus as-needed SABA** (Evidence A) or plus as-needed ICS-SABA (Evidence B), **OR** Medium-dose ICS plus as-needed SABA (Evidence A) or plus as-needed ICS-SABA (Evidence B). Consider likely adherence with daily maintenance treatment.
Initial asthma presentation is with severely uncontrolled asthma, or with an acute exacerbation	**Medium-dose ICS-formoterol maintenance and reliever therapy** (MART) (Evidence D). A short course of oral corticosteroids may also be needed.	**Medium- or high-dose ICS-LABA** (Evidence D) plus as-needed SABA or plus as-needed ICS-SABA. Consider likely adherence with daily maintenance treatment. A short course of oral corticosteroids may also be needed. High-dose ICS plus as-needed SABA is another option (Evidence A) but adherence is weak compared with combination ICS-LABA.

Clinical Practice Guideline and Pathway for the Management of Adults and Children with Bronchial Asthma in Family Practice

- **Recommendation #1**. Ask for the following from the patient's clinical history:
  - Symptoms of cough, breathlessness, and chest tightness
  - Pattern and timing of symptoms.
  - Triggers or provoking factors, history of recent respiratory infection, and exposure to allergens
  - Associated symptoms
  - Smoking and/or vaping history
  - Personal and family history of allergy or atopy
  - History of previous intake of bronchodilators or other asthma medications
- **Recommendation #2**. Perform a detailed physical examination, with emphasis on the upper airway, chest and lungs, to support the diagnosis of bronchial asthma.
- **Recommendation #3**. Measure the patient's **peak expiratory flow rate** as part of *standard physical examination*
- **Recommendation #4**. For patients suspected to have **bronchial asthma during initial consult**, perform **bronchodilator response test** by measuring baseline **PEF**, *giving a single dose of inhalational SABA, then measure the change in PEF 15 minutes after giving SABA*
- **Recommendation #5**. Assess family function using the Family APGAR and family resources using the SCREEEM tool
- **Recommendation #6**. Based on *history*, *physical examination* and *response to bronchodilator challenge test*, classify patient into one of the following:
  - **a. Bronchial Asthma not likely**
  - **b. Probable Bronchial Asthma, new case**
  - **c. Clinical Bronchial Asthma, previously treated**
  - **d. Bronchial Asthma previously confirmed**
- **Recommendation #7**. For patients with probable or confirmed bronchial asthma, and *determination of specific phenotype* is necessary, **refer to specialist**
- **Recommendation #8**. Determine the patient's *frequency, severity and level of control of asthma symptoms.*
  - For patients with uncontrolled asthma, determine the frequency and severity of exacerbations
- **Recommendations #9.** Among patients classified as a **new case of Probable Bronchial Asthma** or **previously treated Clinical Bronchial Asthma**, offer **referral for spirometry** if available to establish objective evidence of bronchial asthma
- **Recommendation #10**. If **spirometry is not available** ***PEF variability may be an alternative option*** to establish objective evidence of bronchial asthma. This must be a shared decision
- **Recommendation #11**. If *PEF variability cannot be done or will not be reliable*, **therapeutic trial can be used**, and diagnose the patient as Clinical Bronchial Asthma. This must be a shared decision
- **Recommendation #12**. Pharmacological and non-pharmacological treatment must be adjusted in a continuing cycle that involves assessment, treatment and review to achieve the desired management outcome
- **Recommendation #13**. Pharmacologic treatment must be adjusted based on frequency and severity of symptoms and level of control using the stepwise approach

Recommendation #14. **Step 1 pharmacologic recommendations** are for those with signs and symptoms **less than twice a month** and *no risk factors*

	Controller/Maintenance/Dose	Reliever/Dose
Children	Intermittent low dose ICS plus SABA	As needed SABA
Adolescent and Adults	Intermittent low dose ICS-Formoterol (MART) or Intermittent low dose ICS plus SABA	As needed low dose ICS-Formoterol (MART) or As needed SABA

- **Recommendation #15**. **Step 2 pharmacologic recommendations** are for those with symptoms **more than twice a month** but *less than 4-5 days a week*

	Controller/Maintenance/Dose	Reliever/Dose
Children	Daily low dose ICS	As needed SABA
Adolescent and Adults	Intermittent low dose ICS-Formoterol (MART) or Daily low dose ICS	As needed low dose ICS-Formoterol (MART) or As needed SABA

- **Recommendation #16**. **Step 3 pharmacologic interventions** are for those with symptoms **for most days and waking with asthma** *once a week or more*.

	Controller/Maintenance/Dose	Reliever/Dose
Children	Daily low dose ICS-LABA or Daily medium dose ICS Or Very Low dose ICS-Formoterol	As needed SABA Or Very Low dose ICS-Formoterol
Adolescent and Adults	Daily low dose ICS-Formoterol (MART) or Daily low dose ICS-LABA	As needed low dose ICS-Formoterol (MART) or As needed SABA

- **Recommendation #17**. **Step 4 pharmacologic interventions** are for those with **daily symptoms and waking with asthma once a week or more**, and **low lung function**. *Offer referral for specialist management or manage in family practice based on shared decision*

	Controller/Maintenance/Dose	Reliever/Dose
Children	Low dose ICS-Formoterol (MART) or Daily medium dose ICS-LABA	As needed low dose ICS-Formoterol (MART) or As needed SABA
Adolescent and Adults	Daily medium dose ICS-Formoterol (MART) or Daily medium dose ICS-LABA	As needed low dose ICS-Formoterol (MART) or As needed SABA

- **Recommendation #18**. Among patients with inadequate response to medium dose ICS-LABA at step 4, LAMA and LTRA may be offered as add-on based on shared decision as this might entail additional costs and potential side effects
- **Recommendation #19**. Step 5 For those with uncontrolled symptoms despite step 4 treatment, refer patients for appropriate specialist management
- **Recommendation #20**. Antibiotics should not be offered to patients for the management of asthma in the absence of bacterial infection necessitating its use
- **Recommendation #21** Vitamin D and other vitamins and minerals should not be offered to patients for the management of asthma in the absence of deficiency necessitating its use
- **Recommendation #22**. The management of asthma requires a partnership and shared-decision making between the patient, family and physician.
- **Recommendation #23**. All asthma patients should be given health education on the following:
  - Breathing exercises and regular physical activity.
  - Increased intake of fruits and vegetables and weight loss if overweight or obese.
  - Smoking cessation or avoidance of second-hand smoke.
  - Avoidance/control of triggers.
- **Recommendation #24** All asthmatic patients should be given asthma self-management intervention containing the following:
  - Written asthma action plan.
  - Regular review of asthma control, treatment, and patient skills by the family physician
- **Recommendation #25** All asthmatic patients should be given training and re-training on the use of inhalers and peak flow meters.
- **Recommendation #26**. Family members and caregivers must also receive education on asthma management plan
- **Recommendation #27**. Household members who smoke cigarettes or e-cigarettes vape must be offered cessation intervention
- **Recommendation #28**. Multi-component control of home environment like regular cleaning, maintain adequate airflow or use of filters to minimize exposure to cigarette smoke, allergens, dust, mites, pet dander and other toxic inhalants should be done
- **Recommendation #29**. Digital health interventions like telemedicine may be utilized to implement and monitor patient-centered and family-focused interventions.
- **Recommendation #30**. Family physicians should advocate for community-based interventions such as linkage with communityhealth workers, school-based and workplace asthma care programs
- **Recommendation #31**. Among patients with bronchial asthma, family physicians must establish a network of primary and specialist care for navigation, coordination and referral
- **Recommendation #32**. The expected psychosocial outcomes should be adherence to medical advice and practices on asthma self-management, appropriate use of bronchodilators, correct inhalation techniques, and implementation of asthma management control plans by the family. These should be evaluated at every patient follow-up
- **Recommendation #33**. The expected clinical outcomes should be improvements in reported asthma symptoms, FEV1/PEF (by using a same meter), decreased annual frequency of severe exacerbations, and decreased maintenance corticosteroid use to objectively measure improvements of asthma control and its impact on the quality of life of the patients. This can be done using validated questionnaires (i.e., Asthma APGAR system).
- **Recommendation #34**. If the patient did not meet the desired outcomes or the outcomes in Recommendations 32 and 33 reveal no improvement despite maximizing the pharmacologic and non-pharmacologic management, referral to a respiratory specialist is warranted.

Global Strategy for Asthma Management and Prevention 2025

Medications and treatment regimens for adults, adolescents and children 6–11 years

Box 4-1. Terminology for asthma medications

Term	Definition	Notes
Maintenance treatment	Asthma treatment that is prescribed for use every day (or on a regularly scheduled basis)	Medications intended to be used continuously, even when the person does not have asthma symptoms. Examples include ICS-containing medications (ICS, ICS-LABA, ICS-LABA-LAMA), LTRA,* and biologic therapy. The term "maintenance" describes the prescribed frequency of administration, not a particular class of asthma medicine.
Controller	Medication targeting both domains of asthma control (symptom control and future risk)	In the past, "controller" was largely used for ICS-containing medications prescribed for regular daily treatment, so "controller" and "maintenance" became almost synonymous. However, this became confusing after the introduction of combination ICS-containing relievers for as-needed use. To avoid confusion, "ICS-containing treatment" and "maintenance treatment" have been substituted as appropriate where the intended meaning was unclear.
Reliever	Asthma inhaler taken as needed, for quick relief of asthma symptoms	Sometimes called rescue inhalers. As well as being used for symptom relief, reliever inhalers can also be used before exercise, to prevent exercise-induced asthma symptoms. Includes SABAs (e.g., salbutamol [albuterol], terbutaline, ICS-salbutamol), as-needed ICS-formoterol, and as-needed ICS-SABA. SABA-containing relievers should not be used for regular maintenance use, or to be taken when the person does not have asthma symptoms (except before exercise).
Anti-inflammatory reliever (AIR)	Reliever inhaler that contains both a low-dose ICS and a rapid-acting bronchodilator	Includes budesonide-formoterol, beclometasone-formoterol and ICS-salbutamol combinations. Patients can also use AIRs as needed before exercise or allergen exposure to prevent asthma symptoms and bronchoconstriction. Non-formoterol LABAs in combination with ICS cannot be used as relievers. ICS-formoterol should not be used as the reliever with maintenance ICS-non-formoterol LABAs (p.69).[306] The anti-inflammatory effect of as-needed ICS-formoterol was demonstrated by reduction in FeNO in several studies.[195,196,308] Some anti-inflammatory relievers can be used as-needed at Steps 1–2 as the person's sole asthma treatment, without a maintenance treatment ("**AIR-only**" treatment). Almost all evidence for this is with ICS-formoterol. Some ICS-formoterol combinations can be used as both maintenance treatment and reliever treatment at Steps 3–5 (see **MART**, below). For medications and doses, see Box 4-8 (p.84).
Maintenance-and-reliever therapy (MART)	Treatment regimen in which the patient uses an ICS-formoterol inhaler every day (maintenance dose), and also uses the same medication as needed for relief of asthma symptoms (reliever doses)	**MART** (**M**aintenance-**A**nd-**R**eliever **T**herapy) can be used **only** with combination ICS-formoterol inhalers such as budesonide-formoterol and beclometasone-formoterol. Other ICS-formoterol inhalers can also potentially be used, but combinations of ICS with non-formoterol LABAs, or ICS-SABA, cannot be used for MART. MART is also sometimes called SMART (single-inhaler maintenance-and-reliever therapy); the meaning is the same. For medications and doses, see Box 4-8 (p.84).

*If prescribing LTRA, advise patient/caregiver about risk of neuropsychiatric adverse effects.[309]

AIR: anti-inflammatory reliever; FeNO: fractional exhaled nitric oxide; ICS: inhaled corticosteroid; LABA: long-acting beta$_2$-agonist; LAMA: long-acting muscarinic antagonist; LTRA: leukotriene receptor antagonist; MART: maintenance-and-reliever therapy with ICS-formoterol; SABA: short-acting beta$_2$-agonist.

KEY POINTS

- For safety, **GINA does not recommend treatment** of asthma in adults, adolescents or children 6–11 years with **short-acting beta$_2$-agonist (SABA) alone**.
  - Instead, they should receive **inhaled corticosteroid (ICS)-containing treatment** to *reduce their risk of severe exacerbations and to control symptoms*.
    - Prevention of severe exacerbations is a high priority across all treatment steps, to reduce the risk and burden to patients and the burden to the health system, and to reduce the need for oral corticosteroids (OCS), which have cumulative long-term adverse effects.

Treatment tracks for adults and adolescents

- For clarity, the treatment figure for adults and adolescents shows two "tracks", largely based on the choice of reliever.
- Treatment may be stepped up or down within a track using the same reliever at each step, or treatment may be switched between tracks, according to the individual patient's needs.
- **Track 1, in which the *reliever* is low-dose ICS-formoterol**
  - **preferred approach recommended** by GINA.
  - When a patient at any step has asthma symptoms, they use low-dose ICS-formoterol as needed for symptom relief.
  - In Steps 3–5, they also take ICS-formoterol as regular daily treatment.
  - This approach is preferred because it reduces the risk of severe exacerbations, compared with using a SABA reliever, with similar symptom control, and because of the simplicity for patients and clinicians of needing only a single medication across treatment Steps 1–4.
- **Track 2, in which the *reliever* is an ICS-SABA or SABA**
  - is an alternative if Track 1 is not possible, or if a patient is stable, with good adherence and no exacerbations in the past year on their current therapy.
  - In Step 1, the patient takes a SABA and a low-dose ICS together for symptom relief (in combination if available, or with the ICS taken immediately after the SABA).
  - In Steps 2–5, the reliever is a SABA or combination ICS-SABA. Before considering a SABA reliever, consider whether the patient is likely to adhere to their ICS-containing treatment, as poor adherence (with resulting SABA-only treatment) will increase the risk of exacerbations.

INITIAL ASTHMA TREATMENT FOR ADULTS AND ADOLESCENTS

Box 4-4. Initial asthma treatment for adults and adolescents with a diagnosis of asthma

These recommendations are based on evidence, where available, and on consensus.

Presenting symptoms	Preferred INITIAL treatment (Track 1)	Alternative INITIAL treatment (Track 2)
Infrequent asthma symptoms, e.g., 1–2 days/week or less	**As-needed low-dose ICS-formoterol** (Evidence A)	**Low-dose ICS taken whenever SABA is taken**, in combination or separate inhalers (Evidence B). Such patients are highly unlikely to be adherent with daily ICS if prescribed.
Asthma symptoms less than 3–5 days/week, with normal or mildly reduced lung function		**Low-dose ICS (i.e., daily treatment) plus as-needed SABA** (Evidence A). Before choosing this option, consider likely adherence to daily ICS.
Asthma symptoms most days (e.g., 4+ days/week); or waking due to asthma once a week or more, or with reduced lung function. See p.81 for additional considerations.	**Low-dose ICS-formoterol maintenance-and-reliever therapy** (MART) (Evidence A)	**Low-dose ICS-LABA plus as-needed SABA** (Evidence A) or plus as-needed ICS-SABA (Evidence B), **OR** Medium-dose ICS plus as-needed SABA (Evidence A) or plus as-needed ICS-SABA (Evidence B). Consider probability of adherence to daily maintenance treatment.
Daily asthma symptoms or waking at night with asthma once a week or more, and with low lung function or recent exacerbation.	**Medium-dose ICS-formoterol maintenance-and-reliever therapy** (MART) (Evidence D).	**Medium-dose ICS-LABA** (Evidence D) **plus as-needed SABA or plus as-needed ICS-SABA**. Consider probability of adherence to daily maintenance treatment. High-dose ICS plus as-needed SABA is another option (Evidence A) but adherence is worse than with combination ICS-LABA.
Initial asthma presentation is during an acute exacerbation	Treat as for exacerbation (Box 9-4, p.168 and Box 9-6, p172), including short course of OCS if severe; commence medium-dose MART (Evidence D).	Treat as for exacerbation (Box 9-4, p.168 and Box 9-6, p.172), including short course of OCS if severe; commence medium-dose ICS-LABA plus as-needed SABA (Evidence D).

Steps 1 and 2 for adults and adolescents

- Track 1: (Steps 1–2 combined) In adults and adolescents who were considered by their clinician to have mild asthma, and were taking SABA alone or had controlled asthma on daily low-dose ICS or leukotriene receptor antagonist (LTRA), treatment with as-needed-only low-dose ICS-formoterol reduced the risk of severe exacerbations and emergency department visits or hospitalizations by about two-thirds, compared with SABA-only treatment.
- As-needed-only low-dose ICS-formoterol reduced the risk of emergency department visits and hospitalization, compared with daily ICS, with no clinically important difference in symptom control.
- In patients previously using SABA alone, as-needed low-dose ICS-formoterol also significantly reduced the risk of severe exacerbations needing OCS, compared with daily ICS.
- Track 2: Treatment with regular daily low-dose ICS plus as-needed SABA (Step 2), if taken, is highly effective in reducing asthma symptoms and reducing the risk of asthma-related exacerbations, hospitalization and death, compared with SABA alone. However, adherence to maintenance ICS treatment in the community is poor, leaving patients taking SABA alone and at increased risk of exacerbations. For patients with infrequent symptoms, who are likely to have very poor adherence, as-needed-only ICS-SABA, with separate or combination inhalers, is the best option for Step 1 in Track 2. However, evidence supporting this treatment option is limited to small studies that were not powered to detect differences in exacerbation rates.

Consider step-up if asthma remains uncontrolled despite good adherence and inhaler technique

- Before considering any step up, first confirm that the symptoms are due to asthma and identify and address common problems such as inhaler technique, adherence, allergen exposure and multimorbidity; provide patient education.
- For adults and adolescents, the preferred Step 3 treatment is the Track 1 regimen with low-dose ICS-formoterol as maintenance-and-reliever therapy (MART). This reduces the risk of severe exacerbations, with similar or better symptom control, compared with maintenance treatment using a combination of an ICS and a long-acting beta$_2$-agonist (LABA) as controller, plus as-needed SABA. If needed, the maintenance dose of ICS-formoterol can be increased to medium (i.e., Step 4) by increasing the number of maintenance inhalations. MART is also a preferred treatment option at Steps 3 and 4 for children 6–11 years, with a lower dose ICS-formoterol inhaler.
- ICS-formoterol should not be used as the reliever for patients taking a different ICS-LABA maintenance treatment, because clinical evidence for safety and efficacy is lacking.
- Other Step 3 options for adults and adolescents in Track 2, and in children, include maintenance ICS-LABA plus as-needed SABA or plus as-needed ICS-SABA (if available) or, for children 6-11 years, medium-dose ICS plus as-needed SABA. For children, try other controller options at the same step before stepping up.

Step down to find the minimum effective treatment

- Once good asthma control has been achieved and maintained for 2–3 months, consider stepping down gradually to find the patient's lowest treatment that controls both symptoms and exacerbations.
- Provide the patient with a written asthma action plan, monitor closely, and schedule a follow-up visit.
- Do not completely withdraw ICS unless this is needed temporarily to confirm the diagnosis of asthma.

For all patients with asthma, provide asthma education and training in essential skills

- After choosing the right class of medication for the patient, the choice of inhaler device depends on which inhalers are available for the patient for that medication, which of these inhalers the patient can use correctly after training, and their relative environmental impact. Check inhaler technique frequently.
- Provide inhaler skills training: this is essential for medications to be effective, but technique is often incorrect.
- Encourage adherence to ICS-containing medication, even when symptoms are infrequent.
- Provide training in asthma self-management (self-monitoring of symptoms and/or peak expiratory flow (PEF), written asthma action plan and regular medical review) to control symptoms and minimize the risk of exacerbations.

For patients with one or more risk factors for exacerbations

- Prescribe ICS-containing medication, preferably from Track 1 options, i.e., with as-needed low-dose ICS-formoterol as reliever; provide a written asthma action plan; and arrange review more frequently than for lower-risk patients.
- Identify and address modifiable risk factors (e.g., smoking, low lung function, over-use of SABA).
- Consider non-pharmacological strategies and interventions to assist with symptom control and risk reduction, (e.g., smoking cessation advice, breathing exercises, some avoidance strategies).

Difficult-to-treat and severe asthma (see Section 8, p.139)

- Patients who have poor symptom control and/or exacerbations, despite medium- or high-dose ICS-LABA treatment, should be assessed for contributing factors, and asthma treatment should be optimized.
- If the problems continue or diagnosis is uncertain, refer to a specialist center for phenotypic assessment and consideration of add-on therapy including biologics.

Allergen immunotherapy

- Allergen-specific immunotherapy may be considered as add-on therapy for patients with asthma who have clinically significant sensitization to aeroallergens, and stable but not well-controlled asthma.

Sample Questions - Asthma

1. Which among the following is regarded BOTH MAINTENANCE AND RELIEVER THERAPY?
A. Salbutamol + Ipatropium
B. Salmeterol + Fluticasone
C. Formoterol + Budesonide
D. Terbutaline + Budesonide

2. Totoy, an 11-year old boy, with a history of BRONCHIAL ASTHMA on DAILY INHALED FLUTICASONE, has been using SALBUTAMOL NEBULIZATION once a day for several weeks. What changes should be made to the current regimen?
A. Use Ipratropium and Salbutamol, instead of Salbutamol alone, to control symptoms.
B. Use Salmeterol with Fluticasone for better control of symptoms.
C. Give bedtime Montelukast to prevent future exacerbations.
D. Add Prednisone to the existing regimen.

3. Asthma is a disease with many variations, usually characterized by chronic airway inflammation. You are confronted by a 25 year old patient who had a history of on an off difficulty of breathing that occurs early in the morning for 1 month already. If you are to make an initial 4. diagnosis of asthma, what are the 2 defining features of this disease?
A. History of wheezing and variable expiratory airflow limitation
B. History of chest tightness and irreversibility of airflow limitation
C. Shortness of breath with peak flow variability of 10%
D. Spirometry change from baseline of 20% and cough

4. Lica, is a 29 year old asthmatic female. She was diagnosed of having adult onset asthma. Her private physician advised her to have her lung function be measured. When should it be done to this patient?
A. Recorded once then every 2-3 months after treatment
B. Recorded every 2 years after the initial diagnosis
C. Recorded at diagnosis, then 3-6 months after starting treatment
D. Recorded at first visit, then it can be assessed annually if normal

5. A 32-year-old security guard with BRONCHIAL ASTHMA was maintained with "as-needed" inhaled corticosteroid(ICS) + formoterol but has needed his metered-dose inhaler three to four times this past week. He DENIES NOCTURNAL SYMPTOMS and alleges to have GOOD ADHERENCE AND INHALER TECHNIQUE. Based on the 2025 Global Initiative for Asthma (GINA), what is the appropriate next step for this non-smoker security guard?
A. Start oral corticosteroids (e.g., Prednisone).
B. Step up to daily low-dose ICS–formoterol.
C. Step up to daily low-dose ICS + SABA as needed.
D. Continue current therapy and observe for now.

6. 32 housewife came at the ER due to dyspnea. Her last attack was 2 years ago and so she thought she had overcome her illness; she stopped her inhaled meds about a year ago. She came in wheel chair borne, hunched forward with some difficulty answering your questions but is calm. Her BP is 130/90, CR: 110, RR: 25 bpm, 02 sat of 93%. There were wheezes all over her lung field. Given her history and PE, what will be your priority?
A. Refer the patient immediately to a pulmonologist
B. Oxygen/ face mask, admit the patient for observation, give IV hydrocortisone,
C. administer nebulization of beta 2 agonist, give oral prednisolone, 02/nasal cannula
D. administer nebulization of beta 2 agonist plus ipratropium, oral prednisolone, 02/facemask

7. 10/girl brought to your clinic with symptoms of frequent dyspnea cough and occasional noisy breathing. There is a family history of asthma in the father's family. What will you tell the family?
A. This is probably a respiratory infection
B. Asthma is a possibility but need to do Lung Function test
C. Asthma is most likely but can still be managed with B agonist
D. Asthma is the diagnosis and start with controller therapy

8. 16/M discharged for Asthma came for his follow up after one month. He indicated that he doesn't have any night time attacks for the past month and uses his Salmeterol+Fluticasone inhaler twice a day regularly without the need of as needed doses. There were no noted dyspnea when he play basketball with friends. What is the best next move?
A. decrease his present medication to once a day
B. maintain his medication
C. decrease his medication to plain Fluticasone
D. remove his medication and observe for exacerbation

9. 45-year old asthmatic female, came to your clinic due to increased frequency of asthmatic attacks for the past month. Three months ago, when you last saw her, her symptoms were well controlled. She is using her Salbutamol inhaler on an as needed basis and for the past month, she has been using it for at least three times a week. She claims to have daytime symptoms most days of the week but denies any activity limitation and night walking due to asthma. What management is appropriate for her at present?
A. Doxofylline tablet maintenance
B. Salbutamol inhaler as needed
C. Budesonide 200 ug inhaler twice daily
D. Budesonide inhaler BID plus salbutamol as needed

10. A 30/F nurse with a BMI of 39 came to your clinic for a wellness check- up. She has no known comorbidities, with family history of asthma in the paternal side. Vital signs were unremarkable. Which of the following recommendations would be appropriate for the patient?
A. Motivational coaching and counseling to promote physical activity would be helpful to promote weight loss, prevent diabetes and hypertension.
B. Advise the patient to enroll in a weight loss program.
C. Counseling on proper diet and recommending a nutritionist to guide the patient on proper diet would be the initial step for a targeted weight loss.
D. Plan a bi-annual check-up to monitor the patient's weight loss combined with pharmacotherapy.

11. In the recent GINA guidelines, which of the following statements is INCORRECT about parental advise given to parents regarding the primary prevention of asthma in children less than 5 y/o?
A. Vaginal delivery should be encouraged for pregnant patients if possible
B. Vitamin D supplementation for children
C. Promotion of Breastfeeding
D. Avoidance of antibiotics in the first 5 years of life

12. A 28/M asthmatic patient came in to your clinic due to cough and wheezes for 2 days. He denies night awakenings, had no trouble with daily activities, and seems to be able to speak in sentences. He has not taken any medication since the onset of his symptoms. Your management for him should include:
A. SABA only
B. SABA prn + Low-dose ICS-Formoterol
C. Medium-dose ICS-Formoterol Maintenance and Reliever
D. SABA prn + Medium-dose ICS-LABA

13. Which of the following statements is CORRECT regarding the management of asthma exacerbations in primary care?
A. Delivery of SABA via pMDI and a spacer or a DPI leads to a similar improvement in lung function as delivery via nebulizer
B. Any combination ICS-LABA is now widely used as an anti-inflammatory reliever
C. 100% Oxygen therapy to be given at 5-10 LPM via a face mask
D. Routine use of antibiotics in the treatment of acute asthma exacerbations

14. An adult male asthmatic patient with no known allergies came into the ER due to shortness of breath. He is awake, alert, talks in words, hunched forward, with obvious use of accessory muscles. Management in the ER would include:
A. Intramuscular injection of epinephrine
B. Oral or IV Corticosteroids
C. Aminophylline given via IV route
D. Leukotriene Receptor Antagonist

15. In spirometry, this is considered evidence of reversibility of airway obstruction:
A. Improvement in FEV1 of at least 12% and at least 200 mL from prebronchodilator to post bronchodilator measurement.
B. Improvement in FEV1/FVC ratio of at least 12% and at least 200 mL from prebronchodilator to post bronchodilator measurement.
C. Improvement in FVC ratio of at least 12% and at least 200 mL from prebronchodilator to post bronchodilator measurement.
D. Improvement in FV6 ratio of at least 12% and at least 200 mL from prebronchodilator to post bronchodilator measurement.

16. John is a 13 y/o, known case of bronchial asthma since childhood. He reports no exacerbation of asthma for more than 5 years and has no asthma maintenance medication. He consulted at the primary care clinic due to troublesome asthma symptoms on most days and is waking up from asthma once or more a week. Which management will best control his asthma symptoms and prevent exacerbation based on the 2020 Global Initiative for Asthma?
A. Consider starting at Step 1 with as needed low dose ICS-formoterol

B. Consider starting at Step 2 with either regularly daily low dose ICS or as needed low dose ICS- formoterol.
C. Consider starting at Step 3 with low dose ICS- LABA or medium dose ICS.
D. Consider starting at Step 4 with medium dose ICS- LABA or high dose ICS, add on ipratropium or LTRA

17. A middle aged housewife, known asthmatic with poor compliance to medications sought consult at the primary care clinic. She has asthma attacks almost every day of the week and now talks in phrases, RR of 28cpm, PR 110 and with O2 saturation of 93%. What will be the initial step to take in managing this patient.
A. Check inhaler technique, adherence
B. Adjust controller medication, give higher dose for 1-2 weeks or long term (3 mos)
C. Give SABA, Ipratropium bromide, O2 and systemic corticosteroid.
D. Give SABA 4-10 puffs by pMDI + spacer, Oral Prednisolone 40-50mg, Controlled O2 "

18. According to the latest Global Initiative for Asthma (GINA), which criteria would aid in the INITIAL DIAGNOSIS OF BRONCHIAL ASTHMA in ADULTS, ADOLESCENTS, and CHILDREN 6-11 years old?
A. wheeze, shortness of breath and cough, with symptoms often worse at night or in the early morning
B. wheeze, shortness of breath, and cough with chronic sputum production
C. exercise induced dyspnea with noisy inspiration
D. shortness of breath, cough, and chest pain triggered by exercise

19. A 24-year-old male Grab driver (i.e., non-smoker) came to the barangay health center with complaints of DRY COUGH and occasional SHORTNESS OF BREATH. He was allegedly ASTHMATIC as a child, but with NO MAINTENANCE MEDICATIONS and had been lost to follow-up. SYSTEMIC PHYSICAL EXAMINATION was generally UNREMARKABLE. According to the latest Global Initiative for Asthma (GINA) guidelines, which of the following recommendations is correct in STARTING ASTHMA TREATMENT for MILD BRONCHIAL ASTHMA?
A. As needed low dose inhaled corticosteroid (e.g., Budesonide) + Formoterol is recommended as reliever therapy.
B. Start with daily low dose inhaled corticosteroid (e.g., Budesonide) + Formoterol, plus a long-acting muscarinic agent (e.g., Umeclidinium).
C. Start short-acting beta agonist (e.g., Salbutamol) metered-dose inhaler as needed for asthma exacerbation.
D. Inhaled corticosteroid + short acting beta agonist (e.g., Salmeterol + Fluticasone) is recommended for patients with mild asthma

20. A 20-year-old college student consults at the school infirmary for the first time due to a 6-month history of on-and-off / recurring WHEEZES and SHORTNESS OF BREATH of variable intensity. On history, you note that he has DAYTIME SYMPTOMS on most days (i.e., 4-5 days) of the week, with NO NIGHT-TIME AWAKENINGS. Spirometry reveals BRONCHODILATOR REVERSIBILITY. What ASTHMA REGIMEN will you recommend for this college student?
A. Budesonide 160 mcg + Formoterol 4.5 mcg dry powder inhaler, 2 puffs BID as maintenance AND 1 puff PRN as reliever
B. Salmeterol 25 mcg + Fluticasone 125 mcg metered-dose inhaler, 2 puffs BID as maintenance AND Salbutamol 100 mcg metered dose inhaler, 1 puff PRN as reliever
C. Salmeterol 25 mcg + Fluticasone 125 mcg metered-dose inhaler, 2 puffs OD as maintenance AND Budesonide 160 mcg + Formoterol 4.5 mcg dry powder inhaler, 1 puff PRN as reliever
D. Budesonide 160 mcg + Formoterol 4.5 mcg dry powder inhaler, 2 puffs BID as maintenance AND Salbutamol 100 mcg metered-dose inhaler, 1 puff PRN as reliever

21. A 35-year-old college faculty came to the school infirmary, complaining of daily exacerbations of dry cough, associated with "whistle-like" breathing for the past week with night awakenings, triggered by walking long distances and by cold air. She had no other complaints, with previous history of skin atopy, with stable vital signs, and auscultation of the lungs revealed tight air entry with generalized wheezing on both lung fields. There was note of improvement in the peaked expiratory flow rate immediately after nebulization with Ipatropium and Salbutamol. What INHALER THERAPY will you recommend for this individual BRONCHIAL ASTHMA?
A. Fluticasone 125 mcg + Salmeterol 25 mcg one puff once a day; Salbutamol 100 mcg one puff as needed for exacerbation
B. Budesonide 160 mcg + Formoterol 4.5mcg two puffs twice a day and as needed for exacerbation
C. Budesonide 160 mcg + Formoterol 4.5mcg one puff twice a day and as needed for exacerbation
D. Budesonide 160 mcg +Formoterol 4.5mcg two puffs as needed for exacerbation

22. Brittney, a 24-year-old PRIMIGRAVID PATIENT on her FIRST TRIMESTER is seeking consult regarding her BRONCHIAL ASTHMA (BA). She was previously prescribed with Budesonide + Formoterol (ICS+LABA) pressurized metered dose inhaler (pMDI), but she stopped treatment upon learning of her pregnancy due to fear of adverse perinatal outcomes. Based on the most recent Global Initiative Against Asthma (GINA), what will you advise Brittney?
A. Continue the ICS+LABA pMDI with reduced dosing and frequency.
B. Continue the ICS+LABA pMDI with the usual prescribed pre-pregnancy dosing and frequency.
C. Discontinue use of the ICS+LABA pMDI and evaluate use of once a weekly dose of oral corticosteroids together with "as needed" Salbutamol pMDI.
D. Discontinue use of ICS+LABA pMDI and reinforce removal of risk factors that may precipitate BA exacerbations.

23. Alexandria Renee is a 17-year-old senior high school student, diagnosed case of bronchial asthma (BA) with no maintenance medications. However, since the start of the rainy season, she has been gradually experiencing BA exacerbations. Within the last three weeks, she has complained of daytime shortness of breath at least three episodes weekly. She has no night-time awakening, and there is no limitation in her activities of daily living. However, since the symptoms have re-appeared, she has self-medicated using Salbutamol nebulization at home. How will the LEVEL OF BRONCHIAL ASTHMA (BA) CONTROL be categorized?
A. BA, partly controlled
B. BA, controlled
C. BA, uncontrolled
D. Status asthmaticus

24. Mrs. Lomadeo, a known ASTHMATIC, complains of activity limitation while working, always uses Salbutamol inhaler twice weekly, experiences daytime asthma symptoms thrice weekly, but without nocturnal exacerbations. What is the LEVEL OF ASTHMA CONTROL of Mrs. Lomadeo?
A. well controlled
B. moderately controlled
C. uncontrolled
D. partly controlled

25. Gina, a newly diagnosed 19-year old ASTHMATIC and recently started on inhaled corticosteroid / long-acting beta agonist (ICS-LABA) inhaler, came in for follow-up after a week due to persistence of EXERTIONAL DYSPNEA and WHEEZING, despite daily use of her DRY POWDER INHALER. As the attending physician, what must be performed promptly?
A. Identify possible risk factors that may have triggered an asthmatic attack.
B. Consider adding anti-histamine and oral corticosteroids to abate ongoing inflammatory reaction.
C. Ask the patient to demonstrate how she uses her dry powder inhaler.
D. Check medication dosage and consider treatment step-up.

26. Daniel, a 30-year-old ASTHMATIC patient came in for follow-up consultation. He is very pleased and reports that he is now SYMPTOM-FREE for at least three months straight, after being maintained on FORMOTEROL + BUDESONIDE DRY POWDER INHALER, two inhalations twice daily. Which of the following is now recommended in terms of the CURRENT ASTHMA MAINTENANCE MEDICATION?
A. Continue with the current dosage of Formoterol + Budesonide DPI as maintenance dose.
B. Consider stepping down the Formoterol + Budesonide treatment.
C. Discontinue Formoterol + Budesonide DPI and advise patient to avoid asthma triggers.
D. Shift to "as needed" Salbutamol pressurized metered dose inhaler therapy.

27. Vic, a 34-year-old known ASTHMATIC, desires to have a healthier lifestyle as he begins his new year this 2025. He plans to do AEROBIC EXERCISE in the form of early morning JOGGING. As his primary care physician, which among the following NON-PHARMACOLOGIC STRATEGIES will you recommend?

A. Respectfully advice against the idea since jogging may trigger exercise-induced bronchoconstriction.
B. Anticipate exercise-induced bronchoconstriction and administer inhaler treatment prior to jogging.
C. Encourage the idea of jogging and instruct patient to proceed with planned activity with no special preparations.
D. Refer the patient to a pulmonologist for clearance prior to planned jogging activity.

28. According to the 2025 Global Initiative for Asthma (GINA) update, what is the PREFERRED RELIEVER MEDICATION for ADOLESCENTS with BRONCHIAL ASTHMA?
A. long-acting beta-agonist (LABA) alone
B. oral corticosteroids during exacerbations
C. low-dose inhaled corticosteroid (ICS) + formoterol as needed
D. short-acting beta-agonist (SABA) alone

29. What is the key rationale behind the 2025 Global Initiative for Asthma (GINA) emphasis on INHALED CORTICOSTEROID-CONTAINING MEDICATIONS for patients with BRONCHIAL ASTHMA?
A. They treat the underlying airway inflammation to prevent asthma attacks.
B. They replace the need for any reliever medications.
C. They provide rapid relief of bronchospasm.
D. They are cheaper and more accessible than other medications.

30. In the 2025 Global Initiative for Asthma (GINA) strategy, what role do BIOMARKERS, such as FRACTIONAL EXHALED NITRIC OXIDE (FeNO), play in BRONCHIAL ASTHMA management?
A. They replace spirometry in monitoring lung function.
B. They are used primarily for initial diagnosis of asthma.
C. They determine the need for oral corticosteroid therapy.
D. They help assess adherence and response to inhaled corticosteroid therapy during follow-up.

31. A 6-year-old girl on AS-NEEDED SHORT-ACTING BETA-AGONIST (SABA) ALONE continues to have DAYTIME ASTHMASYMPTOMS more than twice per week. What is the next appropriate medical management?
A. Continue SABA and add oral Montelukast.
B. Add Theophylline nebulization.
C. Start oral corticosteroids (Prednisone).
D. Step up to daily low-dose inhaled corticosteroids (ICS).

Answers & Rationale - Asthma

1. Answer C
- This combination is the basis of the MART (Maintenance and Reliever Therapy) approach, which is GINA's preferred Track 1. Formoterol is a Long-Acting Beta-Agonist (LABA) with a fast onset of action, allowing it to be used as a reliever. Budesonide is an Inhaled Corticosteroid (ICS) that provides the anti-inflammatory maintenance. Salmeterol (Option B) has a slow onset and cannot be used as a reliever.

2. Answer B
- The patient's daily use of Salbutamol indicates his asthma is not controlled on his current therapy (daily low-dose ICS, which is GINA Track 2, Step 2). The appropriate "step-up" (Track 2, Step 3) is to add a LABA to his daily regimen, creating a combination ICS-LABA inhaler (such as Salmeterol/Fluticasone).

3. Answer A
- The GINA guidelines define asthma by the presence of two key features: 1) a history of variable respiratory symptoms (such as wheeze, shortness of breath, chest tightness, or cough) and 2) documented evidence of variable expiratory airflow limitation (e.g., from spirometry or PEF monitoring).

4. Answer C
- Lung function testing (spirometry) is essential to confirm the initial diagnosis. It should be performed again 3-6 months after starting controller medication to establish the patient's "personal best" lung function and to confirm the treatment is effective.

5. Answer B
- The patient is on the GINA Track 1 (Preferred) regimen, using as-needed low-dose ICS–formoterol (which corresponds to Steps 1-2). His symptoms (needing his reliever 3-4 times a week) indicate his asthma is not well-controlled (well-controlled is defined as symptoms ≤2 times a week).
- According to the GINA guidelines, the appropriate "step-up" from Step 1-2 in Track 1 is to Step 3, which is starting a daily maintenance low-dose ICS–formoterol (while continuing to use the same inhaler for as-needed relief).

6. Answer D
- The patient is in a severe exacerbation, as evidenced by her inability to speak in full sentences, hunched posture, tachycardia (HR 110), tachypnea (RR 25), and hypoxemia (O_2 sat 93%). The correct protocol for a severe exacerbation is a SABA (beta-2 agonist) plus an anticholinergic (Ipratropium), systemic corticosteroids (oral prednisolone), and supplemental oxygen (via facemask, to titrate to 93-95%).

7. Answer B
- The diagnosis of asthma is based on both a suggestive clinical history (which this patient has) and objective evidence of variable expiratory airflow limitation. This must be confirmed with a lung function test, such as spirometry with a reversibility test, before starting long-term controller therapy.

8. Answer A
- The patient's asthma is well-controlled on his current therapy (low-dose ICS-LABA, GINA Step 3). The goal of management is to maintain control with the minimum effective dose. After control is maintained (typically for 3 months), a "step-down" is appropriate. A logical first step down from a twice-daily ICS-LABA is to reduce the frequency to once-daily.

9. Answer D
- The patient's symptoms (using SABA >2 times/week, daytime symptoms most days) mean her asthma is uncontrolled. She is currently on SABA-only (Track 2, Step 1), which is insufficient. The correct "step-up" (Track 2, Step 2) is to start a daily controller medication, such as a low-dose inhaled corticosteroid (Budesonide inhaler BID), and continue to use the SABA (Salbutamol) only for as-needed relief.

10. Answer A
- This is the most comprehensive, patient-centered, and appropriate answer. The patient's primary modifiable risk factor is severe obesity (BMI 39), which increases her risk for diabetes, hypertension, and can worsen asthma. Motivational coaching is a core family medicine skill to promote sustainable behavioral change (physical activity, diet, and weight loss) to prevent these exact comorbidities.

11. Answer B
- The GINA guidelines, as summarized in the PAFP document, explicitly list "Vitamin D supplementation... during pregnancy or infancy" in the section "What is NOT recommended" for primary prevention of asthma. The other options (vaginal delivery, breastfeeding, avoidance of antibiotics in the first year) are all listed as (weakly) recommended strategies.

12. Answer B
- The patient has mild, intermittent symptoms. SABA-only (Option A) is contraindicated. Options C and D (Medium-dose) are overtreatment for these symptoms. Option B is the only one that includes a low-dose anti-inflammatory approach. While it is written incorrectly (mixing Track 1 and 2 concepts), it is the "least wrong" option, as GINA's preferred Track 1 (Step 1-2) is "as-needed low-dose ICS-Formoterol".

13. Answer A
- The provided guidelines state that for mild-to-moderate exacerbations, SABA delivered via a pMDI (pressurized metered-dose inhaler) with a spacer is as effective as when delivered via a nebulizer. Option B is incorrect (only *Formoterol* combinations work as relievers). Option C is incorrect (oxygen should be *titrated* to 93-95%, not given at 100%). Option D is incorrect (antibiotics are not *routine*).

14. Answer B
- This patient is in a severe exacerbation (talks in words, hunched posture, using accessory muscles). First-line treatment for a severe exacerbation includes SABA plus Ipratropium, controlled oxygen, and systemic corticosteroids (oral or IV) to control the underlying inflammation. Epinephrine (A) and Aminophylline (C) are not first-line treatments.

15. Answer A
- This is the standard definition of a positive bronchodilator reversibility (BDR) test, which is a key component in diagnosing asthma.

16. Answer C
- The patient's symptoms ("symptoms on most days" AND "waking up... once or more a week") meet the criteria for Step 3. The corresponding treatment for Step 3 is a low-dose ICS-LABA (for Track 1 or 2) or medium-dose ICS (Track 2).

17. Answer C
- The patient is in a severe exacerbation (talks in phrases, RR 28, PR 110, O2 sat 93%). The immediate priority is acute management. The correct protocol for a severe exacerbation is SABA plus Ipratropium

Bromide (an anticholinergic), supplemental oxygen (O2), and a systemic corticosteroid. Options A and B are for follow-up, and Option D is for a mild-to-moderate exacerbation.

18. Answer A

- This matches the GINA definition of asthma, which is a history of variable respiratory symptoms (wheeze, shortness of breath, chest tightness, cough) that are often worse at night or in the early morning. Option B (sputum) is more like COPD, and C (noisy inspiration) describes stridor.

19. Answer A

- This patient has symptoms consistent with mild asthma (Step 1-2). The preferred regimen (GINA Track 1) is an as-needed low-dose ICS-Formoterol inhaler, which acts as both the anti-inflammatory and the reliever. Option C (SABA-only) is no longer recommended. Options B and D represent overtreatment (Step 5 and Step 3/4, respectively).

20. Answer B

- The patient's symptoms ("DAYTIME SYMPTOMS on most days") place him at Step 3. Option B describes the GINA Track 2, Step 3 regimen: a low-dose ICS-LABA (Salmeterol/Fluticasone 125mcg BID = 250mcg/day, which is low dose) as a daily controller, plus a SABA (Salbutamol) as the as-needed reliever.
- Why not A? Option A (Budesonide 160mcg/Formoterol 4.5mcg at 2 puffs BID) describes a Step 4 (medium-dose) maintenance regimen, which would be overtreatment.

21. Answer C

- The patient's symptoms (daily symptoms and night awakenings) indicate uncontrolled asthma, placing her at GINA Step 3. The preferred regimen (Track 1, Step 3) is a daily low-dose ICS-Formoterol (Budesonide 160/4.5 one puff twice a day) as maintenance, plus using the same inhaler as needed for relief. Option B (two puffs twice a day) is a medium-dose regimen (Step 4), which is overtreatment at this stage.

22. Answer B

- GINA guidelines emphasize that maintaining asthma control is crucial during pregnancy, as exacerbations pose a significant risk to both the mother and the fetus. Asthma medications, including ICS (Budesonide) and LABA (Formoterol), are considered safe and should be continued at the dose that effectively controls symptoms.

23. Answer A

- According to the GINA assessment of symptom control, a patient is considered "Partly Controlled" if they experience daytime symptoms or need to use their reliever medication more than twice a week. Since this patient has symptoms "three episodes weekly," her asthma is partly controlled.

24. Answer D

- The patient's asthma is "Partly Controlled" based on two criteria: (1) daytime symptoms "thrice weekly" (which is more than twice a week) and (2) "activity limitation". The use of SABA "twice weekly" is borderline, but the other two symptoms confirm the "partly controlled" status.

25. Answer C

- Before stepping up treatment in a patient with persistent symptoms, it is essential to first check for common causes of treatment failure. The most common cause, especially for a newly diagnosed patient with a new device, is incorrect inhaler technique. Adherence should also be checked.

26. Answer B

- The goal of asthma management is to maintain control using the minimum effective dose. Since the patient has been well-controlled for 3 months on his current regimen (which is a medium-dose ICS-LABA, Step 4), a "step-down" to a lower dose (e.g., one inhalation twice daily, Step 3) is the recommended next step to find his lowest effective dose and reduce long-term side effects.

27. Answer B

- GINA encourages physical activity for asthmatics. For patients who experience exercise-induced bronchoconstriction (EIB), the standard recommendation is to use a reliever inhaler (SABA or, in Track 1, low-dose ICS-formoterol) 5-15 minutes before starting exercise to prevent symptoms.

28. Answer C

- GINA's preferred approach (Track 1) for all adolescents and adults is to use an as-needed low-dose ICS-formoterol combination inhaler. This is the preferred reliever because it addresses both bronchospasm (with formoterol) and the underlying inflammation (with ICS), reducing the risk of severe exacerbations. SABA-only (Option D) is no longer recommended.

29. Answer A

- Asthma is defined as a disease of chronic airway inflammation. The primary purpose of ICS is to treat this underlying inflammation. This, in turn, controls symptoms and, most importantly, reduces the risk of severe exacerbations (asthma attacks) and asthma-related death.

30. Answer D

- FeNO is a biomarker for Type 2 (eosinophilic) airway inflammation. In management, it is used to assess the type of inflammation, which helps predict the response to inhaled corticosteroid therapy (patients with high FeNO respond well to ICS). It can also be used as an objective measure to assess adherence (a low FeNO in a patient who is expected to have high FeNO may indicate they are not taking their ICS medication).

31. Answer D

- The patient is a 6-year-old child whose asthma is not well-controlled. According to the GINA guidelines, asthma is considered "partly controlled" or "uncontrolled" if symptoms occur more than twice per week.
- Her current "as-needed" SABA-only regimen is GINA Step 1. Since her symptoms are not controlled at this step, a "step-up" to Step 2 is required. For children aged 6-11, the preferred controller treatment at Step 2 is a daily low-dose inhaled corticosteroid (ICS).

Chronic Obstructive Pulmonary Disease

- is a disease characterized by chronic respiratory symptoms and airflow obstruction.
- It also affects quality of life, due to exacerbations and hospitalizations.
- The most common and most important risk factor remains **smoking**, hence interventions for smoking cessation are critical in COPD management.
- The long-term goals of management include the improvement of health outcomes and quality of life, reduction of symptoms, exacerbations, hospitalizations, and mortality, and improvement of lung function.

COPD Overview	
Risk Factors	• Cigarette smoking or vaping - most important • Asthma and airway hyperresponsiveness • Childhood pneumonia • Respiratory infections - risk factor for COPD exacerbations • Occupational exposures to dust and fumes (e.g. coal mining, gold mining, cotton textile dust) • Biomass/biofuel combustion - particularly among women • Genetic risk factors (e.g., α1 antitrypsin deficiency)
Prevention	Avoidance/cessation of smoking, avoidance of second-hand exposure - most important preventive measure for primary, secondary, and tertiary prevention Avoidance of environmental exposure to biomass smoke, pollution, etc. Adequate treatment of respiratory infections including pneumonia (particularly in infancy/childhood) and TB (See General Wellness and Preventive Measures for general guidance)
Screening	**In asymptomatic patients.** Not recommended. **In symptomatic patients.** Use clinical scoring systems to assess the probability of COPD.
Diagnosis	**Minimum at Primary Care.** Clinical scoring system + handheld spirometer Classify *confirmed* COPD patients using the Modified Medical Research Council (mmRC) Dyspnea Scale **Gold standard**. Facility-based spirometer
Pharmacologic Treatment	Stable COPD, not in exacerbation: • FEV1≥80% or mmRC <2: LAMA Monotherapy • FEV1<80% or mmRC ≥2: LABA + LAMA Combination; if unavailable, LAMA monotherapy ○ If with increased risk of exacerbation and without infection: add ICS COPD in exacerbation: SABA + SAMA; if unavailable, SABA monotherapy COPD + bacterial infection: Oral antibiotics
Non-pharmacologic management	• COPD Action Plan • Smoking or vaping Cessation

Signs and Symptoms

- Consider COPD in adults with a history of smoking and presenting with persistent and progressive respiratory symptoms such as difficulty of breathing, cough, and phlegm production

Screening

- Screening for COPD is **not recommended** in asymptomatic adults
- Assess patients with symptoms of probable COPD using a clinical scoring system to identify patients for confirmatory testing

Diagnostic Tests

- **Minimum at Primary Care.**
  - Confirm the diagnosis among probable COPD patients by using the combination of a clinical scoring system and handheld spirometry, as alternative to facility-based spirometry **Examples of a clinical scoring system are:**
    - COPD Diagnostic Questionnaire (CDQ)
    - COPD Population Screener (COPD-PS)
    - Lung Function Questionnaire (LFQ)
    - COPD Assessment in Primary Care to Identify Undiagnosed Respiratory Disease and Exacerbation Risk (CAPTURE) Screening Tool
  - Do not use clinical scoring system, handheld spirometer, or peak flow meter **alone** to confirm the diagnosis

- COPD is confirmed if there is non-fully reversible airflow limitation: **FEV1/FVC 0.7 post-bronchodilation**.

- **Gold Standard.** If available and accessible, request for the gold standard - **facility-based spirometry**, to confirm the diagnosis. Refer to a higher level facility for this test, if necessary.
- Initial assessment of confirmed COPD. Consider determining the following four fundamental aspects in COPD assessment among those confirmed with COPD by spirometry:
  - Severity of airflow limitation
  - Nature and magnitude of current symptoms
  - Previous history of moderate and severe exacerbations
  - Presence and type of other disease (multimorbidity)
- Classification of confirmed COPD. Classify the patient's symptoms according to the **Modified Medical Research Council (mmRC) Dyspnea Scale to** identify the appropriate treatment.

mmRC Classification	Symptoms
mmRC 0	Dyspnea only with strenuous exercise
mmRC 1	Dyspnea when hurrying or walking up a slight hill
mmRC 2	Walks slower than people of the same age because of dyspnea or has to stop for breath when walking at own pace
mmRC 3	Stops for breath after walking 100 yards (91 meters) or after a few minutes
mmRC 4	Too dyspneic to leave house or breathless when dressing

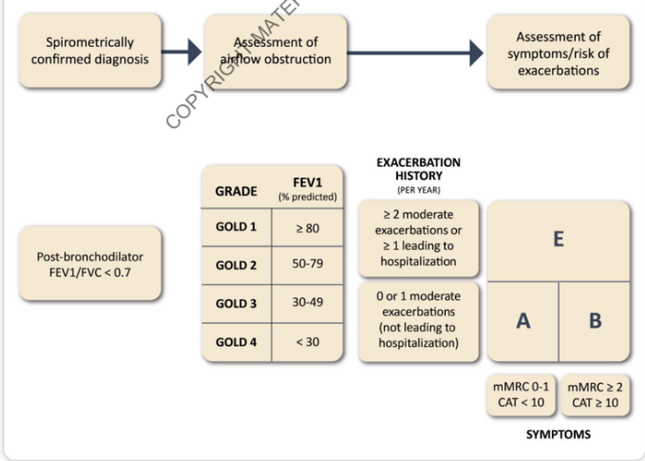
CAT™ Assessment — Figure 2.9

For each item below, place a mark (x) in the box that best describes you currently.
Be sure to only select one response for each question.

EXAMPLE: I am very happy	0 X 2 3 4 5	I am very sad	Score
I never cough	0 1 2 3 4 5	I cough all the time	
I have no phlegm (mucus) in my chest at all	0 1 2 3 4 5	My chest is completely full of phlegm (mucus)	
My chest does not feel tight at all	0 1 2 3 4 5	My chest feels very tight	
When I walk up a hill or one flight of stairs I am not breathless	0 1 2 3 4 5	When I walk up a hill or one flight of stairs I am very breathless	
I am not limited doing any activities at home	0 1 2 3 4 5	I am very limited doing activities at home	
I am confident leaving my home despite my lung condition	0 1 2 3 4 5	I am not at all confident leaving my home because of my lung condition	
I sleep soundly	0 1 2 3 4 5	I don't sleep soundly because of my lung condition	
I have lots of energy	0 1 2 3 4 5	I have no energy at all	

Reference: Jones et al. ERJ 2009; 34 (3); 648-54. TOTAL SCORE:

GOLD ABE Assessment Tool — Figure 2.10

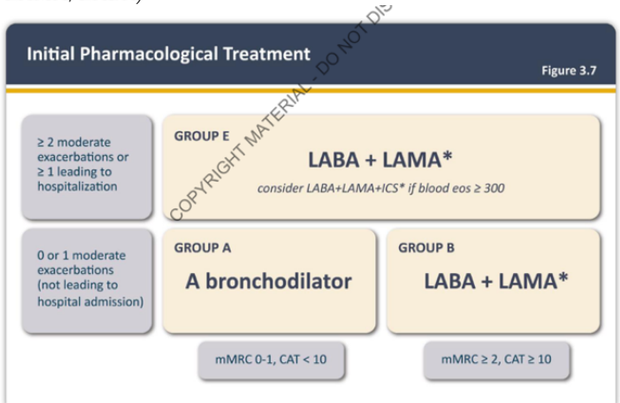


Treatment

- Start treatment in all adults who have COPD.
- **Pharmacologic Management of Stable COPD.**

- **First-line therapy.** Choose the appropriate therapy according to the FEV1 and mmRC classification of the patient.
  - FEV1≥80% or mmRC <2 and not in exacerbation:
    - LAMA monotherapy
  - FEV1<80% or mmRC ≥2 and not in exacerbation:
    - Long-acting B2-agonist (LABA)/Long-acting antimuscarinic antagonist (LAMA) combination therapy
    - If LABA/LAMA combination therapy is not available, use LAMA instead of LABA
  - FEV1<80% or mmRC ≥2 with increased risk of exacerbation and absence of concurrent respiratory infection:
    - Add an inhaled corticosteroid (ICS) on top of long-acting bronchodilator (LABD) (e.g. LABA/LAMA/ICS or LABA/ICS + LAMA/LABA)

Initial Pharmacological Treatment — Figure 3.7



*Single inhaler therapy may be more convenient and effective than multiple inhalers; single inhalers improve adherence to treatment
Exacerbations refers to the number of exacerbations per year; eos: blood eosinophil count in cells per microliter; mMRC: modified Medical Research Council dyspnea questionnaire; CAT™: COPD Assessment Test™.

- **Second-line therapy.** If inhaled long-acting bronchodilators (e.g. LAMA, LABA) are not available or accessible , offer oral methylxanthines However, long-acting bronchodilators remain preferred over oral methylxanthines.
  - Methylxanthines include Theophylline and Doxofylline.
- **Pharmacologic Management of COPD in Exacerbation**.
  - **First-line.** Administer short-acting B2-agonist (SABA) + short-acting antimuscarinic antagonist (SAMA) combination. If SABA + SAMA is not available, administer SABA alone
- **Add-on therapy.** If the patient in exacerbation has worsening symptoms and does not respond to bronchodilators (SABA + SAMA or SABA alone), give a short course of oral steroids (5-10 days)
  - Refer patients with COPD in exacerbation to higher levels of care as necessary.
- **Management of Bacterial Coinfection in Outpatients with COPD Exacerbation.**
  - Initiate oral antibiotics in patients with COPD who present with at least 2 of the following symptoms: increased dyspnea, increased frequency of cough, increased sputum volume or purulence (Anthonsen's criteria)
  - Antibiotic options, to complete course in 5-10 days (2018 National Antibiotics Guideline):
    - Amoxicillin 500 mg 3 times a day
    - Doxycycline 100 mg tab 2 times a day
    - Cefuroxime 500 mg tab 2 times a day
- **Nonpharmacologic Management.**

Smoking or vaping cessation in current smokers or vapers
Develop a COPD Action Plan (sample) with the patient to be used for self-guided management

ANTI-INFLAMMATORY THERAPY IN STABLE COPD

Anti-Inflammatory Therapy in Stable COPD — Figure 3.20

Inhaled Corticosteroids	• Regular treatment with ICS increases the risk of pneumonia especially in those with severe disease **(Evidence A)** • An ICS combined with a LABA is more effective than the individual components in improving lung function and health status and reducing exacerbations in patients with exacerbations and moderate to very severe COPD **(Evidence A)** • We do not encourage the use of a LABA+ICS combination in COPD. If there is an indication for an ICS the combination LABA+LAMA+ICS has been shown to be superior to LABA+ICS and is therefore the preferred choice • Triple inhaled therapy of LABA+LAMA+ICS improves lung function, symptoms and health status, and reduces exacerbations, compared to LABA+ICS, LABA+LAMA or LAMA monotherapy **(Evidence A)**. Recent data suggesta beneficial effect of triple inhaled therapy versus fixed-dose LABA+LAMA combinations on mortality in symptomatic COPD patients with a history of frequent and/or severe exacerbations • If patients with COPD have features of asthma, treatment should always contain an ICS • Independent of ICS use, there is evidence that a blood eosinophil count < 2% increases the risk of pneumonia **(Evidence C)** • Combinations can be given as single or multiple inhaler therapy. Single inhaler therapy may be more convenient and effective than multiple inhalers
Oral Glucocorticoids	• Long-term use of oral glucocorticoids has numerous side effects **(Evidence A)** with no evidence of benefits **(Evidence C)**
PDE4 Inhibitors	• In patients with chronic bronchitis, severe to very severe COPD and a history of exacerbations: ▪ Roflumilast improves lung function and reduces moderate and severe exacerbations **(Evidence A)**
Antibiotics	• Long-term azithromycin and erythromycin therapy reduces exacerbations over one year **(Evidence A)** • Preferentially, but not only in former smokers with exacerbations despite appropriate therapy, azithromycin can be considered **(Evidence B)** • Treatment with azithromycin is associated with an increased incidence of bacterial resistance **(Evidence A)** and hearing test impairments **(Evidence B)**
Mucoregulators and Antioxidant Agents	• Regular treatment with mucolytics such as erdosteine, carbocysteine and NAC reduces the risk of exacerbations in select populations **(Evidence B)** • Antioxidant mucolytics are recommended only in selected patients **(Evidence A)**
Other Anti-Inflammatory Agents	• Statin therapy is not recommended for prevention of exacerbations **(Evidence A)** • Simvastatin does not prevent exacerbations in COPD patients at increased risk of exacerbations and without indications for statin therapy **(Evidence A)**. However, observational studies suggest that statins may have positive effects on some outcomes in patients with COPD who receive them for cardiovascular and metabolic indications **(Evidence C)** • Leukotriene modifiers have not been tested adequately in COPD patients

Referral

- Refer patients with COPD who have any of the following conditions which are associated with higher risk of moderate to severe exacerbation to higher level of care:
  - Prior history of exacerbations
  - Presence of comorbidities
  - Severe or very severe airflow limitation
- Refer patients with COPD who have any of the following conditions which are associated with higher risk mortality to higher level of care:
  - Presence of uncontrolled diabetes or cardiovascular disease
  - Previous hospitalization for acute exacerbation within the past year
  - Hospital readmission within 30 days
  - Use of long-term oxygen therapy.

Palliative Care

- Consider giving low flow oxygen therapy to relieve dyspnea in symptomatic COPD patients with moderate to severe breathlessness (mmRC 3-4) who are not hypoxemic and who do not fulfill the criteria for long-term oxygen therapy (LTOT), provided it is used with caution and the patient is closely supervised:
  - Prior history of exacerbations
  - Presence of comorbidities
  - Severe or very severe airflow limitation
- Consider giving opioids (e.g., Morphine) to relieve dyspnea despite maximized medical managements in patients with advanced-stage or end-stage COPD and/or refractory dyspnea
  - Presence of uncontrolled diabetes or cardiovascular disease
  - Previous hospitalization for acute exacerbation within the past year
  - Hospital readmission within 30 days
  - Use of long-term oxygen therapy

Summary of Recommendations
CLINICAL PRACTICE GUIDELINES FOR THE MANAGEMENT OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

- Among smokers, we recommend smoking cessation to prevent COPD
- Among patients with COPD who are smokers, we recommend smoking cessation to prevent COPD-related morbidity and mortality
- Among households using biomass fuels, we recommend shifting to clean fuel (i.e., gas or electricity) to reduce the risk for COPD
- Among probable COPD patients, **we recommend against** the use of clinical scoring system alone compared to facility-based spirometry in confirming the diagnosis of COPD in the primary care setting
- Among probable COPD patients, we suggest the use of clinical scoring system to identify patients who may need further confirmatory testing
- Among probable COPD patients, **we recommend against** the use of **peak flow meter** alone in confirming the diagnosis of COPD in the primary care setting
- Among probable COPD patients, **we recommend against** the use of **handheld spirometer** alone in confirming the diagnosis of COPD in the primary care setting
- Among probable COPD patients, we suggest the use of combined clinical scoring system and handheld spirometer as an alternative to facility-based spirometry in confirming the diagnosis of COPD in the primary care setting
- Among probable COPD patients, **we suggest against** use of combined clinical scoring system and peak flow meter compared to facility-based spirometry in confirming the diagnosis of COPD in the primary care setting
- Among stable COPD patients in the primary care setting with FEV1<80% or mMRC≥2* and are not in exacerbation, we recommend the use of LABA/LAMA combination therapy over LAMA or LABA monotherapy
- Among stable COPD patients in the primary care setting with FEV1<80% or mMRC≥2* and are not in exacerbation, we suggest the use of LAMA over LABA
  - *The Modified Medical Research Council (mmRC) Dyspnea Scale stratifies severity of dyspnea in respiratory diseases, particularly COPD: [mmRC of 0] Dyspnea only with strenuous exercise; [mmRC of 1] Dyspnea when hurrying or walking up a slight hill; [mmRC of 2] Walks slower than people of the same age because of dyspnea or has to stop for breath when walking at own pace; [mmRC of 3] Stops for breath after walking 100 yards (91m) or after a few minutes; [mmRC of 4] Too dyspneic to leave house or breathless when dressing.
- Among stable COPD patients in the primary care setting with FEV1≥80% or mMRC<2* and are not in exacerbation, we suggest the use of LAMA monotherapy over LABA monotherapy or LABA/LAMA combination therapy
- Among stable COPD patients in the primary care setting with FEV1<80% or mMRC≥2* with increased risk for exacerbations and absence of concurrent respiratory infection**, we recommend the use of inhaled corticosteroids in combination with inhaled long-acting bronchodilators
  - **Based on included RCTS in this review, addition of ICS to long-acting bronchodilator was indicated for patients with recurrent history of exacerbations. However, concurrent respiratory infection was identified as a contraindication.
- Among stable COPD patients in the primary care setting, we recommend the use of inhaled long-acting bronchodilator over oral methylxanthines
- Among stable COPD patients in the primary care setting, we recommend the use of oral methylxanthines versus no treatment if inhaled long-acting bronchodilator is not available
- Among stable COPD patients in the primary care setting, we recommend against adding oral methylxanthines to inhaled long-acting bronchodilator
- Among patients with COPD, we recommend the use of SABA+SAMA (combination therapy) in the management of acute exacerbation. In situations where SABA+SAMA is not readily available, SABA may be used
- Among COPD patients in acute exacerbation with worsening symptoms and not responding to bronchodilators, we recommend the use of short course*** oral steroids in the primary care setting
  - ***The duration of short course is 5-10 days. Referral to higher level of care may be done upon discretion of the primary care physician at any time for non-responders or for those with incomplete response.
- Among outpatients with COPD, we recommend initiation of oral antibiotics in the presence of at least two of the following symptoms: increased dyspnea, increased frequency of cough, increased sputum volume or purulence
- Among COPD patients managed at the primary level, we recommend referral of any of the following conditions that are associated with higher risk of moderate to severe exacerbation to higher level of care: prior history of exacerbation, presence of comorbidities, and severe or very severe airflow limitation
- Among COPD patients managed at the primary level, we recommend referral of any of the following conditions that are associated with higher risk of mortality to higher level of care: presence of uncontrolled diabetes or cardiovascular disease, previous hospitalization for acute exacerbation within the past year, hospital readmission within 30 days, and use of long-term oxygen therapy
- Among stable COPD patients, we recommend the use of guided self-management utilizing COPD action plan in the primary care setting

- Among symptomatic COPD patients with moderate to severe breathlessness,**** who are not hypoxemic, and does not fulfill criteria for long-term oxygen therapy (LTOT), we suggest using low flow oxygen therapy for relief of dyspnea with caution and close supervision of attending physician
  - ****Moderate to severe breathlessness is defined as mMRc of 3-4 (3 stops for breath after walking 100m or stops after a few minutes walking on the level; 4 Too breathless to leave the house or breathless on dressing or undressing)
- Among patients with advanced-stage or end-stage COPD and/or refractory dyspnea, we suggest to consider the use of opioids with close supervision to relieve dyspnea that persists despite maximized medical management

GLOBAL STRATEGY FOR THE DIAGNOSIS, MANAGEMENT, AND PREVENTION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (2025 REPORT)

CHAPTER 1: DEFINITION AND OVERVIEW

KEY POINTS:

Definition

- Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production and/or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.

Causes and Risk Factors

- COPD results from gene(G)-environment(E) interactions occurring over the lifetime(T) of the individual (GETomics) that can damage the lungs and/or alter their normal development/aging processes.
- The main environmental exposures leading to COPD are tobacco smoking and the inhalation of toxic particles and gases from household and outdoor air pollution, but other environmental and host factors (including abnormal lung development and accelerated lung aging) can also contribute.
- The most relevant (albeit rare) genetic risk factor for COPD identified to date are mutations in the SERPINA1 gene that lead to α-1 antitrypsin deficiency. A number of other genetic variants have also been associated with reduced lung function and risk of COPD, but their individual effect size is small.

Diagnostic Criteria

- In the appropriate clinical context (see 'Definition' & 'Causes and Risk Factors' above), the presence of non-fully reversible airflow obstruction (i.e., FEV1/FVC < 0.7 post-bronchodilation) measured by spirometry confirms the diagnosis of COPD.
- Some individuals can have respiratory symptoms and/or structural lung lesions (e.g., emphysema) and/or physiological abnormalities (including low FEV1, gas trapping, hyperinflation, reduced lung diffusing capacity and/or rapid FEV1 decline) without airflow obstruction (FEV1/FVC ≥ 0.7 post-bronchodilation). These subjects are labeled 'Pre-COPD'. The term 'PRISm' (Preserved Ratio Impaired Spirometry) has been proposed to identify those with normal ratio but abnormal spirometry. Subjects with Pre-COPD or PRISm are at risk of developing airflow obstruction over time, but not all of them do.

Clinical Presentation

- Patients with COPD typically complain of dyspnea, activity limitation and/or cough with or without sputum production and may experience acute respiratory events characterized by increased respiratory symptoms called exacerbations that require specific preventive and therapeutic measures.
- Patients with COPD frequently harbor other comorbid diseases that influence their clinical condition and prognosis and require specific treatment as well. These comorbid conditions can mimic and/or aggravate an acute exacerbation.

New Opportunities

- COPD is a common, preventable, and treatable disease, but extensive under-diagnosis and misdiagnosis leads to patients receiving no treatment or incorrect treatment. Appropriate and earlier diagnosis of COPD can have a very significant public-health impact.
- The realization that environmental factors other than tobacco smoking can contribute to COPD, that it can start early in life and affect young individuals, and that there are precursor conditions (Pre-COPD, PRISm), opens new windows of opportunity for its prevention, early diagnosis, and prompt and appropriate therapeutic intervention.

CHAPTER 2: DIAGNOSIS AND ASSESSMENT

KEY POINTS:

- A diagnosis of COPD should be **considered** in any patient who has dyspnea, chronic cough or sputum production, a history of recurrent lower respiratory tract infections and/or a history of exposure to risk factors for the disease, but **spirometry** showing the presence of a post-bronchodilator FEV1/FVC < 0.7 is **mandatory** to establish the diagnosis of COPD.
- The goals of the initial COPD assessment are to determine the severity of airflow obstruction, the impact of disease on the patient's health status, and the risk of future events (such as exacerbations, hospital admissions, or death), to guide therapy.
- Additional clinical assessment, including the measurement of lung volumes, diffusion capacity, exercise testing and/or lung imaging may be considered in COPD patients with persistent symptoms after initial treatment.
- Concomitant chronic diseases (multimorbidity) occur frequently in COPD patients, including cardiovascular disease, skeletal muscle dysfunction, metabolic syndrome, osteoporosis, depression, anxiety, and lung cancer. These comorbidities should be actively sought, and treated appropriately when present, because they influence health status, hospitalizations and mortality independently of the severity of airflow obstruction due to COPD.

Clinical Indicators for Considering a Diagnosis of COPD — Figure 2.1

Consider the diagnosis of COPD, and perform spirometry, if any of these clinical indicators are present: (these indicators are not diagnostic themselves, but the presence of multiple key indicators increases the probability of the presence of COPD; in any case, spirometry is required to establish a diagnosis of COPD)

Dyspnea that is	Progressive over time Worse with exercise Persistent
Recurrent wheeze	
Chronic cough	May be intermittent and may be non-productive
Recurrent lower respiratory tract infections	
History of risk factors	Tobacco smoke (including popular local preparations) Smoke from home cooking and heating fuels Occupational dusts, vapors, fumes, gases and other chemicals Host factors (e.g., genetic factors, developmental abnormalities, low birthweight, prematurity, childhood respiratory infections etc.)

Differential Diagnosis of COPD — Figure 2.3

Diagnosis	Suggestive Features
COPD	Symptoms slowly progressive History of tobacco smoking or other risk factors
Asthma	Variable airflow obstruction Symptoms vary widely from day to day Symptoms worse at night/early morning Allergy, rhinitis, and/or eczema also present Often occurs in children Family history of asthma
Congestive heart failure	Chest X-ray shows dilated heart, pulmonary edema Pulmonary function tests indicate volume restriction, not airflow obstruction
Bronchiectasis	Large volumes of purulent sputum Commonly associated with bacterial infection Chest X-ray/HRCT shows bronchial dilation
Tuberculosis	Onset at all ages Chest X-ray shows lung infiltrate Microbiological confirmation High local prevalence of tuberculosis
Obliterative bronchiolitis	Can occur in children Seen after lung or bone marrow transplantation HRCT on expiration shows hypodense areas
Diffuse panbronchiolitis	Predominantly seen in patients of Asian descent Most patients are male and nonsmokers Almost all have chronic sinusitis Chest X-ray & HRCT show diffuse small centrilobular nodular opacities & hyperinflation

These features tend to be characteristic of the respective diseases, but are not mandatory. For example, a person who has never smoked may develop COPD (especially in LMICs where other risk factors may be more important than cigarette smoking).

GOLD Grades and Severity of Airflow Obstruction in COPD (based on post-bronchodilator FEV1) — Figure 2.8

In COPD patients (FEV1/FVC < 0.7):

GOLD 1:	Mild	FEV1 ≥ 80% predicted
GOLD 2:	Moderate	50% ≤ FEV1 < 80% predicted
GOLD 3:	Severe	30% ≤ FEV1 < 50% predicted
GOLD 4:	Very Severe	FEV1 < 30% predicted

Modified MRC Dyspnea Scale

Figure 2.9

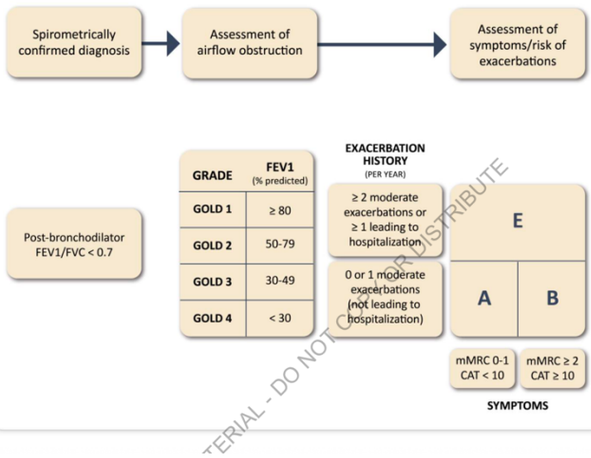
PLEASE TICK IN THE BOX THAT APPLIES TO YOU | ONE BOX ONLY | Grades 0 - 4

mMRC Grade 0	mMRC Grade 1	mMRC Grade 2	mMRC Grade 3	mMRC Grade 4
I only get breathless with strenuous exercise	I get short of breath when hurrying on the level or walking up a slight hill	I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level	I stop for breath after walking about 100 meters or after a few minutes on the level	I am too breathless to leave the house or I am breathless when dressing or undressing
☐	☐	☐	☐	☐

Reference: ATS (1982) Am Rev Respir Dis. Nov;126(5):952-6.

GOLD ABE Assessment Tool

Figure 2.11



CHAPTER 3: PREVENTION & MANAGEMENT OF COPD

KEY POINTS:

- All individuals who smoke should be strongly encouraged and supported to quit. Nicotine replacement and pharmacotherapy reliably increase long-term smoking abstinence rates. Legislative smoking bans and counseling, delivered by healthcare professionals, improve quit rates. There is no evidence to support the effectiveness and safety of e-cigarettes as a smoking cessation aid at present.
- The main treatment goals are to reduce symptoms and future risk of exacerbations. The management strategy of stable COPD should be predominantly based on the assessment of symptoms and the history of exacerbations.
- Pharmacotherapy can reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance. Data suggest beneficial effects on rates of lung function decline and mortality.
- Each pharmacological treatment regimen should be individualized and guided by the severity of symptoms, risk of exacerbations, side-effects, comorbidities, drug availability and cost, and the patient's response, preference, and ability to use various drug delivery devices.
- Inhaler technique needs to be assessed regularly.
- COVID-19 vaccines are highly effective against SARS-CoV-2 infection and people with COPD should have the COVID-19 vaccination in line with national recommendations.
- Influenza vaccination and pneumococcal vaccination decrease the incidence of lower respiratory tract infections.
- The CDC recommends: the Tdap vaccination (dTaP/dTPa; pertussis, tetanus and diptheria) for COPD patients who were not vaccinated in adolescence; routine use of shingles vaccine in all COPD patients; the new respiratory syncytial virus (RSV) vaccine for individuals over 60 years and/or with chronic heart or lung disease.
- Pulmonary rehabilitation with its core components, including exercise training combined with disease-specific education, improves exercise capacity, symptoms, and quality of life across all grades of COPD severity.
- In patients with severe resting chronic hypoxemia ($PaO_2 \leq 55$ mmHg or < 60 mmHg if there is *cor pulmonale* or secondary polycythemia), long-term oxygen therapy improves survival.
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long-term oxygen treatment should not be prescribed routinely. However, individual patient factors must be considered when evaluating the patient's need for supplemental oxygen.
- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long-term non-invasive ventilation may decrease mortality and prevent re-hospitalization.
- In select patients with advanced emphysema refractory to optimized medical care, surgical or bronchoscopic interventional treatments may be beneficial.
- Palliative approaches are effective in controlling symptoms in advanced COPD.

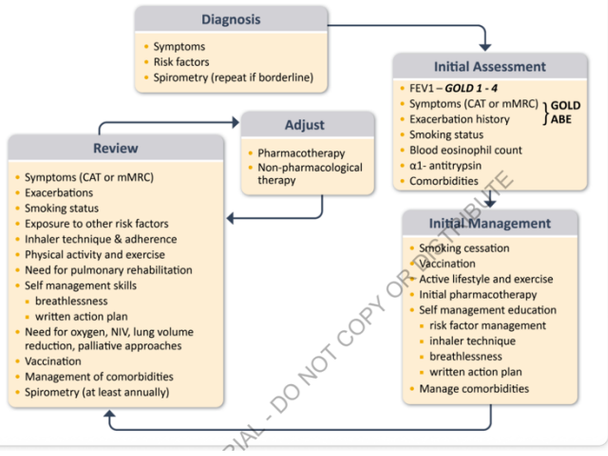
Brief Strategies to Help the Patient Willing to Quit

Figure 3.4

ASK	Systematically identify all tobacco users at every visit *Implement an office-wide system that ensures that, for EVERY patient at EVERY clinic visit, tobacco-use status is queried and documented*
ADVISE	Strongly urge all tobacco users to quit *In a clear, strong, and personalized manner, urge every tobacco user to quit*
ASSESS	Determine willingness and rationale of patient's desire to make a quit attempt. *Ask every tobacco user if he or she is willing to make a quit attempt at this time (e.g., within the next 30 days)*
ASSIST	Aid the patient in quitting *Help the patient with a quit plan; provide practical counseling; provide intra-treatment social support; help the patient obtain extra-treatment social support; recommend use of approved pharmacotherapy except in special circumstances; provide supplementary materials*
ARRANGE	Schedule follow-up contact *Schedule follow-up contact, either in person or via telephone*

Management of COPD

Figure 3.2



Vaccination for Stable COPD

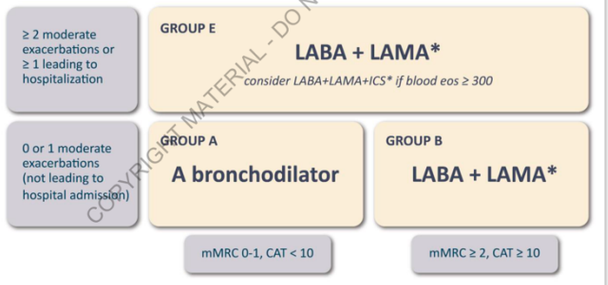
Figure 3.6

People with COPD should receive all recommended vaccinations in line with the relevant local guidelines:

- Yearly influenza vaccination **(Evidence B)**
- SARS-CoV-2 (COVID-19) vaccination based on WHO and CDC updated recommendations **(Evidence B)**
- Either one dose of 21-valent pneumococcal conjugate vaccine (PCV21) or one dose PCV20, as recommended by the CDC **(Evidence B)**. Pneumococcal vaccination has been shown to reduce the incidence of community-acquired pneumonia and exacerbations for people with COPD **(Evidence B)**
- Respiratory syncytial virus (RSV) vaccination for individuals aged ≥ 60 years and/or with chronic heart or lung disease, as recommended by the CDC **(Evidence A)**
- Tdap (dTaP/dTPa) vaccination to protect against pertussis (whooping cough) for people with COPD that were not vaccinated in adolescence, as recommended by the CDC **(Evidence B)**
- Zoster vaccine to protect against shingles for people with COPD aged > 50 years, as recommended by the CDC **(Evidence B)**

Initial Pharmacological Treatment

Figure 3.7

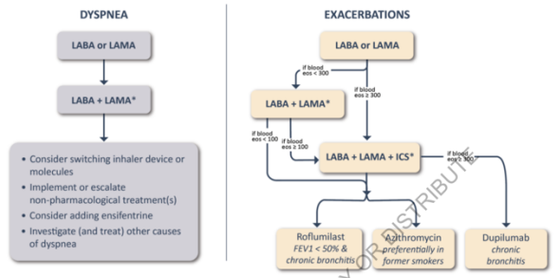


*Single inhaler therapy may be more convenient and effective than multiple inhalers; single inhalers improve adherence to treatment

Exacerbations refers to the number of exacerbations per year; eos: blood eosinophil count in cells per microliter; mMRC: modified Medical Research Council dyspnea questionnaire; CAT™: COPD Assessment Test™.

Follow-up Pharmacological Treatment

Figure 3.9



*Single inhaler therapy may be more convenient and effective than multiple inhalers. Single inhalers improve adherence to treatment. Consider de-escalation of ICS if pneumonia or other considerable side-effects. In case of blood eos ≥ 300 cells/µl de-escalation is more likely to be associated with the development of exacerbations. Exacerbations refers to the number of exacerbations per year.

Non-Pharmacological Management of COPD*

Figure 3.12

Patient Group	Essential	Recommended	Depending on Local Guidelines
A	Smoking cessation (can include pharmacological treatment)	Physical activity	Influenza vaccination COVID-19 vaccinations Pneumococcal vaccination Pertussis vaccination Shingles vaccination RSV vaccination
B and E	Smoking cessation (can include pharmacological treatment) Pulmonary rehabilitation	Physical activity	Influenza vaccination COVID-19 vaccinations Pneumococcal vaccination Pertussis vaccination Shingles vaccination RSV vaccination

*Can include pharmacological treatment

Follow-up of Non-Pharmacological Treatment

Figure 3.13

1. If response to initial treatment is appropriate, maintain it and offer:

- Influenza vaccination every year and other recommended vaccinations according to guidelines
- Self-management education
- Assessment of behavioral risk factors such as smoking cessation (if applicable) and environmental exposures

Ensure

- Maintenance of exercise program and physical activity
- Adequate sleep and a healthy diet

2. If not, consider the predominant treatable trait to target

DYSPNEA

- Self-management education (written action plan) with integrated self-management regarding:
  - Breathlessness, energy conservation techniques, and stress management strategies
- Pulmonary rehabilitation (PR) program and/or maintenance exercise program post PR

EXACERBATIONS

- Self-management education (written action plan) that is personalized with respect to:
  - Avoidance of aggravating factors
  - How to monitor/manage worsening of symptoms
  - Contact information in the event of an exacerbation
  - Pulmonary rehabilitation (PR) program and/or maintenance exercise program post PR

All patients with advanced COPD should be considered for end of life and palliative care support to optimize symptom control and allow patients and their families to make informed choices about future management.

Oxygen Therapy and Ventilatory Support in Stable COPD

Figure 3.14

Oxygen Therapy

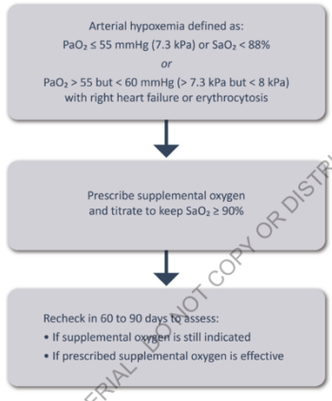
- The long-term administration of oxygen increases survival in patients with severe chronic resting arterial hypoxemia **(Evidence A)**
- In patients with stable COPD and moderate resting or exercise-induced arterial desaturation, prescription of long-term oxygen does not lengthen time to death or first hospitalization or provide sustained benefit in health status, lung function and 6-minute walk distance **(Evidence A)**
- Resting oxygenation at sea level does not exclude the development of severe hypoxemia when traveling by air **(Evidence C)**

Ventilatory Support

- NPPV may improve hospitalization-free survival in selected patients after recent hospitalization, particularly in those with pronounced daytime persistent hypercapnia ($PaCO_2$ > 53 mmHg) **(Evidence B)**
- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long-term noninvasive ventilation may be considered **(Evidence B)**

Prescription of Supplemental Oxygen to COPD Patients

Figure 3.15



Palliative Care, End of Life and Hospice Care in COPD

Figure 3.16

- All clinicians managing patients with COPD should be aware of the effectiveness of palliative approaches to symptom control and use these in their practice **(Evidence D)**
- End of life care should include discussions with patients and their families about their views on resuscitation, advance directives and place of death preferences **(Evidence D)**
- Opiates, neuromuscular electrical stimulation (NMES), oxygen and fans blowing air onto the face can relieve breathlessness **(Evidence C)**
- Nutritional supplementation should be considered in malnourished patients with COPD **(Evidence B)** as it may improve respiratory muscle strength and overall health status **(Evidence B)**
- Fatigue can be improved by self-management education, pulmonary rehabilitation, nutritional support and mind-body interventions **(Evidence B)**

Maintenance Medications in COPD*

Figure 3.18

Generic Drug Name	Inhaler Type	Nebulizer	Oral/Injectable Delivery	Duration of Action
$BETA_2$-Agonists				
Short-acting (SABA)				
Fenoterol	MDI	✓	tablet, solution	variable
Levalbuterol	MDI	✓		variable
Salbutamol (albuterol)	MDI & DPI	✓	syrup, tablet	variable
Terbutaline	DPI		tablet	variable
Long-acting (LABA)				
Arformoterol		✓		12 hours
Formoterol	DPI	✓		12 hours
Indacaterol	DPI			24 hours
Olodaterol	SMI			24 hours
Salmeterol	MDI & DPI			12 hours
Anticholinergics				
Short-acting (SAMA)				
Ipratropium bromide	MDI	✓		6-8 hours
Oxitropium bromide	MDI	✓		7-9 hours
Long-acting (LAMA)				
Aclidinium bromide	DPI			12 hours
Glycopyrronium bromide	DPI		solution	variable
Tiotropium	DPI, SMI, MDI			24 hours
Umeclidinium	DPI			24 hours
Glycopyrronium		✓		12 hours
Revefenacin		✓		24 hours
Combination Short-Acting $Beta_2$-Agonist Plus Anticholinergic in One Device (SABA+SAMA)				
Fenoterol/ipratropium	SMI	✓		6-8 hours
Salbutamol/ipratropium	SMI, MDI	✓		variable
Combination Long-Acting $Beta_2$-Agonist Plus Anticholinergic in One Device (LABA+LAMA)				
Formoterol/aclidinium	DPI			12 hours
Formoterol/glycopyrronium	MDI			12 hours
Indacaterol/glycopyrronium	DPI			12-24 hours
Vilanterol/umeclidinium	DPI			24 hours
Olodaterol/tiotropium	SMI			24 hours
Methylxanthines				
Aminophylline			solution, injectable	variable
Theophylline (SR)			tablet, capsule, elixir, solution, injectable	variable
Combination of Long-Acting $Beta_2$-Agonist Plus Corticosteroid in One Device (LABA+ICS)				
Formoterol/beclometasone	MDI, DPI			12 hours
Formoterol/budesonide	MDI, DPI			12 hours
Formoterol/mometasone	MDI			12 hours
Salmeterol/fluticasone propionate	MDI, DPI			12 hours
Vilanterol/fluticasone furoate	DPI			24 hours
Triple Combination in One Device (LABA+LAMA+ICS)				
Fluticasone/umeclidinium/vilanterol	DPI			24 hours
Beclometasone/formoterol/glycopyrronium	MDI, DPI			12 hours
Budesonide/formoterol/glycopyrrolate	MDI			12 hours
Phosphodiesterase-3 and/or -4 Inhibitors				
Roflumilast			tablet	24 hours
Ensifentrine		✓		12 hours
Mucolytic Agents				
Erdosteine			capsule, suspension	12 hours
Carbocysteine†			capsule, packet, solution,syrup	6-8 hours
N-acetylcysteine†		✓	solution, tablet	2-6 hours
Biologics				
Dupilumab			injectable	2 weeks

*This list is not exhaustive. Not all formulations are available in all countries. In some countries other formulations and dosages may be available. †Dosing regimens are under discussion. MDI = metered dose inhaler; DPI = dry powder inhaler; SMI = soft mist inhaler. Note that glycopyrrolate & glycopyrronium are the same compound.

Bronchodilators in Stable COPD

Figure 3.19

- Inhaled bronchodilators in COPD are central to symptom management and commonly given on a regular basis to prevent or reduce symptoms **(Evidence A)**
- Inhaled bronchodilators are recommended over oral bronchodilators **(Evidence A)**
- Regular and as-needed use of SABA or SAMA improves FEV1 and symptoms **(Evidence A)**
- Combinations of SABA and SAMA are superior compared to either medication alone in improving FEV1 and symptoms **(Evidence A)**
- LABAs and LAMAs are preferred over short-acting agents except for patients with only occasional dyspnea (**Evidence A**), and for immediate relief of symptoms in patients already on long-acting bronchodilators for maintenance therapy
- LABAs and LAMAs significantly improve lung function, dyspnea, health status, and reduce exacerbation rates **(Evidence A)**
- LAMAs have a greater effect on exacerbation reduction compared with LABAs **(Evidence A)** and decrease hospitalizations **(Evidence B)**
- When initiating treatment with long acting bronchodilators the preferred choice is a combination of a LABA and a LAMA. In patients with persistent dyspnea on a single long-acting bronchodilator treatment should be escalated to two (**Evidence A**).
- Combination treatment with a LABA and a LAMA increases FEV1 and reduces symptoms compared to monotherapy **(Evidence A)**
- Combination treatment with a LABA+LAMA reduces exacerbations compared to monotherapy **(Evidence B)**
- Combinations can be given as single inhaler or multiple inhaler treatment. Single inhaler therapy may be more convenient and effective than multiple inhalers
- Ensifentrine significantly improves lung function **(Evidence A)**, dyspnea **(Evidence A)** and health status **(Evidence B)**
- Theophylline exerts a small bronchodilator effect in stable COPD **(Evidence A)** and that is associated with modest symptomatic benefits **(Evidence B)**

Anti-Inflammatory Therapy in Stable COPD

Figure 3.20

Inhaled Corticosteroids	• Regular treatment with ICS increases the risk of pneumonia especially in those with severe disease **(Evidence A)** • An ICS combined with a LABA is more effective than the individual components in improving lung function and health status and reducing exacerbations in patients with exacerbations and moderate to very severe COPD **(Evidence A)** • We do not encourage the use of a LABA+ICS combination in COPD. If there is an indication for an ICS the combination LABA+LAMA+ICS has been shown to be superior to LABA+ICS and is therefore the preferred choice • Triple inhaled therapy of LABA+LAMA+ICS improves lung function, symptoms and health status, and reduces exacerbations, compared to LABA+ICS, LABA+LAMA or LAMA monotherapy **(Evidence A)**. Recent data suggesta beneficial effect of triple inhaled therapy versus fixed-dose LABA+LAMA combinations on mortality in symptomatic COPD patients with a history of frequent and/or severe exacerbations • If patients with COPD have features of asthma, treatment should always contain an ICS • Independent of ICS use, there is evidence that a blood eosinophil count < 2% increases the risk of pneumonia **(Evidence C)** • Combinations can be given as single or multiple inhaler therapy. Single inhaler therapy may be more convenient and effective than multiple inhalers
Oral Glucocorticoids	• Long-term use of oral glucocorticoids has numerous side effects **(Evidence A)** with no evidence of benefits **(Evidence C)**
PDE Inhibitors	• In patients with chronic bronchitis, severe to very severe COPD and a history of exacerbations: • Roflumilast improves lung function and reduces moderate and severe exacerbations **(Evidence A)** • Ensifentrine improves lung function **(Evidence A)** but an effect on exacerbations has not been evaluated in patients at increased exacerbation risk
Antibiotics	• Long-term azithromycin and erythromycin therapy reduces exacerbations over one year **(Evidence A)** • Preferentially, but not only in former smokers with exacerbations despite appropriate therapy, azithromycin can be considered **(Evidence B)** • Treatment with azithromycin is associated with an increased incidence of bacterial resistance **(Evidence A)** and hearing test impairments **(Evidence B)**
Mucoregulators & Antioxidant Agents	• Regular treatment with mucolytics such as erdosteine, carbocysteine and NAC reduces the risk of exacerbations in select populations **(Evidence B)** • Antioxidant mucolytics are recommended only in selected patients **(Evidence A)**
Biologics	• In patients with moderate to severe COPD with a history of exacerbations, chronic bronchitis and higher blood eosinophil counts (≥ 300 cells/μL): • Dupilumab reduces exacerbations, improves lung function and quality of life **(Evidence A)**
Other Anti-Inflammatory Agents	• Statin therapy is not recommended for prevention of exacerbations **(Evidence A)** • Simvastatin does not prevent exacerbations in COPD patients at increased risk of exacerbations and without indications for statin therapy **(Evidence A)**. However, observational studies suggest that statins may have positive effects on some outcomes in patients with COPD who receive them for cardiovascular and metabolic indications **(Evidence C)** • Leukotriene modifiers have not been tested adequately in COPD patients

Factors to Consider when Initiating ICS Treatment

Figure 3.21

Factors to consider when adding ICS to long-acting bronchodilators:
(note the scenario is different when considering ICS withdrawal)

STRONGLY FAVORS USE	History of hospitalization(s) for exacerbations of COPD[#] ≥ 2 moderate exacerbations of COPD per year[#] Blood eosinophils ≥ 300 cells/μL History of, or concomitant asthma
FAVORS USE	1 moderate exacerbation of COPD per year[#] Blood eosinophils 100 to < 300 cells/μL
AGAINST USE	Repeated pneumonia events Blood eosinophils < 100 cells/μL History of mycobacterial infection

[#]despite appropriate long-acting bronchodilator maintenance therapy (see Figures 3.7 & 3.18 for recommendations); *note that blood eosinophils should be seen as a continuum; quoted values represent approximate cut-points; eosinophil counts are likely to fluctuate.

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Other Pharmacological Treatments

Figure 3.23

Alpha-1 Antitrypsin Augmentation Therapy	• Intravenous augmentation therapy may slow down the progression of emphysema **(Evidence B)**
Antitussives	• There is no conclusive evidence of a beneficial role of antitussives in people with COPD **(Evidence C)**
Vasodilators	• Vasodilators do not improve outcomes and may worsen oxygenation **(Evidence B)**
Opioids	• Low-dose long acting oral and parenteral opioids may be considered for treating dyspnea in COPD patients with severe disease **(Evidence B)**
Pulmonary Hypertension Therapy	• Drugs approved for primary pulmonary hypertension are not recommended for patients with a pulmonary hypertension secondary to COPD **(Evidence B)**

Pulmonary Rehabilitation, Self-Management and Integrative Care in COPD

Figure 3.24

Pulmonary Rehabilitation	• Rehabilitation is indicated in all patients with relevant symptoms and/or a high risk for exacerbation **(Evidence A)** • Pulmonary rehabilitation improves dyspnea, health status and exercise tolerance in stable patients **(Evidence A)** • Pulmonary rehabilitation reduces hospitalization among patients who have had a recent exacerbation (≤ 4 weeks from prior hospitalization) **(Evidence B)** • Pulmonary rehabilitation leads to a reduction in symptoms of anxiety and depression **(Evidence A)**
Education and Self-Management	• Education is needed to change patient's knowledge but there is no evidence that used alone it will change patient behavior **(Evidence C)** • Self-management intervention with communication with a health care professional improves health status and decreases hospitalizations and emergency department visits **(Evidence B)**
Integrated Care Programs	• Integrative care and telehealth have no demonstrated benefit at this time **(Evidence B)**
Physical Activity	• Physical activity is a strong predictor of mortality **(Evidence A)**. People with COPD should be encouraged to increase their level of physical activity although we still do not know how to best ensure the likelihood of success

Interventional Therapy in Stable COPD

Figure 3.27

Lung Volume Reduction Surgery	• Lung volume reduction surgery improves survival in severe emphysema patients with an upper-lobe emphysema and low post-rehabilitation exercise capacity **(Evidence A)**
Bullectomy	• In selected patients, bullectomy is associated with decreased dyspnea, improved lung function and exercise tolerance **(Evidence C)**
Transplantation	• In appropriately selected patients with very severe COPD, lung transplantation has been shown to improve quality of life and functional capacity **(Evidence C)** • In patients with very severe COPD (progressive disease, BODE score of 7 to 10, and not candidates for lung volume reduction) lung transplantation may be considered for referral with at least one of the following: (1) history of hospitalization for exacerbation associated with acute hypercapnia (Pco_2 > 50 mmHg); (2) pulmonary hypertension and/or cor pulmonale, despite oxygen therapy; or (3) FEV1 < 20% and either DLco < 20% or homogenous distribution of emphysema **(Evidence C)**
Bronchoscopic Interventions	• In select patients with advanced emphysema, bronchoscopic interventions reduce end-expiratory lung volume and improve exercise tolerance, health status and lung function at 6-12 months following treatment. Endobronchial valves **(Evidence A)**; Lung coils **(Evidence B)**; Vapor ablation **(Evidence B)**
Bronchoscopic Interventions Under Study	• Phase III trials are currently being conducted to determine the efficacy of treatments for patients with refractory exacerbations and chronic bronchitis using cryospray, rheoplasty and targeted lung denervation technology

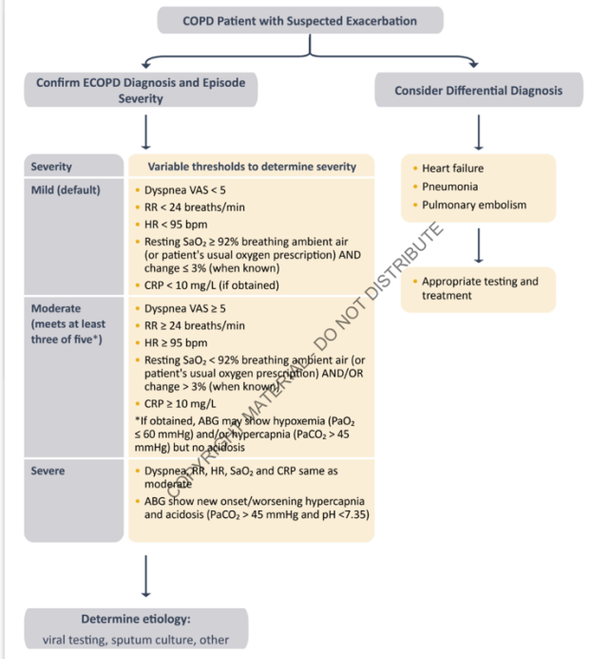
CHAPTER 4: MANAGEMENT OF EXACERBATIONS

KEY POINTS:

- An exacerbation of COPD is defined as an event characterized by dyspnea and/or cough and sputum that worsen over < 14 days. Exacerbations of COPD are often associated with increased local and systemic inflammation caused by airway infection, pollution, or other insults to the lungs.
- As the symptoms are not specific to COPD relevant differential diagnoses should be considered, particularly pneumonia, congestive heart failure and pulmonary embolism.
- The goals for treatment of COPD exacerbations are to minimize the negative impact of the current exacerbation and to prevent subsequent events.
- Short-acting inhaled beta$_2$-agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an exacerbation.
- Maintenance therapy with long-acting bronchodilators should be initiated as soon as possible. In patients with frequent exacerbations and elevated blood eosinophil levels addition of inhaled corticosteroids to the double bronchodilator regimen should be considered.
- In patients with severe exacerbations, systemic corticosteroids can improve lung function (FEV1), oxygenation and shorten recovery time including hospitalization duration. Duration of therapy should not normally be more than 5 days.
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5 days.
- Methylxanthines are not recommended due to increased side effect profiles.
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival.
- Exacerbation recovery time varies, taking up to 4-6 weeks to recover, with some patients failing to return to the pre-exacerbation functional state. Following an exacerbation, appropriate measures for exacerbation prevention should be initiated (see **Chapter 3**).

Classification of the Severity of COPD Exacerbations

Figure 4.3



Fagerstrom Test for Nicotine Dependence

	PLEASE TICK (✓) ONE BOX FOR EACH QUESTION		
How soon after waking do you smoke your first cigarette?	Within 5 minutes 5-30 minutes 31-60 minutes	☐ ☐ ☐	3 2 1
Do you find it difficult to refrain from smoking in places where it is forbidden? e.g. Church, Library, etc.	Yes No	☐ ☐	1 0
Which cigarette would you hate to give up?	The first in the morning Any other	☐ ☐	1 0
How many cigarettes a day do you smoke?	10 or less 11 – 20 21 – 30 31 or more	☐ ☐ ☐ ☐	0 1 2 3
Do you smoke more frequently in the morning?	Yes No	☐ ☐	1 0
Do you smoke even if you are sick in bed most of the day?	Yes No	☐ ☐	1 0
	Total Score		

SCORE		
	1- 2 = low dependence 3-4 = low to mod dependence	5 - 7= moderate dependence 8 + = high dependence

Commonly Used Maintenance Medications in COPD*

Figure 3.18

Generic Drug Name	Inhaler Type	DELIVERY OPTIONS: Nebulizer	Oral	Injection	Duration of Action
BETA$_2$-Agonists					
Short-acting (SABA)					
Fenoterol	MDI	✓	pill, syrup		4-6 hours
Levalbuterol	MDI	✓			6-8 hours
Salbutamol (albuterol)	MDI & DPI	✓	pill, syrup, extended release tablet	✓	4-6 hours 12 hours (ext. release)
Terbutaline	DPI		pill	✓	4-6 hours
Long-acting (LABA)					
Arformoterol		✓			12 hours
Formoterol	DPI	✓			12 hours
Indacaterol	DPI				24 hours
Olodaterol	SMI				24 hours
Salmeterol	MDI & DPI				12 hours
Anticholinergics					
Short-acting (SAMA)					
Ipratropium bromide	MDI	✓			6-8 hours
Oxitropium bromide	MDI				7-9 hours
Long-acting (LAMA)					
Aclidinium bromide	DPI				MDI 12 hours
Glycopyrronium bromide	DPI		solution	✓	12-24 hours
Tiotropium	DPI, SMI, MDI				24 hours
Umeclidinium	DPI				24 hours
Glycopyrronium		✓			12 hours
Revefenacin		✓			24 hours
Combination Short-Acting Beta$_2$-Agonist Plus Anticholinergic in One Device (SABA+SAMA)					
Fenoterol/ipratropium	SMI	✓			6-8 hours
Salbutamol/ipratropium	SMI, MDI	✓			6-8 hours
Combination Long-Acting Beta$_2$-Agonist Plus Anticholinergic in One Device (LABA+LAMA)					
Formoterol/aclidinium	DPI				12 hours
Formoterol/glycopyrronium	MDI				12 hours
Indacaterol/glycopyrronium	DPI				12-24 hours
Vilanterol/umeclidinium	DPI				24 hours
Olodaterol/tiotropium	SMI				24 hours
Methylxanthines					
Aminophylline			solution	✓	Variable, up to 24 hours
Theophylline (SR)			pill	✓	Variable, up to 24 hours
Combination of Long-Acting Beta$_2$-Agonist Plus Corticosteroid in One Device (LABA+ICS)					
Formoterol/beclometasone	MDI, DPI				12 hours
Formoterol/budesonide	MDI, DPI				12 hours
Formoterol/mometasone	MDI				12 hours
Salmeterol/fluticasone propionate	MDI, DPI				12 hours
Vilanterol/fluticasone furoate	DPI				24 hours
Triple Combination in One Device (LABA+LAMA+ICS)					
Fluticasone/umeclidinium/vilanterol	DPI				24 hours
Beclometasone/formoterol/glycopyrronium	MDI, DPI				12 hours
Budesonide/formoterol/glycopyrrolate	MDI				12 hours
Phosphodiesterase-4 Inhibitors					
Roflumilast			pill		24 hours
Mucolytic Agents					
Erdosteine			pill		12 hours
Carbocysteine†			pill		
N-acetylcysteine†			pill		

*Not all formulations are available in all countries. In some countries other formulations and dosages may be available. †Dosing regimens are under discussion.
MDI = metered dose inhaler; DPI = dry powder inhaler; SMI = soft mist inhaler. Note that glycopyrrolate & glycopyrronium are the same compound.

Sample Questions - COPD

1. A COPD patient that registers FEV1 of 40% predicted has a GOLD classification of:

A. 1
B. 2
C. 3
D. 4

2. The diagnosis of COPD is confirmed if the spirometry result of FEV1/FVC ratio is:

A. <0.70 after bronchodilator administration
B. >0.80 before bronchodilator administration
C. <0.80 before bronchodilator administration
D. >1/0 after bronchodilator

3. Which of the following statements is TRUE about the use of pharmacotherapy among stable COPD patients?

A. Regular ICS treatment increases the risk of pneumonia
B. Simvastatin prevents exacerbations in COPD patients
C. Regular treatment with mucolytics such as NAC does not affect the risk of exacerbations
D. Antitussives have been shown to be beneficial in patients with COPD

4. What is the recommended initial therapy for a COPD patient who has a history of 1 exacerbation or less that does not warrant hospitalization and has a CAT score <10?

A. Long-acting bronchodilator
B. Inhaled Corticosteroids
C. Pulmonary Rehabilitation
D. Oxygen Therapy

5. COPD patient with 65% of predicted FEV$_1$, with no history of hospital admission due to exacerbation and who scored 20 in CAT assessment of symptomatology is categorized as;

A. GOLD grade 1 group C
B. GOLD grade 2 group B
C. GOLD grade 3 group A
D. GOLD grade 4 group D

6. Which of the following statement is correct for pharmacologic management of stable COPD?

A. Long acting anti-muscarinic agents is inferior to long acting ß2 agonist on exacerbation reduction
B. Long-term Azithromycin therapy reduces exacerbation
C. Regular and as needed use of short acting ß2 agonist is has small effect in improving FEV1
D. Theophylline is known to exert large bronchodilator effect in stable COPD

7. A 65 year old farmer and chronic smoker, came to the emergency room because of breathlessness. He noted increased coughing and worsened sputum production. He also shares difficulty of breathing which makes him stop to catch his breath when walking uphill to his farm. Spirometry for this patient revealed 50% <FEV1<80% predicted Based on the COPD guidelines, the first line treatment for this patient would be

A. Short acting B-2 agonist
B. Short acting muscarinic antagonist
C. Long acting muscarinic antagonist
D. Long acting muscarinic antagonist plus long acting B-2 antagonist

8. Lucio, a 75-year-old, retired businessman, diagnosed with CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) had increased COUGHING EPISODES and PHLEGM PRODUCTION. Which of the following would be the STRONGEST PREDICTOR of FUTURE EXACERBATIONS and would necessitate REFERRAL TO A HIGHER LEVEL OF CARE?

A. evidence of bronchodilator reversibility
B. higher symptom burden
C. exacerbation history within one year from current exacerbation
D. presence of uncontrolled hypertension

9. A 65-year-old kagawad, former CHRONIC SMOKER, came to the barangay health center for the first time due to 6-month history of EXERTIONAL DYSPNEA associated with PERSISTENT COUGH and copious SPUTUM PRODUCTION. ACTIVITY LIMITATION was also noted. There were NO PRIOR HOSPITALIZATIONS, and the patient had no established cardiovascular conditions. Vital signs and physical exam were unremarkable. SPIROMETRY was done, showing a FEV of less than 80% and greater than 50%. On interview, his modified medical research council (mMRC) DYSPNEA SCALE was at 1. This kagawad would have a combined CHRONIC OBSTRUCTIVE PULMONARY DISEASES (COPD) ASSESSMENT of:

A. GOLD 1B
B. GOLD 2A
C. GOLD 1E
D. GOLD 2E

10. Primary care management of CHRONIC OBSRUCTIVE PULMONARY DISEASE (COPD) is important for early diagnosis, as well as initial management and prompt referral to pulmonologists. According to the latest international guidelines, what is the recommended management in the primary care setting among COPD patients in ACUTE EXACERBATION, with WORSENING SYMPTOMS and with POOR RESPONSE TO BRONCHODILATORS?

A. oral antibiotics (e.g., Azithromycin)
B. oral methylxanthines (e.g., Theophyline) + long-acting beta agonist (e.g., Salmeterol)
C. short acting beta agonists / SABA + short-acting muscarinic antagonists / SAMA (e.g., Salbutamol + Ipratropium)
D. oral steroids (e.g., Methylprednisolone)

11. Winston, a 40-year-old call center agent, consulted at the Industrial Medicine clinic, asking for help as he has been thinking of DISCONTINUING SMOKING. As a Family and Community Medicine resident physician trainee, you administered the FAGERSTROM NICOTINE DEPENDENCE SCALE to assess the level of the patient's dependence. According to Winston, he smokes his first cigarette within five minutes of waking up. He finds it difficult to refrain from smoking in places where it is forbidden and hates to give up the first cigarette in the morning. Winston consumes 15 cigarettes per day and smokes frequently during the first hours after awakening. Winston, however, does not smoke whenever he is ill. How do you interpret Winston's NICOTINE DEPENDENCE?

A. Winston scored 7 points, corresponding to high degree of dependence.
B. Winston scored 9 points, corresponding to very high degree of dependence.
C. Winston scored 5 points, corresponding to medium degree of dependence.
D. Winston scored 4 points, corresponding to low degree of dependence.

12. A 62-year-old male with a 40-PACK-YEAR SMOKING HISTORY presents with PROGRESSIVE DYSPNEA, especially on EXERTION. He also reports a CHRONIC, NON-PRODUCTIVE COUGH for the past year. He denies any recent respiratory infections. Which of the following is the MOST APPROPRIATE NEXT STEP in his evaluation?

A. Initiate inhaled corticosteroids and beta-agonists (i.e., Budesonide + Formoterol OR Fluticasone + Salmeterol) without further testing.
B. Prescribe a short course of antibiotics and reassess the patient after two weeks.
C. Order a chest x-ray, postero-anterior/ apicolordotic views, to rule out pulmonary infection (i.e., pneumonia or Koch's infection).
D. Perform spirometry to assess for airflow obstruction.

13. Based on the latest Global Initiative for Chronic Obstructive Lung Disease (GOLD), all of the following STRONGLY FAVORS the use of long acting beta agonist + long acting muscarinic agent + inhaled corticosteroid (LABA + LAMA + ICS), EXCEPT:

A. concomitant bronchial asthma
B. blood eosinophilia ≥ 300 cells / uL
C. presence of Mycobacterium tuberculosis infection
D. history of hospitalization secondary to COPD exacerbation

14. A 70-year-old retired architect, previously diagnosed with PARKINSONISM and CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD), came for follow-up consultation and report RESTING DYSPNEA despite DUAL BRONCHODILATOR THERAPY (i.e., LABA + LAMA). Based on latest clinical practice guidelines, what would be the best next intervention for this patient?

A. Increase the dose of the LABA component and provide long-term oxygen therapy.
B. Assess the patient's inhaler technique and adherence to the treatment regimen.
C. Add an inhaled corticosteroid to the present regimen (i.e., LABA + LAMA + ICS).
D. Switch to nebulized medication (e.g., SABA on PRN basis).

15. From a community health standpoint, which intervention best supports PRIMARY PREVENTION of CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)?

A. community smoking cessation campaigns and clean air advocacy
B. allocation of free oxygen tanks with nasal cannulas to COPD patients
C. provision of free pressurized metered-dose inhalers (MDIs) in all primary care clinics
D. mass screening using pulmonary function test of individuals at risk of developing COPD

16. Which of the following treatments is RECOMMENDED by the 2025 Global Initiative for Chronic Obstructive Lung Disease (GOLD) for patients with SEVERE RESTING HYPOXEMIA (i.e., PaO2≤ 55 mmHg)?

A. oral corticosteroids
B. short-acting beta-agonists as needed
C. long-term oxygen therapy
D. pulmonary rehabilitation only

17. Which NEW PHARMACOLOGIC AGENTS are introduced in the 2025 Global Initiative for Chronic Obstructive Lung Disease (GOLD) report for COPD management?

A. Montelukast and Theophylline
B. Ensifentrine and Dupilumab
C. Umeclidinium and Vilanterol
D. Tiotropium and Formoterol

18. A 62-year-old male with a 35-PACK-YEAR SMOKING HISTORY presents with EXERTIONAL DYSPNEA and CHRONIC COUGH. On auscultation of the chest, DECREASED BREATH SOUNDS are noted bilaterally. Which of the following historical or physical findings would most strongly support a diagnosis of CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD), rather than another chronic respiratory disease (e.g., PULMONARY TUBERCULOSIS or LUNG MALIGNANCY)?

A. daily productive cough with seasonal variation over three months
B. nocturnal cough and wheezing worsening after allergen exposure
C. progressive dyspnea with minimal reversibility to bronchodilators
D. episodic wheezing responsive to bronchodilators

19. In a patient with suspected CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD), spirometry reveals a pre-bronchodilator FEV / FVC of 0.68 and a post-bronchodilator FEV / FVC of 0.69. FEV improved from 72% to 75% predicted. Based on the 2025 Global Initiative for Chronic Obstructive Lung Disease (GOLD), which of the following is the MOST APPROPRIATE INTERPRETATION?

A. normal lung function
B. persistent airflow limitation; consistent with COPD
C. reversible obstruction; asthma more likely
D. mixed restrictive and obstructive pattern

20. According to 2025 Global Initiative for Chronic Obstructive Lung Disease (GOLD), essential NON-PHARMACOLOGIC ADVICE for ALL patient groups / stages of COPD will be:

A. pulmonary rehabilitation
B. physical activity
C. influenza vaccination
D. smoking cessation

Answers & Rationale – COPD

1. Answer C

GRADE	FEV1 (% predicted)
GOLD 1	≥ 80
GOLD 2	50-79
GOLD 3	30-49
GOLD 4	< 30

2. Answer A

- The hallmark of COPD is persistent airflow limitation. To confirm this, a **post-bronchodilator** FEV1/FVC ratio of **< 0.70** is required.

3. Answer A

- The GOLD 2025 report states that while Inhaled Corticosteroids (ICS) can be beneficial for exacerbation reduction in select patients (Group E with high eosinophils), their use is associated with an increased risk of pneumonia.

4. Answer A

- This patient has a low exacerbation risk (1 or less) and low symptom burden (CAT < 10), placing them in Group A. The recommended initial therapy for Group A is a single long-acting bronchodilator (either a LABA or a LAMA).

5. Answer B

- Grade: An FEV1 of 65% is between 50-80%, making it GOLD 2.
- Group: The patient has a low exacerbation risk ("no history of hospital admission," assume 0-1) but a high symptom burden (CAT≥10), which is Group B.

6. Answer B

- Long-term azithromycin therapy is a follow-up option recommended for Group E patients who are former smokers and remain at high risk for exacerbations, as it has been shown to reduce them.

7. Answer D

- Group: The patient's symptom ("stop... walking uphill") corresponds to an mMRC Grade 2, which is a high symptom burden (High Symptoms). Assuming a low exacerbation risk (not mentioned), this places him in Group B.
- Treatment: The recommended initial therapy for Group B is dual bronchodilation, a LABA + LAMA.

8. Answer C

- The GOLD 2025 guidelines are very clear that the single strongest predictor of future exacerbations is a history of past exacerbations. This is the primary reason the ABE model assesses exacerbation history first to identify Group E.

9. Answer B

- Grade: FEV1 is 50-79%, which is GOLD 2.
- Group: The patient has low exacerbation risk ("NO PRIOR HOSPITALIZATIONS") and low symptom burden ("mMRC... at 1"), which is Group A.

10. Answer D

- The core treatments for a COPD exacerbation are short-acting bronchodilators, systemic corticosteroids, and antibiotics (if indicated). If a patient has a "poor response to bronchodilators" (the first-line treatment), the next step is to add systemic corticosteroids (e.g., 40mg Prednisone for 5 days) to reduce inflammation and shorten recovery time.

11. Answer A

- The score is calculated using the Fagerstrom Nicotine Dependence Scale:
  - Smokes first cigarette within five minutes of waking up: 3 points
  - Finds it difficult to refrain from smoking where forbidden: 1 point
  - Hates to give up the first cigarette in the morning: 1 point
  - Consumes 15 cigarettes per day (11-20 range): 1 point
  - Smokes frequently during the first hours after awakening: 1 point
  - Does not smoke when ill: 0 points
- " Total Score: 3 + 1 + 1 + 1 + 1 + 0 = 7. A score of 7 indicates a high degree of nicotine dependence.

12. Answer D

- The patient's history (chronic smoking, progressive dyspnea, chronic cough) is classic for COPD. According to the GOLD 2025 guidelines, the diagnosis of COPD must be confirmed by spirometry showing a persistent post-bronchodilator $FEV_1/FVC < 0.70$.

13. Answer C

- The use of Inhaled Corticosteroids (ICS) is associated with an increased risk of pneumonia and other infections. An active tuberculosis infection would be a contraindication or at least a very strong reason against starting ICS, as steroids can worsen the infection. Options A, B, and D are all strong indications for adding ICS.

14. Answer B

- According to the GOLD 2025 guidelines, when a patient on dual bronchodilator (LABA + LAMA) therapy still experiences persistent dyspnea, the first step is not to immediately escalate pharmacologic therapy.
- The guidelines recommend a "check, review, and investigate" approach.
- Check Inhaler Technique and Adherence: This is the most common and most overlooked cause of treatment failure. Before adding more medications, the physician must ensure the patient is using their current inhaler correctly and consistently.
- Clinical Context: This step is critically important in this specific patient. His co-morbidity of Parkinsonism (which involves tremor, rigidity, and bradykinesia) can make it physically difficult to coordinate the steps required for a dry powder inhaler (DPI) or pressurized metered-dose inhaler (pMDI). His "resting dyspnea" may be a direct result of being unable to properly actuate and inhale his medication.
- Why Other Options Are Incorrect:
  - Option A: Long-term oxygen therapy is indicated for resting hypoxemia (SpO2 ≤88%), not the symptom of dyspnea itself.
  - Option C: Adding an inhaled corticosteroid (triple therapy) is the recommended step-up for managing persistent exacerbations (in patients with eosinophil ≥300 cells/μL), not for managing dyspnea.
  - Option D: Switching maintenance therapy (LABA+LAMA) to an as-needed SABA would be an incorrect step-down and would lead to loss of control.

15. Answer A

- Primary prevention aims to stop the disease before it ever starts. The vast majority of COPD is caused by exposure to noxious particles, primarily tobacco smoke. Therefore, preventing or stopping smoking and advocating for clean air are the most effective primary prevention strategies.

16. Answer C

- The GOLD 2025 guidelines explicitly state that Long-Term Oxygen Therapy (LTOT) is indicated for patients with severe, chronic resting hypoxemia, defined as PaO2 ≤ 55 mmHg or SpO2 ≤ 88%

17. Answer B

- The GOLD 2025 report includes new sections on emerging therapies, highlighting the first-in-class inhaled PDE3/PDE4 inhibitor, Ensifentrine, and the biologic Dupilumab**,** for patients with a T2 inflammatory phenotype and high exacerbation risk.

18. Answer C

- The key feature that distinguishes COPD from asthma is persistent airflow limitation. While asthma (Options B and D) is characterized by reversible obstruction, COPD is defined by its progressive nature and minimal reversibility (i.e., a post-bronchodilator $FEV_1/FVC < 0.70$).

19. Answer B

- The diagnosis of COPD is confirmed by a post-bronchodilator $FEV_1/FVC < 0.70$. Since this patient's post-bronchodilator ratio is 0.69, it confirms the presence of persistent airflow limitation, which is diagnostic for COPD.

20. Answer D

- While physical activity and vaccinations are also recommended for all patients, smoking cessation is identified as the single most effective and "essential" intervention to slow disease progression for all patients who smoke. It is the cornerstone of all COPD management.

Diabetes Mellitus

Screening for and diagnosis of GDM

One-step strategy

Perform a 75-g OGTT, with plasma glucose measurement when an individual is fasting and at 1 and 2 h, at 24–28 weeks of gestation in individuals not previously diagnosed with diabetes.

The OGTT should be performed in the morning after an overnight fast of at least 8 h.

The diagnosis of GDM is made when any of the following plasma glucose values are met or exceeded:

- Fasting: 92 mg/dL (5.1 mmol/L)
- 1 h: 180 mg/dL (10.0 mmol/L)
- 2 h: 153 mg/dL (8.5 mmol/L)

Two-step strategy

Step 1: Perform a 50-g GLT (nonfasting), with plasma glucose measurement at 1 h, at 24–28 weeks of gestation in individuals not previously diagnosed with diabetes.

If the plasma glucose level measured 1 h after the load is ≥130, 135, or 140 mg/dL (7.2, 7.5, or 7.8 mmol/L, respectively),* proceed to a 100-g OGTT.

Step 2: The 100-g OGTT should be performed when the individual is fasting.

The diagnosis of GDM is made when at least two† of the following four plasma glucose levels (measured fasting and at 1, 2, and 3 h during OGTT) are met or exceeded (Carpenter-Coustan criteria [208]):

- Fasting: 95 mg/dL (5.3 mmol/L)
- 1 h: 180 mg/dL (10.0 mmol/L)
- 2 h: 155 mg/dL (8.6 mmol/L)
- 3 h: 140 mg/dL (7.8 mmol/L)

GDM, gestational diabetes mellitus; GLT, glucose load test; OGTT, oral glucose tolerance test. *American College of Obstetricians and Gynecologists (ACOG) recommends any of the commonly used thresholds of 130, 135, or 140 mg/dL for the 1-h 50-g GLT (204). †ACOG notes that one elevated value can be used for diagnosis (204).

Diagnosis and Classification of Diabetes

DIAGNOSTIC TESTS FOR DIABETES

- 2.1a Diagnose diabetes based on **A1C** or **plasma glucose criteria**, either the *fasting plasma glucose (FPG)* value, *2-h plasma glucose (2-h PG) value during a 75-g oral glucose tolerance test (OGTT)*, or *random glucose* value accompanied by *classic hyperglycemic symptoms/crises criteria*.
- 2.1b In the absence of unequivocal hyperglycemia (e.g., hyperglycemic crises), diagnosis requires confirmatory testing.

Criteria for the diagnosis of diabetes in nonpregnant individuals

A1C ≥6.5% (≥48 mmol/mol). The test should be performed in a laboratory using a method that is NGSP certified and standardized to the DCCT assay.*

OR

FPG ≥126 mg/dL (≥7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 h.*

OR

2-h PG ≥200 mg/dL (≥11.1 mmol/L) during OGTT. The test should be performed as described by the WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*

OR

In an individual with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dL (≥11.1 mmol/L). Random is any time of the day without regard to time since previous meal.

DCCT, Diabetes Control and Complications Trial; FPG, fasting plasma glucose; OGTT, oral glucose tolerance test; NGSP, National Glycohemoglobin Standardization Program; WHO, World Health Organization; 2-h PG, 2-h plasma glucose. *In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal results from different tests which may be obtained at the same time (e.g., A1C and FPG), or the same test at two different time points.

Criteria defining prediabetes in nonpregnant individuals

A1C 5.7–6.4% (39–47 mmol/mol)

OR

FPG 100 mg/dL (5.6 mmol/L) to 125 mg/dL (6.9 mmol/L) (IFG)

OR

2-h PG during 75-g OGTT 140 mg/dL (7.8 mmol/L) to 199 mg/dL (11.0 mmol/L) (IGT)

For all three tests, risk is continuous, extending below the lower limit of the range and becoming disproportionately greater at the higher end of the range. FPG, fasting plasma glucose; IFG, impaired fasting glucose; IGT, impaired glucose tolerance; OGTT, oral glucose tolerance test; 2-h PG, 2-h plasma glucose.

Use of A1C for Screening and Diagnosis of Diabetes

- 2.2a The A1C test should be performed using a method that is certified by the National Glycohemoglobin Standardization Program (NGSP) as traceable to the Diabetes Control and Complications Trial (DCCT) reference assay.
- 2.2b Point-of-care A1C testing for diabetes screening and diagnosis should be restricted to U.S. Food and Drug Administration-approved devices at Clinical Laboratory Improvement Amendments (CLIA)-certified laboratories that perform testing of moderate complexity or higher by trained personnel.
- 2.3 Evaluate for the possibility of a problem or interference with either test when there is consistent and substantial discordance between blood glucose values and A1C test results
- 2.4 In conditions associated with an **altered relationship between A1C and glycemia**, such as some hemoglobin variants, pregnancy (second and third trimesters and the postpartum period), glucose-6-phosphate dehydrogenase deficiency, HIV, hemodialysis, recent blood loss or transfusion, or erythropoietin therapy, **plasma glucose criteria should be used to diagnose diabetes**. B

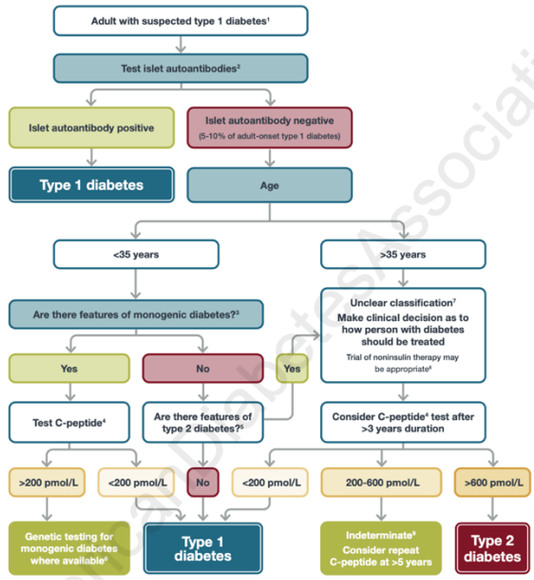
CLASSIFICATION

- 2.5 Classify people with hyperglycemia into appropriate diagnostic categories to aid in personalized management.

TYPE 1 DIABETES

- 2.6 Screening for presymptomatic type 1 diabetes may be done by detection of ***autoantibodies to insulin, glutamic acid decarboxylase (GAD), islet antigen 2 (IA-2), or zinc transporter 8 (Zn18)***. B
- 2.7 Autoantibody-based screening for presymptomatic type 1 diabetes should be offered to those with a family history of type 1 diabetes or otherwise known elevated genetic risk.
- 2.8 Having multiple confirmed islet autoantibodies is a risk factor for clinical diabetes. Testing for dysglycemia may be used to further forecast near-term risk
  - When multiple islet autoantibodies are identified, referral to a specialized center for further evaluation and/or consideration of a clinical trial or approved therapy to potentially delay development of clinical diabetes should be considered.
- 2.9 Standardized islet autoantibody tests are recommended for classification of diabetes in adults who have phenotypic risk factors that overlap with those for type 1 diabetes (e.g., younger age at diagnosis, unintentional weight loss, ketoacidosis, or short time to insulin treatment)

Flow chart for investigation of suspected type 1 diabetes in newly diagnosed adults, based on data from White European populations



PREDIABETES AND TYPE 2 DIABETES

- Screening for prediabetes and type 2 diabetes with an assessment of risk factors or validated risk calculator should be done in asymptomatic adults.
- Testing for prediabetes or type 2 diabetes in asymptomatic people should be **considered in adults of any age with overweight or obesity** *who have one or more risk factors*).
- For all other people, **screening should begin at age 35 years**.
- In people without prediabetes or diabetes after screening, repeat screening recommended at a minimum of **3-year intervals** is reasonable, sooner with symptoms or change in risk (e.g., weight gain
- **To screen for prediabetes and type 2 diabetes, FPG, 2-h PG during 75-g OGTT, and A1C are each appropriate**.
- When using **OGTT** as a screen for prediabetes or diabetes, **adequate carbohydrate intake (at least 150 g/day)** should be assured for **3 days prior** to testing.
- Risk-based screening for prediabetes or type 2 diabetes should be considered after the **onset of puberty** or **after 10 years of age**, whichever occurs earlier, **in children and adolescents with overweight** (BMI ≥85th percentile) **or obesity** (BMI ≥95th percentile) and who have one or more risk factors for diabetes.
- Consider screening people for prediabetes or diabetes **if on certain medications**, such as ***glucocorticoids, statins, thiazide diuretics, some HIV medications, and second-generation antipsychotic medications***, as these agents are known to increase the risk of these conditions.
- In people who are prescribed **second-generation antipsychotic medications**, screen for prediabetes and diabetes at **baseline and repeat 12-16 weeks after medication** initiation or sooner, if clinically indicated, and annually. B

- **People with HIV** should be screened for diabetes and prediabetes with an FPG test **before starting** antiretroviral therapy, at the **time of switching** antiretroviral therapy, and **3-6 months after starting or switching** antiretroviral therapy.
  - If initial screening results are normal, FPG should be checked annually.

Criteria for screening for diabetes or prediabetes in asymptomatic adults

1. Testing should be considered in adults with overweight or obesity (BMI ≥25 kg/m^2 or ≥23 kg/m^2 in individuals of Asian ancestry) who have one or more of the following risk factors:
   - First-degree relative with diabetes
   - High-risk race, ethnicity, and ancestry (e.g., African American, Latino, Native American, Asian American)
   - History of cardiovascular disease
   - Hypertension (≥130/80 mmHg or on therapy for hypertension)
   - HDL cholesterol level <35 mg/dL (<0.9 mmol/L) and/or triglyceride level >250 mg/dL (>2.8 mmol/L)
   - Individuals with polycystic ovary syndrome
   - Physical inactivity
   - Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans, metabolic dysfunction–associated steatotic liver disease)
2. People with prediabetes (A1C ≥5.7% [≥39 mmol/mol], IGT, or IFG) should be tested yearly.
3. People who were diagnosed with GDM should have testing at least every 1–3 years.
4. For all other people, testing should begin at age 35 years.
5. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.
6. Individuals in other high-risk groups (e.g., people with HIV, exposure to high-risk medicines, evidence of periodontal disease, history of pancreatitis) should also be closely monitored

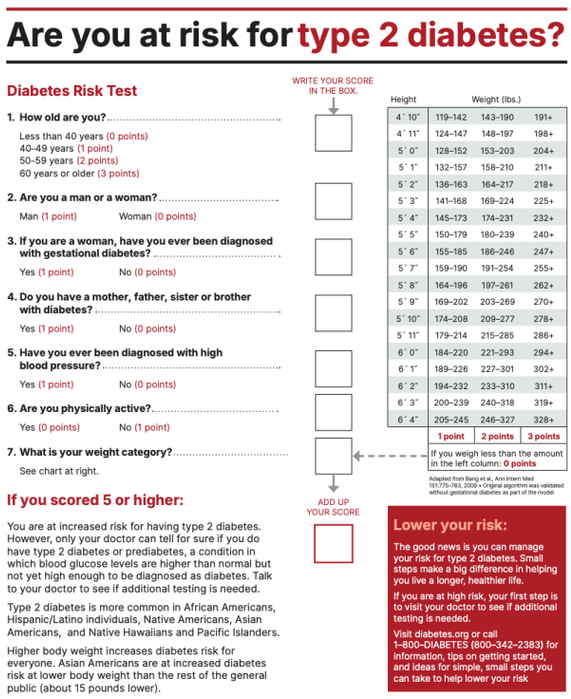
GDM, gestational diabetes mellitus; IFG, impaired fasting glucose; IGT, impaired glucose tolerance.

Risk-based screening for type 2 diabetes or prediabetes in asymptomatic children and adolescents in a clinical setting

Screening should be considered in youth* who have overweight (≥85th percentile) or obesity (≥95th percentile) and who have one or more additional risk factors:
- Maternal history of diabetes or GDM during the child's gestation
- Family history of type 2 diabetes in first- or second-degree relative
- High-risk race, ethnicity, and ancestry (see **Table 2.5**)
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovary syndrome, large- or small-for-gestational-age birth weight)

GDM, gestational diabetes mellitus. *After the onset of puberty or after 10 years of age, whichever occurs earlier. If tests are normal, repeat testing at a minimum of 3-year intervals (or more frequently if BMI is increasing or risk factor profile is deteriorating) is recommended. Reports of type 2 diabetes before age 10 years exist, and this can be considered with numerous risk factors.

ADA RISK TEST



PANCREATIC DIABETES OR DIABETES IN THE CONTEXT OF DISEASE OF THE EXOCRINE

PANCREAS

- 2.17 Screen people for diabetes within **3-6 months** following an episode of **acute pancreatitis** and **annually** there-after.
  - Screening for diabetes is recommended **annually** for people with **chronic pancreatitis**. E

Cystic Fibrosis-Related Diabetes

- 2.18 Annual screening for cystic fibrosis-related diabetes (CFRD) with an OGTT should begin by age **10 years** in all people with **cystic fibrosis** not previously diagnosed with CFRD. B
- 2.19 **AlC is not recommended as a screening test for CFRD** due to low sensitivity. However, a value of ≥6.5% (<48 mmol/mol) is consistent with a diagnosis of CFRD. B
- 2.20 Beginning **5 years** after the diagnosis of CFRD, **annual monitoring** for complications of diabetes is recommended. E

POST TRANSPLANTATION DIABETES MELLITUS

- 2.21 After **organ transplantation**, **screening for hyperglycemia** should be done.
  - A formal diagnosis of post transplantation diabetes mellitus (PTDM) is best made once the individual is stable on an immunosuppressive plan and in the absence of an acute infection. B
- 2.22 The **OGTT is the preferred test** to make a diagnosis of PTDM. B
- 2.23 Immunosuppressive plans shown to provide the best outcomes for individuals and graft survival should be used, irrespective of PTDM risk. E

MONOGENIC DIABETES SYNDROMES

- 2.24a Regardless of current age, all people diagnosed with diabetes in the first 6 months of life should have immediate genetic testing for neonatal diabetes. A
- 2.24b Children and young adults who do not have typical characteristics of type 1 or type 2 diabetes and who often have a family history of diabetes in successive generations (suggestive of an autosomal dominant pattern of inheritance) should have genetic testing for maturity-onset diabetes of the young (MODY). A
- 2.24c In both instances, consultation with a center specializing in diabetes genetics is recommended to understand the significance of genetic mutations and how best to approach further evaluation, treatment, and genetic counseling. E

Table 2.6—Most common causes of monogenic diabetes

	Gene	Inheritance	Clinical features
MODY	*HNF1A*	AD	HNF1A-MODY: progressive insulin secretory defect with presentation in adolescence or early adulthood; lowered renal threshold for glucosuria; large rise in 2-h PG level on OGTT (>90 mg/dL [>5 mmol/L]); sensitive to sulfonylureas
	HNF4A	AD	HNF4A-MODY: progressive insulin secretory defect with presentation in adolescence or early adulthood; may have large birth weight and transient neonatal hypoglycemia; sensitive to sulfonylureas
	HNF1B	AD	HNF1B-MODY: developmental renal disease (typically cystic); genitourinary abnormalities; atrophy of the pancreas; hyperuricemia; gout
	GCK	AD	GCK-MODY: higher glucose threshold (set point) for glucose-stimulated insulin secretion, causing stable, nonprogressive elevated fasting blood glucose; typically does not require treatment; microvascular complications are rare; small rise in 2-h PG level on OGTT (<54 mg/dL [<3 mmol/L])
Neonatal diabetes	*KCNJ11*	AD	Permanent or transient: IUGR; possible developmental delay and seizures; responsive to sulfonylureas
	INS	AD	Permanent: IUGR; insulin requiring
	ABCC8	AD	Permanent or transient: IUGR; rarely developmental delay; responsive to sulfonylureas
	6q24 (*PLAGL1*, *HYMA1*)	AD for paternal duplications	Transient: IUGR; macroglossia; umbilical hernia; mechanisms include UPD6, paternal duplication, or maternal methylation defect; may be treatable with medications other than insulin
	GATA6	AD	Permanent: pancreatic hypoplasia; cardiac malformations; pancreatic exocrine insufficiency; insulin requiring
	EIF2AK3	AR	Permanent: Wolcott-Rallison syndrome: epiphyseal dysplasia; pancreatic exocrine insufficiency; insulin requiring
	EIF2B1	AD	Permanent diabetes: can be associated with fluctuating liver function (157)
	FOXP3	X-linked	Permanent: immunodysregulation, polyendocrinopathy, enteropathy X-linked (IPEX) syndrome: autoimmune diabetes, autoimmune thyroid disease, exfoliative dermatitis; insulin requiring

Adapted from Carmody et al. (156). AD, autosomal dominant; AR, autosomal recessive; IUGR, intrauterine growth restriction; OGTT, oral glucose tolerance test; UPD6, uniparental disomy of chromosome 6; 2-h PG, 2-h plasma glucose.

GESTATIONAL DIABETES MELLITUS

- 2.25 In individuals who are planning pregnancy, screen those with risk factors (Table 2.4) B and consider testing all individuals of childbearing potential for undiagnosed prediabetes or diabetes. E
- 2.26a Before 15 weeks of gestation, test individuals with risk factors (Table 2.4) B and consider testing all individuals E for undiagnosed diabetes at the first prenatal visit using standard diagnostic criteria if not screened preconception.
- 2.26b Before 15 weeks of gestation, screen for abnormal glucose metabolism to identify individuals who are at higher risk of adverse pregnancy and neonatal outcomes, are more likely to need insulin, and are at high risk of a later gestational diabetes mellitus (GDM) diagnosis. B Early treatment for individuals with abnormal glucose metabolism may provide some benefit. E
- 2.26c Screen for early abnormal glucose metabolism with dysglycemia using FPG of 110-125 mg/dL (6.1-6.9 mmol/L) or A1C 5.9-6.4% (41-47 mmol/mol). B
- 2.27 Screen for GDM at 24-28 weeks of gestation in pregnant individuals not previously found to have diabetes or high-risk abnormal glucose metabolism detected earlier in the current pregnancy. A
- 2.28 Screen individuals with GDM for prediabetes or diabetes at 4-12 weeks postpartum, using the 75-g OGTT and clinically appropriate nonpregnancy diagnostic criteria. A
- 2.29 Individuals with a history of GDM should have lifelong screening for the development of prediabetes or diabetes at least every 3 years. B

Table 2.7—Screening for and diagnosis of GDM

One-step strategy

Perform a 75-g OGTT, with plasma glucose measurement when an individual is fasting and at 1 and 2 h, at 24–28 weeks of gestation in individuals not previously diagnosed with diabetes.

The OGTT should be performed in the morning after an overnight fast of at least 8 h.

The diagnosis of GDM is made when any of the following plasma glucose values are met or exceeded:

- Fasting: 92 mg/dL (5.1 mmol/L)
- 1 h: 180 mg/dL (10.0 mmol/L)
- 2 h: 153 mg/dL (8.5 mmol/L)

Two-step strategy

Step 1: Perform a 50-g GLT (nonfasting), with plasma glucose measurement at 1 h, at 24–28 weeks of gestation in individuals not previously diagnosed with diabetes.

If the plasma glucose level measured 1 h after the load is ≥130, 135, or 140 mg/dL (7.2, 7.5, or 7.8 mmol/L, respectively),* proceed to a 100-g OGTT.

Step 2: The 100-g OGTT should be performed when the individual is fasting.

The diagnosis of GDM is made when at least two† of the following four plasma glucose levels (measured fasting and at 1, 2, and 3 h during OGTT) are met or exceeded (Carpenter-Coustan criteria [226]):

- Fasting: 95 mg/dL (5.3 mmol/L)
- 1 h: 180 mg/dL (10.0 mmol/L)
- 2 h: 155 mg/dL (8.6 mmol/L)
- 3 h: 140 mg/dL (7.8 mmol/L)

GDM, gestational diabetes mellitus; GLT, glucose load test; OGTT, oral glucose tolerance test. *American College of Obstetricians and Gynecologists (ACOG) recommends any of the commonly used thresholds of 130, 135, or 140 mg/dL for the 1-h 50-g GLT (222). †ACOG notes that one elevated value can be used for diagnosis (222).

3. Prevention or Delay of Diabetes and Associated Comorbidities:

- 3.1 In people with prediabetes, monitor for the development of type 2 diabetes at least annually; modify based on individual risk assessment. E
- 3.2 In people with preclinical type 1 diabetes, monitor for disease progression using A1C approximately every 6 months and 75-g oral glucose tolerance test (i.e., fasting and 2-h plasma glucose) annually; modify frequency of monitoring based on individual risk assessment based on age, number and type of autoantibodies, and glycemic metrics. E

LIFESTYLE BEHAVIOR CHANGE FOR DIABETES PREVENTION

- 3.3 Refer adults with overweight or obesity at high risk of type 2 diabetes, as seen in the Diabetes Prevention Program (DPP), to an intensive lifestyle behavior change program to achieve and maintain a weight reduction of at least 7% of initial body weight through healthy reduced-calorie diet and ≥150 min/week of moderate-intensity physical activity. A
- 3.4 A variety of eating patterns can be considered to prevent type 2 diabetes in individuals with prediabetes. B
- 3.5 Given the cost-effectiveness of lifestyle behavior modification programs for diabetes prevention, such diabetes prevention programs should be offered to adults at high risk of type 2 diabetes. A Diabetes prevention programs should be covered by third-party payers, and inconsistencies in access should be addressed. E
- 3.6 Based on individual preference. certified technology-assisted diabetes prevention programs may be effective in preventing type 2 diabetes and should be considered. B

PHARMACOLOGIC INTERVENTIONS

- 3.7 **Metformin** for the **prevention** of type 2 diabetes should be considered in adults at high risk of type 2 diabetes, as typified by the DPP, especially those aged 25-59 years with BMI ≥35 kg/m', higher fasting plasma glucose (e.g., ≥110 mg/dL [≥6 mmol/L]), and higher A1C (e.g., ≥6.0% [≥42 mmol/moll), and in individuals with prior gestational diabetes mellitus. A
- 3.8 Long-term use of metformin may be associated with vitamin B12 deficiency; consider periodic assessment of vitamin B12 level in metformin-treated individuals, especially in those with anemia or peripheral neuropathy. B

PREVENTION OF VASCULAR DISEASE AND MORTALITY

- 3.9 Prediabetes is associated with heightened cardiovascular risk; therefore, screening for and treatment of modifiable risk factors for cardiovascular disease are suggested. B
- 3.10 **Statin therapy may increase the risk of type 2 diabetes** in people at high risk of developing type 2 diabetes. In such individuals, glucose status should be monitored regularly and diabetes prevention approaches reinforced. It is not recommended that statins be discontinued for this adverse effect. B
- 3.11 In people with a *history of stroke and evidence of insulin resistance and prediabetes*, **pioglitazone** may be considered to **lower the risk of stroke or myocardial infarction**. However, this benefit needs to be balanced with the increased risk of weight gain, edema, and fractures. A Lower doses may mitigate the risk of adverse effects but may be less effective. C

PERSON-CENTERED CARE GOALS

- 3.12 In adults with overweight or obesity at high risk of type 2 diabetes, care goals should include **weight loss** and maintenance, minimizing the progression of hyperglycemia, and **attention to cardiovascular risk**. B
- 3.13 Pharmacotherapy (e.g., for weight management, minimizing the progression of hyperglycemia, and cardiovascular risk reduction may be considered to support person-centered care goals. B
- 3.14 More intensive preventive approaches should be considered in individuals who are at particularly high risk of progression to diabetes, including individuals with BMI ≥35 kg/m², those at higher glucose levels (e.g., fasting plasma glucose 110-125 mg/dL [6.1-6.9 mmol/L], 2-h post challenge glucose 173-199 mg/dL [9.6-11.0 mmol/L], and A1C ≥6.0% [≥42 mmol/mol]), and individuals with a history of gestational diabetes mellitus. A

PHARMACOLOGIC INTERVENTIONS TO DELAY SYMPTOMATIC TYPE 1 DIABETES

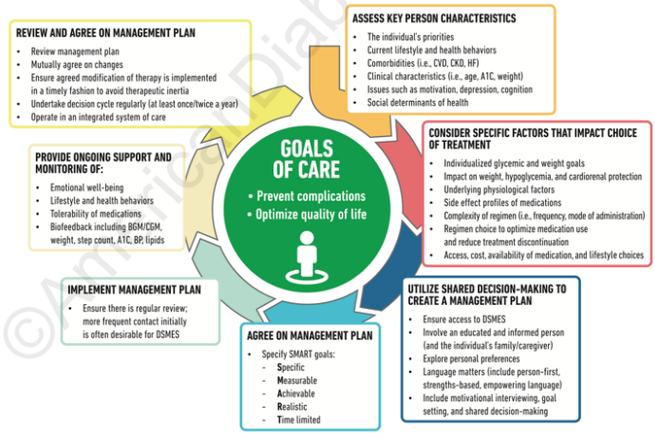
- 3.15 Teplizumab-mzw infusion to delay the onset of symptomatic type 1 diabetes (stage 3) should be considered in selected individuals aged ≥8 years with stage 2 type 1 diabetes. Management should be in a specialized setting with appropriately trained personnel. B

4. Comprehensive Medical Evaluation and Assessment of Comorbidities

PERSON-CENTERED COLLABORATIVE CARE

- 4.1 A person-centered communication style that uses person-centered, culturally sensitive, and strength-based language and active listening; elicits individual preferences and beliefs; and assesses literacy, numeracy, and potential barriers to care should be used to optimize health outcomes and health-related quality of life. B
- 4.2 People with diabetes can benefit from a coordinated interprofessional team that may include and is not limited to diabetes care and education specialists, primary care and subspecialty clinicians, nurses, registered dietitian nutritionists, exercise specialists, pharmacists, dentists, podiatrists, and behavioral health professionals. E

DECISION CYCLE FOR PERSON-CENTERED GLYCEMIC MANAGEMENT IN TYPE 2 DIABETES



COMPREHENSIVE MEDICAL EVALUATION

- 4.3 A complete medical evaluation should be performed at the initial visit to:
  - Confirm the diagnosis and classify diabetes. A
  - Evaluate for diabetes complications, potential comorbid conditions, and overall health status. A
  - Identify care partners and support system. E
  - Assess social determinants of health and structural barriers to optimal health and health care. A
  - Review previous treatment and risk factor management in people with established diabetes. A
  - Begin engagement with the person with diabetes in the formulation of a care management plan including initial goals of care. A
  - Develop a plan for continuing care. A
- 4.4 A follow-up visit should include most components of the initial comprehensive medical evaluation (Table 4.1). A
- 4.5 Ongoing management should be guided by the assessment of overall health status, diabetes complications, cardiovascular risk, hypoglycemia risk, and shared decision-making to set therapeutic goals. B

Table 4.1 - Components of the comprehensive diabetes medical evaluation at initial, follow-up, and annual visits

		INITIAL VISIT	EVERY FOLLOW-UP VISIT	ANNUAL VISIT
PAST MEDICAL AND FAMILY HISTORY	**Diabetes history**			
	• Characteristics at onset (e.g., age, symptoms)	✓		
	• Review of previous treatment plans and response	✓		
	• Assess frequency/cause/severity of past hospitalizations	✓		
	Family history			
	• Family history of diabetes in a first-degree relative	✓		
	• Family history of autoimmune disorder	✓		
	Personal history of complications and common comorbidities			
	• Common comorbidities (e.g., obesity, OSA, NAFLD)	✓		
	• High blood pressure or abnormal lipids	✓		✓
	• Macrovascular and microvascular complications	✓		✓
	• Hypoglycemia: awareness/frequency/causes/timing of episodes	✓	✓	✓
	• Presence of hemoglobinopathies or anemias	✓		✓
	• Last dental visit	✓		✓
	• Last dilated eye exam			✓
	• Visits to specialists			✓
	• Disability assessment and use of assistive devices (e.g., physical, cognitive, vision and auditory, history of fractures, podiatry)	✓	✓	✓
	• Personal history of autoimmune disease	✓		
	Interval history			
	• Changes in medical/family history since last visit		✓	✓
BEHAVIORAL FACTORS	• Eating patterns and weight history	✓	✓	✓
	• Assess familiarity with carbohydrate counting (e.g., type 1 diabetes, type 2 diabetes treated with MDI)	✓		✓
	• Physical activity and sleep behaviors; screen for obstructive sleep apnea	✓	✓	✓
	• Tobacco, alcohol, and substance use	✓		✓
MEDICATIONS AND VACCINATIONS	• Current medication plan	✓	✓	✓
	• Medication-taking behavior, including rationing of medications and/or medical equipment	✓	✓	✓
	• Medication intolerance or side effects	✓	✓	✓
	• Complementary and alternative medicine use	✓	✓	✓
	• Vaccination history and needs	✓		✓
TECHNOLOGY USE	• Assess use of health apps, online education, patient portals, etc.	✓		✓
	• Glucose monitoring (meter/CGM): results and data use	✓	✓	✓
	• Review insulin pump settings and use, connected pen and glucose data	✓	✓	✓
SOCIAL LIFE ASSESSMENT	**Social network**			
	• Identify existing social supports	✓		✓
	• Identify surrogate decision maker, advanced care plan	✓		✓
	• Identify social determinants of health (e.g., food security, housing stability & homelessness, transportation access, financial security, community safety)	✓		✓
	• Assess daily routine and environment, including school/work schedules and ability to engage in diabetes self-management	✓	✓	✓
PHYSICAL EXAMINATION	• Height, weight, and BMI; growth/pubertal development in children and adolescents	✓	✓	✓
	• Blood pressure determination	✓	✓	✓
	• Orthostatic blood pressure measures (when indicated)	✓		
	• Fundoscopic examination (refer to eye specialist)	✓		✓
	• Thyroid palpation	✓		✓
	• Skin examination (e.g., acanthosis nigricans, insulin injection or insertion sites, lipodystrophy)	✓	✓	✓
	• Comprehensive foot examination	✓		✓
	◦ Visual inspection (e.g., skin integrity, callous formation, foot deformity or ulcer, toenails)**	✓	✓	✓
	◦ Screen for PAD (pedal pulses—refer for ABI if diminished)	✓		✓
	◦ Determination of temperature, vibration or pinprick sensation, and 10-g monofilament exam	✓		✓
	• Screen for depression, anxiety, diabetes distress, fear of hypoglycemia, and disordered eating	✓		✓
	• Consider assessment for cognitive performance*	✓		✓
	• Consider assessment for functional performance*	✓		✓
	• Consider assessment for bone pain	✓		✓
LABORATORY EVALUATION	• A1C, if the results are not available within the past 3 months	✓	✓	✓
	• If not performed/available within the past year	✓		✓
	◦ Lipid profile, including total, LDL, and HDL cholesterol and triglycerides#	✓		✓^
	◦ Liver function tests#	✓		✓
	◦ Spot urinary albumin-to-creatinine ratio	✓		✓
	◦ Serum creatinine and estimated glomerular filtration rate+	✓		✓
	◦ Thyroid-stimulating hormone in people with type 1 diabetes#	✓		✓
	◦ Vitamin B12 if on metformin	✓		✓
	◦ Complete blood count (CBC) with platelets	✓		✓
	◦ Serum potassium levels in people with diabetes on ACE inhibitors, ARBs, or diuretics*	✓		✓
	◦ Calcium, vitamin D, and phosphorous for appropriate people with diabetes	✓		✓

ABI, ankle-brachial pressure index; ARBs, angiotensin receptor blockers; CGM, continuous glucose monitors; MDI, multiple daily injections; NAFLD, nonalcoholic fatty liver disease; OSA, obstructive sleep apnea; PAD, peripheral arterial disease.

*At 65 years of age or older.

+May be needed more frequently in people with diabetes with known chronic kidney disease or with changes in medications that affect kidney function and serum potassium (see Table 11.1).

#May also need to be checked after initiation or dose changes of medications that affect these laboratory values (i.e., diabetes medications, blood pressure medications, cholesterol medications, or thyroid medications).

^In people without dyslipidemia and not on cholesterol-lowering therapy, testing may be less frequent.

**Should be performed at every visit in people with diabetes with sensory loss, previous foot ulcers, or amputations.

IMMUNIZATIONS

- 4.6 Provide routinely recommended vaccinations for children and adults with diabetes as indicated by age.

Table 4.4—Highly recommended immunizations for adults with diabetes (Advisory Committee on Immunization Practices and Centers for Disease Control and Prevention)

Vaccine	Recommended ages	Schedule	GRADE evidence type*	References
COVID-19	Recommended for all 6 months of age and older	Current initial vaccination and boosters		Centers for Disease Control and Prevention, Interim Clinical Considerations for Use of COVID-19 Vaccines, 2023 (295)
Hepatitis B	Recommended for adults with diabetes aged <60 years; for adults aged ≥60 years, hepatitis B vaccine may be administered at the discretion of the treating clinician based on the person's likelihood of acquiring hepatitis B infection			Weng et al., Universal Hepatitis B Vaccination in Adults Aged 19–59 Years: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2022 (18)
Influenza	All people with diabetes advised not to receive live attenuated influenza vaccine	Annual		Centers for Disease Control and Prevention, Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2023–24 Influenza Season (296)
Pneumonia (PPSV23 [Pneumovax])	19–64 years of age, vaccinate with Pneumovax	One dose is recommended for those who previously received PCV13; if PCV15 was used, follow with PPSV23 ≥1 year later; PPSV23 is not indicated after PCV20; adults who received only PPSV23 may receive PCV15 or PCV20 ≥1 year after their last dose	2	Centers for Disease Control and Prevention, Updated Recommendations for Prevention of Invasive Pneumococcal Disease Among Adults Using the 23-Valent Pneumococcal Polysaccharide Vaccine (PPSV23) (23)
	≥65 years of age	One dose is recommended for those who previously received PCV13; if PCV15 was used, follow with PPSV23 ≥1 year later; PPSV23 is not indicated after PCV20; adults who received only PPSV23 may receive PCV15 or PCV20 ≥1 year after their last dose	2	Falkenhorst et al., Effectiveness of the 23-Valent Pneumococcal Polysaccharide Vaccine (PPV23) Against Pneumococcal Disease in the Elderly: Systematic Review and Meta-analysis (24)
PCV20 or PCV15	Adults 19–64 years of age, with an immunocompromising condition (e.g., chronic renal failure), cochlear implant, or cerebrospinal fluid leak	One dose of PCV15 or PCV20 is recommended by the Centers for Disease Control and Prevention	3	Kobayashi et al., Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2022 (25)
	19–64 years of age, immunocompetent	For those who have never received any pneumococcal vaccine, the CDC recommends one dose of PCV15 or PCV20		
	≥65 years of age, immunocompetent, have shared decision-making discussion with health care professionals	One dose of PCV15 or PCV20; PCSV23 may be given ≥8 weeks after PCV15; PPSV23 is not indicated after PCV20		
RSV	Older adults ≥60 years of age with diabetes appear to be a risk group	Adults aged ≥60 years may receive a single dose of an RSV vaccine		Centers for Disease Control and Prevention, CDC Recommends RSV Vaccine for Older Adults (29)
Tetanus, diphtheria, pertussis (Tdap)	All adults; pregnant individuals should have an extra dose	Booster every 10 years	2 for effectiveness, 3 for safety	Havers et al., Use of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccines: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2019 (297)

Vaccine	Recommended ages	Schedule	GRADE evidence type*	References
Zoster	≥50 years of age	Two-dose Shingrix, even if previously vaccinated	1	Dooling et al., Recommendations of the Advisory Committee on Immunization Practices for Use of Herpes Zoster Vaccines (298)

For a comprehensive list of vaccines, refer to the Centers for Disease Control and Prevention web site at cdc.gov/vaccines/. Advisory Committee on Immunization Practices recommendations can be found at cdc.gov/vaccines/acip/recommendations. GRADE, Grading of Recommendations Assessment, Development, and Evaluation; PCV13, 13-valent pneumococcal conjugate vaccine; PCV15, 15-valent pneumococcal conjugate vaccine; PCV 20, 20-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine. *Evidence type: 1, randomized controlled trials (RCTs) or overwhelming evidence from observational studies; 2, RCTs with important limitations or exceptionally strong evidence from observational studies; 3, observational studies or RCTs with notable limitations; 4, clinical experience and observations, observational studies with important limitations, or RCTs with several major limitations.

Autoimmune Diseases

- 4.7 People with type 1 diabetes should be screened for autoimmune thyroid disease soon after diagnosis and periodically thereafter. B
- 4.8 Adults with type 1 diabetes should be screened for celiac disease in the presence of gastrointestinal symptoms, signs, laboratory manifestations, or clinical suspicion suggestive of celiac dis-ease. B

Bone Health

- 4.9 Fracture risk should be assessed in older adults with diabetes as a part of routine care in diabetes clinical practice, according to risk factors and comorbidities. A
- 4.10 Monitor **bone mineral density** using **dual-energy X-ray absorptiometry** of high-risk older adults with diabetes (aged >65 years) and younger individuals with diabetes and multiple risk factors *every 2-3 years*. A
- 4.11 Clinicians should consider the potential adverse impact on bone health when selecting pharmacological options to lower glucose levels in people with diabetes. Prioritizing medications with a proven safety profile for bones is recommended, particularly for those at elevated risk for fractures. A
- 4.12 To reduce the risk of falls and fractures, glycemic management goals should be individualized for people with diabetes at a higher risk of fracture. C Prioritize use of glucose-lowering medications that are associated with low risk for hypoglycemia to avoid falls. E
- 4.13 Advise people with diabetes on their intake of calcium and vitamin D to ensure it meets the recommended daily allowance for those at risk for fracture, either through their diet or supplemental means. B
- 4.14 Antiresorptive medications and osteoanabolic agents should be considered for people with diabetes who have low bone mineral density with a T-score #2.0 or have experienced fragility fractures. B

Cognitive Impairment/Dementia

- 4.15 In the presence of cognitive impairment, diabetes treatment plans should be simplified as much as possible and tailored to minimize the risk of hypoglycemia. B

Diabetes and COVID-19

- 4.16 Health care professionals should help people with diabetes aim to achieve individualized glycemic goals to reduce the risk of macrovascular and

microvascular risk as well as reduce the risk of coronavirus disease 2019 (COVID-19) and its complications. B

- 4.17 As we move into the recovery phase, diabetes health care services and practitioners should address the impact of the COVID-19 pandemic in higher-risk groups, including minority, socioeconomically deprived, and older populations. B
- 4.18 People with diabetes who have been infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) should be followed up in the longer term to assess complications and symptoms of long COVID-19. E
- 4.19 New-onset diabetes cases should receive routine clinic follow-up to determine if the condition is transient. B
- 4.20 There is no clear indication to change prescribing of glucose-lowering therapies in people with diabetes infected by SARS-CoV-2. B
- 4.21 People with diabetes should be prioritized and offered SARS-CoV-2 vaccines and vaccine boosters. B

Disability

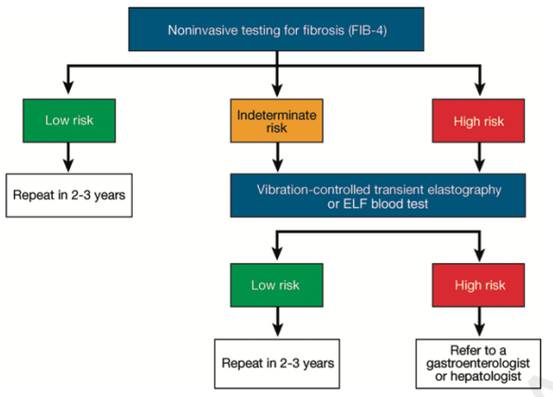
- 4.22 An assessment of disability should be performed at each visit for people with diabetes. If a disability is impacting functional ability or capacity to manage their diabetes, a referral should be made to an appropriate health care professional specializing in disability (e.g., physical medicine and rehabilitation specialist, physical therapist, occupational therapist, speech-language pathologist). E

Low Testosterone in Men

- 4.23 In men with diabetes who have symptoms or signs of hypogonadism, such as decreased sexual desire (libido) or activity or erectile dysfunction, consider screening with a morning serum testosterone level. B

Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis Screening

- 4.24a Adults with **type 2 diabetes or prediabetes**, particularly those with **obesity or cardiometabolic risk factors** or established **cardiovascular disease**, should be screened/risk stratified for clinically significant liver fibrosis (defined as moderate fibrosis to cirrhosis) using a calculated fibrosis-4 index (FIB-4) (derived from age, ALT, AST, and platelets [mdcalc.com/calc/2200/ fibrosis4-fib-4-index-liver-fibrosis]), even if they have normal liver enzymes. B
- 4.24b Adults with diabetes or prediabetes with persistently elevated plasma aminotransferase levels for >6 months and low FIB-4 should be evaluated for other causes of liver disease. B
- 4.25 Adults with type 2 diabetes or prediabetes with an indeterminate or high FIB-4 should have additional risk stratification by liver stiffness measurement with transient elastography or the blood biomarker enhanced liver fibrosis (ELF). B
- 4.26 Adults with type 2 diabetes or prediabetes with indeterminate results or at high risk for significant liver fibrosis (i.e., by FIB-4, liver stiffness measurement, or ELF) should be referred to a gastroenterologist or hepatologist for further workup. Interprofessional care is recommended for long-term management. B



Management

- 4.27 Adults with type 2 diabetes or pre-diabetes, particularly with overweight or obesity, with nonalcoholic fatty liver disease (NAFLD) should be recommended lifestyle changes that promote weight loss, ideally within a structured nutrition plan and physical activity program for cardiometabolic benefits B and histological improvement. C
- 4.28 For adults with type 2 diabetes, particularly with overweight or obesity, with NAFLD, consider using a **glucagon-like peptide 1 (GLP-1) receptor agonist** with demonstrated benefits in nonalcoholic steatohepatitis (NASH) as an adjunctive therapy to lifestyle interventions for weight loss. B
- 4.29 **Pioglitazone or GLP-1 receptor agonists** are the preferred agents for the treatment of hyperglycemia in adults with type 2 diabetes with biopsy-proven NASH or those at high risk with clinically significant liver fibrosis using noninvasive tests. A
- 4.30a In adults with type 2 diabetes and NAFLD, use of glucose-lowering therapies other than pioglitazone or GLP-1 receptor agonists may be continued as clinically indicated, but these therapies lack evidence of benefit in NASH. B
- 4.30b Insulin therapy is the preferred agent for the treatment of hyperglycemia in adults with type 2 diabetes with decompensated cirrhosis. C
- 4.31a Adults with type 2 diabetes and NAFLD are at increased cardiovascular risk; therefore, comprehensive management of cardiovascular risk factors is recommended. B
- 4.31b Statin therapy is safe in adults with type 2 diabetes and compensated cirrhosis from NAFLD and should be initiated or continued for cardiovascular risk reduction as clinically indicated. B Statin therapy should be used with caution and close monitoring in people with decompensated cirrhosis, given limited safety and efficacy data. B
- 4.32a Consider metabolic surgery in appropriate candidates as an option to treat NASH in adults with type 2 diabetes B and to improve cardiovascular outcomes. B
- 4.32b Metabolic surgery should be used with caution in adults with type 2 diabetes with compensated cirrhosis from NAFLD B and is not recommended in decompensated cirrhosis. B

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes:

DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT

- 5.1 Strongly encourage all people with diabetes to participate in diabetes self-management education and support (DSMES) to facilitate informed decision-making, self-care behaviors, problem-solving, and active collaboration with the health care team. A
- 5.2 In addition to annually, there are critical times to evaluate the need for DSMES to promote skills acquisition to aid treatment plan implementation, medical
- nutrition therapy, and well-being: at diagnosis, when not meeting treatment goals, when complicating factors develop (medical, physical, and psychosocial), and when transitions in life and care occur. E
- 5.3 Clinical outcomes, health status, and well-being are key goals of DSMES that should be assessed as part of routine care. C
- 5.4 DSMES should be culturally sensitive and responsive to individual preferences, needs, and values and may be offered in group or individual set-tings. A Such education and support should be documented and made available to members of the entire diabetes care team. E
- 5.5 Consider offering DSMES via telehealth and/or digital interventions to address barriers to access and improve satisfaction. B
- 5.6 Since DSMES can improve outcomes and reduce costs, reimbursement by third-party payers is recommended. B
- 5.7 Identify and address barriers to DSMES that exist at the payer, health system, clinic, health care professional, and individual levels. E
- 5.8 Include social determinants of health of the target population in guiding design and delivery of DSMES c with the ultimate goal of health equity across all populations.

Medical nutrition therapy recommendations

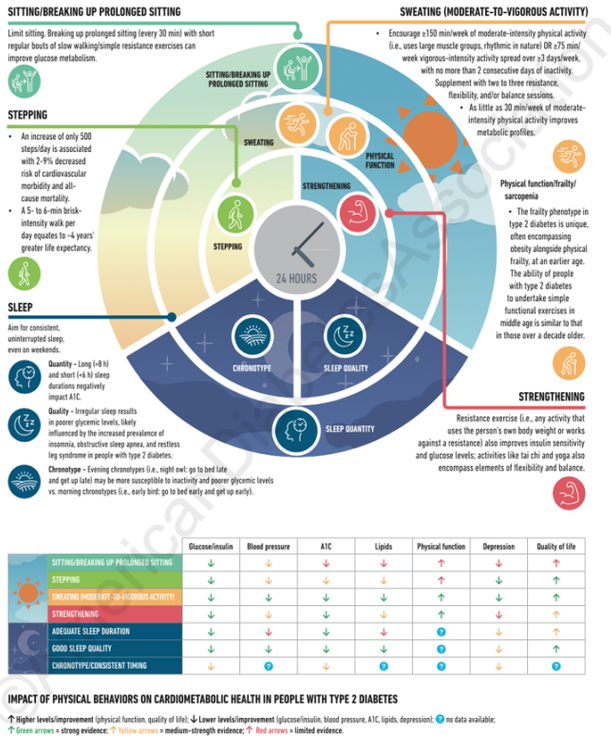
Table 5.1—Medical nutrition therapy recommendations

	Recommendations
Effectiveness of nutrition therapy	**5.9** An individualized medical nutrition therapy program as needed to achieve treatment goals, provided by a registered dietitian nutritionist, preferably one who has comprehensive knowledge and experience in diabetes care, is recommended for all people with type 1 or type 2 diabetes, prediabetes, and gestational diabetes mellitus. **A** **5.10** Because diabetes medical nutrition therapy can result in cost savings **B** and improved cardiometabolic outcomes, **A** medical nutrition therapy should be adequately reimbursed by insurance and other payers. **E**
Energy balance	**5.11** For all people with overweight or obesity, behavioral modification to achieve and maintain a minimum weight loss of 5% is recommended. **A**
Eating patterns and macronutrient distribution	**5.12** For diabetes prevention and management of people with prediabetes or diabetes, recommend individualized meal plans that keep nutrient quality, total calories, and metabolic goals in mind, **B** as data do not support a specific macronutrient pattern. **5.13** Food-based dietary patterns should emphasize key nutrition principles (inclusion of nonstarchy vegetables, whole fruits, legumes, whole grains, nuts/seeds, and low-fat dairy products and minimizing consumption of meat, sugar-sweetened beverages, sweets, refined grains, and ultraprocessed foods) in people with prediabetes and diabetes. **B** **5.14** Consider reducing overall carbohydrate intake for adults with diabetes to improve glycemia, as this approach may be applied to a variety of eating patterns that meet individual needs and preferences. **B**
Carbohydrates	**5.15** Emphasize minimally processed, nutrient-dense, high-fiber sources of carbohydrate (at least 14 g fiber per 1,000 kcal). **B** **5.16** People with diabetes and those at risk are advised to replace sugar-sweetened beverages (including fruit juices) with water or low-calorie or no-calorie beverages as much as possible to manage glycemia and reduce risk for cardiometabolic disease **B** and minimize consumption of foods with added sugar that have the capacity to displace healthier, more nutrient-dense food choices. **A** **5.17** Provide education on the glycemic impact of carbohydrate, **A** fat, and protein **B** tailored to an individual's needs, insulin plan, and preferences to optimize mealtime insulin dosing. **5.18** When using fixed insulin doses, individuals should be provided with education about consistent patterns of carbohydrate intake with respect to time and amount while considering the insulin action time, as it can result in improved glycemia and reduce the risk for hypoglycemia. **B**
Protein	**5.19** For people with type 2 diabetes, consider avoiding carbohydrate sources high in protein when treating or preventing hypoglycemia, as ingested protein appears to increase insulin response without increasing plasma glucose concentrations. **B**
Dietary fat	**5.20** Counsel people with diabetes to consider an eating plan emphasizing elements of a Mediterranean eating pattern, which is rich in monounsaturated and polyunsaturated fats and long-chain fatty acids such as fatty fish, nuts, and seeds, to reduce cardiovascular disease risk **A** and improve glucose metabolism. **B**
Micronutrients and herbal supplements	**5.21** Dietary supplementation with vitamins, minerals (such as chromium and vitamin D), herbs, or spices (such as cinnamon or aloe vera) are not recommended for glycemic benefits. Health care professionals should inquire about intake of supplements and counsel as needed. **C** **5.22** Counsel against β-carotene supplementation, as there is evidence of harm for certain individuals and it confers no benefit. **B**
Alcohol	**5.23** Advise adults with diabetes who consume alcohol to not exceed the recommended daily limits (one drink per day for adult women and two drinks per day for adult men). **C** Advise abstainers to not start to drink, even in moderation, solely for the purpose of improving health outcomes. **C** **5.24** Educating people with diabetes about the signs, symptoms, and self-management of delayed hypoglycemia after drinking alcohol, especially when using insulin or insulin secretagogues, is recommended. The importance of monitoring glucose after drinking alcoholic beverages to reduce hypoglycemia risk should be emphasized. **B**
Sodium	**5.25** Counsel people with diabetes to limit sodium consumption to <2,300 mg/day. **B**
Nonnutritive sweeteners	**5.26** Counsel people with prediabetes and diabetes that water is recommended over nutritive and nonnutritive sweetened beverages. However, the use of nonnutritive sweeteners as a replacement for sugar-sweetened products in moderation is acceptable if it reduces overall calorie and carbohydrate intake. **B**

PHYSICAL ACTIVITY

- 5.27 Counsel youth with type 1 diabetes C or type 2 diabetes B to engage in 60 min/day or more of moderate- or vigorous-intensity aerobic activity, with vigorous muscle-strengthening and bone-strengthening activities at least 3 days/week.
- 5.28 Counsel most adults with type 1 diabetes C and type 2 diabetes B to engage in 150 min or more of moderate- to vigorous-intensity aerobic activity per week, spread over at least 3 days/ week, with no more than 2 consecutive days without activity. Shorter du- rations (minimum 75 min/week) of vigorous-intensity or interval training may be sufficient for younger and more physically fit individuals.
- 5.29 Counsel adults with type 1 diabetes C and type 2 diabetes B to engage in 2–3 sessions/week of resistance exercise on nonconsecutive days.
- 5.30 Recommend flexibility training and balance training 2–3 times/week for older adults with diabetes. Yoga and tai chi may be included based on individual preferences to increase flexibility, muscular strength, and balance. C
- 5.31 For all people with diabetes, evaluate baseline physical activity and time spent in sedentary behavior (i.e., quiet sitting, lying, and leaning). For people who do not meet activity guidelines, encourage increase in physical activities (e.g., walking, yoga, housework, gardening, swimming, and dancing) above baseline (type 1 diabetes E and type 2 diabetes B). Counsel that prolonged sitting should be interrupted every 30 min for blood glucose benefits. C

IMPORTANCE OF 24-HOUR PHYSICAL BEHAVIORS FOR TYPE 2 DIABETES



	Glucose/insulin	Blood pressure	A1C	Lipids	Physical function	Depression	Quality of life
SITTING/BREAKING UP PROLONGED SITTING	↓	↓	↓	↓	↑	↓	↑
STEPPING	↓	↓	↓	↓	↑	↓	↑
SWEATING (MODERATE-TO-VIGOROUS ACTIVITY)	↓	↓	↓	↓	↑	↓	↑
STRENGTHENING	↓	↓	↓	↓	↑	↓	↑
ADEQUATE SLEEP DURATION	↓	↓	↓	↓	?	↓	↑
GOOD SLEEP QUALITY	↓	↓	↓	↓	?	↓	↑
CHRONOTYPE/CONSISTENT TIMING	↓	?	↓	?	?	↓	?

IMPACT OF PHYSICAL BEHAVIORS ON CARDIOMETABOLIC HEALTH IN PEOPLE WITH TYPE 2 DIABETES

↑ **Higher levels/improvement** (physical function, quality of life); ↓ **Lower levels/improvement** (glucose/insulin, blood pressure, A1C, lipids, depression); ? no data available; ↑ Green arrows = **strong evidence**; ↑ Yellow arrows = **medium-strength evidence**; ↑ Red arrows = **limited evidence**.

SMOKING CESSATION: TOBACCO, E-CIGARETTES, AND CANNABIS

- 5.32 Advise all people with diabetes not to use cigarettes and other tobacco products or e-cigarettes. A
- 5.33 As a routine component of diabetes care and education, ask people with diabetes about the use of cigarettes or other tobacco products. After identification of use, recommend and refer for combination treatment consisting of both tobacco/smoking cessation counseling and pharmacological therapy. A

SUPPORTING POSITIVE HEALTH BEHAVIORS

- 5.34 Behavioral strategies should be used to support diabetes self-management and engagement in health behaviors (e.g., taking medications, using diabetes technologies, and engaging in physical activity and healthy eating) to promote optimal diabetes health outcomes. A

PSYCHOSOCIAL CARE

- 5.35 Psychosocial care should be provided to all people with diabetes, with the goal of optimizing health-related quality of life and health outcomes.
  - Such care should be integrated with routine medical care and delivered by trained health care professionals using a collaborative, person-centered, culturally informed approach. A
- 5.36 Diabetes care teams should implement psychosocial screening protocols for general and diabetes-related mood concerns as well as other topics such as stress, quality of life, available resources (financial, social, family, and emotional), and/or psychiatric history.
  - Screening should occur at least annually or when there is a change in disease, treatment, or life circumstances. C
- 5.37 When indicated, refer to behavioral health professionals or other trained health care professionals, ideally those with experience in diabetes, for further assessment and treatment for symptoms of diabetes distress, depression, suicidality, anxiety, treatment-related fear of hypoglycemia, disordered eating, and/or cognitive capacities. Such specialized psychosocial care should use age-appropriate standardized and validated tools and treatment approaches. B
- 5.38 Consider developmental factors and use age-appropriate validated tools for psychosocial screening in people with diabetes. E

Diabetes Distress

- 5.39 Screen people with diabetes, care-givers, and family members for diabetes distress at least annually, and consider more frequent monitoring when treatment targets are not met, at transitional times, and/or in the presence of diabetes complications. Health care professionals can address diabetes distress and may consider referral to a qualified behavioral health professional, ideally one with experience in diabetes, for further assessment and treatment if indicated. B

Situations that warrant referral of a person with diabetes to a qualified behavioral health professional for evaluation and treatment

Table 5.2—Situations that warrant referral of a person with diabetes to a qualified behavioral health professional for evaluation and treatment

• A positive screen on a validated screening tool for depressive symptoms, diabetes distress, anxiety, fear of hypoglycemia, suicidality, or cognitive impairment
• The presence of symptoms or suspicions of disordered eating behavior, an eating disorder, or disrupted patterns of eating
• Intentional omission of insulin or oral medication to cause weight loss is identified
• A serious mental illness is suspected
• In youth and families with behavioral self-care difficulties, repeated hospitalizations for diabetic ketoacidosis, failure to achieve expected developmental milestones, or significant distress
• Low engagement in diabetes self-management behaviors, including declining or impaired ability to perform diabetes self-management behaviors
• Before undergoing bariatric or metabolic surgery and after surgery, if assessment reveals an ongoing need for adjustment support

Anxiety

- 5.40 Consider screening people with diabetes for anxiety symptoms, fear of hypoglycemia, or diabetes-related worries. Health care professionals can discuss diabetes-related worries and should consider referral to a qualified behavioral health professional for further assessment and treatment if anxiety symptoms indicate interference with diabetes self-management behaviors or quality of life.

Depression

- 5.41 Conduct at least annual screening of depressive symptoms in all people with diabetes and more frequently among those with a self-reported history of depression. Use age-appropriate, validated depression screening measures, recognizing that further evaluation will be necessary for individuals who have a positive screen. B
- 5.42 Beginning at diagnosis of complications or when there are significant changes in medical status, consider assessment for depression. B
- 5.43 Refer to qualified behavioral health professionals or other trained health care professionals with experience using evidence-based treatment approaches for depression in conjunction with collaborative care with the diabetes treatment team.

Disordered Eating Behavior

- 5.44 Consider screening for disordered or disrupted eating using validated screening measures when hyperglycemia and weight loss are unexplained based on self-reported behaviors related to medication dosing, meal plan, and physical activity.
- In addition, a review of the medical treatment plan is recommended to identify potential treatment-related effects on hunger/caloric intake. B
- 5.45 Consider reevaluating the treatment plan of people with diabetes who present with symptoms of disordered eating behavior, an eating disorder, or disrupted patterns of eating, in consultation with a qualified professional. Key qualifications include familiarity with diabetes disease physiology, treatments for diabetes and disordered eating behaviors, and weight-related and psychological risk factors for disordered eating behaviors.

Serious Mental Illness

- 5.46 Provide an increased level of support for people with diabetes and serious mental illness through enhanced monitoring of and assistance with diabetes self-management behaviors. B
- 5.47 Monitor changes in body weight, glycemia, and lipids in adolescents and adults with diabetes who are prescribed second-generation antipsychotic medications; adjust the treatment plan accordingly, if needed.

Cognitive Capacity/Impairment

- 5.48 Cognitive capacity should be monitored throughout the life span for all individuals with diabetes, particularly in those who have documented cognitive disabilities, those who experience severe hypoglycemia, very young children, and older adults. B
- 5.49 If cognitive capacity changes or appears to be suboptimal for decision-making and/or behavioral self-management, referral for a formal assessment should be considered. E

Sleep Health

- 5.50 Consider screening for sleep health in people with diabetes, including symptoms of sleep disorders, disruptions to sleep due to diabetes symptoms or management needs, and worries about sleep. Refer to sleep medicine specialists and/or qualified behavioral health professionals as indicated. B
- 5.51 Counsel people with diabetes to practice sleep-promoting routines and habits (e.g., maintaining consistent sleep schedule and limiting caffeine in the afternoon).

6. Glycemic Goals and Hypoglycemia:

Glycemic Assessment

- 6.1 Assess glycemic status by A1C and/or appropriate **continuous glucose monitoring (CGM)** metrics at least **two times a year**. Assess more frequently (e.g., every 3 months) for individuals not meeting treatment goals, with frequent or severe hypoglycemia or hyperglycemia, changing health status, or growth and development in youth. E
- 6.2 Assess glycemic status at least quarterly and as needed in individuals whose therapy has recently changed and/or who are not meeting glycemic goals.

Table 6.1—Equivalent A1C levels and estimated average glucose (eAG)

A1C (%)	mg/dL*	mmol/L
5	97 (76–120)	5.4 (4.2–6.7)
6	126 (100–152)	7.0 (5.5–8.5)
7	154 (123–185)	8.6 (6.8–10.3)
8	183 (147–217)	10.2 (8.1–12.1)
9	212 (170–249)	11.8 (9.4–13.9)
10	240 (193–282)	13.4 (10.7–15.7)
11	269 (217–314)	14.9 (12.0–17.5)
12	298 (240–347)	16.5 (13.3–19.3)

Data in parentheses are 95% CI. A calculator for converting A1C results into eAG, in either mg/dL or mmol/L, is available at professional.diabetes.org/eAG. *These estimates are based on ADAG data of ~2,700 glucose measurements over 3 months per A1C measurement in 507 adults with type 1, type 2, or no diabetes. The correlation between A1C and average glucose was 0.92 (19,20). Adapted from Nathan et al. (19).

Glycemic Assessment by Continuous Glucose Monitoring

- 6.3 Standardized, single-page glucose reports from CGM devices with visual cues, such as the ambulatory glucose profile, should be considered as a standard summary for all CGM devices. E
- 6.4 Time in range (TIR) is associated with the risk of microvascular complications and can be used for assessment of glycemic status. Additionally, time below range and time above range are useful parameters for the evaluation of the treatment plan

Table 6.2—Standardized CGM metrics for clinical care in nonpregnant individuals with type 1 or type 2 diabetes

Metric	Interpretation	Goals
1. Number of days CGM device is worn		14-day wear for pattern management
2. Percentage of time CGM device is active		70% of data from 14 days
3. Mean glucose	Simple average of glucose values	*
4. Glucose management indicator	Calculated value approximating A1C (not always equivalent)	*
5. Glycemic variability (%CV) target	Spread of glucose values	≤36%†
6. TAR: % of readings and time >250 mg/dL (>13.9 mmol/L)	Level 2 hyperglycemia	<5% (most adults); <10% (older adults)
7. TAR: % of readings and time 181–250 mg/dL (10.1–13.9 mmol/L)	Level 1 hyperglycemia	<25% (most adults); <50% (older adults)‡
8. TIR: % of readings and time 70–180 mg/dL (3.9–10.0 mmol/L)	In range	>70% (most adults); >50% (older adults)
9. TBR: % of readings and time 54–69 mg/dL (3.0–3.8 mmol/L)	Level 1 hypoglycemia	<4% (most adults); <1% (older adults)§
10. TBR: % of readings and time <54 mg/dL (<3.0 mmol/L)	Level 2 hypoglycemia	<1%

CGM, continuous glucose monitoring; CV, coefficient of variation; TAR, time above range; TBR, time below range; TIR, time in range. *Goals for these values are not standardized. †Some studies suggest that lower %CV targets (<33%) provide additional protection against hypoglycemia for those receiving insulin or sulfonylureas. ‡Goals are for level 1 and level 2 hyperglycemia combined. §Goals are for level 1 and level 2 hypoglycemia combined. Adapted from Battelino et al. (32).

GLYCEMIC GOALS

- 6.5a An AC goal for many nonpregnant adults of <7% (<53 mmol/mol) without significant hypoglycemia is appropriate. A
- 6.5b If using an ambulatory glucose profile/glucose management indicator to assess glycemia, a parallel goal for many nonpregnant adults is TIR > 70% with time below range <4% and time <54 mg/dL (<3 mmol/L) <1%. For those with frailty or at high risk of hypoglycemia, a goal of >50% TIR with <1% time below range is recommended. B
- 6.6 On the basis of health care professional judgment and the preference of the person with diabetes, achievement of lower A1C levels than the goal of 7% (53 mmol/mol) may be acceptable and even beneficial if it can be achieved safely without significant hypoglycemia or other adverse effects of treatment. B
- 6.7 Less stringent glycemic goals may be appropriate for individuals with limited life expectancy or where the harms of treatment are greater than the benefits. B
- 6.8a Deintensify hypoglycemia-causing medications (insulin, sulfonylureas, or meglitinides), or switch to a medication class with lower hypoglycemia risk, for individuals who are at high risk for hypoglycemia, within individualized glycemic goals. B
- 6.8b Deintensify diabetes medications for individuals for whom the harms and/or burdens of treatment may be greater than the benefits, within individualized glycemic goals. B
- 6.9 Reassess glycemic goals based on the individualized criteria shown in Fig. 6.2. E
- 6.10 Setting a glycemic goal during consultations is likely to improve patient outcomes. E

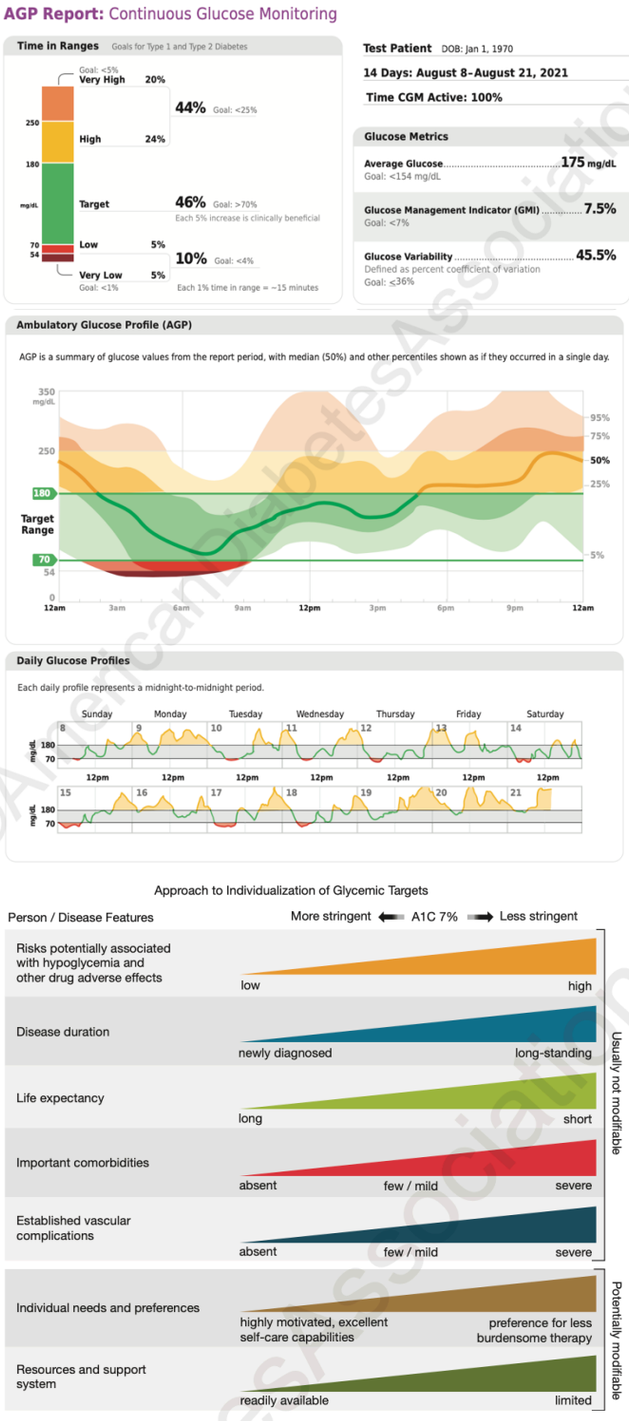


Figure 6.2—Person and disease factors used to determine optimal glycemic targets. Characteristics and predicaments toward the left justify more stringent efforts to lower A1C; those toward the right suggest less stringent efforts. A1C 7% = 53 mmol/mol. Adapted with permission from Inzucchi et al. (36).

Summary of glycemic recommendations for many nonpregnant adults with diabetes

Table 6.3—Summary of glycemic recommendations for many nonpregnant adults with diabetes

A1C	<7.0% (<53 mmol/mol)*†
Preprandial capillary plasma glucose	80–130 mg/dL* (4.4–7.2 mmol/L)
Peak postprandial capillary plasma glucose‡	<180 mg/dL* (<10.0 mmol/L)

*More or less stringent glycemic goals may be appropriate for individuals. †CGM may be used to assess glycemic status as noted in Recommendation 6.5b and **Fig. 6.1**. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations (per **Fig. 6.2**). ‡Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals. Postprandial glucose measurements should be made 1–2 h after the beginning of the meal, generally peak levels in people with diabetes.

HYPOGLYCEMIA ASSESSMENT, PREVENTION, AND TREATMENT

- 6.11a History of hypoglycemia should be reviewed at every clinical encounter for all individuals at risk for hypoglycemia and evaluated as indicated. C
- 6.11b Clinicians should screen all individuals at risk for hypoglycemia for impaired hypoglycemia aware-ness. E
- 6.11c Clinicians should consider an individual's risk for hypoglycemia (see Table 6.5) when selecting diabetes medications and glycemic goals. E 6.11d Use of CGM is beneficial and recommended for individuals at high risk for hypoglycemia. A
- 6.12 **Glucose is the preferred treatment for the conscious individual with glucose <70 mg/dL** (<3.9 mmol/L), although any form of carbohydrate that contains glucose may be used.
  - Fifteen minutes after initial treatment, repeat the treatment if hypoglycemia persists. B
- 6.13 **Glucagon should be prescribed for all individuals taking insulin or at high risk for hypoglycemia**. Family, care-givers, school personnel, and others providing support to these individuals should know its location and be educated on how to administer it.
  - Glucagon preparations that do not have to be reconstituted are preferred. E
- 6.14 All individuals taking insulin A or at risk for hypoglycemia C should receive structured education for hypoglycemia prevention and treatment, with ongoing education for those who experience hypoglycemic events.
- 6.15 One or more episodes of level 2 or 3 hypoglycemia should prompt reevaluation of the treatment plan, including deintensifying or switching diabetes medications if appropriate. E
- 6.16 Refer individuals with impaired hypoglycemia awareness to a trained health care professional to receive evidence-based intervention to help reestablish awareness of symptoms of hypoglycemia. A
- 6.17 Ongoing assessment of cognitive function is suggested with increased vigilance for hypoglycemia by the clinician, patient, and caregivers if impaired or declining cognition is found. B

Classification of hypoglycemia

Table 6.4—Classification of hypoglycemia

	Glycemic criteria/description
Level 1	Glucose <70 mg/dL (<3.9 mmol/L) and ≥54 mg/dL (≥3.0 mmol/L)
Level 2	Glucose <54 mg/dL (<3.0 mmol/L)
Level 3	A severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia, irrespective of glucose level

Reprinted from Agiostratidou et al. (70).

Assessment of hypoglycemia risk among individuals treated with insulin, sulfonylureas, or meglitinides

Table 6.5—Assessment of hypoglycemia risk among individuals treated with insulin, sulfonylureas, or meglitinides

Clinical/biological risk factors	Social, cultural, and economic risk factors
Major risk factors • Recent (within the past 3–6 months) level 2 or 3 hypoglycemia • Intensive insulin therapy* • Impaired hypoglycemia awareness • End-stage kidney disease • Cognitive impairment or dementia	Major risk factors • Food insecurity • Low-income status§ • Homelessness • Fasting for religious or cultural reasons
Other risk factors • Multiple recent episodes of level 1 hypoglycemia • Basal insulin therapy* • Age ≥75 years† • Female sex • High glycemic variability‡ • Polypharmacy • Cardiovascular disease • Chronic kidney disease (eGFR <60 mL/min/1.73 m^2 or albuminuria) • Neuropathy • Retinopathy • Major depressive disorder	Other risk factors • Low health literacy • Alcohol or substance use disorder

Major risk factors are those that have a consistent, independent association with a high risk for level 2 or 3 hypoglycemia. Other risk factors are those with less consistent evidence or a weaker association. These risk factors are identified through observational analyses and are intended to be used for hypoglycemia risk stratification. Individuals considered at high risk for hypoglycemia are those with ≥1 major risk factor or who have multiple other risk factors (determined by the health care professional incorporating clinical judgment) (87,88,92,94–97,113,146). Proximal causes of hypoglycemic events (e.g., exercise and sleep) are not included. eGFR, estimated glomerular filtration rate. *Rates of hypoglycemia are highest for individuals treated with intensive insulin therapy (including multiple daily injections of insulin, continuous subcutaneous insulin infusion, or automated insulin delivery systems), followed by basal insulin, followed by sulfonylureas or meglitinides. Combining treatment with insulin and sulfonylureas also increases hypoglycemia risk. †Accounting for treatment plan and diabetes subtype, the oldest individuals (aged ≥75 years) have the highest risk for hypoglycemia in type 2 diabetes; younger individuals with type 1 diabetes are also at very high risk. ‡Tight glycemic control in randomized trials increases hypoglycemia rates. In observational studies, both low and high A1C are associated with hypoglycemia in a J-shaped relationship. §Includes factors associated with low income, such as being underinsured or living in a socioeconomically deprived area.

Components of hypoglycemia prevention for individuals at risk for hypoglycemia at initial, follow-up, and annual visits

Table 6.7—Components of hypoglycemia prevention for individuals at risk for hypoglycemia at initial, follow-up, and annual visits

Hypoglycemia prevention action	Initial visit	Every follow-up visit	Annual visit
Hypoglycemia history assessment	✓	✓	✓
Hypoglycemia awareness assessment	✓		✓
Cognitive function and other hypoglycemia risk factor assessment	✓		✓
Structured patient education for hypoglycemia prevention and treatment	✓	✓*	✓*
Consideration of continuous glucose monitoring needs	✓	✓	✓
Reevaluation of diabetes treatment plan with deintensification, simplification, or agent modification as appropriate	✓	✓†	✓†
Glucagon prescription and training for close contacts for insulin-treated individuals or those at high hypoglycemic risk	✓		✓
Training to reestablish awareness of hypoglycemia	✓‡		✓‡

The listed frequencies are the recommended minimum; actions for hypoglycemia prevention should be done more often as needed based on clinical judgment. *Indicated with recurrent hypoglycemic events or at initiation of medication with a high risk for hypoglycemia. †Indicated with any level 2 or 3 hypoglycemia, intercurrent illness, or initiating interacting medications. ‡Indicated when impaired hypoglycemia awareness is detected.

7. Diabetes Technology

GENERAL DEVICE PRINCIPLES

- 7.1 Diabetes devices should be offered to people with diabetes. A
- 7.2 Initiation of continuous glucose monitoring (CGM) should be offered to people with type 1 diabetes early in the disease, even at time of diagnosis. A
- 7.3 Consider establishing competencies based on role in practice setting for health care professionals working with diabetes technology. E
- 7.4 The type(s) and selection of devices should be individualized based on a person's specific needs, preferences, and skill level. In the setting of an individual whose diabetes is partially or wholly managed by someone else (e.g., a young child or a person with cognitive impairment or dexterity, psychosocial, and/or physical limitations), the caregiver's skills and preferences are integral to the decision-making process. E
- 7.5 When prescribing a device, ensure that people with diabetes and caregivers receive initial and ongoing education and training, either in person or remotely, and ongoing evaluation of technique, results, and the ability to utilize data, including up- loading/sharing data (if applicable), to monitor and adjust therapy. C
- 7.6 People with diabetes who have been using CGM, continuous subcutaneous insulin infusion (CSII), and/or automated insulin delivery (AID) for diabetes management should have continued access across third-party payers, regardless of age or A1C lev- els. E
- 7.7 Students should be supported at school in the use of diabetes technol- ogy, such as CGM systems, CSII, connected insulin pens, and AID systems, as recommended or prescribed by their health care team. E
- 7.8 Initiation of CSII and/or AID early, even at diagnosis, in the treatment of diabetes can be beneficial depending on a person's or caregiver's needs and preferences. C

BLOOD GLUCOSE MONITORING

- 7.9 People with diabetes should be provided with blood glucose monitoring (BGM) devices as indicated by their circumstances, preferences, and treatment. People using CGM devices must also have access to BGM at all times. A
- 7.10 People who are taking insulin and using BGM should be encouraged to check their blood glucose levels when appropriate based on their insulin therapy. This may include checking when fasting, prior to meals and snacks, after meals, at bedtime, in the middle of the night, prior to, during, and after exercise, when hypoglycemia is suspected, after treating low blood glucose levels until they are normoglycemic, when hyperglycemia is suspected, and prior to and while performing critical tasks such as driving. B
- 7.11 Health care professionals should be aware of the differences in accuracy among blood glucose meters. Only meters approved by the U.S. Food and Drug Administration (FDA) (or comparable regulatory agencies for other geographical locations) with proven accuracy should be used, with unexpired test strips purchased from a pharmacy or licensed distributor and properly stored. E
- 7.12 Although BGM in people on non-insulin therapies has not consistently shown clinically significant reductions in A1C levels, it may be helpful when altering meal plans, physical activity plans, and/or medications (particularly medications that can cause hypoglycemia) in conjunction with a treatment adjustment program. E
- 7.13 Health care professionals should be aware of medications and other factors that can interfere with glucose meter accuracy and provide clinical management as indicated. E

Interfering substances for glucose meter readings

Table 7.2—Interfering substances for glucose meter readings

Glucose oxidase monitors
Uric acid
Galactose
Xylose
Acetaminophen
L-DOPA
Ascorbic acid
Glucose dehydrogenase monitors using pyrroloquinolinequinone cofactor (GDH/PQQ)
Icodextrin (used in peritoneal dialysis)

CONTINUOUS GLUCOSE MONITORING DEVICES

- 7.14 Real-time CGM (rCGM) A or intermittently scanned CGM (isCGM) B should be offered for diabetes management in adults with diabetes on multiple daily injections (MDI) or CSIl who are capable of using the devices safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's cir- cumstances, preferences, and needs.
- 7.15 CGM A or iSCGM B should be offered for diabetes management in adults with diabetes on basal insulin who are capable of using the devices safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs. 7.16 rCGM A or isCGM E should be offered for diabetes management in youth with type 1 diabetes on MDI or CSIl who are capable of using the devices safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs.
- 7.17 CGM or isCM should be offered for diabetes management in youth with type 2 diabetes on MDI or CSIl who are capable of using the devices safely (ei-ther by themselves or with a caregiver).The choice of device should be made based on the individual's circumstances, preferences, and needs. E
- 7.18 In people with diabetes on MDI or CSII, rCGM devices should be used as close to daily as possible for maximal benefit. A isCGM devices should be scanned frequently, at a minimum once every 8 h to avoid gaps in data. A People with diabetes should have uninterrupted access to their supplies to minimize gaps in CGM. A
- 7.19 When used as an adjunct to preprandial and postprandial BGM, CGM can help to achieve A1C targets in diabetes and pregnancy. B
- 7.20 Periodic use of tCGM or isCGM or use of professional CGM can be helpful for diabetes management in circumstances where consistent use of CGM is not desired or available. C
- 7.21 Skin reactions, either due to irritation or allergy, should be assessed and addressed to aid in successful use of devices. E
- 7.22 People who wear CGM devices should be educated on potential interfering substances and other factors that may affect accuracy. C

Continuous glucose monitoring devices

Table 7.3—Continuous glucose monitoring devices

Type of CGM	Description
rtCGM	CGM systems that measure and display glucose levels continuously
isCGM with and without alarms	CGM systems that measure glucose levels continuously but require scanning for visualization and storage of glucose values
Professional CGM	CGM devices that are placed on the person with diabetes in the health care professional's office and worn for a discrete period of time (generally 7–14 days). Data may be blinded or visible to the person wearing the device. The data are used to assess glycemic patterns and trends. Unlike rtCGM and isCGM devices, these devices are clinic-based and not owned by the person with diabetes.

CGM, continuous glucose monitoring; isCGM, intermittently scanned CGM; rtCGM, real-time CGM.

INSULIN DELIVERY

Insulin Syringes and Pens

- 7.23 For people with insulin-requiring diabetes on MDI, insulin pens are preferred in most cases. Still, insulin syringes may be used for insulin delivery considering individual and caregiver preference, insulin type, availability in vials, dosing therapy, cost, and self-management capabilities.

- 7.24 Insulin pens or insulin injection aids are recommended for people with dexterity issues or vision impairment or when decided by shared decision-making to facilitate the accurate dosing and administration of insulin. C
- 7.25 Connected insulin pens can be helpful for diabetes management and may be used in people with diabetes taking subcutaneous insulin. E
- 7.26 FDA-approved insulin dose calculators/decision support systems may be helpful for calculating insulin doses.

Continuous glucose monitoring devices interfering substances

Table 7.4—Continuous glucose monitoring devices interfering substances

Medication	Systems affected	Effect
Acetaminophen		
>4 g/day	Dexcom G6, Dexcom G7	Higher sensor readings than actual glucose
Any dose	Medtronic Guardian	Higher sensor readings than actual glucose
Ascorbic acid (vitamin C), >500 mg/day	FreeStyle Libre 14 day, FreeStyle Libre 2, FreeStyle Libre 3	Higher sensor readings than actual glucose
Hydroxyurea	Dexcom G6, Dexcom G7, Medtronic Guardian	Higher sensor readings than actual glucose
Mannitol (intravenously or as peritoneal dialysis solution)	Senseonics Eversense	Higher sensor readings than actual glucose
Sorbitol (intravenously or as peritoneal dialysis solution)	Senseonics Eversense	Higher sensor readings than actual glucose

Insulin Pumps and Automated

Insulin Delivery Systems

- 7.27 AID systems should be offered for diabetes management to youth and adults with type 1 diabetes A and other types of insulin-deficient diabetes E who are capable of using the device safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs. A
- 7.28 Insulin pump therapy alone with or without a sensor-augmented pump low-glucose suspend feature should be offered for diabetes management to youth and adults on MDI with type 1 diabetes A or other types of insulin-deficient diabetes E who are capable of using the device safely (either by themselves or with a care-giver) and are not able to use or do not choose an AID system. The choice of device should be made based on the individual's circumstances, preferences, and needs. A
- 7.29 Insulin pump therapy can be offered for diabetes management to youth and adults on MDI with type 2 diabetes who are capable of using the device safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs. A
- 7.30 Individuals with diabetes who have been using CSII should have continued access across third-party payers. E

Do-It-Yourself Closed-Loop Systems

- 7.31 Individuals with diabetes may be using systems not approved by the FDA, such as do-it-yourself closed-loop systems and others; health care professionals cannot prescribe these systems but should assist in diabetes management to ensure the safety of people with diabetes.

Digital Health Technology

- 7.32 Systems that combine technology and online coaching can be beneficial in managing prediabetes and diabetes for some individuals. B

Inpatient Care

- 7.33 In people with diabetes using personal CGM, the use of CGM should be continued when clinically appropriate during hospitalization, with confirmatory point-of-care glucose measurements for insulin dosing and hypoglycemia assessment and treatment under an institutional protocol. B
- 7.34 People with diabetes who are competent to safely use diabetes devices such as insulin pumps and CGM systems should be supported to continue using them in an inpatient setting or during outpatient procedures, whenever possible, and when proper supervision is available. E

8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

ASSESSMENT AND MONITORING OF THE INDIVIDUAL WITH OVERWEIGHT AND OBESITY

- 8.1 Use person-centered, nonjudgmental language that fosters collaboration between individuals and health care professionals, including person-first language (e.g., "person with obesity" rather than "obese person" and "person with diabetes" rather than "diabetic person"). E
- 8.2a To support the diagnosis of obesity, measure height and weight to calculate BMI and perform additional measurements of body fat distribution, like waist circumference, waist-to-hip ratio, and/or waist-to-height ratio. E
- 8.2b Monitor obesity-related anthropometric measurements at least annually to inform treatment considerations. E
- 8.3 Accommodations should be made to provide privacy during anthropometric measurements. E
- 8.4 In people with type 2 diabetes and overweight or obesity, weight management should represent a primary goal of treatment along with glycemic management. A
- 8.5 People with diabetes and overweight or obesity may benefit from any magnitude of weight loss. Weight loss of 3-7% of baseline weight improves glycemia and other intermediate cardiovascular risk factors. A Sustained loss of >10% of body weight usually confers greater benefits, including dis-ease-modifying effects and possible remission of type 2 diabetes, and may improve long-term cardiovascular outcomes and mortality. B
- 8.6 Individualize initial treatment approaches for obesity (i.e., lifestyle and nutritional therapy, pharmaco-logic agents, or metabolic surgery) A based on the person's medical his-tory, life circumstances, preferences, and motivation. C Consider combining treatment approaches if appropriate.

NUTRITION, PHYSICAL ACTIVITY, AND BEHAVIORAL THERAPY

- 8.7 Nutrition, physical activity, and behavioral therapy to achieve and **maintain ≥5% weight loss** are recommended for people with type 2 diabetes and overweight or obesity. B
- 8.8a Interventions including high frequency of counseling (≥16 sessions in 6 months) with focus on nutrition changes, physical activity, and behavioral strategies to achieve a **500-750 kcal/day energy deficit** have been shown to be beneficial for weight loss and should be considered when available. A
- 8.8b Consider structured programs delivering behavioral counseling (face-to-face or remote) to address barriers to access. E
- 8.9 Nutrition recommendations should be individualized to the person's preferences and nutritional needs. Use nutritional plans that create an energy deficit, regardless of macronutrient composition, to achieve weight loss. A
- 8.10 When developing a plan of care, consider systemic, structural, and socioeconomic factors that may impact nutrition patterns and food choices, such as food insecurity and hunger, access to healthful food options, cultural circumstances, and other social determinants of health. C
- 8.11a For those who achieve weight loss goals, **long-term (≥1 year) weight maintenance programs are recommended**, when available. Effective programs provide monthly contact and support, recommend ongoing monitoring of body weight (weekly or more frequently) and other self-monitoring strategies, and encourage regular physical activity (200-300 min/week). A
- 8.11b For those who achieve weight loss goals, continue to monitor progress periodically, provide ongoing sup-port, and recommend continuing adopted interventions to maintain goals long term. E
- 8.12 When short-term nutrition intervention using structured, very-low-calorie meals (800-1,000 kcal/day) is considered, it should be prescribed to carefully selected individuals by trained practitioners in medical settings with close monitoring. Long-term, comprehensive weight maintenance strategies and counseling should be integrated to maintain weight loss. B
- 8.13 Nutritional supplements have not been shown to be effective for weight loss and are not recommended. A

PHARMACOTHERAPY

- 8.14 Whenever possible, minimize medications for comorbid conditions that are associated with weight gain. E
- 8.15 When choosing glucose-lowering medications for people with type 2 diabetes and overweight or obesity, prioritize medications with beneficial effect on weight. B
- 8.16 Obesity pharmacotherapy should be considered for people with diabetes and overweight or obesity along with lifestyle changes. Potential benefits and risks must be considered. A
- 8.17 In people with **diabetes and overweight or obesity**, the preferred pharmacotherapy should be a **glucagon-like peptide 1 receptor agonist** or **dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide 1 receptor agonist** with ***greater weight loss efficacy*** (i.e., **semaglutide or tirzepatide**), especially considering their added weight-independent benefits (e.g., glycemic and cardiometabolic). A
- 8.18 To prevent therapeutic inertia, for those not reaching goals, reevaluate weight management therapies and intensify treatment with

additional approaches (e.g., metabolic surgery, additional pharmacologic agents, and structured lifestyle management programs). A

METABOLIC SURGERY

- 8.19 Consider **metabolic surgery** as a weight and glycemic management approach in people with diabetes with **BMI ≥30.0 kg/m²** (or ≥27.5 kg/m² in Asian American individuals) who are otherwise good surgical candidates. A
- 8.20 Metabolic surgery should be performed in high-volume centers with inter-professional teams knowledgeable about and experienced in managing obesity, diabetes, and gastrointestinal surgery (www.facs .org/quality-programs/accreditation- and-verification/metabolic-and-bariatric- surgery-accreditation-and-quality- improvement-program/). E
- 8.21 People being considered for metabolic surgery should be evaluated for comorbid psychological conditions and social and situational circumstances that have the potential to interfere with surgery outcomes. B
- 8.22 People who undergo metabolic surgery should receive long term medical and behavioral support and routine micronutrient, nutritional, and metabolic status monitoring. B
- 8.23 If post-metabolic surgery hypoglycemia is suspected, clinical evaluation should exclude other potential disorders contributing to hypoglycemia, and management should include education, medical nutrition therapy with a registered dietitian/nutritionist experienced in post-metabolic surgery hypoglycemia, and medication treatment, as needed.
- A Continuous glucose monitoring should be considered as an important adjunct to improve safety by alerting individuals to hypoglycemia, especially for those with severe hypoglycemia or hypoglycemia unawareness. E
- 8.24 In people who undergo metabolic surgery, routinely screen for psychosocial and behavioral health changes and refer to a qualified behavioral health professional as needed. C
- 8.25 Monitor individuals who have undergone metabolic surgery for in-sufficient weight loss or weight recurrence at least every 6-12 months. E In those who have insufficient weight loss or experience weight recurrence, assess for potential predisposing factors and, if appropriate, consider additional weight loss interventions (e.g., obesity pharmacotherapy). C

9. Pharmacological Approaches to Glycemic Treatment

PHARMACOLOGICAL THERAPY FOR ADULT WITH TYPE 1 DIABETES

- 9.1 Treat most adults with type 1 diabetes with continuous subcutaneous insulin infusion or multiple daily doses of prandial (injected or inhaled) and basal insulin. A
- 9.2 For most adults with type 1 diabetes, insulin analogs (or inhaled insulin) are preferred over injectable human insulins to minimize hypoglycemia risk. A
- 9.3 Early use of continuous glucose monitoring is recommended for adults with type 1 diabetes to improve glycemic outcomes and quality of life and minimize hypoglycemia. B
- 9.4 Automated insulin delivery systems should be considered for all adults with type 1 diabetes. A
- 9.5 To improve glycemic outcomes and quality of life and minimize hypoglycemia risk, most adults with type 1 diabetes should receive education on how to match mealtime insulin doses to carbohydrate intake and, additionally, to fat and protein intake. They should also be taught how to modify the insulin dose (correction dose) based on concurrent glycemia, glycemic trends (if available), sick day management, and anticipated physical activity. B
- 9.6 Glucagon should be prescribed for all individuals taking insulin or at high risk for hypoglycemia, Family, caregivers, school personnel, and others providing support to these individuals should know its location and be educated on how to administer it. Glucagon preparations that do not require reconstitution are preferred. E
- 9.7 Insulin treatment plan and insulin taking behavior should be reevaluated at regular intervals (eg, every 3-6 months) and adjusted to incorporate specific factors that impact choice of treatment and ensure achievement of individualized glycemic goals. E
- 9.8 Healthy lifestyle behaviors, diabetes self-management education and support, avoidance of therapeutic inertia, and social determinants of health should be considered in the glucose- lowering management of type 2 diabetes. A
- 9.9 A person-centered shared decision- making approach should guide the choice of pharmacologic agents for adults with type 2 diabetes. Consider the effects on cardiovascular and renal comorbidities; effectiveness; hypoglycemia risk; impact on weight, cost and access, risk for adverse reactions and tolerability, and individual preferences (Fig. 9.3 and Table 9.2). E
- 9.10 The glucose-lowering treatment plan should consider approaches that support weight management goals (Fig. 9.3 and Table 9.2) for adults with type 2 diabetes. A
- 9.11 For adults with type 2 diabetes, use pharmacological strategies that provide sufficient effectiveness to achieve and maintain the intended treatment goals. A
- 9.12Treatment modification (intensification or deintensification) for adults not meeting individualized treatment goals should not be delayed. A
- 9.13 Medication plan and medication taking behavior should be reevaluated at regular intervals (e.g., every 3-6 months) and adjusted as needed to incorporate specific factors that impact choice of treatment (Fig. 4.1 and Table 9.2). E
- 9.14 Early combination therapy can be considered in adults with type 2diabetes at treatment initiation to shorten time to attainment of individualized treatment goals. A
- 9.15 In adults with type 2 diabetes without cardiovascular and/or kidney disease, pharmacologic agents should address both the individualized glycemic and weight goals (Fig. 9.3). A
- 9.16 In adults with type 2 diabetes who have not achieved their individualized glycemic goals, selection of subsequent glucose-lowering agents should take into consideration the individualized glycemic and weight goals as well as the presence of other metabolic co- morbidities and the risk of hypoglycemia. A
- 9.17 In adults with type 2diabetes who have not achieved their individualized weight goals, additional weight management interventions (e.g., intensification of lifestyle modifications, structured weight management programs, pharmacologic agents, or metabolic surgery, as appropriate) are recommended. A
- 9.18 In adults with type 2 diabetes and established or high risk of atherosclerotic cardiovascular disease, heart failure (HF), and/or chronic kidney disease (CKD), the treatment plan should include agent(s) that re duce cardiovascular and kidney disease risk (e.g., sodium-glucose cotransporter 2 inhibitor [SGLT2] and/or glucagon-like peptide 1 receptor agonist [GLP-1 RAJ) (Fig. 9.3, Table 9.2, Table 10.38, and Table 10.3C) for glycemic management and comprehensive cardiovascular risk reduction, independent of A1C and in consideration of person-specific factors (Fig. 9.3) (see Section 10, "Cardiovascular Disease and Risk Management," for de tails on cardiovascular risk reduction recommendations). A
- 9.19 **In adults with type 2 diabetes who have HF** (with either reduced or preserved ejection fraction), an **SGLT2 inhibitor is recommended**, for glycemic management and prevention of HF hospitalizations (see Section 10, "Cardiovascular Disease and Risk Management," for details on cardio- vascular risk reduction recommendations). A
- 9.20 In adults with type 2 diabetes who have CKD (with confirmed estimated glomerular filtration rate (eGFR) of 20-60 ml/min per 1.73 m² and/or albuminuria), an SGLT2 inhibitor should be used for minimizing progression of CKD, reduction in cardiovascular events, and reduction in hospitalizations for HF (Fig. 9.3); however, the glycemic bene- fits of SGLT2 inhibitors are reduced at eGFR <45 mL/min per 1.73 m² (see Section 11, "Chronic Kidney Disease and Risk Management" for details on renal risk reduction recommendations). A 9.21 in adults with type 2 diabetes and advanced CKD (eGFR <30 mL/min per 1.73 m²), a GLP-1 RA is preferred for glycemic management due to lower risk of hypoglycemia and for cardiovascular event reduction. B
- 9.22 In adults with type 2 diabetes, initiation of insulin should be considered regardless of background glucose lowering therapy or disease stage if there is evidence of ongoing catabolism (eg, unexpected weight loss), if symptoms of hyperglycemia are present, or when AIC or blood glucose levels are very high (ie, AIC >10% 86 mmol/mol] or blood glucose 300 mg/dL [16.7 mmol/L]) E
- 9.23 In adults with type 2 diabetes, a GLP-1 RA, including a dual glucose dependent insulinotropic polypeptide (GIP) and GLP-1 RA, is preferred to insulin (Fig. 9.4). A
- 9.24 If insulin is used, combination therapy with a GLP-1 RA, including a dual GIP and GLP-1 RA, is recommended for greater glycemic effective- ness as well as beneficial effects on weight and hypoglycemia risk for adults with type 2 diabetes. Insulin dosing should be reassessed upon addition or dose escalation of a GLP-1 RA or dual GIP and GLP-1 RA. A
- 9.25 In adults with type 2 diabetes, glucose-lowering agents may be continued upon initiation of insulin therapy (unless contraindicated or not tolerated) for ongoing glycemic and metabolic benefits (ie, weight, cardio metabolic, or kidney benefits). A
- 9.26 To minimize the risk of hypoglycemia and treatment burden when starting insulin therapy in adults with type 2 diabetes, reassess the need

for and/or dose of glucose-lowering agents with higher hypoglycemia risk (i.e., sulfonylureas and meglitinides). A

- 9.27 Monitor for signs of over basalization during insulin therapy, such as basal dose exceeding ~0.5 units/kg/day, significant bedtime-to-morning or post- prandial-to-preprandial glucose differential, occurrences of hypoglycemia (aware or unaware), and high glycemic variability. When over basalization is suspected, a thorough reevaluation should occur promptly to further tailor therapy to the individual's needs. E
- 9.28 Routinely assess all people with diabetes for financial obstacles that could impede their diabetes management. Clinicians, members of the diabetes care team, and social services professionals should work collaboratively, as appropriate and feasible, to support these individuals by implementing strategies to reduce costs, thereby improving their access to evidence-based care. E
- 9.29 In adults with diabetes and cost related barriers, consider use of lower cost medications for glycemic management (ie, metformin, sulfonylureas, thiazolidinediones, and human insulin) within the context of their risks for hypoglycemia, weight gain, cardiovascular and kidney events, and other adverse effects. E

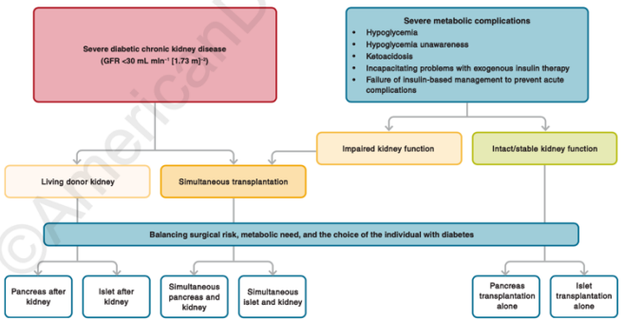


Figure 9.2—Simplified overview of indications for β-cell replacement therapy in people with type 1 diabetes. The two main forms of β-cell replacement therapy are whole-pancreas transplantation or islet cell transplantation. β-Cell replacement therapy can be combined with kidney transplantation if the individual has end-stage renal disease, which may be performed simultaneously or after kidney transplantation. All decisions about transplantation must balance the surgical risk, metabolic need, and the choice of the individual with diabetes. GFR, glomerular filtration rate. Reprinted from Holt et al. (4).

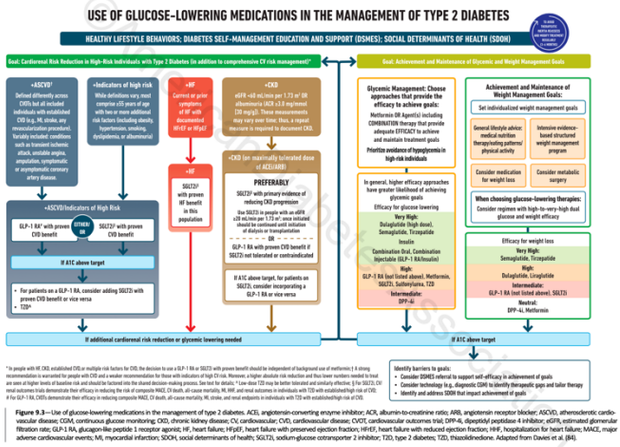
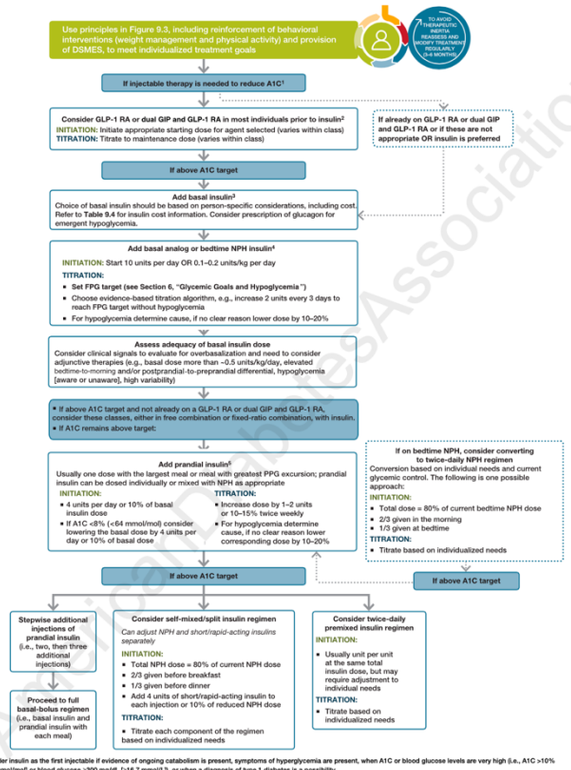


Figure 9.3—Use of glucose-lowering medications in the management of type 2 diabetes. ACEi, angiotensin-converting enzyme inhibitor; ACR, albumin-to-creatinine ratio; ARB, angiotensin receptor blocker; ASCVD, atherosclerotic cardiovascular disease; CGM, continuous glucose monitoring; CKD, chronic kidney disease; CV, cardiovascular; CVD, cardiovascular disease; CVOT, cardiovascular outcomes trial; DPP-4i, dipeptidyl peptidase 4 inhibitor; eGFR, estimated glomerular filtration rate; GLP-1 RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; HHF, hospitalization for heart failure; MACE, major adverse cardiovascular events; MI, myocardial infarction; SDOH, social determinants of health; SGLT2i, sodium-glucose cotransporter 2 inhibitor; T2D, type 2 diabetes; TZD, thiazolidinedione. Adapted from Davies et al. (84).

Table 9.2—Medications for lowering glucose, summary of characteristics

	Efficacy[1]	Hypoglycemia	Weight change[2]	CV effects		Renal effects		Oral/SQ	Cost	Clinical considerations
				Effect on MACE	HF	Progression of CKD	Dosing/use considerations*			
Metformin	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Neutral	• Contraindicated with eGFR <30 mL/min per 1.73 m²	Oral	Low	• GI side effects common; to mitigate GI side effects, consider slow dose titration, extended release formulations, and administration with food • Potential for vitamin B12 deficiency: monitor at regular intervals
SGLT2 inhibitors	Intermediate to high	No	Loss (intermediate)	Benefit: canagliflozin, empagliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin, ertugliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin	• See labels for renal dose considerations of individual agents • Glucose-lowering effect is lower for SGLT2 inhibitors at lower eGFR	Oral	High	• DKA risk, rare in T2DM; discontinue, evaluate, and treat promptly if suspected; be aware of predisposing risk factors and clinical presentation (including euglycemic DKA); discontinue before scheduled surgery (e.g., 3–4 days); during critical illness, or during prolonged fasting to mitigate potential risk • Increased risk of genital mycotic infections • Necrotizing fasciitis of the perineum (Fournier gangrene), rare reports: institute prompt treatment if suspected • Attention to volume status, blood pressure; adjust other volume-contracting agents as applicable
GLP-1 RAs	High to very high	No	Loss (intermediate to very high)	Benefit: dulaglutide, liraglutide, semaglutide (SQ) Neutral: exenatide once weekly, lixisenatide	Neutral	Benefit for renal endpoints in CVOTs, driven by albuminuria outcomes: dulaglutide, liraglutide, semaglutide (SQ)	• See labels for renal dose considerations of individual agents • No dose adjustment for dulaglutide, liraglutide, semaglutide • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ; oral (semaglutide)	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined (liraglutide, dulaglutide, exenatide extended release, semaglutide) • Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges • Counsel patients about potential for bile • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
Dual GIP and GLP-1 RA	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	• See label for renal dose considerations • No dose adjustment • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined • Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges • Not recommended for individuals with history of gastroparesis • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
DPP-4 inhibitors	Intermediate	No	Neutral	Neutral	Neutral (potential risk, saxagliptin)	Neutral	• Renal dose adjustment required (sitagliptin, saxagliptin, alogliptin); can be used in renal impairment • No dose adjustment required for linagliptin	Oral	High	• Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Joint pain • Bullous pemphigoid (postmarketing): discontinue if suspected
Thiazolidinediones	High	No	Gain	Potential benefit: pioglitazone	Increased risk	Neutral	• No dose adjustment required • Generally not recommended in renal impairment due to potential for fluid retention	Oral	Low	• Congestive HF (pioglitazone, rosiglitazone) • Fluid retention/edema; heart failure • Benefit in NASH • Risk of bone fractures • Weight gain: consider lower doses to mitigate weight gain and edema
Sulfonylureas (2nd generation)	High	Yes	Gain	Neutral	Neutral	Neutral	• Glyburide: generally not recommended in chronic kidney disease • Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	Oral	Low	• FDA Special Warning on increased risk of CV mortality based on studies of an older sulfonylurea (tolbutamide); glimepiride shown to be CV safe (see text) • Use with caution in persons at risk for hypoglycemia
Insulin: Human Analogs	High to very high	Yes	Gain	Neutral	Neutral	Neutral	• Lower insulin doses required with a decrease in eGFR. Titrate per clinical response	SQ; inhaled SQ	Low (SQ) High	• Injection site reactions • Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs

CV, cardiovascular; CVOT, cardiovascular outcomes trial; DKA, diabetic ketoacidosis; DKD, diabetic kidney disease; DPP-4, dipeptidyl peptidase 4; eGFR, estimated glomerular filtration rate; GI, gastrointestinal; GIP, glucose-dependent insulinotropic polypeptide; GLP-1 RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; NASH, nonalcoholic steatohepatitis; MACE, major adverse cardiovascular events; SGLT2, sodium-glucose cotransporter 2; SQ, subcutaneous; T2DM, type 2 diabetes mellitus. *For agent-specific dosing recommendations, please refer to manufacturers' prescribing information. [1]Isapas et al. (104). [2]Isapas et al. (152). Adapted from Davies et al. (84).



1. Consider insulin as the first injectable if evidence of ongoing catabolism is present, symptoms of hyperglycemia are present, when A1C or blood glucose levels are very high (i.e., A1C >10% [>86 mmol/mol] or blood glucose ≥300 mg/dL [≥16.7 mmol/L]), or when a diagnosis of type 1 diabetes is a possibility.
2. When selecting GLP-1 RAs, consider individual preference, A1C lowering, weight-lowering effect, or frequency of injection. If CVD is present, consider GLP-1 RA with proven CVD benefit. Oral or injectable GLP-1 RAs are appropriate.
3. For people on GLP-1 RA and basal insulin combination, consider use of a fixed-ratio combination product (IDegLira or GlarLixi).
4. Consider switching from evening NPH to a basal analog if the individual develops hypoglycemia and/or frequently forgets to administer NPH in the evening and would be better managed with an A.M. dose of a long-acting basal insulin.
5. If adding prandial insulin to NPH, consider initiation of a self-mixed or premixed insulin plan to decrease the number of injections required.

Figure 9.4—Intensifying to injectable therapies in type 2 diabetes. DSMES, diabetes self-management education and support; FPG, fasting plasma glucose; GLP-1 RA, glucagon-like peptide 1 receptor agonist; dual GIP and GLP-1 RA, dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide 1 receptor agonist; max, maximum; PPG, postprandial glucose. Adapted from Davies et al. (151).

10. Cardiovascular Disease and Risk Management

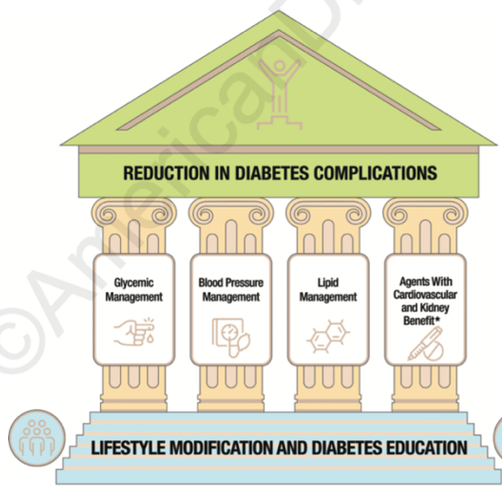


Figure 10.1—Multifactorial approach to reduction in risk of diabetes complications. *Risk reduction interventions to be applied as individually appropriate.

Screening and Diagnosis

- 10.1 **Blood pressure should be measured at every routine clinical visit**. When possible, individuals found to have elevated blood pressure (systolic blood pressure 120-129 mmHg and diastolic <80 mmHg) should have blood pressure confirmed using multiple readings, including measurements on a separate day, to diagnose hypertension. A Hypertension is defined as a systolic blood pressure 130 mmHg or a diastolic blood pressure 80 mmHg based on an average of two or more measurements obtained on two or more occasions. A Individuals with blood pressure 180/110 mmHg and cardiovascular disease could be diagnosed with hypertension at a single visit. E
- 10.2 All people with hypertension and diabetes should be counseled to monitor their blood pressure at home after appropriate education. A

Treatment Goals

- 10.3 For people with diabetes and hypertension, blood pressure targets should be individualized through a shared decision making process that addresses cardiovascular risk, potential adverse effects of antihypertensive medications, and individual preferences. B
- 10.4 The on-treatment target blood pressure goal is **<130/80 mmHg**, if it can be safely attained. A

- 10.5 In pregnant individuals with diabetes and chronic hypertension, a blood pressure threshold of 140/90 mmHg for initiation or titration of therapy is associated with better pregnancy outcomes than reserving treatment for severe hypertension, with no increase in risk of small-for-gestational-age birth weight. A There are limited data on the optimal lower limit, but therapy should be deintensified for blood pressure <90/60 mmHg. E A blood pressure target of 110-135/85 mmHg is suggested in the interest of reducing the risk for accelerated maternal hypertension. A

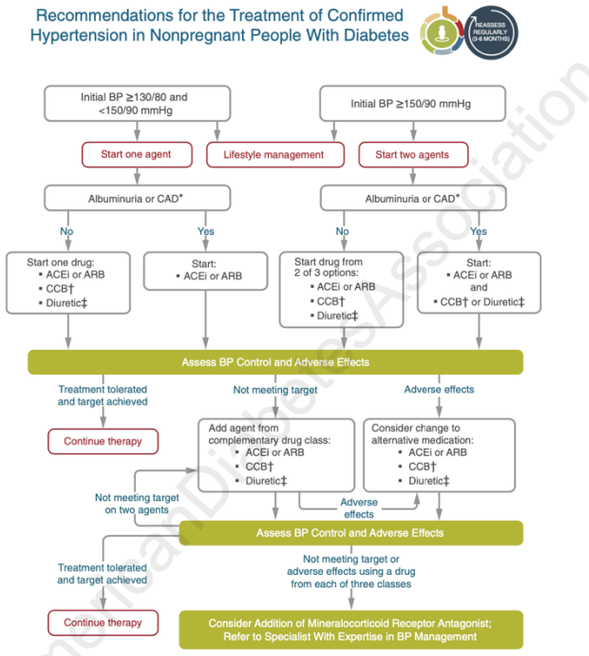


Figure 10.2—Recommendations for the treatment of confirmed hypertension in nonpregnant people with diabetes. *An ACE inhibitor (ACEi) or angiotensin receptor blocker (ARB) is suggested to treat hypertension for people with coronary artery disease (CAD) or urine albumin-to-creatinine ratio 30–299 mg/g creatinine and strongly recommended for individuals with urine albumin-to-creatinine ratio ≥300 mg/g creatinine. †Dihydropyridine calcium channel blocker (CCB). ‡Thiazide-like diuretic; long-acting agents shown to reduce cardiovascular events, such as chlorthalidone and indapamide, are preferred. BP, blood pressure. Adapted from de Boer et al. (18).

Treatment strategies

Lifestyle Intervention

- 10.6 For people with blood pressure >120/80 mmHg, lifestyle intervention consists of weight loss when indicated, a Dietary Approaches to Stop Hypertension (DASH)-style eating pattern including reducing sodium and increasing potassium intake, moderation of alcohol intake, smoking cessation, and increased physical activity. A

Pharmacologic Interventions

- 10.7 Individuals with confirmed office- based blood pressure ≥130/80 mmHg qualify for initiation and titration of pharmacologic therapy to achieve the recommended blood pressure goal of <130/80 mmHg. A
- 10.8 Individuals with confirmed office based blood pressure 150/90 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of two drugs or a single-pill combination of drugs demonstrated to reduce cardiovascular events in people with diabetes. A
- 10.9 Treatment for hypertension should include drug classes demonstrated to reduce cardiovascular events in people with diabetes. A **ACE inhibitors or angiotensin receptor blockers (ARBs) are recommended first-line therapy for hypertension** in people with diabetes and coronary artery disease. A
- 10.10 Multiple-drug therapy is generally required to achieve blood pressure targets. However, *combinations of ACE inhibitors and ARBs and combinations of ACE inhibitors or ARBS (including ARBs/neprilysin inhibitors) with direct renin inhibitors should not be used.* A
- 10.11 An ACE inhibitor or ARB, at the maximum tolerated dose indicated for blood pressure treatment, is the recommended first line treatment for hypertension in people with diabetes and urinary albumin-to-creatinine ratio 300 mg/g creatinine A or 30-299 mg/g creatinine. B If one class is not tolerated, the other should be substituted.
- 10.12 For adults treated with an ACE inhibitor, ARB, mineralocorticoid receptor antagonist (MRA), or diuretic, serum creatinine/estimated glomerular filtration rate and serum potassium levels should be monitored within 7-14 days after initiation of therapy and at least annually. B

Resistant Hypertension

- 10.13 Individuals with hypertension who are not meeting blood pressure targets on three classes of antihypertensive medications (including a diuretic) should be considered for MRA therapy. A

LIPID MANAGEMENT

Lifestyle Intervention

- 10.14 Lifestyle modification focusing on weight loss (if indicated); application of a Mediterranean or DASH eating pattern; reduction of saturated fat and trans-fat; increase of dietary n-3 fatty acids, viscous fiber, and plant stanol/ sterol intake, and increased physical activity should be recommended to improve the lipid profile and reduce the risk of developing atherosclerotic cardiovascular disease (ASCVD) in people with diabetes. A
- 10.15 Intensify lifestyle therapy and optimize glycemic control for people with diabetes with elevated triglyceride levels (150 mg/dL [1.7 mmol/L]) and/or low HDL cholesterol (40 mg/dL [<1.0 mmol/L] for men and <50 mg/dL [<1.3 mmol/L] for women). C

Ongoing Therapy and Monitoring With Lipid Panel

- 10.16 in adults with prediabetes or diabetes not taking statins or other lipid-lowering therapy, it is reasonable to obtain a lipid profile at the time of diagnosis, at an initial medical evaluation, annually thereafter, or more frequently if indicated. E
- 10.17 Obtain a lipid profile at initiation of statins or other lipid-lowering therapy, 4-12 weeks after initiation or a change in dose, and annually there- after, as it may help to monitor the response to therapy and inform medication taking. A

STATIN TREATMENT

Primary Prevention

- 10.18 For people with diabetes aged 40-75 years **without ASCVD,** use **moderate-intensity statin therapy** in addition to lifestyle therapy. A
- 10.19 For people with diabetes aged 20-39 years with additional ASCVD risk factors, it may be reasonable to initiate statin therapy in addition to lifestyle therapy. C
- 10.20 For people with diabetes aged 40-75 years at higher cardiovascular risk, including those with one or more ASCVD risk factors, it is recommended to use **high-intensity statin therapy** to reduce LDL cholesterol by ≥50% of baseline and to target an LDL cholesterol goal of <70 mg/dL (<1.8 mmol/L). A
- 10.21 For people with diabetes aged 40-75 years at higher cardiovascular risk, especially those with multiple ASCVD risk factors and an LDL cholesterol 70 mg/dL (1.8 mmol/L), it may be reasonable to add ezetimibe or a PCSK9 inhibitor to maximum tolerated statin therapy. B
- 10.22 In adults with diabetes aged >75 years already on statin therapy, it is reasonable to continue statin treatment. B
- 10.23 In adults with diabetes aged >75 years, it may be reasonable to initiate moderate-intensity statin therapy after discussion of potential benefits and risks. C
- 10.24 In people with diabetes intolerant to statin therapy, treatment with bempedoic acid is recommended to reduce cardiovascular event rates as an alternative cholesterol-lowering plan. A
- 10.25 **Statin therapy** is **contraindicated in pregnancy**. B

Table 10.2—High-intensity and moderate-intensity statin therapy

High-intensity statin therapy (lowers LDL cholesterol by ≥50%)	Moderate-intensity statin therapy (lowers LDL cholesterol by 30–49%)
Atorvastatin 40–80 mg	Atorvastatin 10–20 mg
Rosuvastatin 20–40 mg	Rosuvastatin 5–10 mg
	Simvastatin 20–40 mg
	Pravastatin 40–80 mg
	Lovastatin 40 mg
	Fluvastatin XL 80 mg
	Pitavastatin 1–4 mg

Once-daily dosing. XL, extended release.

Secondary Prevention

- 10.26 For people of all ages **with diabetes and ASCVD, high-intensity statin therapy should be added to lifestyle therapy**. A
- 10.27 For people with diabetes and ASCVD, treatment with high-intensity statin therapy is recommended to target an LDL cholesterol reduction of 50% from baseline and an LDL cholesterol goal of <55 mg/dL (<1.4 mmol/L). Addition of ezetimibe or a PCSK9 inhibitor with proven benefit in this population is recommended if this goal is not achieved on maximum tolerated statin therapy. B
- 10.28 For individuals who do not tolerate the intended statin intensity, the maximum tolerated statin dose should be used. E
- 10.28b For people with diabetes and ASCVD intolerant to statin therapy, PCSK9 inhibitor therapy with monoclonal antibody treatment, A bempedoic acid therapy, A or PCSK9 inhibitor therapy with inclisiran siRNA E should be considered as an alternative cholesterol lowering therapy.

Treatment of Other Lipoprotein Fractions or Targets

- 10.29 For individuals with fasting triglyceride levels ≥500 mg/dL (≥5.7 mmol/L), evaluate for secondary causes of hypertriglyceridemia and consider medical therapy to reduce the risk of pancreatitis. C
- 10.30 In adults with moderate hypertriglyceridemia (fasting or non-fasting triglycerides 175-499 mg/dL (2.0-5.6 mmol/L]), clinicians should address and treat lifestyle factors (obesity and metabolic syndrome), secondary factors (diabetes, chronic liver or kidney disease and/or nephrotic syndrome, and hypothyroidism), and medications that raise triglycerides. C
- 10.31 In individuals with ASCVD or other cardiovascular risk factors on a statin with controlled LDL cholesterol but elevated triglycerides (135-499 mg/dL (1.5-5.6 mmol/L]), the addition of icosapent ethyl can be considered to reduce cardiovascular risk. A

Other Combination Therapy

- 10.32 Statin plus fibrate combination therapy has not been shown to improve ASCVD outcomes and is generally not recommended. A
- 10.33 Statin plus niacin combination therapy has not been shown to provide additional cardiovascular bene- fit above statin therapy alone, may increase the risk of stroke with additional side effects, and is generally not recommended. A

ANTIPLATELET AGENTS

- 10.34 Use aspirin therapy (75-162 mg/day) as a secondary prevention strategy in those with diabetes and a history of ASCVD. A
- 10.35a For individuals with ASCVD and documented aspirin allergy, clopidogrel (75 mg/day) should be used. B
- 10.35b The length of treatment with dual antiplatelet therapy using low-dose aspirin and a P2Y12 inhibitor in individuals with diabetes after an acute coronary syndrome or acute is- chemic stroke/transient ischemic attack should be determined by an interprofessional team approach that includes a cardiovascular or neurological specialist, respectively. E
- 10.36 Combination therapy with aspirin plus low-dose rivaroxaban should be considered for individuals with stable coronary and/or peripheral artery disease (PAD) and low bleeding risk to prevent major adverse limb and cardiovascular events. A
- 10.37 Aspirin therapy (75-162 mg/day) may be considered as a primary prevention strategy in those with diabetes who are at increased cardiovascular risk, after a comprehensive discussion with the individual on the benefits versus the comparable increased risk of bleeding. A

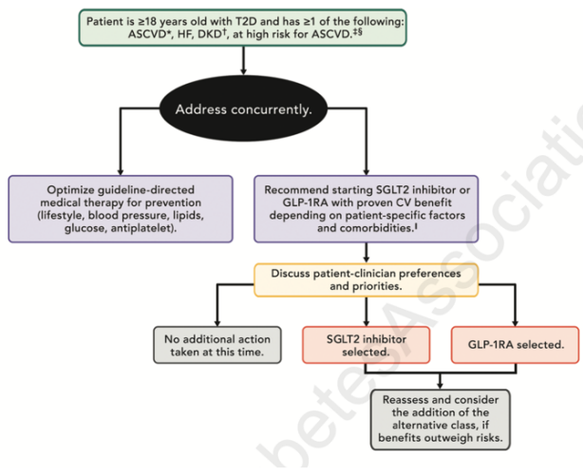
CARDIOVASCULAR DISEASE

Screening

- 10.38a In asymptomatic individuals, routine screening for coronary artery disease is not recommended, as it does not improve outcomes as long as ASCVD risk factors are treated.
- 10.38b Consider investigations for coronary artery disease in the presence of any of the following: atypical cardiac symptoms; signs or symptoms of associated vascular disease, including carotid bruits, transient ischemic attack, stroke, claudication, or PAD; or electrocardiogram abnormalities (e.g., Q waves). E
- 10.39a Adults with diabetes are at increased risk for the development of asymptomatic cardiac structural or functional abnormalities (stage B heart failure) or symptomatic (stage C) heart failure. Consider screening adults with diabetes by measuring a natriuretic peptide (B-type natriuretic pep- tide (BNP) or N-terminal pro-BNP [NT- proBNP]) to facilitate prevention of stage C heart failure. B
- 10.39b In asymptomatic individuals with diabetes and abnormal natriuretic peptide levels, echocardiography is recommended to identify stage B heart failure. A
- 10.40 In asymptomatic individuals with diabetes and age 50 years, microvascular disease in any location, or foot complications or any end-organ damage from diabetes, screening for PAD with ankle brachial index testing is recommended to guide treatment for cardiovascular disease prevention and limb preservation. A In individuals with diabetes duration 10 years, screening for PAD should be considered. B

Treatment

- 10.41 Among people with type 2 diabetes who have established ASCVD or established kidney disease, a sodium-glucose cotransporter 2 (SGLT2) inhibitor or glucagon like peptide 1 (GLP-1) receptor agonist with demonstrated cardiovascular disease benefit (Table 10.38 and Table 10.3C) is recommended as part of the comprehensive cardiovascular risk reduction and/or glucose-lowering treatment plans. A
- 10.41a in people with type 2 diabetes and established ASCVD, multiple ASCVD risk factors, or diabetic kidney disease, an SGLT2 inhibitor with demonstrated cardiovascular bene- fit is recommended to reduce the risk of major adverse cardiovascular events and/or heart failure hospitalization. A
- 10.41b In people with type 2 diabetes and established ASCVD or multiple risk factors for ASCVD, a GLP-1 receptor agonist with demonstrated cardio- vascular benefit is recommended to reduce the risk of major adverse cardiovascular events. A
- 10.41c In people with type 2 diabetes and established ASCVD or multiple risk factors for ASCVD, combined therapy with an SGLT2 inhibitor with demonstrated cardiovascular benefit and a GLP-1 receptor agonist with demonstrated cardiovascular benefit may be considered for additive reduction of the risk of adverse cardio- vascular and kidney events. A
- 10.42a In people with type 2 diabetes and established heart failure with either preserved or reduced ejection fraction, an SGLT2 inhibitor (including SGLT1/2 inhibitor) with proven benefit in this patient population is recommended to reduce the risk of worsening heart failure and cardiovascular death. A
- 10.42b In people with type 2 diabetes and established heart failure with either preserved or reduced ejection fraction, an SGLT2 inhibitor with proven benefit in this patient population is recommended to improve symptoms, physical limitations, and quality of life. A
- 10.43 For individuals with type 2 diabetes and chronic kidney disease with albuminuria treated with maximum tolerated doses of ACE inhibitor or ARB, addition of finerenone is recommended to improve cardiovascular outcomes and reduce the risk of chronic kidney disease progression. A
- 10.44 In individuals with diabetes with established ASCVD or aged 55 years with additional cardio- vascular risk factors, ACE inhibitor or ARB therapy is recommended to reduce the risk of cardiovascular events and mortality. A
- 10.45a In individuals with diabetes and asymptomatic stage B heart failure, an inter-professional approach to optimize guideline-directed medical therapy, which should include a cardiovascular disease specialist, is recommended to reduce the risk for progression to symptomatic (stage C) heart failure. A.
- 10.45b In individuals with diabetes and asymptomatic stage B heart failure, ACE inhibitors/ARBs and B-blockers are recommended to reduce the risk for progression to symptomatic (stage C) heart failure. A
- 10.45c In individuals with type 2 diabetes and asymptomatic stage B heart failure or with high risk of or established cardiovascular disease, treatment with an SGLT inhibitor (including SGLT2 or SGLT1/2 inhibitors) is recommended to reduce the risk of hospitalization for heart failure. A
- 10.45d In individuals with type 2 diabetes and diabetic kidney disease, finerenone is recommended to reduce the risk of hospitalization for heart failure. A
- 10.45e In individuals with diabetes, guideline-directed medical therapy for myocardial infarction and sympiomatic stage C heart failure is recommended with ACE inhibitors/ARBS, MRAS, angiotensin receptor/neprilysin inhibitor, B-blockers, and SGLT2 inhibitors, similar to guideline directed medical therapy for people without diabetes. A
- 10.46 In people with type 2 diabetes with stable heart failure, metformin may be continued for glucose lowering if estimated glomerular filtration rate remains 30 mL/min/ 1.73 m² but should be avoided in un- stable or hospitalized individuals with heart failure. B
- 10.47 Individuals with type 1 diabetes and those with type 2 diabetes who are ketosis prone and/or those consuming ketogenic diets who are treated with SGLT inhibition should be educated on the risks and signs of ketoacidosis and methods of risk management and provided with appropriate tools for accurate ketone measurement (i.e., serum B-hydroxybutyrate). E



11. Chronic Kidney Disease and Risk Management

CHRONIC KIDNEY DISEASE

Screening

- 11.1a At least annually, urinary albumin (e.g., spot urinary albumin-to-creatinine ratio [UACR]) and estimated glomerular filtration rate [eGFR] should be assessed in people with type 1 diabetes with duration of 5 years and in all people with type 2 diabetes regardless of treatment. B
- 11.1b In people with established chronic kidney disease (CKD), urinary albumin (e.g., spot UACR) and eGFR should be monitored 1-4 times per year de- pending on the stage of the kidney disease (Fig. 11.1). B

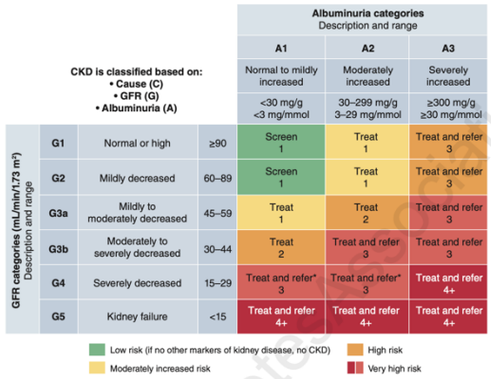


Figure 11.1—Risk of CKD progression, frequency of visits, and referral to nephrology according to GFR and albuminuria. The numbers in the boxes are a guide to the frequency of screening or monitoring (number of times per year). Green reflects no evidence of CKD by estimated GFR or albuminuria, with screening indicated once per year. For monitoring of prevalent CKD, suggested monitoring varies from once per year (yellow) to four times or more per year (i.e., every 1–3 months, [deep red]) according to risks of CKD progression and CKD complications (e.g., cardiovascular disease, anemia, hyperparathyroidism). These are general parameters based only on expert opinion and underlying comorbid conditions, and disease state must be taken into account, as well as the likelihood of impacting a change in management for any individual. CKD, chronic kidney disease; GFR, glomerular filtration rate. Reprinted and adapted from de Boer et al. (1).

Treatment

- 11.2 Optimize glucose management to reduce the risk or slow the progression of CKD. A
- 11.3 Optimize blood pressure control and reduce blood pressure variability to reduce the risk or slow the progression of CKD and reduce cardiovascular risk. A
- 11.4a In non-pregnant people with diabetes and hypertension, either an ACE inhibitor or an angiotensin receptor blocker (ARB) is recommended for those with moderately increased albuminuria (UACR 30-299 mg/g creatinine) B and is strongly recommended for those with severely increased albuminuria (UACR ≥300 mg/g creatinine) and/or eGFR <60 ml/min/1.73 m² to prevent the progression of kidney disease and reduce cardiovascular events. A
- 11.4b Periodically monitor for increased serum creatinine and potassium levels when ACE inhibitors, ARBs, and mineralocorticoid receptor antagonists are used, or for hypokalemia when diuretics are used. B
- 11.4c An ACE inhibitor or an ARB is not recommended for the primary prevention of CKD in people with diabetes who have normal blood pressure, nor- mal UACR (<30 mg/g creatinine), and normal eGFR. A
- 11.4d Do not discontinue renin-angiotensin system blockade for mild to moderate increases in serum creatinine (30%) in the absence of signs of extracellular fluid volume depletion. A
- 11.5a For people with type 2 diabe tes and CKD, use of a sodium-glucose cotransporter 2 (SGLT2) inhibitor is recommended to reduce CKD progression and cardiovascular events in individuals with eGFR ≥20 mL/min/ 1.73 m² and urinary albumin 200 mg/g creatinine. A
- 11.5b For people with type 2 diabetes and CKD, use of an SGLT2 inhibitor is recommended to reduce CKD progression and cardiovascular events in individuals with eGFR ≥20 mL/min/ 1.73 m² and urinary albumin rang- ing from normal to 200 mg/g creatinine. B
- 11.5c For cardiovascular risk reduction in people with type 2 diabetes and CKD, consider use of an SGLT2 inhibitor (if eGFR is 20 mL/min/ 1.73 m²), a glucagon-like peptide 1 agonist, or a nonsteroidal mineralocorticoid receptor antagonist (if eG&R is 25 ml/min/1.73 m²). A
- 11.5d As people with CKD and albuminuria are at increased risk for cardiovascular events and CKD progression, a nonsteroidal mineralocorticoid receptor antagonist that has been shown to be effective in clinical trials is recommended to reduce cardiovascular events and CKD progression (if eGFR is ≥25 ml/min/1.73 m²). Potassium levels should be monitored.
- 11.6 In people with CKD who have ≥300 mg/g urinary albumin, a reduction of 30% or greater in mg/g urinary albumin is recommended to slow CKD progression. C
- 11.7 For people with non-dialysis- dependent stage G3 or higher CKD, dietary protein intake should be aimed to a target level of 0.8 g/kg body weight per day. A For individuals on dialysis, 1.0-1.2 g/kg/day of dietary protein intake should be considered since protein energy wasting is a ma jor problem in some individuals on dialysis. B
- 11.8 Individuals should be referred for evaluation by a nephrologist if they have continuously increasing urinary albumin levels and/or continuously decreasing eGFR and/or if the eGFR is 30 ml/min/1.73 m². A
- 11.9 Promptly refer to a nephrologist for uncertainty about the etiology of kidney disease, difficult management issues, and rapidly progressing kidney disease. B

Table 11.1—Screening for selected complications of chronic kidney disease

Complication	Physical and laboratory evaluation
Blood pressure >130/80 mmHg	Blood pressure, weight, BMI
Volume overload	History, physical examination, weight
Electrolyte abnormalities	Serum electrolytes
Metabolic acidosis	Serum electrolytes
Anemia	Hemoglobin; iron, iron saturation, ferritin testing if indicated
Metabolic bone disease	Serum calcium, phosphate, PTH, vitamin 25(OH)D

Complications of chronic kidney disease (CKD) generally become prevalent when estimated glomerular filtration rate falls below 60 mL/min/1.73 m² (stage G3 CKD or greater) and become more common and severe as CKD progresses. Evaluation of elevated blood pressure and volume overload should occur at every clinical contact possible; laboratory evaluations are generally indicated every 6–12 months for stage G3 CKD, every 3–5 months for stage G4 CKD, and every 1–3 months for stage G5 CKD, or as indicated to evaluate symptoms or changes in therapy. PTH, parathyroid hormone; 25(OH)D, 25-hydroxyvitamin D.

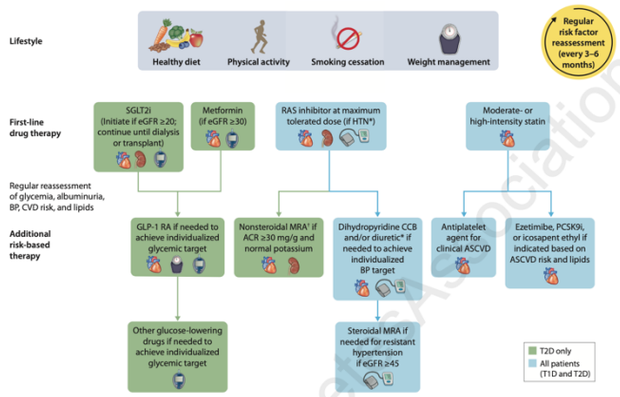


Figure 11.2—Holistic approach for improving outcomes in people with diabetes and CKD. Icons presented indicate the following benefits: BP cuff, BP lowering; glucometer, glucose lowering; heart, cardioprotection; kidney, kidney protection; scale, weight management. eGFR is presented in units of mL/min/1.73 m². *ACEi or ARB (at maximal tolerated doses) should be first-line therapy for hypertension when albuminuria is present. Otherwise, dihydropyridine calcium channel blocker or diuretic can also be considered; all three classes are often needed to attain BP targets. †Finerenone is currently the only ns-MRA with proven clinical kidney and cardiovascular benefits. ACEi, angiotensin-converting enzyme inhibitor; ACR, albumin-to creatinine ratio; ARB, angiotensin receptor blocker; ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CCB, calcium channel blocker; CVD, cardiovascular disease; eGFR, estimated glomerular filtration rate; GLP-1 RA, glucagon-like peptide 1 receptor agonist; HTN, hypertension; MRA, mineralocorticoid receptor antagonist; ns-MRA, nonsteroidal mineralocorticoid receptor antagonist; PCSK9i, proprotein convertase subtilisin/kexin type 9 inhibitor; RAS, renin-angiotensin system; SGLT2i, sodium–glucose cotransporter 2 inhibitor; T1D, type 1 diabetes; T2D, type 2 diabetes. Reprinted from de Boer et al. (1).

12. Retinopathy, Neuropathy and Foot Care

DIABETIC RETINOPATHY

- 12.1 Implement strategies to help people with diabetes reach glycemic goals to reduce the risk or slow the progression of diabetic retinopathy. A
- 12.2 Implement strategies to help people with diabetes reach blood pressure and lipid goals to reduce the risk or slow the progression of diabetic retinopathy. A

Screening

- 12.3 Adults with type 1 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 5 years after the onset of diabetes. B
- 12.4 People with type 2 diabetes should have an **initial dilated and comprehensive eye examination by an ophthalmologist** or optometrist at the time of the diabetes diagnosis. B 12.5 If there is no evidence of retinopathy from one or more annual eye exams and glycemic indicators are within the goal range, then ***screening every 1-2 years*** may be considered. If any level of diabetic retinopathy is present, subsequent dilated retinal examinations should be repeated at least annually by an ophthalmologist or optometrist. If retinopathy is progressing or sight- threatening, then examinations will be required more frequently. B
- 12.6 Programs that use retinal photography with remote reading or the use of U.S. Food and Drug Ad- ministration-approved artificial intelligence algorithms to improve access to diabetic retinopathy screening are appropriate screening strategies for diabetic retinopathy. Such programs need to provide pathways for timely referral for a comprehensive eye examination when indicated. B
- 12.7 Counsel individuals of child bearing potential with preexisting type 1 or type 2diabetes who are planning pregnancy or who are pregnant on the risk of development and/or progression of diabetic retinopathy. B
- 12.8 Individuals with preexisting type 1 or type 2diabetes should receive an eye exam before pregnancy and in the first trimester and should be monitored every trimester and for 1 year postpartum as indicated by the degree of retinopathy. B

Treatment

- 12.9 Promptly refer individuals with any level of diabetic macular edema, moderate or worse non-proliferative diabetic retinopathy (a precursor of proliferative diabetic retinopathy (PDR)), or any PDR to an ophthalmologist who is knowledgeable and experienced in the management of diabetic retinopathy. A
- 12.10 Panretinal laser photocoagulation therapy is indicated to reduce the risk of vision loss in individuals with high-risk PDR and, in some cases, severe non-proliferative diabetic retinopathy. A
- 12.11 Intravitreous injections of anti- vascular endothelial growth factor (anti-VEGF) are a reasonable alternative to traditional panretinal laser photocoagulation for some individuals with PDR and also reduce the risk of vision loss in these individuals. A
- 12.12 Intravitreous injections of anti- VEGF are indicated as first-line treatment for most eyes with diabetic macular edema that involves the foveal center and impairs vision acuity. A
- 12.13 Macular focal/grid photocoagulation and intravitreal injections of corticosteroid are reasonable treatments in eyes with persistent diabetic macular edema despite previous anti-VEGF therapy or eyes that are not candidates for this first-line approach. A
- 12.14 The presence of retinopathy is not a contraindication to aspirin therapy for cardio protection, as aspirin does not increase the risk of retinal hemorrhage. A

Visual Rehabilitation

- 12.15 People who experience vision loss from diabetes should be counseled on the availability and scope of vision rehabilitation care and provided, or referred for, a comprehensive evaluation of their visual impairment by a practitioner experienced in vision rehabilitation. E
- 12.16 People with vision loss from diabetes should receive educational materials and resources for eye care support in addition to self-management education (eg, glycemic management and hypoglycemia awareness). E

NEUROPATHY

Screening

- 12.17 All people with diabetes should be assessed for **diabetic peripheral neuropathy** starting at diagnosis of type 2 diabetes and 5 years after the diagnosis of type 1 diabetes and at least annually thereafter. B
- 12.18 Assessment for distal symmetric polyneuropathy should include a careful history and assessment of either temperature or pinprick sensation (small-fiber function) and vibration sensation using a 128-Hz tuning fork (for large-fiber function). All people with diabetes should have ***annual 10-g monofilament testing to identify feet at risk for ulceration and amputation***. B
- 12.19 Symptoms and signs of autonomic neuropathy should be assessed in people with diabetes starting at diagnosis of type 2 diabetes and 5 years after the diagnosis of type 1 diabetes, and at least annually thereafter, and with evidence of other microvascular complications, particularly kidney dis- ease and diabetic peripheral neuropathy. Screening can include asking about orthostatic dizziness, syncope, or dry cracked skin in the extremities. Signs of autonomic neuropathy include orthostatic hypotension, a resting tachycardia, or evidence of peripheral dryness or cracking of skin. E

Treatment

- 12.20 Optimize glucose management to prevent or delay the development of neuropathy in people with type 1 diabetes A and to slow the progression of neuropathy in people with type 2 diabetes. C Optimize blood pressure and serum lipid control to reduce the risk or slow the progression of diabetic neuropathy. B
- 12.21 Assess and treat pain related to diabetic peripheral neuropathy B and symptoms of autonomic neuropathy to improve quality of life. E
- 12.22 Gabapentinoids, serotonin- norepinephrine reuptake inhibitors, tricyclic antidepressants, and sodium channel blockers are recommended as initial pharmacologic treatments for neuropathic pain in diabetes. A Refer to neurologist or pain specialist when adequate pain management is not achieved within the scope of practice of the treating clinician. E

FOOT CARE

- 12.23 Perform a comprehensive foot evaluation at least annually to identify risk factors for ulcers and amputations. A
- 12.24 The examination should include inspection of the skin, assessment of foot deformities, neurological assessment (10-g monofilament testing with at least one other assessment: pinprick, temperature, or vibration), and vascular assessment, including pulses in the legs and feet. B
- 12.25 Individuals with evidence of sensory loss or prior ulceration or amputation should have their feet inspected at every visit. A
- 12.26 Obtain a prior history of ulceration, amputation, Charcot foot, angioplasty or vascular surgery, cigarette smoking, retinopathy, and renal disease and assess current symptoms of neuropathy (pain, burning, numbness) and vascular disease (leg fatigue, claudication). B
- 12.27 Initial screening for peripheral arterial disease (PAD) should include assessment of lower-extremity pulses, capillary refill time, rub or on dependency, pallor on elevation, and venous filling time. Individuals with a history of leg fatigue, claudication, and rest pain relieved with dependency or decreased or absent pedal pulses should be referred for ankle- brachial index with toe pressures and for further vascular assessment as appropriate. B
- 12.28 An inter-professional approach facilitated by a podiatrist in conjunction with other appropriate team members is recommended for individuals with foot ulcers and high-risk feet (e.g., those on dialysis, those with Charcot foot, those with a history of prior ulcers or amputation, and those with PAD). B
- 12.29 Refer individuals who smoke and have a history of prior lower- extremity complications, loss of protective sensation, structural abnormalities, or PAD to foot care specialists for ongoing preventive care and lifelong surveillance. B
- 12.30 Provide general preventive foot self-care education to all people with diabetes, including those with loss of protective sensation, on appropriate ways to examine their feet (palpation or visual inspection with an unbreakable mirror) for daily surveillance of early foot problems. B
- 12.31 The use of specialized therapeutic footwear is recommended for people with diabetes at high risk for ulceration, including those with loss of protective sensation, foot deformities, ulcers, callous formation, poor peripheral circulation, or history of amputation. B
- 12.32 For chronic diabetic foot ulcers that have failed to heal with optimal standard care alone, adjunctive treatment with randomized controlled trial-proven advanced agents should be considered. Considerations might in dude negative pressure wound therapy, placental membranes, bioengineered skin substitutes, several acellular matrices, autologous fibrin and leukocyte platelet patches, and topical oxygen therapy. A

Table 12.2—Categories of advanced wound therapies

Negative-pressure wound therapy
Standard electrically powered
Mechanically powered
Oxygen therapies
Hyperbaric oxygen therapy
Topical oxygen therapy
Oxygen-releasing sprays, dressings
Biophysical
Electrical stimulation, diathermy
Pulsed electromagnetic fields, pulsed radiofrequency energy
Low-frequency noncontact ultrasound
Extracorporeal shock wave therapy
Growth factors
Becaplermin: platelet-derived growth factor
Fibroblast growth factor
Epidermal growth factor
Autologous blood products
Platelet-rich plasma
Leukocyte, platelet, fibrin multilayered patches
Whole blood clot
Acellular matrix tissues
Xenograft dermis
Bovine dermis
Xenograft acellular matrices
Small intestine submucosa
Porcine urinary bladder matrix
Ovine forestomach
Equine pericardium
Fish skin graft
Bovine collagen
Bilayered dermal regeneration matrix
Human dermis products
Human pericardium
Placental tissues
Amniotic tissues/amniotic fluid
Umbilical cord
Bioengineered allogeneic cellular therapies
Bilayered skin equivalent (human keratinocytes and fibroblasts)
Dermal replacement therapy (human fibroblasts)
Stem cell therapies
Autogenous: bone marrow–derived stem cells
Allogeneic: amniotic matrix with mesenchymal stem cells
Miscellaneous active dressings
Hyaluronic acid, honey dressings, etc.
Sucrose octasulfate dressing

Adapted with permission from Frykberg and Banks (95).

Table 12.1—International Working Group on the Diabetic Foot risk stratification system and corresponding foot screening frequency

Category	Ulcer risk	Characteristics	Examination frequency*
0	Very low	No LOPS and No PAD	Annually
1	Low	LOPS or PAD	Every 6–12 months
2	Moderate	LOPS + PAD, or LOPS + foot deformity, or PAD + foot deformity	Every 3–6 months
3	High	LOPS or PAD and one or more of the following: • History of foot ulcer • Amputation (minor or major) • End-stage renal disease	Every 1–3 months

Adapted with permission from Schaper et al. (81). LOPS, loss of protective sensation; PAD, peripheral artery disease. *Examination frequency suggestions are based on expert opinion and person-centered requirements.

13. Older Adults

- 13.1 Consider the assessment of medical, psychological, functional (self-management abilities), and social domains in older adults with diabetes to provide a framework to determine goals and therapeutic approaches for diabetes management.
- 13.2 Screen for geriatric syndromes (e.g., cognitive impairment, depression, urinary incontinence, falls, persistent pain, and frailty) and polypharmacy in older adults with diabetes, as they may affect diabetes self-management and diminish quality of life. B

NEUROCOGNITIVE FUNCTION

- 13.3 Screening for early detection of mild cognitive impairment or dementia should be performed for adults 65 years of age or older at the initial visit, annually, and as appropriate. B

HYPOGLYCEMIA

- 13.4 Because older adults with diabetes have a greater risk of hypoglycemia, especially when treated with hypoglycemic agents (e.g., sulfonylureas, meglitinides, and insulin), than younger adults, episodes of hypoglycemia should be ascertained and ad- dressed at routine visits. B
- 13.5 For older adults with type 1 diabetes, continuous glucose monitoring is recommended to reduce hypoglycemia. A
- 13.6 For older adults with type 2 diabetes on insulin therapy, continuous glucose monitoring should be considered to improve glycemic outcomes and reduce hypoglycemia. B
- 13.7 For older adults with type 1 diabetes, consider the use of automated insulin delivery (AID) systems A and other advanced insulin delivery devices such as connected pens E to reduce risk of hypoglycemia, based on individual ability and support system.

TREATMENT GOALS

- 13.8a Older adults with diabetes who are otherwise healthy with few and stable coexisting chronic illnesses and intact cognitive function and functional status should have lower glycemic goals (such as A1C <7.0-7.5% [<53-58 mmol/mol]).
- 13.8b Older adults with diabetes and intermediate or complex health are clinically heterogeneous with variable life expectancy. Selection of glycemic goals should be individualized, with less stringent goals (such as A1C <8.0% [<64 mmol/mol]) for those with significant cognitive and/or functional limitations, frailty, severe comorbidities, and a less favorable risk-to-benefit ratio of diabetes medications. C
- 13.8c Older adults with very complex or poor health receive minimal bene- fit from stringent glycemic control, and clinicians should avoid reliance on glycemic goals and instead focus on avoiding hypoglycemia and symptomatic hyperglycemia. C
- 13.9 Screening for diabetes complications should be individualized in older adults with diabetes. Particular attention should be paid to complications that would lead to impairment of functional status or quality of life. C
- 13.10 Treatment of hypertension to individualized goal levels is indicated in older adults with diabetes. B
- 13.11 Treatment of other cardiovascular risk factors should be individualized in older adults with diabetes, considering the time frame of benefit. Lipid-lowering therapy and antiplatelet agents may benefit those with life expectancies at least equal to the time frame of primary prevention or secondary intervention trials. E

LIFESTYLE MANAGEMENT

- 13.12 Optimal nutrition and protein in- take is recommended for older adults with diabetes; regular exercise, including aerobic activity, weight-bearing exercise, and/or resistance training, should be encouraged in all older adults with diabetes who can safely engage in such activities. B
- 13.13 For older adults with type 2 diabetes, overweight/obesity, and capacity to safely exercise, an intensive lifestyle intervention focused on dietary changes, physical activity, and modest weight loss (eg., 5-7%) should be considered for its benefits on quality of life, mobility and physical functioning, and cardio-metabolic risk factor control. A

PHARMACOLOGIC THERAPY

- 13.14 In older adults with type 2 diabetes, medications with low risk of hypoglycemia are preferred, especially for those with hypoglycemia risk factors. B
- 13.15 Overtreatment of diabetes is common in older adults and should be avoided. B
- 13.16a In older adults with diabetes, deintensify hypoglycemia causing medications (eg., insulin, sulfonylureas, or meglitinides) or switch to a medication class with low hypoglycemia risk for individuals who are at high risk for hypoglycemia, using individualized glycemic goals. B
- 13.16b In older adults with diabetes, deintensify diabetes medications for individuals for whom the harms and/or burdens of treatment may be greater than the benefits, within individualized glycemic goals. E
- 13.16c Simplification of complex treatment plans (especially insulin) is recommended to reduce the risk of hypoglycemia and polypharmacy and decrease the treatment burden if it can be achieved using the individualized glycemic goals. B
- 13.16d In older adults with type 2 diabetes and established or high risk of atherosclerotic cardiovascular dis- ease, heart failure, and/or chronic kidney disease, the treatment plan should include agents that reduce cardio-renal risk, irrespective of glycaemia. A
- 13.17 Consider costs of care and coverage when developing treatment plans in order to reduce risk of cost related barriers to medication taking and self-management behaviors. B

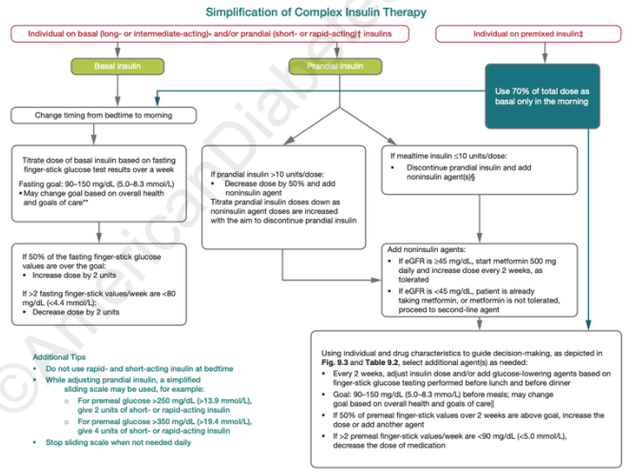


Figure 13.1—Algorithm to simplify insulin plans for older adults with type 2 diabetes. eGFR, estimated glomerular filtration rate. *Basal insulins: glargine U-100 and U-300, detemir, degludec, and human NPH. †Prandial insulins: short-acting (regular human insulin) or rapid-acting (lispro, aspart, and glulisine). ‡Premixed insulins: 70/30, 75/25, and 50/50 products. §Examples of noninsulin agents include metformin, sodium–glucose cotransporter 2 inhibitors, dipeptidyl peptidase 4 inhibitors, and glucagon-like peptide 1 receptor agonists. ‖See **Table 13.1**. Adapted with permission from Munshi et al. (102).

TREATMENT IN SKILLED NURSING FACILITIES AND NURSING HOMES

- 13.18 Consider diabetes education/ training (including that for CGM devices, insulin pumps, and advanced insulin delivery systems) for the staff of long-term care and rehabilitation facilities to improve the management of older adults with diabetes. E
- 13.19 People with diabetes residing in long-term care facilities need careful assessment to establish individualized glycemic goals and to make appropriate choices of glucose-lowering agents and devices (including CGM devices, insulin pumps, and advanced insulin delivery systems) based on their clinical and functional status. E

END-OF-LIFE CARE

- 13.20 When palliative care is needed in older adults with diabetes, health care professionals should initiate conversations with people with diabetes and their care partners regarding the goals and intensity of care. *Strict glucose and blood pressure management* are **not necessary**, and simplification of medication plans can be considered. Similarly, the **intensity of lipid management can be relaxed**, and withdrawal of lipid-lowering therapy may be appropriate. E
- 13.21 Overall comfort, prevention of distressing symptoms, and preservation of quality of life and dignity are primary goals for diabetes management at the end of life. C

14. Children and Adolescents

Diabetes Self-Management Education and Support

- 14.1 Youth with type 1 diabetes and their parents/caregivers (for individuals aged 18 years) should receive culturally sensitive and developmentally appropriate individualized diabetes self-management education and support according to national standards at diagnosis and routinely there- after. B

Nutrition Therapy

- 14.2 Individualized medical nutrition therapy is recommended for youth with type 1 diabetes as an essential component of the overall treatment plan. A
- 14.3 Monitoring carbohydrate intake, whether by carbohydrate counting or experience-based estimation, is a key component to optimizing glycemic management. B
- 14.4 Meal composition impacts postprandial glucose excursions. Education on the impact of high-fat and high-protein meals and the adjustment of insulin dosing is necessary. A
- 14.5 Comprehensive nutrition education at diagnosis, with at least annual updates and as needed, by an experienced registered dietitian nutritionist

is recommended to assess caloric and nutrition intake in relation to weight status and cardiovascular disease risk factors and to inform macronutrient choices. E

Physical Activity and Exercise

- 14.6 Physical activity is recommended for all youth with type 1 diabetes with the goal of 60 min of moderate- to vigorous-intensity aerobic activity daily, with vigorous muscle-strengthening and bone-strengthening activities at least 3 days per week. C
- 14.7 Frequent glucose monitoring before, during, and after exercise, via blood glucose meter or continuous glucose monitoring (CGM), is important to prevent, detect, and treat hypoglycemia and hyperglycemia associated with exercise. C
- 14.8 Youth and their parents/care- givers should receive education on goals and management of glycemia before, during, and after physical activity, individualized according to the type and intensity of the planned physical activity. E
- 14.9 Youth and their parents/care- givers should be educated on strategies to prevent hypoglycemia during, after, and overnight following physical activity and exercise, which may include reducing prandial insulin dosing for the meal/snack preceding (and, if needed, following) exercise, reducing basal insulin doses, increasing carbohydrate intake, eating bedtime snacks, and/or using CGM. Treatment for hypoglycemia should be accessible before, during, and after engaging in activity. C

Psychosocial Care

- 14.10 At diagnosis and during routine follow-up care, screen youth with type 1 diabetes for psychosocial concerns (e.g., diabetes distress, depressive symptoms, and disordered eating), family factors, and behavioral health concerns that could impact diabetes management with age-appropriate standardized and validated tools. Refer to a qualified behavioral health professional, preferably experienced in childhood diabetes, when indicated. B
- 14.11 Behavioral health professionals should be considered integral members of the pediatric diabetes inter-professional team. E
- 14.12 Encourage developmentally appropriate family involvement in diabetes management tasks for children and adolescents, recognizing that premature or unsupportive transfer of diabetes care responsibility to the youth can contribute to diabetes distress, lower engagement in diabetes self- management behaviors, and deterioration in glycemia. A
- 14.13 Health care professionals should screen for food security, housing stability/homelessness, health literacy, financial barriers, and social/community support and apply that information to treatment decisions. E
- 14.14 Health care professionals should consider asking youth and their pa- rents/caregivers about social adjustment (peer relationships) and school performance to determine whether further intervention is needed. B
- 14.15 Offer adolescents time by them- selves with their health care professional(s) starting at age 12 years or when developmentally appropriate. E
- 14.16 Starting at puberty, preconception counseling should be incorporated into routine diabetes care for all individuals of childbearing potential. A

Glycemic Monitoring, Insulin Delivery, and Goals

- 14.17 All youth with type 1 diabetes should monitor glucose levels multiple times daily (up to 6-10 times/day by blood glucose meter or CGM), including prior to meals and snacks, at bed- time, and as needed for safety in specific situations such as physical activity, driving, or the presence of symptoms of hypoglycemia. B
- 14.18 Real-time CGM A or intermittently scanned CGM E should be offered for diabetes management at diagnosis or as soon as possible in youth with diabetes on multiple daily injections or insulin pump therapy who are capable of using the device safely (either by themselves or with caregivers). The choice of device should be made based on the individual's and family's circumstances, desires, and needs.
- 14.19 Automated insulin delivery (AID) systems should be offered for diabetes management to youth with type 1 diabetes who are capable of using the device safely (either by themselves or with caregivers). The choice of device should be made based on the individual's and family's or circumstances, desires, and needs. A
- 14.20 Insulin pump therapy alone should be offered for diabetes management to youth on multiple daily injections with type 1 diabetes who are capable of using the device safely (either by themselves or with care- givers) if unable to use AID systems. The choice of device should be made based on the individual's and family's circumstances, desires, and needs. A
- 14.21 Students must be supported at school in the use of diabetes technology, including continuous glucose monitors, insulin pumps, connected insulin pens, and AID systems as prescribed by their diabetes care team. E
- 14.22 A1C goals must be individualized and reassessed over time. An A1C of <7% (<53 mmol/mol) is appropriate for many children and adolescents. B
- 14.23 Less stringent A1C goals (such as <7.5% [<58 mmol/mol]) may be appropriate for youth who cannot articulate symptoms of hypoglycemia; have hypoglycemia unawareness; lack access to analog insulins, advanced insulin delivery technology, and/or CGM; cannot check blood glucose regularly; or have non-glycemic factors that increase A1C (e.g., high glycators). B
- 14.24 Even less stringent A1C goals (such as <8% [<64 mmol/mol]) may be appropriate for individuals with a history of severe hypoglycemia, limited life expectancy, or where the harms of treatment are greater than the benefits. B
- 14.25 Health care professionals may reasonably suggest more stringent A1C goals (such as <6.5% [<48 mmol/mol]) for selected individuals if they can be achieved without significant hypoglycemia, negative impacts on well-being, or undue burden of care or in those who have non-glycemic factors that decrease A1C (e.g., lower erythrocyte life span) Lower goals may also be appropriate during the honeymoon phase. B
- 14.26 CGM metrics derived from continuous glucose monitor use over the most recent 14 days (or longer for youth with more glycemic variability), including time in range (70-180 mg/dL [3.9-10.0 mmol/L]), time below range (<70 mg/dL [<3.9 mmol/L) and <54 mg/dL [<3.0 mmol/L]), and time above range (>180 mg/dL [>10.0 mmol/L] and 250 mg/dL [>13.9 mmol/L]), are recommended to be used in conjunction with A1C whenever possible. E

Autoimmune Conditions

- 14.27 Assess for additional autoimmune conditions soon after the diagnosis of type 1diabetes and if symptoms develop. B

Thyroid Disease

- 14.28 Consider testing children with type 1 diabetes for anti-thyroid peroxidase and anti-thyroglobulin anti- bodies soon after diagnosis. B
- 14.29 Measure thyroid-stimulating hormone concentrations at diagnosis when clinically stable or soon after optimizing glycemia. If normal, suggest rechecking every 1-2 years or sooner if the youth has positive thyroid antibodies or develops symptoms or signs suggestive of thyroid dysfunction, thyromegaly, an abnormal growth rate, or unexplained glycemic variability. B

Celiac Disease

- 14.30 Screen youth with type 1 dia- betes for celiac disease by measuring IgA tissue transglutaminase (tTG) anti- bodies, with neither documentation of nor- mal total serum IgA levels, soon after the diagnosis of diabetes, or IgG tTG and deamidated gliadin antibodies if IgA is deficient. B
- 14.31 Repeat screening for celiac dis- ease within 2 years of diabetes diagnosis and then again after 5 years and consider more frequent screening in youth who have symptoms or a first- degree relative with celiac disease. B
- 14.32 Individuals with confirmed celiac disease should be placed on a gluten-free diet for treatment and to avoid complications. Youth and their caregivers should also have a consultation with a registered dietitian nutritionist experienced in managing both diabetes and celiac disease. B

Management of Cardiovascular Risk Factors

- 14.33 Blood pressure should be measured at every routine visit. In youth with high blood pressure (blood pressure 90th percentile for age, sex, and height or, in adolescents aged ≥13 years, blood pressure ≥120/80 mmHg) on three separate measurements, ambulatory blood pressure monitoring should be strongly considered. B

Hypertension Treatment

- 14.34 Treatment of elevated blood pressure (defined as 90th to <95th percentile for age, sex, and height or, in adolescents aged ≥13 years, 120-129/<80 mmHg) is lifestyle modification focused on healthy nutrition, physical activity, sleep, and, if appropriate, weight management. C
- 14.35 In addition to lifestyle modification, ACE inhibitors or angiotensin receptor blockers should be started for treatment of confirmed hypertension (defined as blood pressure consistently ≥95th percentile for age, sex, and height or, in adolescents aged 13 years, ≥130/80 mmHg). Due to the potential teratogenic effects, individuals of childbearing age should receive reproductive counseling, and ACE inhibitors and angiotensin receptor blockers should be avoided in individuals of childbearing age who are not using reliable contraception. B

- 14.36 The goal of treatment is blood pressure 90th percentile for age, sex, and height or, in adolescents aged 13 years, <130/80 mmHg. C

Dyslipidemia Screening

- 14.37 Initial lipid profile should be performed soon after diagnosis, preferably after glycemia has improved and age is ≥2 years. If initial LDL cholesterol is 100 mg/dL (≤2.6 mmol/L), subsequent testing should be per- formed at 9-11 years of age. B Initial testing may be done with a non-fasting lipid level with confirmatory testing with a fasting lipid panel. 14.38 If LDL cholesterol values are within the accepted risk level (<100 mg/dL [<2.6 mmol/L]), a lipid profile repeated every 3 years is reasonable. E

Dyslipidemia Treatment

- 14.39 If lipids are abnormal, initial therapy should consist of optimizing glycemia and medical nutrition therapy to limit the amount of calories from fat to 25-30% and saturated fat to <7%, limit cholesterol to <200 mg/day, avoid trans fats, and aim for ~10% calories from monounsaturated fats. A
- 14.40 After the age of 10 years, addition of a statin may be considered in youth with type 1 diabetes who, de- spite medical nutrition therapy and life- style changes, continue to have LDL cholesterol > 160 mg/dL (>4.1 mmol/L) or LDL cholesterol >130 mg/dL (>3.4 mmol/L) and one or more cardiovascular disease risk factors. E Due to the potential teratogenic effects, individuals of childbearing age should receive reproductive counseling, and statins should be avoided in individuals of childbearing age who are not using reliable contraception. B
- 14.41 The goal of therapy is an LDL cholesterol value <100 mg/dL (<2.6 mmol/L). E

Microvascular Complications

Nephropathy Screening

- 14.42 Annual screening for albuminuria with a random (morning sample preferred to avoid effects of exercise) spot urine sample for albumin-to-creatinine ratio should be considered at puberty or at age >10 years, which- ever is earlier, once the youth has had diabetes for 5 years. B

Nephropathy Treatment

- 14.43 An ACE inhibitor or an angiotensin receptor blocker, titrated to normalization of albumin excretion, may be considered when elevated urinary albumin-to-creatinine ratio (30 mg/g) is documented (two of three urine samples obtained over a 6-month interval following efforts to improve glycemia and normalize blood pressure). E Due to the potential teratogenic effects, individuals of childbearing age should receive reproductive counseling, and ACE inhibitors and angiotensin receptor blockers should be avoided in individuals of childbearing age who are not using reliable contraception. B

Retinopathy

- 14.44 An initial dilated and comprehensive eye examination is recommended once youth have had type 1 diabetes for 3-5 years, provided they are aged 11 years or puberty has started, whichever is earlier. B
- 14.45 After the initial examination, repeat dilated and comprehensive eye examination every 2 years. Less frequent examinations, every 4 years, may be acceptable on the advice of an eye care professional and based on risk factor assessment, including a history of A1C <8%. B
- 14.46 Programs that use retinal photography (with remote reading or use of a validated assessment tool) to improve access to diabetic retinopathy screening can be appropriate screening strategies for diabetic retinopathy. Such programs need to provide pathways for timely referral for a comprehensive eye examination when indicated. E

Neuropathy

- 14.47 Consider an annual comprehensive foot exam at the start of puberty or at age 10 years, whichever is earlier, once the youth has had type 1diabetes for 5 years. The examination should include inspection, assessment of foot pulses, pinprick, and 10-g monofilament sensation tests, testing of vibration sensation using a 128-Hz tuning fork, and ankle reflex tests. B

Screening and Diagnosis

- 14.48 Risk-based screening for prediabetes and/or type 2 diabetes should be considered after the onset of puberty or 10 years of age, whichever occurs earlier, in youth with over- weight (BMI ≥85th percentile) or obesity (BMI ≥95th percentile) and who have one or more additional risk factors for diabetes (see Table 2.5 for evidence grading of other risk factors).
- 14.49 If screening is normal, repeat screening at a minimum of 3 year intervals, E or more frequently if BMI is increasing. C
- 14.50 Fasting plasma glucose, 2-h plasma glucose during a 75 g oral glucose tolerance test, and A1C can be used to test for prediabetes or diabetes in children and adolescents. B
- 14.51 Children and adolescents with overweight or obesity in whom the diagnosis of type 2 diabetes is being considered should have a panel of pancreatic autoantibodies tested to exclude the possibility of autoimmune type 1 diabetes. B

Management

Lifestyle Management

- 14.52 All youth with type 2 diabetes and their families should receive comprehensive diabetes self-management education and support that is specific to youth with type 2 diabetes and is culturally appropriate. B 14.53 Youth with overweight/obesity and type 2 diabetes and their families should be provided with developmentally and culturally appropriate comprehensive lifestyle programs that are integrated with diabetes management to achieve at least a 7-10% decrease in excess weight. C
- 14.54 Given the necessity of long- term weight management for youth with type 2 diabetes, lifestyle intervention should be based on a chronic care model and offered in the context of diabetes care. E
- 14.55 Youth with prediabetes and type 2 diabetes, like all children and adolescents, should be encouraged to participate in at least 60 min of moderate to vigorous physical activity daily (with muscle and bone strength training at least 3 days/ week) B and to decrease sedentary behavior. C
- 14.56 Nutrition for youth with prediabetes and type 2 diabetes, like for all children and adolescents, should focus on healthy eating patterns that emphasize consumption of nutrient-dense, high-quality foods and decreased consumption of calorie-dense, nutrient- poor foods, particularly sugar-added beverages. B

Glycemic Goals

- 14.57 Blood glucose monitoring should be individualized, taking into consideration the pharmacologic treatment of the youth with type 2 diabetes. E
- 14.58 Real-time CGM or intermittently scanned CGM should be offered for diabetes management in youth with type 2 diabetes on multiple daily injections or insulin pumps who are capable of using the device safely (either by themselves or with a caregiver). The choice of device should be made based on an individual's and family's circumstances, desires, and needs.
- 14.59 Glycemic status should be assessed at least every 3 months. E 14.60 A reasonable A1C goal for most children and adolescents with type 2 diabetes is <7% (<53 mmol/mol). More stringent A1C goals (such as <6.5% [<48 mmol/moll) may be appropriate for selected individuals if they can be achieved without significant hypoglycemia or other adverse effects of treatment. Appropriate individuals might include those with a short duration of diabetes and lesser degrees of B-cell dysfunction and individuals treated with lifestyle or metformin only who achieve significant weight improvement. E
- 14.61 Less stringent A1C goals (such as 7.5% [58 mmol/mol]) may be appropriate if there is an increased risk of hypoglycemia. E
- 14.62 A1C goals for individuals on insulin should be individualized, taking into account the relatively low rates of hypoglycemia in youth-onset type 2 diabetes. E

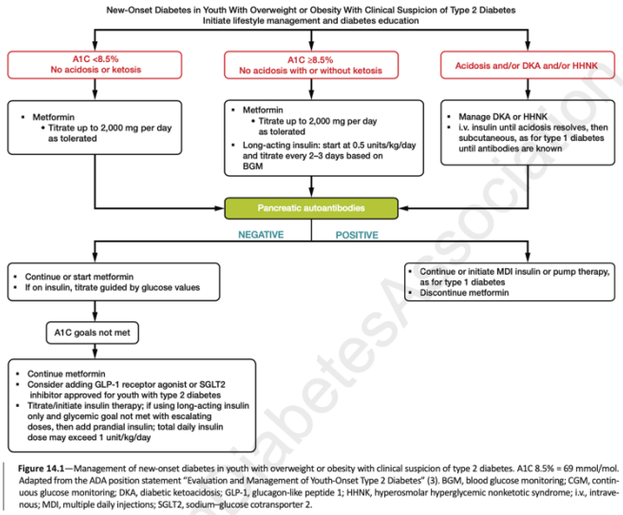


Figure 14.1—Management of new-onset diabetes in youth with overweight or obesity with clinical suspicion of type 2 diabetes. A1C 8.5% = 69 mmol/mol. Adapted from the ADA position statement "Evaluation and Management of Youth-Onset Type 2 Diabetes" (3). BGM, blood glucose monitoring; CGM, continuous glucose monitoring; DKA, diabetic ketoacidosis; GLP-1, glucagon-like peptide 1; HHNK, hyperosmolar hyperglycemic nonketotic syndrome; i.v., intravenous; MDI, multiple daily injections; SGLT2, sodium–glucose cotransporter 2.

Pharmacologic Management

- 14.63 Initiate pharmacologic therapy, in addition to behavioral counseling for healthful nutrition and physical activity changes, at diagnosis of type 2 diabetes. A
- 14.64 In individuals with incidentally diagnosed or metabolically stable diabetes (A1C <8.5% [<69 mmol/mol] and asymptomatic), metformin is the initial pharmacologic treatment of choice if renal function is normal. A
- 14.65 Youth with marked hyperglycemia (blood glucose 250 mg/dL [13.9 mmol/L], A1C ≥8.5% [≥69 mmol/mol]) without acidosis at diagnosis who are symptomatic with polyuria, polydipsia, nocturia, and/or weight loss should be treated initially with long-acting insulin while metformin is initiated and titrated. B
- 14.66 In individuals with ketosis/ketoacidosis, treatment with subcutaneous or intravenous insulin should be initiated to rapidly correct the hyperglycemia and the metabolic derangement. Once acidosis is resolved, metformin should be initiated while subcutaneous insulin therapy is continued. A
- 14.67 In individuals presenting with severe hyperglycemia (blood glucose ≥600 mg/dL (≥33.3 mmol/L]), consider assessment for hyperglycemic hyperosmolar nonketotic syndrome. A
- 14.68 If glycemic goals are no longer met with metformin (with or without long-acting insulin), glucagon-like pep- tide 1 (GLP-1) receptor agonist therapy and/or empagliflozin should be considered in children 10 years of age or older. A
- 14.69 When choosing glucose-lowering or other medications for youth with overweight or obesity and type 2 diabetes, consider medication-taking behavior and the medications' effect on weight. E
- 14.70 For youth not meeting glycemic goals, maximize noninsulin therapies (metformin, a GLP-1 receptor agonist, and empagliflozin) before initiating and/or intensifying insulin therapy plan. E 14.71 In individuals initially treated with insulin and metformin and/or other glucose lowering medications who are meeting glucose goals based on blood glucose monitoring or CGM, insulin can be tapered over 2-6 weeks by decreasing the insulin dose 10-30% every few days. B

Metabolic Surgery

- 14.72 Metabolic surgery may be considered for the treatment of adolescents with type 2 diabetes who have class 2 obesity or higher (BMI >35 kg/m² or 120% of 95th percentile for age and sex, whichever is lower) and who have elevated A1C and/or serious comorbidities despite lifestyle and pharmacologic intervention. A 14.73 Metabolic surgery should be per- formed only by an experienced surgeon working as part of a well-organized and engaged inter-professional team, including a surgeon, endocrinologist, registered dietitian nutritionist, behavioral health specialist, and nurse. A

Prevention and Management of Diabetes Complications
Hypertension

- 14.74 Blood pressure should be measured at every clinic visit. In youth with high blood pressure (blood pressure 90th percentile for age, sex, and height or, in adolescents aged 13 years, 120/80 mmHg) on three separate measurements, ambulatory blood pressure monitoring should be strongly considered. B
- 14.75 Treatment of elevated blood pressure (defined as 90th to <95th percentile for age, sex, and height or, in adolescents aged 13 years, 120-129/ <80 mmHg) is lifestyle modification focused on healthy nutrition, physical activity, sleep, and, if appropriate, weight management. C
- 14.76 In addition to lifestyle modification, ACE inhibitors or angiotensin receptor blockers should be started for treatment of confirmed hypertension (defined as blood pressure consistently 295th percentile for age, sex, and height or, in adolescents aged >= 13 years, >= 130/80 mmHg). Due to the potential teratogenic effects, individuals of childbearing age should receive reproductive counseling, and ACE inhibitors and angiotensin receptor blockers should be avoided in individuals of childbearing age who are not using reliable contraception. B
- 14.77 The goal of treatment is blood pressure <90th percentile for age, sex, and height or, in adolescents aged >= 13 years, < 130/80 mmHg. C

Nephropathy

- 14.78 Protein intake should be at the recommended daily allowance of 0.85-1.2 g/kg/day (according to age). E
- 14.79 Urine albumin-to-creatinine ratio should be obtained at the time of diagnosis and annually thereafter. An elevated urine albumin-to-creatinine ratio (>30 mg/g creatinine) should be confirmed on two of three samples. B
- 14.80 Estimated glomerular filtration rate (GFR) should be determined at the time of diagnosis and annually thereafter. E
- 14.81 in youth with diabetes and hypertension, either an ACE inhibitor or an angiotensin receptor blocker is recommended for those with modestly elevated urinary albumin-to-creatinine ratio (30-299 mg/g creatinine) and is strongly recommended for those with urinary albumin-to-creatinine ratio>300 mg/g creatinine and/or estimated GFR 60 mL/min/1.73 m². E Due to the potential teratogenic effects, individuals of childbearing age should receive reproductive counseling, and ACE inhibitors and angiotensin receptor blockers should be avoided in individuals of childbearing age who are not using reliable contraception. B
- 14.82 For youth with nephropathy, continue monitoring (yearly and/or as indicated by urinary albumin-to-creatinine ratio and estimated GFR) to detect disease progression. E 14.83 Referral to nephrology is recommended in case of uncertainty of etiology, worsening urinary albumin- to-creatinine ratio, or decrease in estimated GFR. E

Neuropathy

- 14.84 Youth with type 2 diabetes should be screened for the presence of neuropathy by foot examination at diagnosis and annually. The examination should include inspection, assessment of foot pulses, pinprick and 10-g mono filament sensation tests, testing of vibration sensation using a 128-Hz tuning fork, and ankle reflex tests. C
- 14.85 Prevention of neuropathy should focus on achieving glycemic goals. C

Retinopathy

- 14.86 Screening for retinopathy should be performed by dilated fundoscopy at or soon after diagnosis and annually thereafter. C
- 14.87 Optimizing glycemia is recommended to decrease the risk or slow the progression of retinopathy. B
- 14.88 Less frequent examination (every 2 years) may be considered if achieving glycemic goals and a normal eye exam. C
- 14.89 Programs that use retinal photography (with remote reading or use of a validated assessment tool) to improve access to diabetic retinopathy screening can be appropriate screening strategies for diabetic retinopathy. Such programs need to provide pathways for timely referral for a comprehensive eye examination when indicated. E

Nonalcoholic Fatty Liver Disease

- 14.90 Evaluation of youth with type 2 diabetes for nonalcoholic fatty liver disease (by measuring AST and ALT) should be done at diagnosis and annually thereafter. B
- 14.91 Referral to gastroenterology should be considered for persistently elevated or worsening transaminases. B

Obstructive Sleep Apnea

- 14.92 Screening for symptoms of sleep apnea should be done at each visit, and referral to a pediatric sleep specialist for evaluation and a polysomnogram, if indicated, is recommended. Obstructive sleep apnea should be treated when documented. B

Polycystic Ovary Syndrome

- 14.93 Evaluate for polycystic ovary syndrome in female adolescents with type 2 diabetes, including laboratory studies, when indicated. B
- 14.94 Metformin, in addition to life- style modification, is likely to improve the menstrual cyclicity and hyperan-drogenism in female individuals with type 2 diabetes. E

Cardiovascular Disease

- 14.95 Intensive lifestyle interventions focusing on weight loss, dyslipidemia, hypertension, and dysglycemia are important to prevent overt macrovascular disease in early adulthood. E

Dyslipidemia

- 14.96 Lipid screening should be per- formed initially after optimizing glycemia and annually thereafter. B
- 14.97 Optimal goals are LDL cholesterol <100 mg/dL (<2.6 mmol/L), HDL cholesterol >35 mg/dL (>0.91 mmol/L), and triglycerides <150 mg/dL (<1.7 mmol/L). E
- 14.98 If lipids are abnormal, initial therapy should consist of optimizing glycemia and medical nutritional therapy to limit the amount of calories from fat to 25-30% and saturated fat to <7%, limit cholesterol to <200 mg/day, avoid trans fats, and aim for ~10% calories from monounsaturated fats for elevated LDL. For elevated triglycerides, medical nutrition therapy should also focus on decreasing simple sugar intake and increasing dietary n-3 fatty acids in addition to the above changes. A
- 14.99 If LDL cholesterol remains >130 mg/dL (>3.4 mmol/L) after 6 months of dietary intervention, initiate therapy with statin, with a goal of LDL 100 mg/dL (<2.6 mmol/L). Due to the potential teratogenic

effects individuals of childbearing age should receive reproductive counseling, and statins should be avoided in individuals of childbearing age who are not using reliable contraception. B

- 14.100 If triglycerides are >400 mg/dL (>4.7 mmol/L) fasting or >1,000 mg/dl (>11.6 mmol/L) nonfasting, optimize glycemia and begin fibrate, with a goal of <400 mg/dL (<4.7 mmol/L) fasting to reduce risk for pancreatitis. C

Cardiac Function Testing

- 14.101 Routine screening for heart disease with electrocardiogram, echo-cardiogram, or stress testing is not recommended in asymptomatic youth with type 2 diabetes. B

Psychosocial Factors

- 14.102 Health care professionals should screen for food insecurity, housing instability/homelessness, health literacy, financial barriers, and social/ community support and apply that in- formation to treatment decisions. E
- 14.103 Use age-appropriate standardized and validated tools to screen for diabetes distress, depressive symptoms, and behavioral health in youth with type 2diabetes, with attention to symptoms of depression and disordered eating, and refer to a qualified behavioral health professional when indicated. B
- 14.104 Starting at puberty, preconception counseling should be incorporated into routine diabetes clinic visits for all individuals of childbearing potential because of the ad- verse pregnancy outcomes in this population. A
- 14.105 Adolescents and young adults should be screened for tobacco/nicotine, electronic cigarettes, substance use, and alcohol use at diagnosis and regularly thereafter. C

SUBSTANCE USE IN PEDIATRIC DIABETES

Tobacco and Electronic Cigarettes

- 14.106 Elicit a smoking history at initial and follow-up diabetes visits; dis- courage smoking in youth who do not smoke and encourage smoking cessation in those who do smoke. A 14.107 Electronic cigarette use should be discouraged. A

TRANSITION FROM PEDIATRIC TO ADULT CARE

- 14.108 Pediatric diabetes care teams should implement transition preparation programs for youth beginning in early adolescence and, at the latest, at least 1 year before the anticipated transfer from pediatric to adult health care. E
- 14.109 Inter-professional adult and pediatric health care teams should provide support and resources for adolescents, young adults, and their families prior to and during the transition process from pediatric to adult health care. E
- 14.110 Pediatric diabetes specialists should partner with youth with diabetes and their caregivers to decide on the timing of transfer to an adult diabetes specialist. E

15. Management of Diabetes in Pregnancy

Preconception Counseling

- 15.1 Starting at puberty and continuing in all people with diabetes and child bearing potential, preconception counseling should be incorporated into routine diabetes care. A
- 15.2 Family planning should be discussed, and effective contraception (with consideration of long-acting, reversible contraception) should be prescribed and used until an individual's treatment plan and A1C are optimized for pregnancy. A
- 15.3 Preconception counseling should address the importance of achieving glucose levels as close to normal as is safely possible, ideally A1C <6.5% (<48 mmol/mol), to reduce the risk of congenital anomalies, preeclampsia, macrosomia, preterm birth, and other complications. A

Preconception Care

- 15.4 Individuals with preexisting diabetes who are planning a pregnancy should ideally begin receiving inter-professional care for preconception, which includes an endocrinology health care professional, maternal-fetal medicine specialist, registered dietitian nutritionist, and diabetes care and education specialist, when available. B
- 15.5 In addition to focused attention on achieving glycemic targets, A standard preconception care should be augmented with extra focus on nutrition, physical activity, diabetes self- care education, and screening for diabetes comorbidities and complications. B
- 15.6 Individuals with preexisting type 1 or type 2 diabetes who are planning a pregnancy or who have become pregnant should be counseled on the risk of development and/or progression of diabetic retinopathy. Dilated eye examinations should occur ideally before pregnancy or in the first trimester, and then pregnant individuals should be monitored every trimester and for 1 year postpartum as indicated by the degree of retinopathy and as recommended by the eye care health care professional. B

Table 15.1—Checklist for preconception care for people with diabetes

Preconception education should include:

- ☐ Comprehensive nutrition assessment and recommendations for:
  - Overweight/obesity or underweight
  - Meal planning
  - Correction of dietary nutritional deficiencies
  - Caffeine intake
  - Safe food preparation technique
- ☐ Lifestyle recommendations for:
  - Regular moderate exercise
  - Avoidance of hyperthermia (hot tubs)
  - Adequate sleep
- ☐ Comprehensive diabetes self-management education
- ☐ Counseling on diabetes in pregnancy per current standards, including: natural history of insulin resistance in pregnancy and postpartum; preconception glycemic goals; avoidance of DKA/severe hyperglycemia; avoidance of severe hypoglycemia; progression of retinopathy; PCOS (if applicable); fertility in people with diabetes; genetics of diabetes; risks to pregnancy including miscarriage, still birth, congenital malformations, macrosomia, preterm labor and delivery, hypertensive disorders in pregnancy, etc.
- ☐ Supplementation
  - Folic acid supplement (400 µg routine)
  - Appropriate use of over-the-counter medications and supplements

Health assessment and plan should include:

- ☐ General evaluation of overall health
- ☐ Evaluation of diabetes and its comorbidities and complications, including DKA/severe hyperglycemia; severe hypoglycemia/hypoglycemia unawareness; barriers to care; comorbidities such as hyperlipidemia, hypertension, NAFLD, PCOS, and thyroid dysfunction; complications such as macrovascular disease, nephropathy, neuropathy (including autonomic bowel and bladder dysfunction), and retinopathy
- ☐ Evaluation of obstetric/gynecologic history, including a history of cesarean section, congenital malformations or fetal loss, current methods of contraception, hypertensive disorders of pregnancy, postpartum hemorrhage, preterm delivery, previous macrosomia, Rh incompatibility, and thrombotic events (DVT/PE)
- ☐ Review of current medications and appropriateness during pregnancy

Screening should include:

- ☐ Diabetes complications and comorbidities, including comprehensive foot exam; comprehensive ophthalmologic exam; ECG in individuals starting at age 35 years who have cardiac signs/symptoms or risk factors and, if abnormal, further evaluation; lipid panel; serum creatinine; TSH; and urine albumin-to-creatinine ratio
- ☐ Anemia
- ☐ Genetic carrier status (based on history):
  - Cystic fibrosis
  - Sickle cell anemia
  - Tay-Sachs disease
  - Thalassemia
  - Others if indicated
- ☐ Infectious disease
  - *Neisseria gonorrhoeae/Chlamydia trachomatis*
  - Hepatitis B and hepatitis C
  - HIV
  - Pap smear
  - Syphilis

Immunizations should include:

- ☐ Inactivated influenza
- ☐ Tdap (tetanus, diphtheria, and pertussis)
- ☐ COVID-19 (certain populations)
- ☐ Hepatitis A and hepatitis B (certain populations)
- ☐ Others if indicated

Preconception plan should include:

- ☐ Nutrition and medication plan to achieve glycemic goals prior to conception, including appropriate implementation of monitoring, continuous glucose monitoring, and pump technology
- ☐ Contraceptive plan to prevent pregnancy until glycemic goals are achieved
- ☐ Management plan for general health, gynecologic concerns, comorbid conditions, or complications, if present, including hypertension, nephropathy, retinopathy; Rh incompatibility; and thyroid dysfunction

Created using information from American College of Obstetricians and Gynecologists (10) and Ramos (20). COVID-19, coronavirus disease 2019; DKA, diabetic ketoacidosis; DVT/PE, deep vein thrombosis/pulmonary embolism; ECG, electrocardiogram; NAFLD, nonalcoholic fatty liver disease; PCOS, polycystic ovary syndrome; TSH, thyroid-stimulating hormone.

GLYCEMIC GOALS IN PREGNANCY

- 15.7 Fasting, preprandial, and postprandial blood glucose monitoring are recommended in individuals with diabetes in pregnancy to achieve optimal glucose levels. Glucose goals are fasting plasma glucose <95 mg/dL (<5.3 mmol/L) and either 1-h postprandial glucose <140 mg/dL (<7.8 mmol/L) or 2-h postprandial glucose <120 mg/dL (<6.7 mmol/L). B
- 15.8 Due to increased red blood cell turnover, A1C is slightly lower during pregnancy in people with and with- out diabetes. Ideally, the A1C goal in pregnancy is <6% (<42 mmol/mol) if this can be achieved without significant hypoglycemia, but the goal may be relaxed to 7% (<53 mmol/mol) if necessary to prevent hypoglycemia. B 15.9 When used in addition to pre and postprandial blood glucose monitoring, continuous glucose monitoring (CGM) can help to achieve the A1C goal in diabetes and pregnancy. B
- 15.10 CGM is recommended in pregnancies associated with type 1 diabetes. A When used in addition to blood glucose monitoring, achieving traditional pre and postprandial goals, real-time CGM can reduce the risk for large-for-gestational age infants and neonatal hypoglycemia in pregnancy complicated by type 1 diabetes. A
- 15.11 CGM metrics may be used in addition to but should not be used as a substitute for blood glucose monitoring to achieve optimal pre- and postprandial glycemic goals. E

- 15.12 Commonly used estimated A1C and glucose manager dent indicator calculations should not be used in pregnancy as estimates of A1C. C
- 15.13 Nutrition counseling should endorse a balance of macronutrients including nutrient-dense fruits, vegetables, legumes, whole grains, and healthy fats with n-3 fatty acids that include nuts and seeds and fish in the eating pattern. E

MANAGEMENT OF GESTATIONAL DIABETES MELLITUS

- 15.14 Lifestyle behavior change is an essential component of management of gestational diabetes mellitus (GDM) and may suffice as treatment for many individuals. Insulin should be added if needed to achieve glycemic goals. A
- 15.15 Insulin is the preferred medication for treating hyperglycemia in GDM. Metformin and glyburide, individually or in combination, should not be used as first-line agents, as both cross the placenta to the fetus. A Other oral and noninsulin injectable glucose-lowering medications lack long- term safety data. E
- 15.16 Metformin, when used to treat polycystic ovary syndrome and induce ovulation, should be discontinued by the end of the first trimester. A
- 15.17 Telehealth visits used in combination with in-person visits for pregnant people with GDM can improve outcomes compared with standard in- person care alone. A

MANAGEMENT OF PREEXISTING TYPE 1 DIABETES AND TYPE 2 DIABETES IN PREGNANCY

- 15.18 Insulin should be used to man- age type 1 diabetes in pregnancy. A Insulin is the preferred agent for the management of type 2 diabetes in pregnancy. B
- 15.19 Either multiple daily injections or insulin pump technology can be used in pregnancy complicated by type 1 diabetes. C

PREECLAMPSIA AND ASPIRIN

- 15.20 Pregnant individuals with type 1 or type 2 diabetes should be pre- scribed low-dose aspirin 100-150 mg/ day starting at 12 to 16 weeks of gestation to lower the risk of preeclampsia. E A dosage of 162 mg/day may be acceptable; E currently, in the U.S., low-dose aspirin is available in 81-mg tablets.

PREGNANCY AND DRUG CONSIDERATIONS

- 15.21 In pregnant individuals with diabetes and chronic hypertension, a blood pressure threshold of 140/90 mmHg for initiation or titration of therapy is associated with better pregnancy outcomes than reserving treatment for severe hypertension, with no increase in risk of small-for-gestational-age birth weight. A There are limited data on the optimal lower limit, but therapy should be deintensified for blood pressure <90/60 mmHg. E A blood pressure target of 110-135/ 85 mmHg is suggested in the interest of reducing the risk for accelerated maternal hypertension. A
- 15.22 Potentially harmful medications in pregnancy (i.e., ACE inhibitors, angiotensin receptor blockers, statins) should be stopped prior to conception and avoided in sexually active individuals of childbearing potential who are not using reliable contraception. B

POSTPARTUM CARE

- 15.23 Insulin resistance decreases dramatically immediately postpartum and insulin requirements need to be evaluated and adjusted as they are often roughly half the pre pregnancy requirements for the initial few days postpartum. C
- 15.24 A contraceptive plan should be discussed and implemented with all people with diabetes of child bearing potential. A
- 15.25 Screen individuals with a recent history of GDM at 4-12 weeks post-partum, using the 75-g oral glucose tolerance test and clinically appropriate non-pregnancy diagnostic criteria. B 15.26 Individuals with overweight/ obesity and a history of GDM found to have prediabetes should receive intensive lifestyle interventions and/or metformin to prevent diabetes. A
- 15.27 Breastfeeding efforts are recommended for all individuals with diabetes. A Breastfeeding is recommended for individuals with a history of GDM for multiple benefits, A including a reduced risk for type 2 diabetes later in life. B
- 15.28 Individuals with a history of GDM should have lifelong screening for the development of type 2 diabetes or prediabetes every 1-3 years. B 15.29 Individuals with a history of GDM should seek preconception screening for diabetes and preconception care to identify and treat hyperglycemia and prevent congenital malformations. E
- 15.30 Postpartum care should include psychosocial assessment and support for self-care. E

16. Diabetes Care in the Hospital:

HOSPITAL CARE DELIVERY STANDARDS

- 16.1 Perform an A1C test on all people with diabetes or hyperglycemia (random blood glucose > 140 mg/dL [>7.8 mmol/L]) admitted to the hospital if no A1C test result is available from the prior 3 months. B
- 16.2 Institutions should implement protocols using validated written or computerized provider order entry sets for management of dyslycemia in the hospital (including emergency department, intensive care unit [ICU] and non-ICU wards, gynecology-obstetrics/delivery units, dialysis suites, and behavioral health units) that allow for a personalized approach, including glucose monitoring, insulin and/ or noninsulin therapy, hypoglycemia management, diabetes self-management education, nutrition recommendations, and transitions of care. B

Diabetes Care Specialists in the Hospital Recommendation

- 16.3 When caring for hospitalized people with diabetes (with an existing or new diagnosis) or stress hyperglycemia, consult with a specialized diabetes or glucose management team when accessible. B

GLYCEMIC GOALS IN HOSPITALIZED ADULTS

- Recommendations
- 16.4 Insulin A and/or other therapies B should be initiated or intensified for treatment of persistent hyperglycemia starting at a threshold of ≥180 mg/dL (≥10.0 mmol/L) (confirmed on two occasions within 24 h) for noncritically ill (non-ICU) individuals. A
- 16.5a Once therapy is initiated, a glycemic goal of 140-180 mg/dL (7.8-10.0 mmol/L) is recommended for most critically ill (ICU) individuals with hyperglycemia. A
- 16.5b More stringent glycemic goals, such as 110-140 mg/dL (6.1-7.8 mmol/L), may be appropriate for selected critically ill individuals and are acceptable if they can be achieved without significant hypoglycemia. B

Continuous Glucose Monitoring

- 16.6 In people with diabetes using a personal continuous glucose monitoring (CGM) device, the use of CGM should be continued during hospitalization if clinically appropriate, with confirmatory point-of-care (POC) glucose measurements for insulin dosing decisions and hypoglycemia assessment, if resources and training are available, and according to an institutional protocol. B
- 16.7 For people with diabetes using an automated insulin delivery (AID) system along with CM, the use of AID and
- CGM should be continued during hospitalization if clinically appropriate, with confirmatory POC blood glucose measurements for insulin dosing decisions and hypoglycemia assessment, if resources and training are available, and according to an institutional protocol. C

Insulin Therapy

- 16.8 Basal insulin or a basal plus bolus correction insulin plan is the preferred treatment for noncritically ill hospitalized individuals with poor oral intake or those who are taking nothing by mouth. A
- 16.9 An insulin plan with basal, prandial, and correction components is the preferred treatment for most noncritically ill hospitalized individuals with adequate nutritional intake. A
- 16.10 Sole use of a correction or supplemental insulin without basal insulin (formerly referred to as a sliding scale) in the inpatient setting is discouraged. A

Noninsulin Therapies

- 16.11 For people with type 2 diabetes hospitalized with heart failure, it is recommended that use of a sodium-glucose cotransporter 2 inhibitor be initiated or continued during hospitalization and upon discharge, if there are no contraindications and after recovery from the acute illness. A

HYPOGLYCEMIA

- 16.12 A hypoglycemia management protocol should be adopted and implemented by each hospital or hospital system. A plan for preventing and treating hypoglycemia should be established for each individual. Episodes of hypoglycemia in the hospital should be documented in the electronic health record and tracked for quality assessment and quality improvement. E
- 16.13 Treatment plans should be reviewed and changed as necessary to prevent hypoglycemia and recurrent hypoglycemia when a blood glucose value of <70 mg/dL (<3.9 mmol/L) is documented. C

Sample Questions - Diabetes

1. Among adults with TYPE 2 DIABETES MELLITUS and OBESITY, what is the preferred pharmacologic agent to induce WEIGHT LOSS?
A. Tirzepatide
B. Dapagliflozin
C. Orlistat
D. Phentermine

2. The following are test/s that can be done to determine if a patient has diabetes mellitus, EXCEPT:
A. Request for urinalysis to test for glucosuria
B. Begin screening at age 45 years, then every 3 years
C. Screen at earlier age if they are overweight (BMI >/=25 kg/m2 or 23 kg/m2 in Asians) + one additional risk factor for DM.
D. May use HBa1C, FPG, or 2-hr plasma glucose after 75-g OGTT for screening

3. Mrs. Spleng Da, a 64 y/o diabetic female, is presenting with abdominal pain and diaphoresis. She is maintained on Metformin 500mg BID and insulin, but is lost to follow-up. CBG is at 350 mg/dl and urinalysis revealed 50 pus cells with +4 glucose and +3 ketones. Which is the most appropriate initial diagnosis?
A. Diabetes mellitus
B. Hypoglycemia
C. Hyperosmolar hyperglycemic non ketotic coma
D. Diabetic ketoacidosis

4. In many patients with type 2 DM, glucose levels are adequately controlled with lifestyle changes or oral drugs, and insulin is added when glucose remains inadequately controlled by ≥ 2 oral drugs. The addition of insulin is the most effective with which of the following oral drugs?
A. AGIs
B. Insulin secretagogues
C. Oral biguanides
D. SGLT2 inhibitors

5. According to most practice guidelines, the diagnosis of DM among adults are based on the following clinical manifestations, EXCEPT:
A. Polyuria, Polyphagia, Polydipsia
B. Nocturia
C. Weight gain
D. Blurring of vision, numbness, or non-healing wound

6. Which of the following is NOT AN INDICATION for diabetes screening among overweight patients according to the ADA guidelines?
A. History of GDM
B. BP 140/90
C. Third degree relative with diabetes
D. HDL 90 mg/dL

7. Mrs, Spleng Da who is a diabetic on insulin treatment, was brought to the ER, unconscious. Which among the following is the initial diagnostics to do as an acute care approach?
A. 12 L ECG
B. CBG
C. Cranial CT Scan
D. MRI

8. You referred Ms E Qual to cardio service and renal service after finding out that she had a previous MI and that her creatinine clearance was slightly decreased. She was referred back to you for continuation of care. Refusing any insulin treatment, the second line of treatment with proven benefit is?
A. Glibenclamide
B. Glyburide
C. Acarbose
D. Dapagliflozin

9. Which among the following diet is recommended to a family with a diabetic patient based on most DM practice guidelines?
A. Atkins Diet
B. Mediterranean Diet
C. Ketogenic Diet
D. Pinggang Pinoy

10. An asymptomatic 33 year old patient with a BMI of 22 and no family history of DM, came to your clinic with the following labs: FBS 126 and A1c 5.6%. Which among the following is the best recommended approach?
A. Repeat FBS
B. Start Metformin 500 mg BID
C. Start Insulin treatment
D. Refer to diabetologist

11. You worked up a diabetic in his annual examination and found out that he has an A1c of 7% and has eGFR of 55 mL/min/1.73m2 According to ADA, what is the most appropriate medication to add to his ongoing Metformin prescription?
A. Glimepiride
B. Dapagliflozin
C. Sitagliptin
D. Liraglutide

12. According to ADA, which among the following patients is recommended to use hemoglobin A1c in order to screen for diabetes mellitus?
A. Patients with hemoglobinopathies
B. Pregnant patients
C. Hemodialysis patients
D. Children and Adolescents

13. A pregnant patient came for a prenatal exam in your health center. 75 gram OGTT was done which revealed the following results: Fasting 90 mg/dl, 1hr postprandial 190 mg/dl, and 2 hr postprandial 160 mg/dl. Which among the following is TRUE?
A. The patient does not have GDM
B. The cutoff for GDM is Fasting of 92, 1 hr postprandial of 190 and 2 hr postprandial of 160
C. Patients should undergo repeat fasting of at least 12 hours for OGTT
D. Patient should be on GDM therapy

14. An asymptomatic patient with BMI of 26, came to your clinic with the following laboratories: FBS 115 mg/dl, and A1c 6.1%. He has no comorbidities and there was no heredofamilial diseases noted. Which is the most appropriate approach?
A. Advise weight loss and increase physical activity
B. Start Metformin 500mg 1 tab BID
C. Start Insulin therapy
D. Refer to Specialist

15. According to ADA, which among the following is true about glycemic targets in hospitalized patients?
A. Insulin therapy should be initiated at >200 mg/dl
B. Hospitalized patients should not be managed with insulin
C. Glucose range of 140-180 mg/dl is recommended
D. Sliding scale insulin regimen is strongly recommended

16. A 25 year old female patient came to your clinic with 3P's and an A1c of 7%. He has no other symptoms with essentially normal PE findings. Which among the following laboratories is NOT RECOMMENDED according to the DM Clinical Pathway?
A. 12-L ECG
B. Fasting lipid profile
C. Liver Enzyme Tests (AST/ALT)
D. Creatinine

17. A 47 year old patient brought his annual PE laboratories with the following results: FBS 105 mg/dl and A1c 5.3%. Patient has a BMI of 22 with no family history of DM. Which among the following is the MOST APPROPRIATE approach according to ADA?
A. Start Metformin 500mg 1 tab BID
B. Repeat Lab after 3 months
C. Repeat lab after 1 year
D. Repeat lab after 3 years

18. A 25yo G2P1 (1001) at 8 2/7 wks AOG came to the emergency room due to vaginal discharge. She denies abdominal pain, contractions, headache, fever, dysuria, polyuria, polyphagia, polydipsia. Past medical history reveals Obese Class 2 and is on medical nutrition therapy. Her family medical history revealed (+) DM Type 1= father and DM Type 2= mother. Obstetrics history G2P1 (1001) G1 2019, born term, NSD, at lying-in clinic, alive. She was diagnosed with GDM during the same pregnancy. Gynecologic history: (+) PCOS = 1st diagnosed at 20yo and is non-compliant to her medications. Based on the 2023 American Diabetes Association standards of care, what is the recommended screening management for this patient?
A. Request for FBS on the 24th-28th week of gestation.
B. Request for HBA1C on the 24th-28th week of gestation.
C. Request for FBS as early as the current gestation.
D. Request for 75G OGTT as early as the current gestation.

19. A 35yo, male, obese call center agent came in for consult due to weight loss and polydipsia. One month prior to consult the patient started to notice that he has increased thirst, from his usual 5-6 glasses of water per day to a 1-liter tumbler of water consumed approximately 5x/day. Polyuria and polyphagia were also noticed. One week prior, he started to have decrease in appetite in addition to polydipsia, polyphagia and polyuria. No consultation was sought previously. He denies any past medical conditions, and pertinent family history revealed his brother has

DM Type 1. He is a non-smoker, with alcoholic beverage intake of 5 bottles of beer 3x per week. Today he sought consultation at the company's clinic and was requested CBC, FBS, HBA1C, lipid profile and CXR. Pertinent results were as follows: FBS: 210mg/dL, HBA1C: 11%, Total Chol: 300mg/dL, LDL: 180mg/dL, HDL: 38mg/dL, and a normal CXR. What is your impression for this case?

A. Diabetes Mellitus Type 2, newly diagnosed; Dyslipidemia
B. Diabetes Mellitus Type 1, uncontrolled; Hyperlipidemia
C. Diabetes Mellitus Type 2, uncontrolled; Hyperlipidemia
D. Diabetes Mellitus Type 1, newly diagnosed; Dyslipidemia

20. A 36yo G1P0 who is on her 24 1/7 wks AOG was admitted due to irregular contractions. She has lost to follow up with her OB. She claims that she is only on multivitamins and only had her urine, cbc, HbsAg, RPR, HIV and transvaginal ultrasound done on her 6th wk AOG. She denies weight loss, easy fatigability, dysuria, fever, cough, polyuria, polyphagia, polydipsia. She is obese but denies other medical conditions. Her family medical history reveals (+) DM Type 2, both parents. According to the 2023 American Diabetes Association standards of care which of the following 75G OGTT result will reveal Gestational Diabetes Mellitus?

A. FBS= 92mg/dL; 1hour= 150mg/dL; 2hour= 120mg/dL
B. FBS = 90 mg/dL; 1hour= 160mg/ dL; 2hour= 130mg/dL
C. FBS = 90 mg/dL; 1hour= 170mg/dL; 2hour= 140mg/dL
D. FBS= 90 mg/dL; 1 hour= 180 mg/dL; 2hour= 150mg/dL

21. Based on American Diabetes Association treatment algorithm, the following have VERY HIGH EFFICACY for GLUCOSE LOWERING, EXCEPT:

A. tirzepatide
B. empagliflozin
C. semaglutide
D. insulin glargine

22. According to the American Diabetes Association, which statement is TRUE regarding GESTATIONAL DIABETES MELLITUS (GDM) SCREENING?

A. a. GDM screening reduces the incidence of fetal microsomia, as well as the need for caesarean section delivery.
B. GDM screening is done at the second trimester of the pregnancy.
C. The 100-gram oral glucose tolerance test (OGTT) is the recommended screening test for GDM.
D. Women with body mass index (BMI) of more than 20 kg/m² are screened for GDM during the first prenatal check-up

23. Deana, a 47-year-old sales lady, consults at the Family and Community Medicine Out-Patient Clinic due to pain and burning feeling affecting her feet. She has been religiously taking metformin 500 mg TID for three years now, but she has not seen the doctor after her initial diagnosis in 2021. According to the American Diabetes Association, which of the following statements is FALSE regarding DIABETIC PERIPHERAL NEUROPATHY (DPN)?

A. Pregabalin is considered as one of the first-line agents in DPN.
B. Optimize serum lipid control to reduce the risk or slow the progression of DPN.
C. Neurotropic vitamins, such as vitamin B supplementation, restores nerve damage in DPN.
D. Optimize glucose management to prevent or delay the development of DPN.

24. Which of the following statements on ORAL ANTI-DIABETIC AGENTS used in primary care diabetology is TRUE?

A. Biguanides (e.g., Metformin) can be safely given to geriatric patients with elevated creatinine levels
B. Sulfonylureas (e.g., Gliclazide) can cause significant hypoglycemic episodes, on top of possible weight gain.
C. DPP-4 inhibitors (e.g., Sitagliptin) do not require renal doses, since they are metabolized primarily via the biliary system.
D. SGLT-2 inhibitors (e.g., Dapagliflozin) have been recognized for their cardiorenal benefits and may be given to diabetic patients on hemodialysis for better glycemic control.

25. Which of the following statements on the primary care management of TYPE 2 DIABETES MELLITUS is FALSE?

A. When starting prandial insulin (i.e., Glulisine) in a 45-year-old female, the starting dose may be given at 4 units pre-meals.
B. When starting basal insulin (i.e., Glargine 300) in a non-obese 77-kg adult male, the starting dose may be prescribed at 15 units before breakfast.
C. When starting a GLP-1 receptor agonist (i.e., Liragutide), it is best to combine this with a DPP-4 inhibitor (i.e., Sitagliptin) to maximize synergistic effects of the incretin mimetics.
D. When monitoring the effectiveness of the evening dose of a 70% intermediate-acting insulin (i.e., Isophane) / 30% short-acting insulin (i.e., regular), it is recommended to check the pre-breakfast capillary blood glucose.

26. A 50-year-old businessman consulted at the Family and Community Medicine OutPatient Clinic due to elevated blood glucose in his annual physical examination. His father died of acute myocardial infarction at the age of 54 years, and two of his maternal uncles have type 2 diabetes mellitus (T2DM). His body mass index (BMI) was 28.7 kg/m? with a blood pressure (BP) of 110/70 mmHg. Laboratory results showed a fasting plasma glucose (FPG) of 168 mg/dL, total cholesterol of 198 mg/dL, LDL-cholesterol of 110 mg/dL, HDL-cholesterol of 40 mg/dL, and triglycerides of 190 mg/dL. HbAi Was 7.9%, and he alleged that this was the first time his glucose parameters were elevated. Which of the following is the best DISCHARGE ADVICE encompassing a PATIENT-CENTERED, FAMILY-FOCUSED, and COMMUNITY-ORIENTED management?

A. The patient is a T2DM suspect and must have repeat FPG to confirm the diagnosis together with the lipid profile after 6-8 weeks. Low carbohydrate and low-fat diet must be observed by patient and his family. Community programs for lifestyle change must be encouraged.
B. The patient is a T2DM suspect, must have repeat FPG, but must already be started on low intensity statin therapy. Weight reduction is important for the patient and must be supported by the family. Members of the family must all advocate healthy lifestyle in the community.
C. The patient has T2DM and may be started on medications, such as a biguanide and a sulfonylurea. He should also be started on low to moderate statin therapy. Family support for his lifestyle modification of importance and community participation in healthy programs are likewise encouraged.
D. The patient has T2DM, and oral antl-hyperglycemic agents, such as SGLT-2 inhibitor and GLP-1 receptor agonist, ought to be started. He should be prescribed with Simvastatin 20 mg OD. The family should observe Pinggang Pinoy diet methods and join community lifestyle activities with the patient.

27. Which CLASS OF MEDICATION is recommended for adult patients with TYPE 2 DIABETES MELLITUS (T2DM) and CHRONIC KIDNEY DISEASE (CKD) to reduce progression of NEPHROPATHY?

A. SGLT-2 inhibitors
B. DPP-4 inhibitors
C. basal insulin
D. meglitinides

28. Based on the 2025 American Diabetes Association (ADA) guidelines, which of the following drugs is MOST ASSOCIATED with WEIGHT LOSS BENEFITS in adult patients with TYPE 2 DIABETES MELLITUS (T2DM)?

A. Sitagliptin
B. Liraglutide
C. Glimepiride
D. Pioglitazone

29. Which NEW PHARMACOLOGIC OPTION introduced in the 2025 American Diabetes Association guidelines combines GIP and GLP-1 RECEPTORS AGONISM?

A. Tirzepatide
B. Liraglutide
C. Dulaglutide
D. Semaglutide

30. Which of the following is TRUE regarding TIME-IN-RANGE (TIR) MONITORING in the 2025 American Diabetes Association (ADA) recommendations?

A. TIR ≥70% is a desirable goal in continuous glucose monitored (CGM) users.
B. TIR is only useful for patients on insulin pumps.
C. TIR is discouraged due to lack of evidence.
D. TIR should replace HBA1c for diagnosis.

31. According to the 2025 American Diabetes Association (ADA) guidelines, when should INSULIN THERAPY be considered in adult patients with TYPE 2 DIABETES MELLITUS (T2DM)?

A. at diagnosis, regardless of HBA1c
B. only when oral medications fail
C. only after trying at least three (3) non-insulin agents
D. if there is evidence of catabolism or HBA1c ≥ 10% with symptoms

32. A 50-year-old civil engineer with CHRONIC KIDNEY DISEASE (CKD) presents for TYPE 2 DIABETES MELLITUS (T2DM) screening. He is concerned about the RELIABILITY OF BLOOD TESTS due to his kidney condition. Which of the

following statements regarding the use of HbAIc for SCREENING in this patient is consistent with the latest guidelines?

E. HbAIc is the preferred screening test due to its convenience of use.
F. HbAIc is a reliable screening tool for all patients, regardless of comorbidities.
G. HbAIc is only recommended if a 75-gram oral glucose tolerance test (OGTT) cannot be performed.
H. HbAIc may be used if performed with standardized assays, but it is not recommended in conditions like chronic kidney disease

Answers & Rationale - Diabetes

1. Answer A

- According to the guidelines (Recommendation 8.17), for adults with type 2 diabetes and overweight or obesity, the preferred pharmacologic agents for weight loss are those with the greatest efficacy. This includes dual glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide 1 (GLP-1) receptor agonists, such as tirzepatide, or potent GLP-1 receptor agonists like semaglutide

2. Answer A

- While glucose in the urine (glucosuria) can be a sign of high blood sugar, it is **not a standard diagnostic test** for diabetes mellitus. The formal diagnosis relies on blood tests, specifically the **A1C, Fasting Plasma Glucose (FPG), or the 2-hour plasma glucose value during an OGTT** (Recommendation 2.1a).

3. Answer D

- The patient presents with the key features of Diabetic Ketoacidosis (DKA): **hyperglycemia** (CBG 350 mg/dL) and significant **ketosis** (+3 ketones). Abdominal pain is a classic symptom of DKA, and the high pus cell count suggests a UTI, which is a common trigger for DKA, even in patients with type 2 diabetes.

4. Answer C

- Oral biguanides, specifically **metformin**, are almost always continued when insulin is added. Metformin's primary mechanism is to decrease insulin resistance and reduce the liver's glucose production. This action is complementary to injected insulin and helps make the insulin therapy more effective, often allowing for lower insulin doses.

5. Answer C

- The classic symptoms of uncontrolled hyperglycemia and new-onset diabetes are polyuria (excessive urination), polyphagia (excessive hunger), and polydipsia (excessive thirst). Due to the body's inability to use glucose for energy and the loss of calories in the urine, a common sign is **unexplained weight loss**, not weight gain (Recommendation 2.9).

6. Answer C

- The ADA guidelines specify having a **first-degree relative** (parent, sibling, child) with diabetes as a key risk factor that warrants screening in an overweight individual. A third-degree relative (like a cousin or great-grandparent) does not meet this specific criterion. High HDL (Option D) is protective, not a risk factor

7. Answer B

- In any patient with diabetes presenting with a decreased level of consciousness, the most critical and immediate step is to check for hypoglycemia, as it is a rapidly reversible and life-threatening condition. A **capillary blood glucose (CBG)** test provides this information within seconds at the bedside.

8. Answer D

- This patient has established atherosclerotic cardiovascular disease (previous MI) and chronic kidney disease (decreased creatinine). The guidelines (Recommendation 10.41a) strongly recommend using an **SGLT2 inhibitor** (like dapagliflozin) in such patients because they have proven benefits in reducing the risk of major adverse cardiovascular events and slowing the progression of kidney disease.

9. Answer B

- The guidelines (Recommendation 10.14) explicitly recommend eating patterns like the **Mediterranean diet** or DASH diet to improve the lipid profile and reduce cardiovascular risk in people with diabetes. While "Pinggang Pinoy" (Option D) is an excellent, culturally appropriate dietary tool for Filipinos that reflects similar healthy principles, the Mediterranean diet is the one specifically named in most international practice guidelines.

10. Answer A

- The patient has conflicting lab results: the Fasting Blood Sugar (FBS) of 126 mg/dL meets the criteria for diabetes, but the A1C of 5.6% is normal. In an asymptomatic patient with discordant results, the guidelines (Recommendation 2.1b) require a **confirmatory test**. The most logical next step is to repeat the abnormal test to confirm the diagnosis before starting any treatment.

11. Answer B

- The patient has chronic kidney disease (CKD), as indicated by an eGFR of less than 60 mL/min/1.73m². According to the guidelines (Recommendation 11.5a), an **SGLT2 inhibitor** like dapagliflozin is recommended for people with type 2 diabetes and CKD (with eGFR ≥20) to slow the progression of kidney disease and reduce cardiovascular events

12. Answer D

- The guidelines explicitly state that A1C should **not** be used for screening in patients with conditions that alter red blood cell turnover, which includes hemoglobinopathies (A), pregnancy (B), and hemodialysis (C) (Recommendation 2.4). A1C is, however, listed as an appropriate screening test for children and adolescents (Recommendation 14.50).

13. Answer D

- According to the "one-step" 75g OGTT criteria for diagnosing Gestational Diabetes Mellitus (GDM), a diagnosis is made if any one of the following thresholds is met or exceeded: Fasting ≥92 mg/dL, 1-hour ≥180 mg/dL, or 2-hour ≥153 mg/dL. This patient's 1-hour (190 mg/dL) and 2-hour (160 mg/dL) values both exceed the diagnostic cutoffs, confirming a diagnosis of GDM that requires treatment.

14. Answer A

- The patient's lab results (FBS 115 mg/dL and A1c 6.1%) fall squarely in the **prediabetes** range. For individuals with prediabetes, the primary and universal recommendation is an intensive lifestyle behavior change program focused on achieving weight loss and increasing physical activity (Recommendation 3.3). Metformin may be considered, but only after or alongside lifestyle changes, especially as this patient does not meet the higher-risk criteria for initiating medication (e.g., BMI ≥35).

15. Answer C

- The guidelines (Recommendation 16.5a) state that a target glucose range of **140–180 mg/dL** is recommended for the majority of hospitalized patients (both critically and non-critically ill). Insulin is typically initiated at a threshold of ≥180 mg/dL, and sliding scale insulin as a sole therapy is strongly discouraged.

16. Answer A

- While a comprehensive evaluation is necessary at diagnosis, a routine screening ECG for coronary artery disease is not recommended in asymptomatic young adults (age 25) with a new diabetes diagnosis unless there are specific cardiac symptoms or signs (Recommendation 10.38a). A fasting lipid profile, liver enzymes, and creatinine (for eGFR) are all standard parts of the initial metabolic and complication assessment.

17. Answer D

- The patient is 47 years old, so he meets the age criterion for screening (≥35 years). His A1c is normal and his BMI is normal. He has an isolated impaired fasting glucose (FBS 105 mg/dL), which puts him at low risk. For individuals without diabetes after screening, the guidelines recommend repeat screening at a minimum of **3-year intervals** (bullet point under 2.10).

18. Answer D

- This patient has multiple significant risk factors for undiagnosed type 2 diabetes (obesity, history of GDM, PCOS, family history). The guidelines (Recommendation 2.26a) recommend testing for undiagnosed diabetes at the **first prenatal visit** (before 15 weeks) for individuals with risk factors. The 75g OGTT is the preferred and most comprehensive test to formally diagnose glucose metabolism abnormalities in pregnancy.

19. Answer A

- The patient's phenotype (35 years old, obese) strongly suggests **Type 2 DM** as the initial diagnosis. Since this is his first consultation for these symptoms and labs, it is considered **newly diagnosed**. The term **dyslipidemia** is the most accurate description for his lipid panel, which includes high total cholesterol, high LDL, and low HDL. While his brother's Type 1 DM is noted, the patient's own clinical picture is classic for Type 2.

20. Answer A

- The diagnosis of GDM using the one-step 75g OGTT is made if **any one** of the following values is met or exceeded: Fasting ≥92 mg/dL, 1-hour ≥180 mg/dL, or 2-hour ≥153 mg/dL. In option A, the fasting blood sugar is exactly **92 mg/dL**, which meets the criteria for diagnosis. The other options do not have any values that meet or exceed the diagnostic thresholds.

21. Answer B

- In terms of glucose-lowering ability, empagliflozin (an SGLT-2 inhibitor) has intermediate efficacy. Agents with very high efficacy include insulin, high-dose GLP-1 RAs (like semaglutide), and dual GIP/GLP-1 RAs (like tirzepatide).

22. Answer B

- For pregnant individuals not previously known to have diabetes, standard screening for Gestational Diabetes Mellitus (GDM) is performed at 24–28 weeks of gestation (Recommendation 2.27), which is during the second trimester. Early screening is only done for those with significant risk factors.

23. Answer C

- This statement is FALSE. While it's important to test for and treat vitamin B12 deficiency (especially in those on metformin), there is no evidence that vitamin supplementation can reverse or restore existing nerve damage from Diabetic Peripheral Neuropathy (DPN) in people without a deficiency. Management focuses on glycemic control to prevent progression and medications to manage pain symptoms

24. Answer B

- This statement is TRUE. The two most well-known and clinically significant adverse effects of the sulfonylurea class are a high risk of hypoglycemia and the tendency to cause weight gain

25. Answer C

- This statement is **FALSE**. Both GLP-1 receptor agonists and DPP-4 inhibitors work on the incretin pathway. Using them together is considered duplicative therapy, as it offers little to no additional glucose-lowering benefit and is not recommended.

26. Answer D

- This is the best and most comprehensive answer.
  - **Diagnosis is Confirmed:** With an FPG of 168 and A1c of 7.9%, the diagnosis of T2DM is confirmed and does not require a repeat test.
  - **Modern Pharmacotherapy:** Recommending an SGLT-2 inhibitor or GLP-1 receptor agonist aligns with modern guidelines that prioritize agents with cardiorenal benefits, especially in a patient with a strong family history of heart disease.
  - **Statin Therapy:** Given his age (>40), T2DM diagnosis, and risk factors, **moderate-intensity statin therapy** (like Simvastatin 20 mg) is indicated.
  - **Patient-Centered Advice:** Recommending the **"Pinggang Pinoy"** diet is a culturally appropriate, family-focused approach for your location in the Philippines.

27. Answer A

- For adult patients with type 2 diabetes and chronic kidney disease (CKD), SGLT-2 inhibitors are recommended. This class of medication is specifically used to reduce the progression of CKD, as well as to reduce cardiovascular events and hospitalizations for heart failure

28. Answer B

- Liraglutide is a glucagon-like peptide 1 (GLP-1) receptor agonist. This class of medication is associated with weight loss (ranging from intermediate to very high).
  - The other options are not associated with weight loss:
    - Sitagliptin (a DPP-4 inhibitor) is "Neutral" for weight change.
    - Glimepiride (a Sulfonylurea) is associated with weight "Gain".
    - Pioglitazone (a Thiazolidinedione) is associated with weight "Gain".

29. Answer A

- Tirzepatide is identified as a dual glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide 1 (GLP-1) receptor agonist. The other options, Liraglutide, Dulaglutide, and Semaglutide, are classified as GLP-1 receptor agonists but do not have this dual GIP agonism

30. Answer A

- Time in Range (TIR) > 70% is a recommended parallel goal to an A1C <7% for many nonpregnant adults. This metric is used to assess glycemic status in individuals using continuous glucose monitoring (CGM). The goal is also to limit "time below range" to less than 4%.
  - Option (b) is incorrect. TIR is a metric used for anyone on CGM, not just those on insulin pumps.
  - Option (c) is incorrect. TIR is recommended and associated with the risk of microvascular complications.
  - Option (d) is incorrect. A1C, FPG, or OGTT are used for diagnosis, while TIR is used for ongoing glycemic assessment or monitoring

31. Answer D

- insulin therapy should be considered for adults with type 2 diabetes if there is evidence of ongoing catabolism (such as unexpected weight loss), if symptoms of hyperglycemia are present, or when A1C or blood glucose levels are very high (i.e., A1C > 10% or blood glucose ≥300 mg/dL). This initiation can occur regardless of the background glucose-lowering therapy already being used.

32. Answer D

- Option A (Preferred due to convenience): This is incorrect. While HbA1c is convenient, its reliability is compromised in this patient, so it is not the preferred test.
- Option B (Reliable for all patients): This is incorrect. The guidelines explicitly list several conditions that interfere with HbA1c accuracy.
- Option C (Only if OGTT cannot be performed): This is incorrect. This reverses the recommendation. For this patient, plasma glucose testing (like an OGTT or FPG) is preferred over HbA1c.
- Option D (Not recommended in CKD): in conditions associated with an "altered relationship between A1C and glycemia," plasma glucose criteria (like FPG or OGTT) should be used for diagnosis. Hemodialysis, a treatment for advanced chronic kidney disease, is specifically listed as one of these interfering conditions. Advanced CKD can cause anemia and require erythropoietin therapy, both of which shorten red blood cell survival and falsely lower the HbA1c, making it an unreliable diagnostic tool for this patient.

Hypertension

Summary of the 2020 Clinical Practice Guidelines for the Management of Hypertension in the Philippines

I. Diagnosis and Management of Hypertension in Adult Population

Among adult Filipinos, what is the definition of hypertension?

- Hypertension is defined as an office blood pressure (BP) of 140/90 mm Hg or above, typically at least twice taken on 2 separate days.
  - It is recommended that **office BP** be classified as Normal, Borderline, Hypertension.

CLASSIFICATION OF BP	
Normal	< 120/80 mmHg
Borderline	120-139/ 80-89 mmHg
Hypertension	> 140/90 mmHg

- Out of office BP measurements are recommended to confirm the diagnosis of hypertension, with:
  - ambulatory blood pressure monitoring (ABPM) as the preferred method,
  - and home blood pressure monitoring (HBPM) as an acceptable alternative.

Among adult Filipinos, what device is recommended for accurate blood pressure determination and monitoring?

- Validated **automated oscillometric sphygmomanometer (digital device)** is recommended for *in office or out of office* use.
- The **aneroid sphygmomanometer** (manual device) may be used *in office or out of office* provided the *examiner is efficient and well trained*, and the *device is periodically checked* according to standard maintenance procedures.
- The **aneroid sphygmomanometer** is recommended for special cases like the ***presence of arrhythmias or extremes in BP levels***.

Among adult Filipinos, what are the blood pressure thresholds for treatment and BP targets for the prevention of cardiovascular disease?

- A therapeutic threshold of 140/90 mmHg to achieve a **goal of less than 130/80** is recommended for most adults with hypertension.
- For the **very elderly**, *defined as 80 years old and above*, a therapeutic threshold of 150/90 mm Hg to achieve a goal BP of **less than 140/90** mm Hg is recommended

Among Filipinos with hypertension, what are the general treatment recommendations?

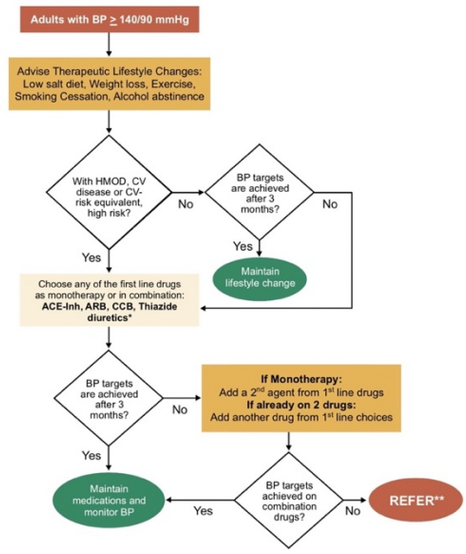
What non-pharmacologic approaches are recommended for persons with hypertension?

- **Lifestyle modification** remains the ***cornerstone for the management of hypertension***.
  - Robust clinical trial evidence has shown that it can prevent or delay the onset of high blood pressure and can reduce cardiovascular risk.
- **Healthy lifestyle choices** are the *first line of antihypertensive treatment* and of course are synergistic to the effects of antihypertensive medications.

- **Lifestyle modifications should include the following:**
  - Sodium restriction to as low as **1500 mg/day**.
    - The American Heart Association recommends that sodium intake be limited to **2300 mg/d** (about roughly half a teaspoon of table salt) in *most healthy individuals*
    - **1500 mg/d** in people with *prehypertension or hypertension*.
  - **Dietary Approaches to Stop Hypertension (DASH)** meal plan which is low in sodium and high in dietary potassium, can be recommended for all patients with hypertension without renal insufficiency
    - The DASH diet is rich in fruits, vegetables, low-fat dairy, fish, whole grains, fiber, potassium, and other minerals at recommended levels and low in red and processed meat, sugar sweetened foods and drinks, saturated fat, cholesterol, and sodium
  - Aerobic physical activity and (dynamic) resistance exercises
  - Abstinence from alcohol or moderate alcohol intake
  - Significant weight loss of > 5% of the baseline weight for those who are overweight or obese
  - Smoking cessation

What are the preferred drugs for the treatment of hypertension among adult Filipinos for prevention of cardiovascular diseases?

- Among persons with uncomplicated hypertension - suitable first-line antihypertensive drugs, either as monotherapy or combination:
  - angiotensin-converting enzyme (ACE) inhibitors or
  - angiotensin-receptor blockers (ARBs)
  - calcium channel blockers
  - thiazide/thiazide-like diuretics
- Ideal combination therapy includes:
  - renin-angiotensin-system (RAS) blocker with calcium channel-blocker (CCB) or thiazide/thiazide-like diuretics.
  - Other combinations of the five major classes may also be used in patients with compelling indications for the use of specific drug classes.
- **ACE inhibitors & ARBs are not recommended to be used in combination.**
  - Likewise, combinations of ACE-I or ARBs with direct renin inhibitors should not be used.
- The use of free combinations is recommended if single-pill combination therapy is not available or not affordable.
- **Beta blockers** are suitable as initial therapy in hypertensive patients with coronary artery disease, acute coronary syndrome, high sympathetic drive and pregnant women.
  - Beta blockers for those with congestive heart failure was specified to be bisoprolol, carvedilol, metoprolol succinate or nebivolol.
- Among patients with BP >150/100 mm Hg (or >160/100 mm Hg in the elderly), a combination of 2 agents, preferably combination of a RAAS inhibitor (ARB/ACE-is) and CCB or diuretic, should be given initially since it is unlikely that any single agent would be sufficient to achieve the BP target.
- Guideline recommendations include risk-factor identification to stratify hypertensive patients since the presence of one or more additional cardiovascular risk factors proportionally increases the risk of coronary, cerebrovascular, and renal diseases.
- Risk stratification directs the degree of aggressiveness in setting BP targets and in using pharmacologic treatment on top of diet and lifestyle modifications.
- Risk stratification involves identification of risk factors, presence of hypertension-mediated organ damage (HMOD) and established cardiovascular and related diseases.
- **Cardiovascular risk factors include**
  - advanced age (>65 years)
  - male gender
  - increased body weight (BMI > 25 kg/m2),
  - diabetes
  - high LDL-C (>130 mg/dl)
  - high triglyceride (>150 mg/dl)
  - family history of CVD
  - family history of hypertension
  - early-onset menopause
  - smoking,
  - various psychosocial or socioeconomic factors (poverty)
- **Hypertension-mediated Organ Damage (HMOD):**
  - LVH (LVH with ECG)
  - moderate-severe CKD (CKD; eGFR <60 ml/min/1.73m2)
  - Significant Comorbid Diseases which increase cardiovascular risk with the background of hypertension
  - previous coronary heart disease (CHD)
  - Heart Failure
  - Stroke
  - peripheral vascular disease
  - atrial fibrillation
  - CKD stage 3+



- ** Preferred combinations: ACE-Inh/ARB + CCB, ACE-Inh/ARB + HCTZ*
- *Beta-blockers may be used as initial therapy in hypertensive patients with coronary artery disease, acute coronary syndrome, high sympathetic drive and pregnant women.*
- *** Patients with hypertension who continue to be uncontrolled on 3 drug combinations one of which is a diuretic are considered to have RESISTANT HYPERTENSION and warrant referral to specialists for work-up or initiation of second line agents.*

II. Management of Hypertension Among persons with diabetes

Among persons with diabetes, what is the threshold for treatment of elevated blood pressure?

- Among persons with diabetes and hypertension, it is recommended that drug therapy (along with lifestyle change) be initiated at a blood pressure of > 140/90 mm Hg.
  - the threshold for treatment continues to be 140/90 mm Hg.

Among persons with diabetes and hypertension, what non-pharmacologic therapy is recommended?

- The general advice for non-pharmacologic therapy for hypertension among persons with diabetes is similar to the general population.
- Additionally, screening for obstructive sleep apnea may be worthwhile as randomized studies of people with diabetes have shown that treatment of OSA (by Continuous Positive Airway Pressure or CPAP) reduces blood pressure

Among persons with diabetes and hypertension, what are the blood pressure targets for prevention of cardiovascular diseases (mortality and morbidity)?

- A blood pressure target of <130/80 mm Hg is recommended for most persons with diabetes mellitus and hypertension; however, do not lower down the blood pressure below 120/70 due to an increased risk for adverse events.
- While cardiovascular risk reduction (myocardial infarction, CV death) is already significant for BP < 140/90 mm Hg (with no additional benefit for < 120 mm Hg), a lower blood pressure target of < 130/80 mm Hg has additional benefit for stroke reduction and decreased risk for nephropathy.

Among persons with diabetes, what are the preferred drugs for the treatment of hypertension?

- It is recommended to initiate treatment with a low-dose combination of a RAAS blocker (ACE-I or ARB) with a CCB or thiazide/thiazide-like diuretic, preferably using a single-pill combination (SPC).
  - Free tablet combinations may also be given if SPCs are not available.
- As already stated in the general guidelines, the choice for starting on initial combination therapy results in greater achievement of BP lowering at the shortest amount of time.
  - Low-dose combination therapy has been shown to be more effective than maximal dose monotherapy in the general population of persons with hypertension.
- The combination of ACE and ARB is not recommended due to a higher risk of hyperkalemia and renal failure.

III. Management of Hypertension in Persons with Chronic Kidney Disease

- Hypertension is highly prevalent in individuals with chronic kidney disease
- The prevalence of hypertension increases from 36% in stage 1 to 84% in chronic kidney disease stage 4 and 5.
  - Needless to say, blood pressure control is fundamental to the care of patients with chronic kidney disease and is relevant at all stages of chronic kidney disease regardless of underlying cause.

Among patients with CKD who are pre-dialysis, what is the level of blood pressure to start pharmacotherapy to prevent cardiovascular complications and renal progression?

- Patients with BP more than or equal to 140/90 mmHg should have prompt initiation and timely titration of pharmacotherapy to achieve blood pressure goals.

Among patients with CKD who are pre-dialysis, what is the target blood pressure to prevent cardiovascular complications and renal progression?

- For routine office blood pressure measurement, maintain a BP target consistently less than 140 mmHg systolic and less than 90 mmHg diastolic in patients with low risk of cardiovascular disease and CKD grade 4 and 5, or if with adverse effect on intensive target of less than 130/80 mmHg.
  - CKD patients with high cardiovascular risk or CKD grade 3 or earlier is recommended to have a blood pressure target of less than less than 130/80 mmHg.
- A systolic BP of less than 120 mmHg using a standardized office BP measurement is targeted, when tolerated, among adults with high BP and non-dialysis CKD (ND-CKD).
- An individualized treatment target is recommended for the following patient populations and *these patient populations, a specialist referral is suggested:*
  - Diabetic Kidney Disease patients
  - CKD grade 4 and 5ND patients
  - patients with proteinuria of more than 1 g/day
  - individuals with baseline SBP of 120 to 129 mmHg
  - those with very low diastolic BP of less than 50 mmHg with CAD
  - those with white coat or severe hypertension
  - stroke patients
  - those with age less than 50 with low absolute risk for CV disease or those individuals above 90 years of age
  - very frail patients
  - those with limited life expectancy
  - those with symptomatic postural hypotension
- If unable to obtain a standardized BP measure, maintain a blood pressure target consistently less than or equal to 130 mmHg systolic and less than or equal to 80 mmHg diastolic in patients with urine albumin excretion of more than 30 mg per 24 hours unless adverse event occurs with achievement of this target.

Among patients with CKD, what is the level of blood pressure to start initiation with two antihypertensive drugs to prevent cardiovascular complications and renal progression?

- Patients with confirmed office-based blood pressure or more than or equal to 160/100 mmHg should, in addition to lifestyle modification, have prompt initiation and timely titration of two drugs or a single-pill combination of drugs demonstrated to reduce cardiovascular events.
- A two-drug combination should consider these mechanisms in the choice of anti-hypertensives: calcium channel blockers and diuretics to address volume dependent type of hypertension, and ACE, ARB and beta blockers for the renin dependent type.

Among patients with CKD, what is the anti-hypertensive of choice to prevent cardiovascular complications and renal progression?

- Treatment for hypertension should include drug classes demonstrated to reduce cardiovascular events in patients with CKD such as ACE inhibitors, Angiotensin Receptor Blockers, Thiazide-like diuretics, and dihydropyridine calcium channel blockers.

Among patients with CKD with albuminuria/proteinuria, what is the anti-hypertensive of choice to prevent cardiovascular complications and renal progression?

- An ACE inhibitor or Angiotensin receptor blocker, at maximally tolerated dose is the recommended first-line treatment for hypertension in CKD patients with urinary albumin-to- creatinine ratio more than or equal to 30 mg/g (or equivalent).
  - If one class is not tolerated, the other is substituted. These medications should not be discontinued unless serum creatinine level rise above 30 % over baseline during the first two months of treatment or hyperkalemia (serum potassium level > or = 5.6 mmol/L).
  - If the patient is intolerant to both ACE inhibitor and angiotensin receptor blocker, a non-dihydropyridine calcium channel blocker (verapamil or diltiazem) may be used as first line treatment in this setting.
- Combinations of ACE inhibitor and Angiotensin receptor blocker and of ACE inhibitors or angiotensin receptor blockers with direct renin inhibitors should not be used.

Among patients with CKD with resistant hypertension, is the addition of mineralocorticoid receptor antagonist beneficial in reducing albuminuria and cardiovascular events?

- CKD patients with resistant hypertension not meeting blood pressure targets on three classes of anti-hypertensive medications (including diuretic) should be considered for mineralocorticoid receptor antagonist therapy

Among patients with CKD, is giving anti-hypertensive at bedtime more beneficial in reducing cardiovascular event?

- Administer one or more antihypertensive medications at bedtime

IV. Blood Pressure Management among Persons with Stroke

- The relationship between hypertension and stroke is very dynamic and multifaceted. Management of hypertension during the acute onset of stroke (whether ischemic or hemorrhagic) and during the secondary prevention phase poses a challenge due to the intricacies of how elevated BP must be handled.

For adults with acute ischemic stroke (AIS) who are eligible for intravenous (IV) thrombolysis but not for mechanical thrombectomy, what is the threshold for pharmacological treatment and the target blood pressure (BP)?

- For adults with AIS who are eligible for IV thrombolysis but not for mechanical thrombectomy, a referral to a neurologist or stroke specialist is advised.
- It is recommended that the BP be maintained <185/110 mmHg prior to treatment and during infusion.
- For the next 24 hours after treatment is given, the BP is recommended to be maintained <180/105 mmHg.

For adults with AIS who are eligible for IV thrombolysis but not for mechanical thrombectomy, what are the pharmacologic agents of choice to reach the target BP?

- It is recommended to use a titratable intravenous medication to allow dynamic adjustment of the drug depending on the current BP.
- For patients with acute ischemic stroke otherwise eligible for intravenous thrombolysis with BP >185/110 mmHg before or during infusion, or BP >180/105 mmHg after treatment, the recommended pharmacologic agent is Nicardipine 1- 5mg/hr. IV, titrated up by 2.5mg/hr. every 5-15 minutes, with maximum of 15mg/hr.
- If available, labetalol 10 mg IV over 1-2 minutes followed by continuous IV infusion of 2-8 mg/min may also be used.

For adults with AIS who are not eligible for IV thrombolysis or mechanical thrombectomy, what is the target BP and threshold for pharmacological treatment?

- For adults with AIS who are not eligible for IV thrombolysis or mechanical thrombectomy, it is recommended to maintain a target mean arterial pressure (MAP) of 110 to 130 mmHg.
- For adults with AIS who are not eligible for IV thrombolysis or mechanical thrombectomy, the threshold for urgent antihypertensive treatment is with severe hypertension of Systolic BP >220 mmHg or Diastolic BP >120 mmHg. If with severe hypertension, it might be reasonable to reduce the BP by 15% during the first 24 hours after the onset of stroke.

For adults with AIS who are not eligible for IV thrombolysis or mechanical thrombectomy, what pharmacological agent may be used to achieve target BP, when needed?

- For adults with AIS who are not eligible for IV thrombolysis or mechanical thrombectomy, the use of IV nicardipine to achieve the target BP may be considered.

For adult patients with acute hypertensive parenchymal intracerebral hemorrhage (ICH), what is the threshold for BP

lowering in the first few hours upon presentation at the emergency room?

- For adult patients with acute ICH, the threshold for BP lowering is SBP ≥ 180 mmHg.

What would be the target BP when lowering the blood pressure in acute ICH?

- The target SBP is <180 mmHg. In patients with SBP ≥180 mmHg, careful BP lowering to 140 to 160 mmHg should be considered.
  - The magnitude of BP reduction is dependent on the clinical context. It should be careful SBP lowering (avoiding reductions ≥60 mmHg in 1 hour).
- It is recommended to keep the blood pressure stable and avoid variability. It is also recommended not to lower the BP acutely to < 140 mmHg

What are the pharmacologic agents of choice and manner of administration?

- It is recommended to use intravenous antihypertensive agents that can easily be titrated to lower the BP to the desired level.
- The 1st line drug of choice is IV Nicardipine.
  - Alternative treatment choice would be labetalol, when available.

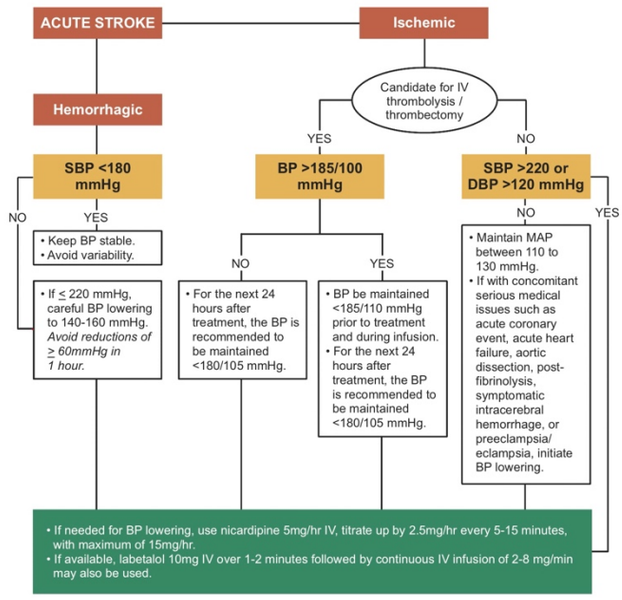
For adults who have a history of stroke, what is the target blood pressure level for secondary prevention?

- For adults with history of stroke, the target blood pressure level for secondary prevention is less than or equal to 130/80 mm Hg
- RAS blockers, CCBs and thiazide diuretics remain to be the first-line pharmacologic agents in hypertension management for secondary stroke prevention.
- A patient with a history of stroke will most likely have another stroke in his lifetime.
- Hypertension remains to be the most important risk factor for both ischemic and hemorrhagic strokes.
  - Therefore, adequate BP control plays a significant role in secondary stroke prevention.

Summary of Blood Pressure Thresholds and Targets for Persons with Stroke

Context	BP threshold for initiating pharmacotherapy	Blood Pressure Targets	Preferred Agents
In-hospital Mgt	Refer to Neurologist for specialist management		Intravenous titratable anti-hypertensives
Acute Ischemic Stroke (AIS), eligible for IV thrombolysis but not for mechanical thrombectomy	>185/110 mmHg	<185/110 mmHg prior to thrombolysis and during infusion; <180/105 mmHg in the next 24 hours	Nicardipine 1-5mg/hr IV, titrate up by 2.5mg/hr every 5-15 minutes, with maximum of 15mg/hr. If available: alternative of labetalol 10 mg IV over 1-2 mins followed by continuous IV infusion of 2-8 mg/min.
AIS, not eligible for IV thrombolysis or mechanical thrombectomy	Severe hypertension: SBP of >220 mm Hg DBP of >120 mm Hg	If with severe hypertension, reduce the BP by 15% during the first 24 hours after the onset of stroke	IV Nicardipine as indicated above
Intracerebral Hemorrhage (ICH)	SBP ≥180 mmHg	<180 mmHg Careful SBP lowering, avoiding reductions ≥60 mmHg in 1 hour Do not lower the BP acutely to< 140 mmHg	First choice: IV Nicardipine Second choice: IV labetalol
Secondary prevention Adults with history of stroke	140/90 mm Hg	≤130/80 mmHg	First line: RAS blockers (ACE- Inh, ARB), CCBs and thiazide diuretics

Algorithm for Blood Pressure Management at the Emergency Room in Acute Stroke Patients



V. Management of Hypertension in Pregnancy

- Hypertensive disorders of pregnancy constitute one of the major causes of maternal and perinatal morbidity and mortality worldwide.
  - It has been estimated that preeclampsia complicates 2-8% of all pregnancies globally.

What are the different types of hypertensive disorders of pregnancy (HDP) and what are the criteria for each?

Pre-eclampsia

- Elevated blood pressure **and** proteinuria.
- Elevated blood pressure defined as:
  - Systolic blood pressure of 140 mm Hg or more or diastolic blood pressure of 90 mm Hg or more on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure.
  - Systolic blood pressure of 160 mm Hg or more diastolic blood pressure of 110 m Hg or more. (Severe hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy).
- Proteinuria
  - 300 mg or more per 24 hour urine collection (or this amount extrapolated from a timed collection), or
  - Protein/creatinine ratio of 0.3 mg/dl or more or
  - Dipstick reading of 2+ (used only if other quantitative methods not available)
- Or in the absence of proteinuria, new onset hypertension with the new onset of any of the following:
  - Thrombocytopenia: Platelet count less than 100,000 x 10^9/L
  - Renal insufficiency: Serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease
  - Impaired liver function: Elevated blood concentrations of liver transaminases to twice normal concentration

- Pulmonary edema
- New-onset headache unresponsive to medication and not accounted for by alternative diagnoses or visual symptoms

Eclampsia

- New-onset tonic-clonic, focal, or multifocal seizures in the absence of other causative conditions such as epilepsy, cerebral arterial ischemia and infarction, intracranial hemorrhage, or drug use.

Chronic Hypertension-

- Hypertension of any cause, that predates pregnancy. BP > 140/90 mm Hg before pregnancy or before 20 weeks gestation or both.

Chronic Hypertension with Superimposed Pre-eclampsia- Chronic hypertension in association with preeclampsia.

- Others define it as worsening baseline hypertension accompanied by new-onset proteinuria or other findings supportive of preeclampsia.
- For patients with chronic hypertension, It can be difficult to differentiate worsening of the hypertension from superimposed preeclampsia.
- Conditions that may indicate superimposed preeclampsia, that warrants a referral to a maternal fetal medicine specialist/perinatologist, include the following:
  - Acute, severe, and persistent elevations in blood pressure.
  - Sudden increase in baseline hypertension.
  - New-onset proteinuria or sudden increase in proteinuria.

Gestational Hypertension

- Systolic blood pressure 140 mm Hg or more or a diastolic blood pressure of 90 mm Hg or more, or both, on two occasions at least 4 hours apart after 20 weeks of gestation, in a woman with a previously normal blood pressure.
- Hypertension without proteinuria or severe features develops after 20 weeks of gestation and blood pressure

Clinical Question 21. What blood pressure threshold is used to define hypertension in pregnancy?

- Hypertension is diagnosed empirically when appropriately taken blood pressure is 140 mm Hg systolic or 90 mm Hg diastolic or above. Korotkoff phase V is used to define diastolic pressure.

What antihypertensive agents can be used for urgent blood pressure control in pregnancy?

- Acute-onset severe hypertension (systolic BP of 160 mm Hg or more or diastolic BP of 110 mm Hg or more, or both) can occur in the prenatal, intrapartum and postpartum period.
- It is accurately measured using standard techniques and is persistent for 15 minutes or more.
- **The first line of treatment is intravenous (IV) hydralazine and labetalol; intravenous nicardipine is also an option.**
- Extended release oral nifedipine also may be considered as a first line therapy, particularly when IV access is not available.
- Use of these drugs does not require cardiac monitoring.

When do we treat hypertension during pregnancy?

- Treatment of severe hypertension (blood pressure of >160/100mmHg) is always recommended as it prevents serious maternal and fetal complications to set in.
- Initiating therapy in non-severe disease, however, is a subject of controversy.
- The NICE, ISSHP and SOGC recommends therapy when the blood pressure remains above 140/90mmHg but SOGC suggests a lower threshold in patients with other co-morbidities.
- The ACOG recommends conservative management of non-severe disease but stressed on the importance of control in the severe type.
- It is also important to avoid hypotension because the degree by which placental blood flow is auto-regulated is not established, and aggressive lowering may cause fetal distress.

What are the pharmacologic treatment options in the OPD management of hypertension in pregnancy?

- The choice of antihypertensive drug for initial therapy should be based on the characteristics of the patient, contraindications to a particular drug and physician and patient preferences.
- **The first line drugs are methyldopa, calcium channel blockers or beta blockers**, and ACE-inhibitors and angiotensin-receptor blockers (ARBs) are generally not recommended.
- Antihypertensives may be used to keep systolic blood pressure at 130 to 155 mmHg and diastolic blood pressure at 80 to 105 mmHg.

How is hypertension managed during the immediate postpartum and breastfeeding periods?

- Blood pressure should be recorded shortly after birth and if normal again within 6 hours.
- All women should have BP recorded and discharge deferred for at least 24 hours or until vital signs are normal and/or treated or referred.
- Any woman with an obstetric complication and/or newborn with complications should stay in the hospital until both are stable.
- In hospital stay for at least 24 hours
- Check-up within 48-72 hours of the birth and again 7-14 days and at six weeks post-partum.
- All women should be reminded of the danger signs of preeclampsia following birth including headaches, visual disturbances, nausea, vomiting, epigastric or hypochondrial pain, feeling faint or convulsions.

VI. Blood Pressure Management in the Pediatric Population

Among pediatric patients, what is the threshold for commencing pharmacologic treatment for Hypertension?

- Pharmacologic treatment for hypertension (HTN) should be started for children with the following conditions:
  - Children who remain hypertensive even after six (6) months of lifestyle modification strategies
  - Symptomatic hypertension or Stage 2 hypertension
  - Presence of co-morbidities like chronic kidney disease (CKD) or diabetes mellitus (DM), or any evidence of target organ involvement (e.g. left ventricular hypertrophy).
- The goal of pharmacologic therapy should be a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP) to <90th percentile for age, sex and height and <120/80 mm Hg in adolescents ≥13 years of age.
- For children with CKD, BP targets should be less than or equal to 50th percentile for age, sex and height.
- The goal of treatment of hypertension in the pediatric population is not only to reduce BP to <90th percentile for age, sex and height and <130/80 mm Hg, but also to reduce cardiovascular risk factors, and prevent target organ damage.
- Follow-up every 4-6 weeks is recommended for monitoring and evaluation of therapy.

Blood Pressure Stages in Filipino Pediatric Population

Filipino Children 1–13 y	Filipino Children ≥ 13 y
Normal BP: <90th percentile	Normal BP: <120/<80 mm Hg
Elevated BP: ≥90th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower)	Elevated BP: 120/<80 to 129/<80 mm Hg
Stage 1 HTN: ≥95th percentile to <95th percentile + 12 mmHg, or 130/80 to 139/89 mm Hg (whichever is lower)	Stage 1 HTN: 130/80 to 139/89 mm Hg
Stage 2 HTN: ≥95th percentile + 12 mm Hg, or ≥140/90 mm Hg (whichever is lower)	Stage 2 HTN: ≥140/90 mm Hg

What advice regarding nonpharmacologic treatment is recommended for pediatric patients?

- Non-pharmacologic therapy of lifestyle modification which include Dietary Approaches to Stop Hypertension (DASH) and engaging in 30-60 minutes of moderate to vigorous physical activity at least 3-5 days a week should be initiated in all pediatric patients consulting for the first time for hypertension.
- All children with hypertension should have their body mass index (BMI) measured during each visit.
- Weight loss intervention is recommended for identified overweight and obese children until a normal BMI is attained through dietary counselling and exercise (weight loss of 1 to 2 kg per month)
- All children diagnosed to have hypertension or elevated BP should be advised to do the following:
  - Decrease intake of high sodium content and calorie-dense food and beverages, and to increase intake of fruits and vegetable to 3-5 servings per day.
  - Engage in moderate-to-vigorous exercise 30 - 60 minutes at least 3-5 times a week but preferably daily, unless with medical contraindication.
  - Avoid smoking including electronic cigarettes and exposure to tobacco smoke.
  - Avoid alcohol intake and caffeinated energy drinks.

What are the BP targets for prevention of target organ complications?

- The target BP for children is <90th percentile for age, sex and height or <120/<80 mmHg whichever is lower.
- For CKD patients, BP target is less than or equal to the 50th percentile for age, sex and height.

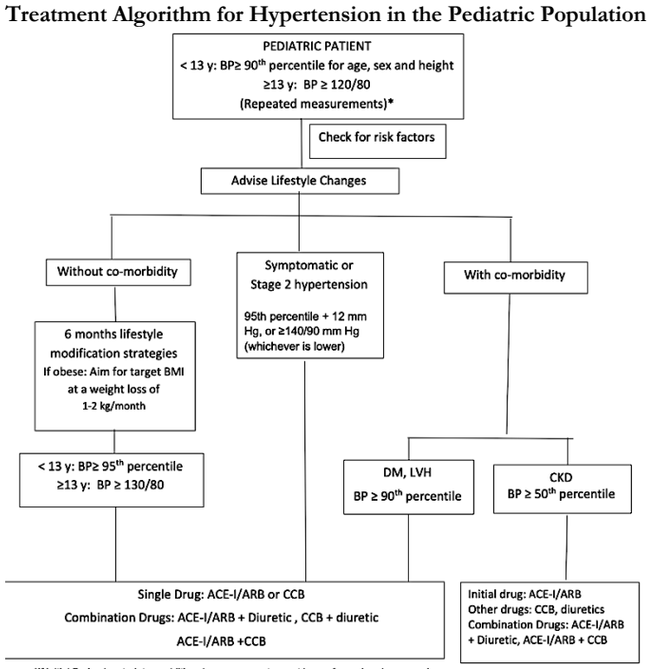
What are the preferred medications for children?

- Any of the following drugs may be used as initial treatment for children with hypertension: ACE inhibitors (Enalapril, Captopril), ARBs (Losartan, Valsartan), or calcium channel blockers (Amlodipine).
- For children with co-existing chronic kidney disease, proteinuria or diabetes mellitus, an ACE-inhibitor or ARB is recommended as the initial antihypertensive drug unless with absolute contraindications. Referral to a specialist is highly recommended.
- Therapy should start with a single drug at the lowest possible dose and titrated up every 2 to 4 weeks until target BP is achieved, or the maximal dose reached or adverse effects occur.
- If BP is not controlled with a single agent (maximal dose is reached or adverse effects occur), a second agent can be added to the regimen and titrated as with the initial drug.
  - Because the use of other anti-hypertensive agents can lead to compensatory salt and water retention, the addition of a thiazide diuretic to an initial drug for uncontrolled hypertension is prudent.
- In combining agents from different drug classes, it is preferable to give those with complementary modes of action. Ideally, no two drugs which act separately on the RAAS, should be used in combination because of the risk of hyperkalemia, impaired kidney function and hypotension.

What is the recommended technique and BP device for accurate BP measurement in pediatric patients?
Statements

- 30.1 The use of proper technique and appropriately-sized cuff is critical for the accurate measurement of BP in children.
- 30.2 An auscultatory device using an aneroid non-mercury sphygmomanometer is recommended for children.
- 30.3 An oscillometric device is a suitable alternative to auscultation for initial BP screening and monitoring in the pediatric population.
- 30.4 Ambulatory BP monitoring (ABPM) is recommended in children (> 5 years old) and adolescents with the following conditions:
  - Elevated office BP measurements for 1 or more years, or if with stage 1 hypertension over 3 clinic visits, for confirmation of hypertension.
  - Those with high risk conditions (e.g. obesity, CKD or structural renal abnormalities, diabetes mellitus, those who have undergone solid organ transplant, obstructive sleep apnea, repaired aortic coarctation) to document masked hypertension.
  - Those with *suspected* white coat hypertension (WCH).
- Home BP monitoring should not be used to diagnose hypertension, MH, or WCH but may be a useful adjunct to office and ambulatory BP measurement if clinically validated oscillometric apparatus and appropriate-sized cuffs are used.

Treatment Algorithm for Hypertension in the Pediatric Population



- **If initial Bp is elevated, two additional measurements must be performed and averaged*

Hypertension in Family and Community Practice

CHECKBOX FOR HISTORY

- What is your highest/lowest blood pressure in the past?
- What is your usual blood pressure?
- When did it start? When did it happen? When were you diagnosed as hypertensive?
- Obtain following information: extent of end-organ damage (eg, heart, brain, kidneys, eyes), assessment of patients' cardiovascular risk status and exclusion of secondary causes of hypertension
- What happened during that time? What were the triggering/ contributory factors? What were you doing that time?
- What symptoms did you experience? Headache, dizziness, blindness/blurring of vision, chest pain/discomfort, difficulty of breathing/shortness of breath, epigastric pain, difficulty in urination, hematuria, edema (face, upper and lower extremities), leg/foot pain?
- Aside from hypertension what other diseases/illnesses does the patient have?
- **Past Medical History:** If the patient is a male, ask if he took any pill/powder form for protein building? If the patient is a female, did she take any oral contraceptive pill? Intake of other maintenance drugs/vitamins/herbal medicines/supplements
- **Family History:** hypertension, coronary artery disease, sudden death, cerebrovascular accident, diabetes mellitus, hyperthyroidism, cancer. Draw genogram.
- **Lifestyle:** diet: what do you usually eat? What are you fond of? Do you have food preferences? Do you eat fish, vegetables and fruits? If yes, how many servings do you get per meal? Do you use condiments? Give a sample menu for a day. Are you taking any supplements? Any weight gain/loss? Exercise/any form of physical activity? Sports? How often?
- **Substance use/abuse:** smoking/tobacco alcohol illicit drugs energy drinks caffeine/coffee. If yes, ask for the amount, how often? What does he feel after?
- **Occupation:** time of work? What are his preparations before going to work? Is he pressured? Do you work overtime? How often? Was there any instance that you were late or absent due to high blood or any other disease? When was the last time you were on a vacation?
- **Last check-up?** Last blood chemistry done? What were the results? Increased total cholesterol/LDL and decreased HDL

Checkbox for Physical Examination

- Blood pressure measurement: both arms and if feasible in one leg
- Office reading (clinic):
  - Other vital signs: cardiac rate, respiratory rate, temperature, BMI
  - General: conscious, coherent, oriented to time, person and place
  - Skin: color (cyanosis)
  - Fundoscopic exam: floaters, arteriovenous nicking, exudates, hemorrhages, papilledema
  - Examine the neck: distended veins, enlarged thyroid gland and listen for carotid bruits
  - Cardiac exam: displacement of apex, sustained and enlarged apical impulse, presence of heaves, thrills, murmurs
  - Abdomen: waist circumference, waist to hip ratio, organomegaly, mass, listen for renal artery bruit
  - Extremity: edema, deformity, palpation of pulses (absent, weak, delayed), mid-upper arm circumference
  - Neurologic exam: cranial nerves, cerebellar function, motor and sensory
  - For adults, Beck's Depression Scale may be used to assess possible psychosocial stressors*
  - For the elderly please do Mini-Mental Status Examination and Geriatric Depression Scale*

First Visit

- **History and Physical Examination**
  - All adult patients consulting at the clinic should be screened for high blood pressure with appropriate BP measurement
  - Make a thorough history focusing on symptoms, family history using genogram, smoking and other lifestyle and co-existing chronic disease
  - Make thorough physical examination focusing on the weight/BMI, waist/hip ratio, fundoscopy, neurological, cardiac, renal and peripheral arteries
  - If BP is ≥ 140/90 mmHg with signs and symptoms of acute end-organ damage, consider referral to hospital
  - If the initial BP is ≥ 180/110 mmHg consider hypertension and start medication.

- If BP is ≥ 140/90 mmHg and with previous history of high BP taken by another health professional within the month consider hypertension and start medication.
- If BP is ≥ 140/90 mmHg and first-time high BP confirm with home BP measurements or second visit within 4 weeks

- **Laboratory**
  - Diagnosed hypertension - Request for 12- lead ECG, urinalysis, FBS, creatinine, serum K and lipid profile to determine co-morbidities and baseline values

- **Pharmacologic Intervention**
  - Start/continue medications with either or a combination of thiazide-type diuretic, calcium channel blockers, angiotensin-converting enzyme inhibitors and angiotensin receptor blocker depending on co-morbidities or side effects
  - Patients for emergency referral - Consider giving a single dose of anti-hypertensive prior to transport

- **Non-pharmacologic Interventions**
  - Educate the patient about hypertension, risk factors and complications
  - If medications were prescribed, explain the dose, frequency, intended effect, possible side effects and importance of medication adherence
  - Lifestyle modifications focusing on weight control, exercise and smoking cessation
  - Inquire and recommend family members' lifestyle activities
  - Inquire for community lifestyle activities
  - Follow-up after 1-2 weeks
  - Offer family wellness package

- **Patient Outcomes**
  - Aware of initial diagnosis
  - Aware of risk factors and complications
  - Aware of importance of adherence to diagnostics and interventions

Second Visit

- **History and Physical Examination**
  - Review and note any change
    in history focusing on symptoms, family history using the genogram, smoking and other lifestyle and co- existing chronic disease
  - Repeat and note any change in physical examination focusing on the weight/BMI, waist/hip ratio, fundoscopy, neurological, cardiac, renal and peripheral arteries
  - Review BP monitoring if available
  - Review laboratory results and establish the presence of other risk factors and co-morbidities
  - If home BP and/or second visit BP are ≥ 140/90 mmHg diagnose as hypertension
  - If home BP and/or second visit BP are < 140/90 mmHg rule out hypertension but monitor after 6-12 months

- **Laboratory**
  - Complete request for 12-lead ECG, urinalysis, FBS, creatinine, serum K and lipid profile to determine co-morbidities and baseline values

- **Pharmacologic Intervention**
  - Start/continue medications with either or a combination of thiazide-type diuretic, calcium channel blockers, angiotensin-converting enzyme inhibitors and angiotensin receptor blocker depending on co-morbidities or side effects

- **Non-pharmacologic Interventions**
  - Enhance education about hypertension, risk factors and complications
  - If medications were prescribed, repeat explanation about the dose, frequency, intended effect, possible side effects and importance of medication adherence
  - Enhance advice on lifestyle modifications focusing on weight control, exercise and smoking cessation
  - Enhance recommendation for family members' appropriate lifestyle activities
  - Recommend participation in appropriate community lifestyle activities
  - Follow-up after 1 month until BP target is achieved and every 3-6 month**s** if BP target is already achieved

- **Patient Outcomes**
  - Improved BP control (Age 18 to 59: <140/90 mmHg; Age > 60: <150/90 mmHg)
  - Body mass index between 18.5-24.9 kg/ m2
  - Modification of risk factors i.e. diet, lifestyle, smoking and exercise
  - Absence of new complications
  - Adherence to diagnostics and interventions
  - Agreed plan for family intervention
  - Agreed plan for community involvement

Continuing Visit

- **History and Physical Examination**
  - Review and note any change in history focusing on symptoms, family history using genogram, smoking and other lifestyle and co- existing chronic disease
  - Repeat and note any change in physical examination focusing on the weight/BMI, waist/hip ratio, fundoscopy, neurological, cardiac, renal and peripheral arteries
  - Review laboratory results and establish the presence of other risk factors and co-morbidities
  - Enhance/revise pharmacologic and non-pharmacologic interventions until BP control is achieved
    - Age 18 to 59: <140/90 mmHg
    - Age > 60: <150/90 mmHg

- **Laboratory**
  - After 6-12 months repeat for 12-lead ECG, urinalysis, FBS, creatinine, serum K and lipid profile

- **Pharmacologic Intervention**
  - Continue/revise medications with either or a combination of thiazide-type diuretic, calcium channel blockers, angiotensin-converting enzyme inhibitors and angiotensin receptor blocker depending on co-morbidities or side effects

- **Non-pharmacologic Interventions**
  - Enhance education about hypertension, risk factors and complications
  - If medications were prescribed, repeat explanation about the dose, frequency, intended effect, possible side effects and importance of medication adherence
  - Enhance advice on lifestyle modifications focusing on weight control, exercise and smoking cessation
  - Enhance recommendation for family members' appropriate lifestyle activities
  - Recommend participation in appropriate community lifestyle activities
  - Follow-up after 1 month until BP target is achieved then every 3-6 months if BP target is already achieved

- **Patient Outcomes**
  - Improved BP control (Age 18 to 59: <140/90 mmHg; Age > 60: <150/90 mmHg)
  - Body mass index between 18.5-24.9 kg/ m2 (A-II) __Modification of risk factors i.e. diet, lifestyle, smoking and exercise
  - Absence of new complications
  - Adherence to diagnostics and interventions
  - Agreed plan for family intervention
  - Agreed plan for community involvement

Patient-directed Non-pharmacologic Interventions	
Goals	Recommendations: EDUCATE patients on the following
Health Education	Lifetime risk of hypertension hypertension increases with advancing age The higher the BP, the greater the chance of heart attack, HF, stroke, and kidney diseases
BP control BP goal	For those >50 years of age, will reach the DBP goal once the SBP goal is achieved, the primary focus should be on attaining the SBP goal In patients with hypertension and diabetes or renal disease, the BP goal is <130/80 mmHg Treating SBP and DBP to targets that are <140/90 mmHg is associated with a decrease in CVD complications Goal blood pressure targets should be reached within a month of starting treatment either by increasing the dose of an initial drug or by using a combination of medications*
BP monitoring	Clinicians should provide to patients, verbally and in writing, their specific BP numbers and the BP goal of their treatment
Compliance	Emphasize that antihypertensive therapy has been associated with reductions in (1) stroke incidence, (2) myocardial infarction (MI), and (3) Heart Failure (HF), hence importance of compliance
Target weight	Maintain normal body weight (body mass index 18,5-24.9 kg/m2 Weight loss of as little as 10 lbs (4.5 kg) reduces BP and/or prevents hypertension in a large proportion of overweight persons
Diet	Adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan

	Consume a diet rich in fruits, vegetables, and low fat dairy products with a reduced content of saturated and total fat Dietary sodium should be reduced to no more than 100 mmol per day (2.4 g of sodium or 6 g sodium chloride) Decrease portion sizes for meals and snacks Decrease frequency and consumption of containing beverages
Fitness	(when able) Engage in regular aerobic physical activity such as brisk walking at least 30 minutes per day most days of the week or moderate to vigorous activity 3-4 days a week averaging 40 min per session* Increase physical activity such as walking, biking, aerobic dancing basketball and other sports Decrease time in sedentary activities such as watching television, playing videogames or on line
Moderation of alcohol intake and smoking cessation	Alcohol intake should be limited to no more than 1 oz (30 mL) of ethanol, the equivalent of two drinks per day in most men and no more than 0.5 oz of ethanol (one drink) per day in women and lighter weight persons Patients should be strongly counseled to quit smoking
Others	Control blood glucose and lipids*
Follow up	most patients should return for follow up and adjustment of medications at monthly intervals or until the BP goal is reached

Family-directed Non-pharmacologic Interventions.	
Goals	Recommendations
Lifestyle Family Diet	Encourage family meals adhering to DASH eating plan, wherein food served should be HIGH in: Fruits and vegetables (4-5 servings each per day; fiber (7-8 servings per day); low fat dairy products (2-3 servings per day); lean meat (2 servings per day); calcium; magnesium; potassium LOW in saturated fat, cholesterol, salt such as unsalted nuts, almonds, peanuts, chocolate, cocoa butter, coconut Increase intake of polyunsaturated fatty acids such as *Foods and oils including walnuts, sunflower seeds, fish such as salmon, mackerel, corn oil, soybean oil
Fitness	Encourage family members engaging in physical activities Family members should have physical activity of moderate intensity involving rhythmic movements with the lower limbs for 50-60 minutes, 3 or 4 times per week Family members with mild hypertension should engage in 50-60 minutes of brisk walking or cycling, 3 or 4 times per week Family members who do not have hypertension should also participate in regular exercise as it reduce the risk of coronary artery disease.

Community-directed Non-pharmacologic Interventions	
Goals	Recommendations
Lifestyle Family Diet	Inquire if patient and family aware of existing community lifestyle activities
Community Programs	Inquire if patient and family aware and willing to participate in existing local health center and programs on hypertension in the community

Reinforcement of Goals		
Patient	**Family**	**Community**
Reinforce BP goals, self-monitoring and recording	Encourage family members to adhere to healthy lifestyle	Encourage family members to join programs on hypertension in the community
Reinforce compliance to antihypertensives	Compliance to healthy family meals	Enrolment in existing community lifestyle activities
Reinforce adherence to lifestyle modification (targeted weight, diet and fitness)	Adherence to family fitness activities	Actively participating in hypertension support groups in the community

Sample Questions - Hypertension

1. Patients with hypertension and heart failure should be treated to a target BP of:
A. >130/80 mmHg and <120/70 mmHg
B. <130/80 mmHg but >120/70 mmHg
C. <140/90 mmHg but >120/70 mmHg
D. >140/80 mmHg and <120/70 mmHg

2. A 58-year old teacher consults at the Family and Community Medicine Clinic for wellness purposes (i.e., usual blood pressure range is 135-145/85-95 mmHg). She is a known hypertensive for at least 15 years, but she has been lost to follow-up and has been non-compliant to her prescribed maintenance medications. She is presently asymptomatic and of good functional capacity. The following are recommended COST-EFFECTIVE, BASELINE DIAGNOSTIC TESTS for this hypertensive patient, EXCEPT:
A. fasting blood sugar (FBS)
B. chest radiograph (PA view)
C. routine urinalysis
D. serum potassium

3. Which of the following is regarded as FIRST-LINE TREATMENT?
A. Clonidine
B. Metoprolol
C. Losartan
D. Spironolactone

4. After starting the above-mentioned patient on his anti-hypertensive medication, when should patient be asked to come back for FOLLOW-UP CONSULTATION, to determine if TARGET BLOOD PRESSURE GOAL has been attained?
A. within 24-72 hours
B. within one month
C. within one week
D. within three months

5. Luis, a 48-year-old male, smoker, consulted because of slurring of speech associated with dizziness. On examination, blood pressure was 200/120 mmHg, Glasgow coma scale (GCS) of 12, body mass index (BMI) 29 kg/m², with facial asymmetry and extremity weakness. One of the following should be considered in the management of HYPERTENSIVE EMERGENCY:
A. The blood pressure must be reduced within 5 minutes to prevent hypertensive encephalopathy.
B. Mannitol should be given to reduce cerebral edema
C. Intravenous Labetalol is the drug of choice.
D. Sublingual Nifedipine is indicated.

6. A 38-year old hypertensive consults at the local health center for first trimester pre-natal check-up. She is G3P2 (1102), with history of pre-eclampsia. Which of the following ORAL ANTI-HYPERTENSIVE AGENTS may be given safely to this patient?
A. Amlodipine
B. Losartan
C. Captopril
D. Metoprolol

7. A 45 y.o. Female sought consult at the ER due to palpitations for a week now. Pt claims her previous BP recorded ranges from 140/90—150/90 mmhg. PE: BP: 140/90, CR:105, RR:18 , T: 36.7, BMI: 22 ECG: Sinus tachycardia. What will be your initial management to this patient?
A. Start patient on Atenolol 50mg OD and advise follow up after 2 weeks
B. Start patient on Amlodipine 5mg OD and advise follow up after 2 weeks
C. Advise her to lose weight since she is overweight and do brisk walking 30 mins 3x a week for her exercise.
D. Assure patient that it is part of perimenopausal symptoms and send her home.

8. A 55-year-old teacher, newly diagnosed with hypertension is in the Family Medicine Clinic for follow-up. Daily BP monitoring revealed usual BP of 150/90 mmHg and still complains of on and off headache and dizziness. The following are regarded as FIRST LINE OF TREATMENT except:
A. Losartan
B. Metoprolol
C. Amlodipine
D. Hydrochlorothiazide

9. Having started the above patient with anti-hypertensive medication, when should we ask the patient to come back for FOLLOW –UP CONSULTATION to monitor if the target BP control is attained?
A. Within 5 days
B. Within 2 weeks
C. Within 4 weeks
D. Within 8 weeks

10. 67/M widower known hypertensive maintained on Imidapril 10 mg and Bisoprolol 5mg presented to the clinic for his follow up check. He proudly mentioned the lifestyle changes he has been able to achieve. BP monitoring revealed range from 110/70 to 130/80. He

claims he feels okay with his medical condition. What will be your advice to him?

A. Discontinue the Bisoprolol since BP has gone down
B. Discontinue the ACE since the BP has improved
C. Decrease the Imidapril to 5mg
D. Maintain current medications

11. 58/F married known asthmatic controlled with Seretide was diagnosed with hypertension prescribed Enalapril 10 mg with thiazide 12.5 mg. She has somewhat modified her diet and has started on an exercise program albeit with some difficulty. On follow up latest BP monitoring still showed BP 130/90 - 150/100 . What will you advice ?

A. stricter lifestyle changes
B. add carvedilol to the regimen
C. add olmesartan to the regimen
D. add amlodipine to the regimen

12. 32 /F factory worker consulted due to headache. She is 32 wks AOG, G2P1 (1001). Her BP is 160/110. She brought her urinalysis showing proteinuria of +2. What is the treatment of choice?

A. Losartan 100mg OD
B. Enalapril 10 mg OD
C. Furosemide 40 mg BID
D. Methyldopa 250mg BID

13. 60 / M Hypertensive executive came for annual periodic examination. At present he did not present any PND, orthopnea, edema nor chest pains but noted that he has exertional dyspnea when he takes 2 flights of stairs. You noted that the BP is retained at 140/80 with Losartan 100mg. The 2D Echo of the patient revealed the following: Ejection Fraction: M-Mode 67% Simpsons 70% Normal LV internal dimension with relative thickness of 0.41 cm, LV mass index of 95.6g/m2 with good wall motion and contractility.
Normal left atrium with volume index of 22.01cc/m2
Structurally normal aortic, mitral, tricuspid and pulmonic valves. Conclusion: Normal LV internal dimension and adequate contractility and systolic function but with Doppler evidence of grade 1 diastolic dysfunction What will be the best recommendation for this patient?

A. shift the Losartan to Enalapril 10 mg and add Carvedilol 25mg BID
B. add Enalapril to present regimen and add Spironolactone 25mg OD
C. add Carvedilol 25 mg BID to present regimen, add Spironolactone 25mg OD
D. add Spironolactone 25mg to present regimen

14. Jimmy, 80/male sought consult at your clinic. On examination BP was recorded at 150/90 mmHg, RR:19 HR:85 T: 36.5C. Based from this information, the following statements are correct EXCEPT:

A. A goal of less than 130/80 is recommended for most adults with hypertension.
B. The recommendation for Danny's case is to start therapy.
C. For patients 80 years old and above, a therapeutic threshold of 140/90 mmHg to achieve a goal BP of less than 130/90 mmHg is recommended.
D. In high-risk individuals, concomitant lifestyle changes and with medical treatment is needed while for those who are low risk hypertensives, this can be addressed with diet and lifestyle modifications.

15. Lorna is a 38/F came in for a scheduled follow up. She is a G2P2 (2002) on her 24th week AOG. From her records you noticed that Lorna's blood pressure has increased since her last check twelve months ago. You plan to start Lorna on anti-hypertensive medication. Which among them are best recommended for her case?

A. Losartan
B. Captopril
C. Methyldopa
D. Amlodipine

16. The following are true regarding Hypertension in the Pediatric Population except;

A. 1-13y/o Normal BP: <90th Percentile> 13y/o Normal BP: <120/<80 mmHg
B. 1-13y/o Stage 1 Hypertension: >95th Percentile to <95th Percentile + 12 mmHg, or 130/80 to 139/89 (whichever is lower) > 13y/o Stage 1 Hypertension: 130/80 mmHg to 139/89 mmHg
C. > 13y/o Stage 2 Hypertension: >140/90 mmHg
D. None of the above

17. When writing an EXERCISE PRESCRIPTION for a 35-year-old male HYPERTENSIVE patient, which among the following regimens is RECOMMENDED?

A. 60 minutes of moderate intensity aerobic exercise everyday
B. 100 to 150 minutes of moderate aerobic intensity exercises spread throughout the week
C. 150 to 300 minutes of moderate intensity exercises spread throughout the week
D. 60 minutes of vigorous intensity aerobic exercises spread throughout the week

18. At the Emergency room, you have attended to a Stroke patient, upon further assessment and work-up, the patient is confirmed to have ischemic type of acute stroke and not a candidate for IV thrombolysis/thrombectomy. If the BP of the patient is >220/>120 mmHg, the next management is?

A. Maintain MAP between 110 to 130 mmHg
B. **Labetalol 10mg IV over 1-2 minutes followed by continuous IV infusion of 2-8 mg/min may also be used**
C. For the next 24 hours after treatment, the BP is recommended to be maintained at <180/105 mmHg.
D. Careful BP lowering to 140-160 mmHg. Avoid reductions of >60 mmHg in 1 hour

19. Which among the two-drug combination will address the volume dependent type of Hypertension in CKD patients?

A. CCB and Diuretics
B. ARB and Diuretics
C. Beta Blockers and Diuretics
D. ACE and ARB

20. The following IS NOT A cardiovascular risk factor among Hypertensive patients?

A. Age: > 40y/o
B. BMI: >25 kg/m2
C. LDL-C: >130mg/dl
D. TG: >150 mg/dl

21. L.R., a 40 year – old male has been experiencing dizziness for the past week. His blood pressure at the OPD were noted to be 140/100 mmHg and 150/100 mmHg. What is the classification L.R.'s blood pressure based on the Philippine CPG on Hypertension? Normal blood pressure

A. Normal blood pressure
B. Borderline blood pressure
C. **Hypertension**
D. Hypertensive Emergency

22. P.L, a 25 year – old female, G1P0, 25 weeks AOG was noted to have a BP of 140/90mmHg on 2 separate reading. There was no noted proteinuria on
urinalysis. The patient has no subjective complaints. Which of the following medications is most appropriate prescription?

A. IV hydralazine
B. Amlodipine 5mg/tab 1tablet OD
C. Losartan 50mg/tab 1 tablet OD
D. Enalapril 10mg/tab 1 tablet OD

23. Based on the Philippine CPG on Hypertension, what is the recommended daily sodium intake for people with pre - hypertension?

A. 230mg
B. 2300mg
C. 150mg
D. 1500mg

24. Which of the following diet is NOT recommended for patients diagnosed with Hypertension?

A. Fruits and vegetables
B. Diet rich in red meat
C. Low saturated fats and cholesterol
D. Low – fat dairy

25. S.J., a 35 year – old female, 35 weeks AOG came in to the Emergency Room because of dizziness and edema. You noted that her blood pressure is 160/100 mmHg. Repeat blood pressure after 15 minutes was noted to be 170/110 mmHg. What will be your initial treatment?

A. Give IV hydralazine immediately
B. Start the patient on amlodipine 10mg/tab 1 tab OD
C. Start Losartan 50mg/tab 1 tablet OD
D. Order for CBC, urinalysis, serum creatinine and liver enzymes

26. Among the following patients with hypertension, which among the following patients has no cardiovascular risks?

A. 70 – year old female, with a HbA1C of 7.0%, no dyslipidemia, non–smoker, with no family history of CVD or hypertension.
B. 40 year – old male, married with 2 children, 20 pack – years smoker, and has an annual income of Php 120,000.
C. **39 – year old female, non – smoker, occasional alcoholic beverage drinker, works as a bank manager with a good work – life balance, no diabetes and no family history of CVD or hypertension**.
D. 50 – year old male, BMI of 30 kg/m2 , smoker for 25 years, LDL – C of 140mg/dl, HbA1C of 6.2%, with no family history of CVD or hypertension.

27. F.L., a 45 year – old male, with diabetes, obesity and newly diagnosed hypertension was admitted due to Community – Acquired Pneumonia. On Day 2 of hospital admission, the patient complained of a morning headache. He stated that this occurs often along with abrupt awakenings accompanied by gasping and dry mouth. What should you assess the patient for?

A. Insomnia
B. Migraine
C. Obstructive Sleep Apnea
D. Adjustment disorder

28. In the continuity clinic, a hypertensive patient was concomitantly diagnosed to have gouty arthritis. Which among the following anti-hypertensives may be given to your patient due to its added uricosuric effect?

A. Carvedilol
B. Captopril
C. Losartan
D. Diltiazem

29. Jerica, a 32-year-old female bank teller, is diagnosed with HYPERTENSION. You instructed her to perform DAILY BLOOD PRESSURE (BP) MONITORING. According to the 2020 Clinical Practice Guidelines for the Management of Hypertension in the Philippines, which among the following devices is best recommended for HOME BP MONITORING?

A. aneroid sphygmomanometer even without trained examiner
B. medical grade smart watch
C. validated digital sphygmomanometer
D. aneroid sphygmomanometer with trained examiner

30. Based on the 2020 Philippine Clinical Practice Guidelines on Hypertension, which BLOOD PRESSURE (BP) THRESHOLD defines HYPERTENSION using HOME BP MONITORING (HBPM)?

A. greater than 125 / 85 mmHg
B. greater than 135 / 85 mmHg
C. greater than 140 / 90 mmHg
D. greater than 130 / 80 mmHg

31. Peter is a 45-year-old messenger, who is diagnosed with HYPERTENSION. What NON-PHARMACOLOGIC INTERVENTION will you recommend for Peter?

A. dietary sodium restriction of less than 2 grams per day
B. conducting the 5 As (i.e., ask / advise / assess / assist / arrange) of smoking cessation
C. weight loss of at least 10% of current body weight
D. cardiovascular and flexibility exercises for at least more than or equal to 150 minutes per week

32. Gabriel is a 50-year-old accountant who is scheduled to receive his PNEUMOCOCCAL CONJUGATE VACCINE. Upon screening, his RESTING BLOOD PRESSURE (BP) is 150/90 mmHg. This is the FIRST TIME that Gabriel had elevated BP. What will be the APPROPRIATE INTERVENTION to do at this point?

A. Advise BP monitoring at home and proceed with the vaccination.
B. Give sublingual clonidine 75 mcg and wait until his BP goes down before proceeding with the vaccination.
C. Seek clearance from a cardiologist prior to vaccination.
D. Start anti-hypertensive regimen (e.g., telmisartan 40 mg OD) and proceed with the vaccination.

33. Jeffrey is a 60-year old lawyer with a smoking history of 20 pack years, who consults the Family and Community Medicine Wellness Clinic for an executive check-up. He denies having any existing comorbidities, alleges to be ASYMPTOMATIC and of GOOD FUNCTIONAL CAPACITY. His RESTING BLOOD PRESSURE is 140/90 mmHg, and on physical examination, his APEX BEAT is noted to be on the left fourth anterior axillary line. He adds that his usual blood pressure ranges from 130-140 / 85-90 mmHg. His resting 12-lead electrocardiogram revealed SINUS RHYTHM, with LEFT VENTRICULAR HYPERTROPHY by voltage, and NON-SPECIFIC ST-T WAVE CHANGES. Based on the latest Philippine clinical practice guidelines, what is the most appropriate management for Jeffrey during this medical evaluation?

A. Recommend lifestyle modification initially, then follow up after three months for re-evaluation.
B. Start antihypertensive monotherapy (i.e., calcium channel blocker or RAS inhibitor) to control his blood pressure, then follow up after three months for re-evaluation.
C. Start antihypertensive combination therapy (i.e., calcium channel blocker and RAS inhibitor), then follow up after three months for re-evaluation.
D. Recommend lifestyle modification, start antihypertensive therapy, then follow up after three months for re-evaluation.

34. Lizette is OVERWEIGHT, with a previous history of DYSLIPIDEMIA and strong family history of CEREBROVASCULAR ACCIDENTS. She has PERSISTENT ELEVATED BLOOD PRESSURE, ranging from 130-150 / 85-100 mmHg. Which of the following ANTI- HYPERTENSIVE DRUGS must be AVOIDED, because of the association of its class to new onset DIABETES MELLITUS?

A. Carvedilol 25 mg OD
B. Felodipine 10 mg OD
C. Enalapril 20 mg OD
D. Candesartan 16 mg OD

35. A 42-year-old bank executive comes to the emergency room (ER) due to a single episode of chest heaviness upon waking up. He is an occasional smoker and alcoholic beverage drinker. He has no known comorbidities but has a family history of stroke. He has a body mass index (BMI) of 27 kg/m'. His blood pressure (BP) at the ER is 180/110 mmHg and resting electrocardiogram showed left ventricular hypertrophy using the Sokolow--yon criteria. His chest heaviness eventually resolves after his blood pressure has reduced to its mean arterial pressure with Captopril 25 mg per orem. Which of the following is the best DISCHARGE INSTRUCTION encompassing a PATIENT-CENTERED, FAMILY-FOCUSED, and COMMUNITY-ORIENTED management?

A. Patient is discharged as hypertension suspect. Regular BP monitoring is needed. The family needs to prepare a low-salt diet of 1,500 mg/day for the patient, with enrollment in existing community lifestyle activities.
B. Patient is discharged with Telmisartan 40 mg OD with a target of less than 140/90 mmg. Encourage the family to adhere with a healthy diet, as well as to join programs on hypertension in the community.
C. Patient is discharged with Telmisartan 40 mg OD and Amlodipine 5 mg OD. Encourage the family not to exceed a maximum of 2,300 mg/day of salt in their food, and to enroll in community health activities, such as tai chi or morning runs.
D. Patient is discharged with Irbesartan 150 mg + Hydrochlorothiazide 12.5 mg OD with a BP goal of ≤ 140/90 mmHg. Encourage the family to have fitness activities, as well as join existing community active lifestyle events.

36. According to the latest Philippine guidelines, which among the following medications is NOT recommended as a FIRST-LINE ANTIHYPERTENSIVE DRUG for persons with UNCOMPLICATED HYPERTENSION?

A. Telmisartan 40 mg OD
B. Amlodipine 5 mg OD
C. Bisoprolol 5 mg OD
D. Lisinopril 20 mg OD

37. A 35-year-old G3P2 (2002), presently with PREGNANCY UTERINE 28 weeks age of gestation (AOG), is presented at the Family and Community Medicine ambulatory unit due to LIGHTHEADEDNESS and BLOOD PRESSURE of 165/115 mmHg. What is the best BLOOD PRESSURE (BP) LOWERING AGENT for this pregnant individual?

A. Labetalol 10 mg IV
B. Nifedipine 5 mg, one capsule sublingual
C. Methyldopa 250 mg per tablets, two tablets per orem
D. Nicardipine 5 mg per hour intravenous infusion, titrated by 2.5 mg per hour every five minutes to reach target BP

Answers & Rationale - Hypertension

1. Answer B

- The document specifies that for patients with diabetes (a high cardiovascular risk group similar to heart failure), the target is <130/80 mmHg, but it cautions not to lower the blood pressure below 120/70 mmHg due to an increased risk for adverse events. Option B is the only choice that accurately reflects this therapeutic window

2. Answer B

- The "First Visit" section in the provided notes lists the recommended baseline laboratory tests for a newly diagnosed hypertensive patient as: "12-lead ECG, urinalysis, FBS, creatinine, serum K and lipid profile". A chest radiograph is not included in this list of routine, cost-effective baseline tests

3. Answer C

- The document lists the preferred first-line drugs for uncomplicated hypertension, which include angiotensin-receptor blockers (ARBs). Losartan is an ARB. Clonidine and Spironolactone are not considered first-line agents, and Metoprolol (a beta-blocker) is only considered first-line for patients with specific compelling indications like coronary artery disease or heart failure

4. Answer B

- The provided text under "Continuing Visit" and the "Patient-directed Non-pharmacologic Interventions" table states that follow-up should occur at monthly intervals or until the BP goal is reached

5. Answer C

- The patient presents with a hypertensive emergency (BP 200/120 mmHg with acute neurological deficits). The document specifies that for acute ischemic stroke, titratable intravenous medications are

recommended. It explicitly mentions Labetalol as a therapeutic option. Rapidly lowering the BP is dangerous (A), sublingual nifedipine is contraindicated (D), and while Mannitol might be used for cerebral edema, the primary intervention is BP control with an appropriate IV agent

6. Answer D

- The patient is in her first trimester of pregnancy. The document states that beta-blockers are suitable as initial therapy in pregnant women. Metoprolol is a beta-blocker. ACE inhibitors (Captopril) and ARBs (Losartan) are generally not recommended in pregnancy. While some calcium channel blockers like Amlodipine may be used, beta-blockers are explicitly mentioned as a preferred class

7. Answer B

- The patient has Stage 1 Hypertension (140/90 mmHg). Her BMI of 22 is normal. The appropriate initial step is to start a first-line antihypertensive medication. **Amlodipine**, a calcium channel blocker, is a recommended first-line agent. Starting a beta-blocker like Atenolol (A) is not a standard first-line choice without a compelling indication. Lifestyle advice alone (C) is insufficient, and dismissing the symptoms (D) is inappropriate.

8. Answer B

- The guidelines identify ACE inhibitors/ARBs, calcium channel blockers, and thiazide diuretics as the preferred first-line drugs for uncomplicated hypertension. It explicitly states that **beta-blockers** (like Metoprolol) are suitable as initial therapy only in specific situations like coronary artery disease or pregnancy, not as a general first-line treatment.

9. Answer C

- The "Continuing Visit" section of the notes recommends follow-up **"at monthly intervals or until the BP goal is reached"**. Four weeks is equivalent to one month.

10. Answer D

- The patient's blood pressure is well-controlled and within the target range (less than 130/80 mmHg) on his current regimen. He has also successfully implemented lifestyle changes. The standard of care in this situation is to continue the effective treatment plan to maintain BP control and prevent future cardiovascular events. Discontinuing or reducing the dose of his medications would risk his hypertension becoming uncontrolled again.

11. Answer D

- The patient's blood pressure is not at the target goal despite being on a two-drug combination (an ACE inhibitor and a thiazide diuretic). According to the guidelines, the ideal combination therapy often involves a renin-angiotensin-system (RAS) blocker (like Enalapril), a calcium channel-blocker (CCB), and a thiazide diuretic. Since the patient is already on a RAS blocker and a diuretic, the next logical step is to add a calcium channel blocker like amlodipine to achieve a three-drug regimen. Adding another RAS blocker (Olmesartan) is not recommended, and beta-blockers (Carvedilol) are not first-line and may be used with caution in asthmatic patients

12. Answer D

- The patient has severe pre-eclampsia, defined by a blood pressure ≥160/110 mmHg with proteinuria after 20 weeks of gestation. The provided guidelines state that for the outpatient management of hypertension in pregnancy, methyldopa is a first-line drug. ACE inhibitors (Enalapril) and ARBs (Losartan) are generally not recommended during pregnancy. Furosemide is a diuretic and not a first-line agent for this condition

13. Answer C

- The patient has uncontrolled hypertension with evidence of hypertension-mediated organ damage (diastolic dysfunction) and symptoms of heart failure (exertional dyspnea). The guidelines state that beta-blockers (specifically carvedilol, bisoprolol, etc.) are indicated for hypertensive patients with heart failure. Additionally, for patients with resistant hypertension or heart failure, a mineralocorticoid receptor antagonist like spironolactone can be considered. Adding both agents addresses the uncontrolled BP and the heart failure component of his condition. Combining an ACE inhibitor and an ARB (Option B) is not recommended

14. Answer C

- This statement is incorrect. The provided guidelines specify a different threshold and target for the very elderly. The text states: "For the very elderly, defined as 80 years old and above, a therapeutic threshold of 150/90 mm Hg to achieve a goal BP of less than 140/90 mm Hg is recommended". The other statements are all consistent with the guidelines.

15. Answer C

- The guidelines state that for hypertension during pregnancy, the first-line drugs include methyldopa, calcium channel blockers, or beta-blockers. It also specifies that ACE inhibitors (Captopril) and ARBs (Losartan) are generally not recommended. Among the choices, Methyldopa is a classic and appropriate first-line agent

16. Answer D

- This question requires specific staging definitions which are listed as a heading in the provided text but not detailed. However, based on standard pediatric hypertension guidelines (which are reflected in the structure of the question options), options A, B, and C represent the correct definitions for Normal BP, Stage 1 HTN, and Stage 2 HTN in children and adolescents. Assuming these definitions are correct as per the full guidelines the text is based on, then none of the statements are false

17. Answer C

- **"Exercising at least 150 minutes per week at moderate to high-intensity** is also recommended". The range of 150 to 300 minutes per week is the standard recommendation that encompasses this guideline, making option C the most appropriate exercise prescription

18. Answer A

- The provided guidelines state that for adults with acute ischemic stroke who are not eligible for thrombolysis, the threshold for urgent treatment is a BP >220/120 mmHg, and the recommendation is to lower the BP by 15% during the first 24 hours. However, it also explicitly recommends maintaining a target mean arterial pressure (MAP) of 110 to 130 mmHg. This MAP target represents the overall goal of the controlled BP reduction.

19. Answer A

- The document, when discussing two-drug combinations for CKD patients, explicitly states: "...consider these mechanisms in the choice of anti-hypertensives: calcium channel blockers and diuretics to address volume dependent type of hypertension...".

20. Answer A

- The provided text lists cardiovascular risk factors, and for age, it specifies "advanced age (>65 years)". While being over 40 is a risk factor in some other scoring systems, it is not the criterion listed in this specific guideline. The other options (BMI >25, LDL-C >130, TG >150) are all explicitly mentioned as risk factors in the text

21. Answer C

- The provided guidelines define Hypertension as an office blood pressure (BP) of 140/90 mm Hg or above. Since the patient's readings are 140/100 mmHg and 150/100 mmHg, they fall into this classification

22. Answer B

- The patient has Gestational Hypertension, defined as a new onset of BP ≥ 140/90 mmHg after 20 weeks of gestation without proteinuria. The guidelines state that first-line drugs for hypertension in pregnancy include methyldopa, calcium channel blockers, or beta-blockers. Amlodipine is a calcium channel blocker. Losartan (an ARB) and Enalapril (an ACE inhibitor) are generally not recommended in pregnancy. IV hydralazine is reserved for urgent control of severe hypertension

23. Answer D

- The document explicitly states that for non-pharmacologic management, "The American Heart Association recommends that sodium intake be limited to... 1500 mg/d in people with prehypertension or hypertension

24. Answer B

- The guidelines recommend the Dietary Approaches to Stop Hypertension (DASH) meal plan, which is described as being rich in fruits, vegetables, and low-fat dairy, and low in red and processed meat.

25. Answer A

- The patient has acute-onset severe hypertension in pregnancy (BP > 160/110 mmHg). The guidelines state, "The first line of treatment is intravenous (IV) hydralazine and labetalol" for urgent blood pressure control in this setting. Starting oral medications would not be appropriate for this level of acuity

26. Answer C

- This patient does not meet any of the cardiovascular risk factors listed in the document (advanced age >65, male gender, BMI > 25, diabetes, dyslipidemia, smoking, family history of CVD, etc.). The other patients all have at least one identifiable risk factor (A: age >65, diabetes; B: male, smoker; D: male, BMI >25, smoker, dyslipidemia

27. Answer C

- The combination of obesity, hypertension, and symptoms like abrupt awakenings with gasping are classic signs of Obstructive Sleep Apnea (OSA). The guidelines specifically mention that "screening for obstructive sleep apnea may be worthwhile" in people with diabetes and hypertension

28. Answer C

- While the provided document does not specify the uricosuric effects of drugs, it is a well-established clinical principle that among the angiotensin receptor blockers (ARBs), Losartan has a mild uricosuric effect (helps excrete uric acid), making it a favorable choice for patients with both hypertension and gout

29. Answer C

- The guidelines clearly state that a "Validated automated oscillometric sphygmomanometer (digital device) is recommended for in office or out of office use".

30. Answer B

- While the document defines the office BP threshold as ≥140/90 mmHg, it recommends out-of-office measurements for confirmation. The standard, widely accepted threshold for diagnosing hypertension based on Home Blood Pressure Monitoring (HBPM) is an average reading of ≥135/85 mmHg

31. Answer A

- All the options listed are valid non-pharmacologic interventions recommended by the guidelines. However, sodium restriction is a cornerstone of hypertension management applicable to every patient with the diagnosis, regardless of their weight or smoking status. The document recommends limiting sodium to as low as 1500 mg/day, making a recommendation of less than 2 grams (2000 mg) per day a correct and universally appropriate starting point

32. Answer A

- The guidelines state that for a first-time high BP reading (if not in the emergency range), the diagnosis should be confirmed with out-of-office measurements like home BP monitoring or a second visit. Starting medication immediately is not indicated. There is no acute contraindication to proceeding with a routine vaccination for a stable, asymptomatic patient with newly noted elevated BP

33. Answer C

- Jeffrey has confirmed hypertension (BP at the 140/90 mmHg threshold) with evidence of Hypertension-Mediated Organ Damage (HMOD), specifically Left Ventricular Hypertrophy (LVH) on his ECG. The presence of HMOD places him in a higher cardiovascular risk category, warranting immediate and more aggressive pharmacologic treatment in addition to lifestyle changes. The guidelines recommend an ideal combination therapy that includes a RAS inhibitor (like an ARB or ACE inhibitor) and a calcium channel blocker

34. Answer A

- While this specific side effect profile is not detailed in the provided text, standard pharmacological knowledge identifies that beta-blockers (like Carvedilol) and thiazide diuretics have a higher propensity to cause metabolic side effects, including an increased risk of new-onset diabetes, especially in at-risk patients like Lizette. ACE inhibitors, ARBs, and CCBs are considered metabolically neutral or even beneficial

35. Answer C

- This patient presented with a very high BP (180/110 mmHg), which warrants starting **combination therapy** immediately. Option C provides an ideal two-drug combination (RAS blocker + CCB) as recommended by the guidelines. Furthermore, it gives a specific and correct dietary recommendation for sodium intake (<2300 mg/day) and incorporates both family-focused (diet preparation) and community-oriented (enrollment in activities) approaches, making it the most comprehensive and correct discharge plan.

36. Answer C

- The guidelines specify that the suitable first-line drugs for uncomplicated hypertension are ACE inhibitors, ARBs, calcium channel blockers, and thiazide/thiazide-like diuretics. It explicitly states that beta-blockers (like Bisoprolol) are suitable as initial therapy only for patients with specific compelling indications such as coronary artery disease or heart failure, not for uncomplicated cases

37. Answer C

- This patient is presenting with acute-onset severe hypertension in pregnancy (BP ≥160/110 mmHg)1.
- While intravenous agents such as Labetalol (Option A) and Nicardipine (Option D) are the first-line treatments for the urgent control of acute-onset severe hypertension in a hospital setting 2, Methyldopa is a recommended first-line oral agent for the standard outpatient (OPD) management of hypertension in pregnancy3. Given the "ambulatory unit" setting and the options provided, Methyldopa represents the standard first-line oral therapy.
- Sublingual nifedipine (Option B) is not recommended due to the risk of a rapid, uncontrolled drop in blood pressure, which can cause fetal distress.

Dyslipidemia

Lifestyle Modifications

- For individuals at any level of cardiovascular risk, **a low-fat, low-cholesterol diet, rich in fruits and vegetables**, is RECOMMENDED.
  - Filipino individual with dyslipidemia utilize the **Pinggang Pinoy**
- For individuals at any level of cardiovascular risk, cigarette **smoking cessation** is STRONGLY RECOMMENDED.
- For individuals at any level of cardiovascular risk, **e-cigarette smoking/vaping CESSATION** IS RECOMMENDED
- For individuals at any level of cardiovascular risk, adequate exercise is RECOMMENDED.
  - Exercising at least **150 minutes per week** at moderate to high-intensity

PRIMARY PREVENTION

Individuals with no prior ASCVD

- For individuals without diabetes aged ≥45 years with LDL-C ≥130 mg/dL AND ≥2 risk factors*, without atherosclerotic cardiovascular disease, statins are RECOMMENDED for the prevention of cardiovascular events.

***Risk Factor Counting as the method in identifying the risk of the Filipino individual for cardiovascular disease**

- individual has two (2) or more risk factors
  - male sex
  - postmenopausal women
  - smoker
  - hypertension
  - BMI >25 kg/m2
  - family history of premature CHD
  - proteinuria
  - left ventricular hypertrophy
- the benefit for statin therapy in primary prevention is fulfilled and statin therapy is indicated

Screening and treatment algorithm for the management of dyslipidemia

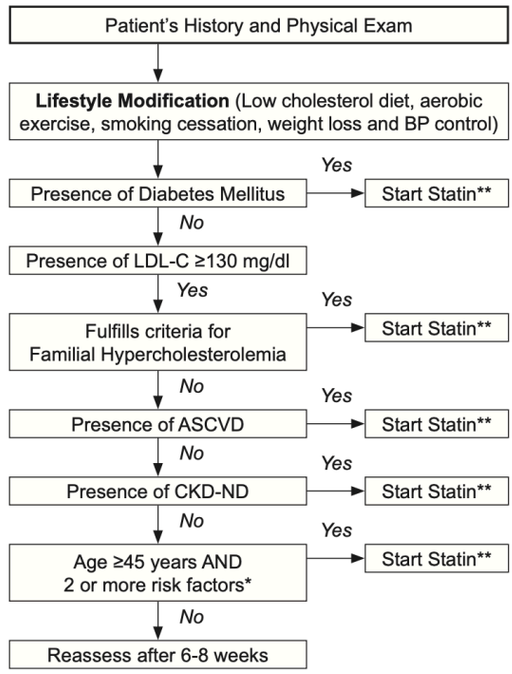


Figure 1. Screening and treatment algorithm for the management of dyslipidemia.

Legend:
* Risk factors: male, smoker, hypertension ≥140/90 mmHg, BMI 25 kg/m², family history of premature coronary heart disease, proteinuria, left ventricular hypertrophy and postmenopausal women
** The guideline recommends maximally-tolerated statin therapy to reach recommended target LDL-C levels

Primary Prevention for Individuals with Diabetes Mellitus

- For individuals with diabetes without evidence of ASCVD, statins are RECOMMENDED for primary prevention of cardiovascular events

Diabetes	Diabetes With >1 Risk Factor	Diabetes With Previous Myocardial Infarction, Unstable Angina Or CVD (Stroke)
LDL goal: <100 mg/dL	LDL-C goal: <70 mg/dL	LDL-C goal: <55mg/dL

Familial Hypercholesterolemia

- For individuals identified to have familial hypercholesterolemia, statin therapy is STRONGLY RECOMMENDED for the prevention of cardiovascular events
  - For familial hypercholesterolemia, the recommended statin therapy is the high-intensity dose of statin
    - with a target LDL-C of less than <70 mg/dl in FH patients without target organ damage
    - <55 mg/dl for FH individuals with target organ damage

Dutch lipid network criteria on the diagnosis of heterozygous familial hypercholesterolemia

Criteria	Points
Family history	
First-degree relative with known premature* coronary and vascular disease, OR First-degree relative with known LDL-C level above the 95th percentile	1
First-degree relative with tendinous xanthomata and/or arcus cornealis OR Children aged less than 18 years with LDL-C level above the 95th percentile	2
Clinical history	
Patient with premature* coronary artery disease	2
Patient with premature* cerebral or peripheral vascular disease	1
Physical examination	
Tendinous xanthomata	6
Arcus cornealis prior to age 45 years	4
Cholesterol levels in mg/dl (mmol/liter)	
LDL-C ≥330 mg/dL (≥8.5)	8
LDL-C 250 – 329 mg/dL (6.5–8.4)	5
LDL-C 190 – 249 mg/dL (5.0–6.4)	3
LDL-C 155 – 189 mg/dL (4.0–4.9)	1
DNA analysis	
Functional mutation in the LDLR,[b] apo B[c] or PCSK9[d] gene	8
Diagnosis (diagnosis is based on the total number of points obtained)	
Definite familial hypercholesterolemia	>8
Probable familial hypercholesterolemia	6-8
Possible familial hypercholesterolemia	3-5
Unlikely familial hypercholesterolemia	<3

* Premature: ≤55 years in men; <60 years in women; LDL-C, low density lipoprotein cholesterol; FH, familial hypercholesterolemia; LDLR, low density lipoprotein receptor; Apo B, apolipoprotein B; PCSK9, proprotein convertase subtilisin/kexin type 9.

Dyslipidemia in the Pediatric Population

- Among pediatric population (≤19 years old) at risk for development of atherosclerosis and premature cardiovascular disease, screening with a fasting lipid profile is RECOMMENDED

Risk factors for cardiovascular disease in the pediatric population

Traditional Risk Factors	Other conditions
Dyslipidemia	• Familial hypercholesterolemia
Obesity	• Chronic kidney disease
Diabetes mellitus (Type 1 or 2)	• Kawasaki disease
Hypertension	• Childhood cancer
Family history of premature CVD	• Transplant vasculopathy
Smoke exposure	• Certain congenital heart disease (e.g., coarctation of the aorta, aortic stenosis) • Cardiomyopathy • Chronic inflammatory disorders • HIV infection • Adolescent depressive and bipolar disorders

CVD, cardiovascular disease; HIV, human immunodeficiency virus

Individuals with Chronic Kidney Disease

- Among individuals with chronic kidney disease who are not on dialysis, statins are RECOMMENDED for the prevention of cardiovascular events
  - individuals who are on renal replacement therapy and post-transplant, this local guideline recommends referring patients to nephrologists for lipid management

SECONDARY PREVENTION

Individuals with Acute Coronary Syndrome

- For individuals with ACS, early high-intensity statin that is maximally-tolerated is RECOMMENDED and should not be discontinued.
- Statins should be given to ACS patients immediately
  - time is muscle," is based on the principle of the necessity for immediate action during the golden period in which myocardial ischemic damage is still potentially reversible or myocyte necrosis can still be contained and much of the myocardium in the ischemic penumbra can still be salvaged

Statin treatment intensity

Treatment intensity	% LDL-C reduction	Drug regimen
Low intensity	<30 %	Fluvastatin 20 - 40 mg Pravastatin 10 - 20 mg Simvastatin 10 mg
Moderate intensity	30% - 50%	Atorvastatin 10 - 20 mg Fluvastatin 80 mg Rosuvastatin 5 - 10 mg Simvastatin 20 - 40 mg Pravastatin 40 - 80 mg Pitavastatin 2 - 4 mg
High intensity	>50%	Atorvastatin 40 - 80 mg Rosuvastatin 20 - 40 mg

LDL-C, low density lipoprotein cholesterol

NON-STATIN THERAPY

Use of Ezetimibe

- For individuals with documented ACS, and target LDL-C has not been reached despite maximally- tolerated high-intensity statin therapy, ezetimibe may be added on top of statin therapy to get to goal LDL-C

Use of Fibrates

- Among individuals without diabetes not at goal LDL-C, routinely adding fibrates on top of statin therapy is **NOT RECOMMENDED** for primary or secondary prevention of cardiovascular disease.
- Among individuals with diabetes, routinely adding fibrates on top of statin therapy is **NOT RECOMMENDED** for primary or secondary prevention of cardiovascular disease.
- However, adding fibrates to statins may be considered among MEN with controlled diabetes, low HDL-C (<35 mg/dl) and persistently high triglycerides (>200 mg/dl) for prevention of CV disease.

Use of Omega Fatty Acids

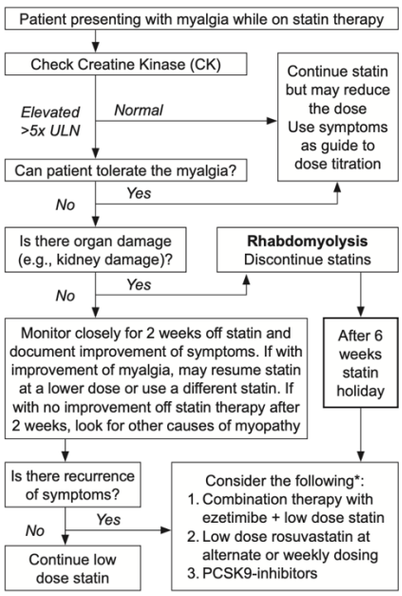
- Among individuals with ASCVD, omega fatty acids (EPA+DHA) given on top of statin therapy is NOT RECOMMENDED.
- Among individuals with ASCVD on statin therapy at goal LDL-C, but with persistently high triglyceride levels of 150-499 mg/dl, omega fatty acids (pure EPA) MAY be given

STATIN ADVERSE EVENTS

Use of Statin Therapy

- Treatment with statins is associated with a low risk of developing statin-associated muscle symptoms (SAMS), but the benefits of cardiovascular risk reduction outweigh the risk
- Treatment with statins is associated with an increased risk of new-onset diabetes mellitus, but the benefits of statin treatment for cardiovascular risk reduction outweigh the risk.
- Treatment with statins is not associated with the development of dementia and cognitive dysfunction
- Treatment with statins is not associated with an increased risk of intracerebral hemorrhage

Algorithm for Statin-induced Myopathy



Additional Targets To Reduce Cardiovascular Risk

Use of non-HDL-C

- Among individuals on statin therapy who have achieved their LDL-C goal, an elevated computed non-HDL-C may be used as an additional therapeutic target to further reduce CV events
  - Non-HDL-C is the difference between the total cholesterol levels and HDL-C and quantifies all atherogenic lipoprotein particles.
  - Target non-HDL in various guidelines set it as 30 mg/dL above target LDL-C.
  - In patients with atherogenic dyslipidemia such as those with metabolic syndrome, type 2 diabetes mellitus and obesity, non- HDL-C determination is recommended as an additional tool providing a better estimate of risk beyond LDL-C.
  - The non-fasting HDL computation has prognostic value in clinical trials as a therapeutic target.

Use of Apolipoprotein B-100

- Among individuals on statin therapy who have achieved their LDL-C goal, an elevated apolipoprotein B-100 may be used as an additional therapeutic target to further reduce CV event

Cholesterol targets for different patient groups

Patient Groups	LDL-C Target	HDL-C Target	Triglyceride Target
Individuals with no clinical ASCVD	<130 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with DM With ≥1 risk factors / target organ damage With ASCVD	<100 mg/dL <70 mg/dL <55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with clinical ASCVD	<55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH without ASCVD or without major risk factor / target organ damage FH with ASCVD or with ≥1 risk factors / target organ damage	<70 mg/dL <55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl

ASCVD, atherosclerotic cardiovascular disease; DM, diabetes mellitus; FH, familial hypercholesterolemia

Sample Questions - Dyslipidemia

1. A 40yo male was admitted due to chest pain. One day prior to consult, he claimed to be stressed and consumed one and a half pack of cigarette and 10 cups of decaffeinated coffee. Eight hours prior to consult, he experienced intermittent acidic epigastric pain with a pain scale of 9/10, which radiated to the back and to the chest. He claims to have bitter taste and cold clammy skin. He denies fever, nausea, vomiting, left sided weakness, and dizziness. He is hypertensive and is on Losartan + Amlodipine 50mg/5mg OD AM dose. Family medical history revealed hypertension both parents. His ECG result done at the emergency room revealed left ventricular hypertrophy, NSTEMI; RBS = 220mg/dL; Troponin I = 10.0 ng/mL. Pertinent laboratory results are as follows: FBS= 400mg/dL; lipid profile (LDL = 200mg/dL; HDL = 40mg/dL; Total Chol = 350mg/dL; Trig = 150mg/dL). According to the 2020 clinical practice guidelines for the management of dyslipidemia in the Philippines, which among the following statins is best to be given?

A. Fluvastatin 20mg/tab ODPM
B. Simvastatin 20mg/tab ODPM
C. Atorvastatin 20mg/tab ODPM
D. Rosuvastatin 20mg/tab ODPM

2. A 45yo female was brought to the emergency room due to chest pain. One hour prior to consult, she claimed to have experienced acidic epigastric pain which radiated to the chest in the middle of the night with a pain scale of 8/10 associated with sour bitter taste, nausea and 1 episode of vomiting while on transit. She is diagnosed with Hypertension and is on Losartan 100mg OD AM. She denies smoking and taking alcoholic beverage. Pertinent physical examination was BP= 170/100mmHg, HR=105bpm, RR=20cpm, temp=37C, O2=98percent; (-) retractions; (+) tachycardic, regular rhythm, (-) murmur; (+) flat, soft, (+) direct tenderness on deep palpation at the epigastric area. Based on the 2020 clinical practice guidelines for the management of dyslipidemia in the Philippines, what diagnostics tests can be done in the emergency room and immediately identify the patient as having the risk of developing a cardiovascular disease?

A. CBC, 12L ECG, RBS
B. CBC, chest Xray, urinalysis
C. CBC, 12L ECG, urinalysis
D. CBC, chest Xray, RBS

3. A 50yo, female sought consult for her annual medical examination results. Her medical history are as follows: Diabetes Mellitus Type 2 and is on Sitagliptin 50mg/tab OD AM dose; Overweight; Dyslipidemia and is on Atorvastatin 10mg OD PM dose which she started 3months prior to consult. Pertinent laboratory result showed: FBS= 100mg/dL; HBA1C = 6.5 percent, lipid profile (LDL = 130mg/dL; HDL = 45mg/dL; Total Chol = 200mg/dL; Trig = 130mg/dL), ECG 12L= normal. Based on the 2020 clinical practice guidelines for the management of dyslipidemia in the Philippines, what is the ideal cholesterol and triglyceride target for this case?

A. LDL-C: less than 130 mg/d, HDL: more than 40 mg/dl, Triglyceride: less than 150 mg/dl
B. LDL-C: less than 130 mg/d, HDL: more than 50 mg/dl, Triglyceride: less than 150 mg/dl
C. LDL-C: less than 100 mg/d, HDL: more than 50 mg/dl, Triglyceride: less than 150 mg/dl
A. LDL-C: less than 100 mg/d, HDL: more than 40 mg/dl, Triglyceride: less than 150 mg/dl

4. Ms. Corazon Amor, a 50-year-old overweight female, has recently started taking medications for CORONARY ARTERY DISEASE (CAD). To achieve a MORE THAN 50% REDUCTION in LOW DENSITY LIPOPROTEIN CHOLESTEROL (LDL-C) LEVELS to reduce the risk of MAJOR ADVERSE CARDIAC EVENTS, which among the following medications should she take?

A. simvastatin 40 mg OD
B. pravastatin 80 mg OD
C. rosuvastatin 20 mg OD
D. atorvastatin 20 mg OD

5. Diosdado Sandoval, 65 years old, is a known DIABETIC and HYPERTENSIVE who was hospitalized last year for NON-FATAL MYOCARDIAL INFARCTION. He is currently on rosuvastatin 40 mg OD, after previous medication adjustments due to elevated LOW DENSITY LIPOPROTEIN CHOLESTEROL (LDL-C). During his last wellness check - up, he is noted to have an LDL-C level of 1.9 mmol/L (73.5 mg/dL), high density lipoprotein cholesterol (HDL-C) of 1.1 mmol/L (42.5 mg/dL), triglycerides of 2.0 mmol/L (177.1 mg/dL), and total cholesterol of 3.4 mmol/L (131.5 mg/dL). He alleges to have good compliance with all his maintenance medications. How will you address Diosdado's current LIPID PROFILE?

A. Reduce the dose of rosuvastatin to 20 mg OD since patient's LDL-C is at goal.
B. Add fenofibrate 200 mg OD to rosuvastatin 40 mg OD.
C. Add ezetimibe 10 mg OD to rosuvastatin 40 mg OD.
D. Continue rosuvastatin 40 mg OD since patient is at LDL-C goal.

6. A 45-year-old lawyer is diagnosed to have HYPERTENSION, TYPE 2 DIABETES MELLITUS, DYSLIPIDEMIA, HYPERURICEMIA, and OBSTRUCTIVE SLEEP APNEA. He is currently on rosuvastatin 10 mg OD, and her latest low-density-lipoprotein cholesterol level is at 95 mg/dl. Based on the latest 2020 clinical practice guidelines on DYSLIPIDEMIA, what appropriate step will you recommend regarding TARGET GOALS for CHOLESTEROL MANAGEMENT?

A. Increase rosuvastatin to 20 mg OD to achieve LDL-C target of 55 mg/dL.
B. Maintain rosuvastatin 10 mg OD since LDL-C target has been achieved.
C. Increase rosuvastatin to 20 mg OD to achieve LDL-C target of 75 mg/dL.
D. Discontinue rosuvastatin since LDL-C target has been achieved.

7. A HYPERTENSIVE, DIABETIC patient online seller consults at the Family and Community Medicine Out-Patient Clinic for follow-up after three months. Current laboratory results showed ELEVATION of the ALT (i.e., four times the upper limit of normal) and low-density-lipoprotein cholesterol (LDL-C) levels. She has been taking atorvastatin 40 mg OD for three

months now, allegedly with good compliance. What is appropriate management for this patient?

A. Stop the atorvastatin for four weeks then resume once ALT normalizes.
B. Stop the atorvastatin, start ezetimibe, and recheck ALT after two weeks.
C. Lower the dose of atorvastatin, add ezetimibe, then recheck ALT after two weeks.
D. Lower the dose of atorvastatin to 10 mg OD and recheck ALT after two weeks.

8. Benjamin is a 55-year-old call center with CONTROLLED TYPE 2 DIABETES MELLITUS and DYSLIPIDEMIA, presently on Atorvastatin 80 mg once daily. Despite good compliance with his oral maintenance medications, his LIPID PROFILE for the PAST SIX MONTHS always reveals persistent HYPETRIGLYCERIDEMIA. What medication may be added for the prevention of complicated CARDIOVASCULAR DISEASES?

A. Ezetimibe
B. Omega Fatty Acids
C. Fenofibrate
D. Niacin

9. According to the 2022 American College of Cardiology Expert Consensus Decision Pathway, which of the following NON-STATIN AGENTS is preferred for patients with clinical ATHEROSCLEROTIC CARDIOVASCULAR DISEASE (ASCVD) and ELEVATED LOW DENSITY LIPOPROTEIN CHOLESTEROL (LDL-C), despite MAXIMALLY TOLERATED STATIN THERAPY (e.g., Rosuvastatin / Atorvastatin)?

A. Niacin
B. Ezetimibe
C. Fenofibrate
D. Fish Oil / Omega-3 Fatty Acid

Answers & Rationale - Dyslipidemia

1. Answer D

- This patient has an established atherosclerotic cardiovascular disease (ASCVD) due to the NSTEMI diagnosis. According to the guidelines, patients with ASCVD are classified as **Very High Risk**. The standard of care for this group is **High-Intensity Statin Therapy**, which aims for an LDL-C reduction of >50%. High-intensity statin doses include Atorvastatin 40-80 mg or Rosuvastatin 20-40 mg. Among the choices, only **Rosuvastatin 20 mg** meets the criteria for high-intensity therapy
- For individuals with ACS, early high-intensity statin that is maximally-tolerated is RECOMMENDED and should not be discontinued.
- Statins should be given to ACS patients immediately
  - time is muscle," is based on the principle of the necessity for immediate action during the golden period in which myocardial ischemic damage is still potentially reversible or myocyte necrosis can still be contained and much of the myocardium in the ischemic penumbra can still be salvaged

Treatment intensity	% LDL-C reduction	Drug regimen
Low intensity	<30 %	Fluvastatin 20 - 40 mg Pravastatin 10 - 20 mg Simvastatin 10 mg
Moderate intensity	30% - 50%	Atorvastatin 10 - 20 mg Fluvastatin 80 mg Rosuvastatin 5 - 10 mg Simvastatin 20 - 40 mg Pravastatin 40 - 80 mg Pitavastatin 2 - 4 mg
High intensity	>50%	Atorvastatin 40 - 80 mg Rosuvastatin 20 - 40 mg
LDL-C, low density lipoprotein cholesterol		

2. Answer A

- In an emergency room setting for a patient presenting with chest pain and hypertension, the immediate goal is to rule out an acute coronary syndrome (ACS) and assess risk. A **12-Lead ECG** is essential to check for ischemic changes. A **CBC** can identify anemia which can precipitate chest pain. A **Random Blood Sugar (RBS)** is crucial to screen for diabetes, a major cardiovascular risk factor. This combination provides the most critical initial information for risk stratification and immediate management.

***Risk Factor Counting as the method in identifying the risk of the Filipino individual for cardiovascular disease**

- individual has two (2) or more risk factors
  - male sex
  - postmenopausal women
  - smoker
  - hypertension
  - BMI >25 kg/m2
  - family history of premature CHD
  - proteinuria
  - left ventricular hypertrophy
- By performing a 12L ECG and a urinalysis, clinicians can immediately check for two additional major risk factors. If either left ventricular hypertrophy or proteinuria is present, the patient would meet the criteria of having two or more risk factors, placing her at higher risk for cardiovascular disease and making her a candidate for statin therapy. The CBC is a general test often included in an initial emergency room workup

3. Answer C

- A 50-year-old patient with Diabetes Mellitus and other risk factors (overweight, dyslipidemia) is considered at least **High Risk** for ASCVD. For high-risk patients, the LDL-C target is **<100 mg/dL**, with an even lower optional target of <70 mg/dL. The ideal HDL-C for females is **>50 mg/dL**, and the target for Triglycerides is **<150 mg/dL**. Option C provides the most appropriate set of targets among the choices.

Patient Groups	LDL-C Target	HDL-C Target	Triglyceride Target
Individuals with no clinical ASCVD	<130 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with DM	<100 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
With ≥1 risk factors / target organ damage	<70 mg/dL		
With ASCVD	<55 mg/dL		
Individuals with clinical ASCVD	<55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH without ASCVD or without major risk factor / target organ damage	<70 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH with ASCVD or with ≥1 risk factors / target organ damage	<55 mg/dL		
ASCVD, atherosclerotic cardiovascular disease; DM, diabetes mellitus; FH, familial hypercholesterolemia			

- The patient has Type 2 Diabetes Mellitus but no clinical atherosclerotic cardiovascular disease (ASCVD).
- The targets for "Individuals with DM" are as follows:
  - LDL-C Target: The baseline target for individuals with diabetes is <100 mg/dL.
  - HDL-C Target: For females, the target is >50 mg/dl.
  - Triglyceride Target: The target is <150 mg/dl

4. Answer C

- A reduction of >50% in LDL-C requires **High-Intensity Statin Therapy**. The recommended high-intensity statin regimens are Atorvastatin 40-80 mg or Rosuvastatin 20-40 mg. Of the options provided, only **Rosuvastatin 20 mg** is classified as a high-intensity statin.

Treatment intensity	% LDL-C reduction	Drug regimen
Low intensity	<30 %	Fluvastatin 20 - 40 mg Pravastatin 10 - 20 mg Simvastatin 10 mg
Moderate intensity	30% - 50%	Atorvastatin 10 - 20 mg Fluvastatin 80 mg Rosuvastatin 5 - 10 mg Simvastatin 20 - 40 mg Pravastatin 40 - 80 mg Pitavastatin 2 - 4 mg
High intensity	>50%	Atorvastatin 40 - 80 mg Rosuvastatin 20 - 40 mg
LDL-C, low density lipoprotein cholesterol		

5. Answer C

- This patient has established ASCVD and diabetes, placing him in the **Very High Risk** category. The LDL-C goal for this group is **<55 mg/dL (<1.4 mmol/L)**. His current LDL-C of 73.5 mg/dL is **not at goal**. Since he is already on a maximal dose of a high-intensity statin (Rosuvastatin 40 mg), the next guideline-recommended step to further lower LDL-C is to add a non-statin agent, such as **ezetimibe**

Patient Groups	LDL-C Target	HDL-C Target	Triglyceride Target
Individuals with no clinical ASCVD	<130 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with DM	<100 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
With ≥1 risk factors / target organ damage	<70 mg/dL		
With ASCVD	<55 mg/dL		
Individuals with clinical ASCVD	<55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH without ASCVD or without major risk factor / target organ damage	<70 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH with ASCVD or with ≥1 risk factors / target organ damage	<55 mg/dL		
ASCVD, atherosclerotic cardiovascular disease; DM, diabetes mellitus; FH, familial hypercholesterolemia			

Treatment intensity	% LDL-C reduction	Drug regimen
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High intensity	>50%	Atorvastatin 40 - 80 mg Rosuvastatin 20 - 40 mg
LDL-C, low density lipoprotein cholesterol		

Use of Ezetimibe

- For individuals with documented ACS, and target LDL-C has not been reached despite maximally- tolerated high-intensity statin

therapy, ezetimibe may be added on top of statin therapy to get to goal LDL-C

- Determine the Patient's Risk and LDL-C Goal: Mr. Sandoval is a 65-year-old with diabetes and a history of myocardial infarction (a form of atherosclerotic cardiovascular disease or ASCVD). According to the guidelines, individuals with both diabetes and clinical ASCVD are in the highest risk category. Their target LDL-C level is less than 55 mg/dL.
- Assess the Current LDL-C Level: The patient's current LDL-C is 73.5 mg/dL. This is above his target of <55 mg/dL, meaning he is not at his goal.
- Evaluate the Current Medication: He is already on rosuvastatin 40 mg, which is a high-intensity statin at a maximally tolerated dose.
- Consult the Guidelines for Next Steps: Since the patient is on a maximally-tolerated high-intensity statin but has not reached his LDL-C goal, the guidelines recommend adding non-statin therapy. Specifically, for individuals with a history of Acute Coronary Syndrome (ACS), like a myocardial infarction, who are not at goal,
  - "ezetimibe may be added on top of statin therapy to get to goal LDL-C"

6. Answer A

- A patient with Type 2 Diabetes and multiple other major risk factors (hypertension, dyslipidemia) is considered **Very High Risk**. The LDL-C goal is **<55 mg/dL**. The patient's current LDL-C of 95 mg/dL is not at goal, and his current therapy (Rosuvastatin 10 mg) is only moderate-intensity. The appropriate next step is to escalate to a **High-Intensity Statin**, such as increasing the dose to Rosuvastatin 20 mg, with the clear target of achieving an LDL-C <55 mg/dL.

Patient Groups	LDL-C Target	HDL-C Target	Triglyceride Target
Individuals with no clinical ASCVD	<130 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with DM With ≥1 risk factors / target organ damage With ASCVD	<100 mg/dL <70 mg/dL <55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
Individuals with clinical ASCVD	<55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl
FH without ASCVD or without major risk factor / target organ damage FH with ASCVD or with ≥1 risk factors / target organ damage	<70 mg/dL <55 mg/dL	>40 mg/dl in males / >50 mg/dl in females	<150 mg/dl

ASCVD, atherosclerotic cardiovascular disease; DM, diabetes mellitus; FH, familial hypercholesterolemia

Treatment intensity	% LDL-C reduction	Drug regimen
Low intensity	<30 %	Fluvastatin 20 - 40 mg Pravastatin 10 - 20 mg Simvastatin 10 mg
Moderate intensity	30% - 50%	Atorvastatin 10 - 20 mg Fluvastatin 80 mg Rosuvastatin 5 - 10 mg Simvastatin 20 - 40 mg Pravastatin 40 - 80 mg Pitavastatin 2 - 4 mg
High intensity	>50%	Atorvastatin 40 - 80 mg Rosuvastatin 20 - 40 mg

LDL-C, low density lipoprotein cholesterol

- Determine the Patient's Risk Category and LDL-C Goal: The patient has Type 2 Diabetes Mellitus along with other comorbidities like hypertension. According to the guidelines, for an individual with diabetes who has one or more additional risk factors (in this case, hypertension), the LDL-C target is less than 70 mg/dL. The patient's current LDL-C is 95 mg/dL, which means the target has not been achieved.
- Determine the Appropriate Action: Since the LDL-C goal has not been met, the current therapy is insufficient. The next step is to increase the intensity of the statin therapy. The patient is currently on rosuvastatin 10 mg OD (a moderate-intensity statin). Increasing the dose to rosuvastatin 20 mg OD would escalate the treatment to a high-intensity statin, which is the appropriate action to further lower the LDL-C. This eliminates options B and D, which incorrectly state that the target has been achieved.

7. Answer A

- A significant elevation of ALT (>3 times the upper limit of normal) warrants intervention. The standard clinical approach is to temporarily **stop the offending drug (atorvastatin)** to see if the liver enzymes normalize, which helps confirm causality. Once the ALT levels have returned to normal, the statin can be cautiously re-introduced, often at a lower dose or by switching to a different statin.

8. Answer B

- The patient is on maximal high-intensity statin therapy with persistent hypertriglyceridemia. The question specifically asks for an add-on medication for the "prevention of complicated CARDIOVASCULAR DISEASES." In this specific clinical scenario (high-risk diabetic on a statin with elevated triglycerides), high-dose prescription **Omega-3 Fatty Acids** (specifically icosapent ethyl) have been shown in major clinical trials (REDUCE-IT) to reduce cardiovascular events. While Fenofibrate lowers triglycerides, its benefit in reducing cardiovascular events on top of a statin is less established.

Use of Ezetimibe

- For individuals with documented ACS, and target LDL-C has not been reached despite maximally- tolerated high-intensity statin therapy, ezetimibe may be added on top of statin therapy to get to goal LDL-C

Use of Fibrates

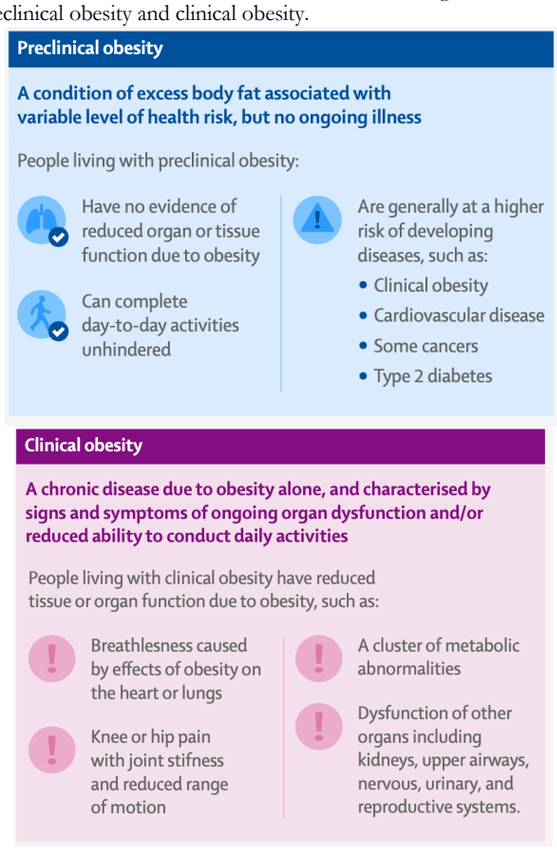
- Among individuals without diabetes not at goal LDL-C, routinely adding fibrates on top of statin therapy is **NOT RECOMMENDED** for primary or secondary prevention of cardiovascular disease.
- Among individuals with diabetes, routinely adding fibrates on top of statin therapy is **NOT RECOMMENDED** for primary or secondary prevention of cardiovascular disease.
- However, adding fibrates to statins may be considered among MEN with controlled diabetes, low HDL-C (<35 mg/dl) and persistently high triglycerides (>200 mg/dl) for prevention of CV disease.

9. Answer B

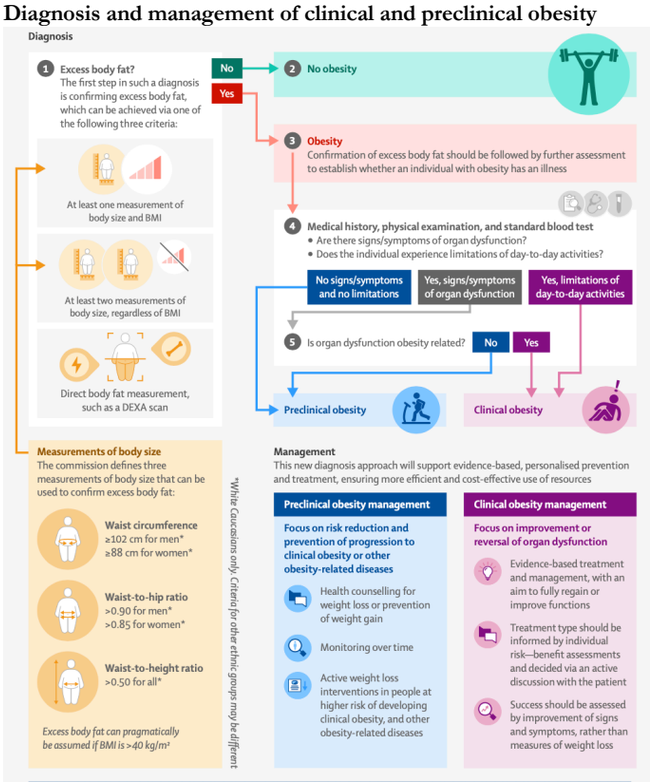
- According to the "2022 ACC Expert Consensus Decision Pathway on the Role of Nonstatin Therapies for LDL-Cholesterol Lowering in the Management of Atherosclerotic Cardiovascular Disease Risk," Ezetimibe is the preferred first non-statin agent to add to maximally tolerated statin therapy.
  - Ezetimibe is recommended due to its proven efficacy in lowering LDL-C (providing an additional 18-25% reduction when added to a statin), its oral administration, low cost, and established cardiovascular outcomes benefit (as demonstrated in the IMPROVE-IT trial).
  - Fenofibrate is a fibrate, which is primarily used to target high triglycerides, not as a primary agent for elevated LDL-C.
  - Niacin is no longer recommended as an add-on to statins for LDL-C lowering, as large clinical trials (e.g., HPS2-THRIVE, AIM-HIGH) failed to show an additional cardiovascular benefit and found an increased risk of side effects.
  - Fish Oil (specifically icosapent ethyl) is recommended for patients with ASCVD who have elevated triglycerides (≥135 mg/dL) despite statin therapy, but it is not the primary choice for lowering LDL-C.

Clinical Obesity

- The Commission proposes a new diagnostic approach to obesity that focuses on other measures of body fat and objective signs and symptoms of ill health.
- The Commission also introduces two new categories of obesity: preclinical obesity and clinical obesity.



Diagnosis and management of clinical and preclinical obesity



Recommendations on the diagnosis of obesity and the screening for obesity-related risk factors and health conditions

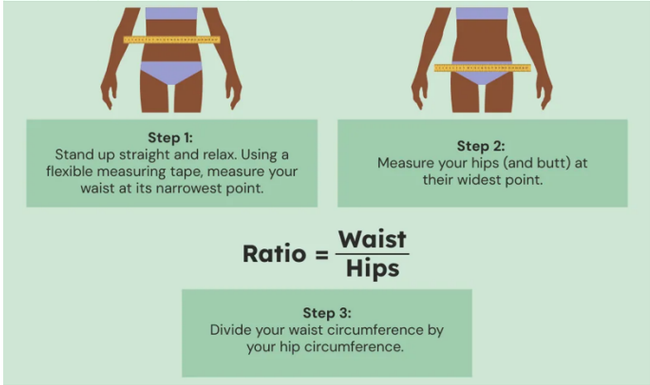
- Among adult Filipinos, we recommend the use of the Asia-Pacific criteria rather than the World Health Organization global criteria for body mass index to diagnose overweight and obesity.

BMI Classification	WHO Cut-offs (kg/m2)	WHO-APP Cut-offs (kg/m2)
Underweight	<18.5 kg/m²	**<18.5 kg/m²**
Normal	18.5–24.9 kg/m²	**18.5–22.9 kg/m²**
Overweight	25–29.9 kg/m²	**23–24.9 kg/m²**
Obesity	≥30 kg/m²	**≥25 kg/m²**

BMI body mass index, WHO World Health Organization, WHO-APP World Health Organization Asia-Pacific population

- Among adult Filipinos, we suggest the use of waist circumference and waist-to-hip ratio in addition to body mass index to diagnose obesity.

	WHO Cut-offs (kg/m²)		WHO-APP Cut-offs (kg/m²)	
Sex	WC	WHR	WC	WHR
Male	≥102 cm	≥1.0	≥90 cm	≥1.0
Female	≥88 cm	≥0.85	≥80 cm	≥0.85



- Among adult Filipinos, we suggest screening for hypothyroidism using thyroid-stimulating hormone among adults ≤70 years old at the initial visit.
- Among adult reproductive-aged Filipino women, we recommend screening for polycystic ovarian syndrome using the Rotterdam criteria at the initial visit.

Rotterdam classification criteria for polycystic ovary syndrome

- To diagnose PCOS, the two out of the three criteria must be met, excluding other causes

Oligo-anovulation	Hyperandrogenism	Polycystic ovaries
• Bleeding interval <21 days • Bleeding interval >35 days, <8 episodes of menses/year • Infertility • No menstruation for 3 consecutive months in the last 12 months	• Clinical: Hirsutism (modified Ferriman-Gallwey score ≥8), acne, male-pattern alopecia • Biochemical Elevated total testosterone or free testosterone, elevated androstenedione, elevated dehydroepiandrosterone, elevated dehydroepiandrosterone sulfate	• ≥12 follicles, 2-9 mm in diameter • Ovarian volume >10 mL in one ovary

- Among adult Filipinos with obesity, we suggest screening for dysglycemia using 75-gram oral glucose tolerance test once a year.
- Among adult Filipinos with obesity, we recommend screening for dyslipidemia using a fasting lipid profile.
- Among adult Filipinos with obesity, we recommend screening for hypertension using a non-invasive blood pressure measurement with an appropriately sized cuff at least once a year.
- Among adult Filipinos with obesity, we suggest screening for non-alcoholic fatty liver disease using liver ultrasound.
- Among adult Filipinos with obesity, we suggest screening for obstructive sleep apnea using the STOP-BANG questionnaire once a year.

STOP

S	So you **snore** loudly (louder enough to be heard through closed doors or louder than talking)?	Yes	No
T	Do you often feel **tired**, fatigued or sleepy during the daytime?	Yes	No
O	Has anyone **observed** you stop breathing or choking or gasping during your sleep?	Yes	No
P	Do you have or are you being treated for high blood **pressure**?	Yes	No

Bang

B	**BMI** more than 35?	Yes	No
a	**Age** – over 50 years old?	Yes	No
n	**Neck** circumference – is it greater than 17" if you are a male or 16" if you are a female?	Yes	No
g	**Gender** – are you a male?	Yes	No

- ○ <3 Low risk of OSA
- ○ ≥3 High risk of OSA

- Among adult Filipinos with obesity, we recommend screening for depression using the Patient Health Questionnaire-9 tool every 6 months.
- Among adult Filipinos with obesity, we recommend screening for osteoarthritis using the American College of Rheumatology clinical classification criteria at every visit.

The American College of Radiology clinical classification criteria for knee osteoarthritis

Method	Criteria
Using history & physical examination[a]	*Knee pain + any 3 of the following:* • >50 years of age • <30 minutes of morning stiffness • Crepitus on active motion • Bony tenderness • Bony enlargement • No palpable warmth of synovium
Using history, physical examination, & radiographic findings	*Knee pain + any 1 of the following:* • >50 years of age • <30 minutes of morning stiffness • Crepitus on active motion and osteophytes
Using history, physical examination, & laboratory findings	*Knee pain + any 5 of the following:* • >50 years of age • <30 minutes of morning stiffness • Crepitus on active motion • Bony tenderness • Bony enlargement • No palpable warmth of synovium • ESR < 40mm/hour • RF < 1:40 • SF signs of osteoarthritis

[a]The ACR criteria may be applied through different assessment methods, but the current CPG focuses on using the criteria through history and physical examination.

- Among adult Filipinos with obesity, we recommend screening for use of obesogenic medications for other health conditions at every visit.

Examples of medications classified according to their effects on weight

Medication Class	Weight Gain	Weight Neutral/ Less Weight Gain	Weight Loss
Antidepressants	lithium, MAOIs, SNRIs, SSRIs (paroxetine), TCAs (amitriptyline, doxepine, imipramine, nortiptyline)	SSRIs (fluoxetine, sertraline)	bupropion
Antipsychotics	clozapine, olanzapine, quetiapine, risperidone	aripiprazole, lurasidone, ziprasidone	-
Antiepileptics	carbamazepine, gabapentine, pregabalin, valproic acid	lamotrigine, levetiracetam, phenytoin	topiramate, zonisamide
Antihypertensives	α-adrenergic blockers, B-adrenergic blockers (atenolol, metoprolol, nadolol, propranolol)	ACE inhibitors, ARBs, B-adrenergic blockers (carvedilol, nebivolol), CCBs, thiazides	-
Antidiabetics	insulin, meglitinides, sulfonylureas, thiazolidinediones	α-glucosidase inhibitors, bromocriptine, colesevelam, DPP-4 inhibitors	GLP-1 agonists, metformin, pramlintide, SGLT2 inhibitors

ACE angiotensin-converting enzyme; ARB angiotensin receptor blocker; CCB calcium channel blocker; DPP-4 dipeptidul peptidase IV; GLP-1 glucagon-like peptide-1; MAOI monoamine oxidase inhibitor; SGLT2 sodium-glucose cotransporter-2; SNRI serotonin and norepinephrine reuptake inhibitor; SSRI selective serotonin reuptake inhibitor

Sample Questions – Clinical Obesity

1. According to the 2021 American Academy of Sleep Medicine (AASM) guidelines, which of the following is the PREFERRED DIAGNOSTIC TOOL for evaluating a patient with SUSPECTED MODERATE TO SEVERE OBSTRUCTIVE SLEEP APNEA (OSA), in the ABSENCE OF SIGNIFICANT COMORBID MEDICAL CONDITIONS?

A. Berlin Questionnaire
B. Epworth Sleepiness Scale
C. Overnight Pulse Oximetry
D. Home Sleep Apnea Testing (HSAT)

2. Based on the 2023 American Association of Clinical Endocrinology and Obesity Society clinical practice guidelines, which of the following is considered an appropriate INITIAL PHARMACOLOGIC OPTION for a patient with a BODY MASS INDEX (BMI) ≥ 30kg/m2 (or ≥ 27 kg/m2 with comorbidities) who has NOT ACHIEVED SUFFICIENT WEIGHT LOSS with LIFESTYLE MODIFICATION ALONE?

A. Orlistat
B. Semaglutide
C. Phentermine
D. Empagliflozin

Answers & Rationale - Clinical Obesity

1. Answer D

- According to the American Academy of Sleep Medicine (AASM) clinical practice guidelines, Home Sleep Apnea Testing (HSAT) with a technically adequate device is a standard diagnostic tool for OSA in uncomplicated adult patients.
- The guidelines strongly recommend that either in-lab polysomnography (the "gold standard") or an HSAT can be used for the diagnosis of OSA in "uncomplicated adult patients presenting with signs and symptoms that indicate an increased risk of moderate to severe OSA." The key qualifier is "uncomplicated," which aligns with the question's "absence of significant comorbid medical conditions."
  - Options (a) and (b): The Berlin Questionnaire and Epworth Sleepiness Scale are screening tools used to assess risk and sleepiness, not diagnostic tests. The AASM strongly recommends against using questionnaires alone to diagnose OSA.
  - Option (c): Overnight pulse oximetry is also considered a screening tool, not a definitive diagnostic test, as it does not measure airflow or respiratory effort.

2. Answer B

- The guidelines explicitly state that glucagon-like peptide 1 (GLP-1) receptor agonists (like Semaglutide) or dual GIP/GLP-1 receptor agonists (like Tirzepatide) are the preferred pharmacotherapy due to their "greater weight loss efficacy".
  - A. Orlistat and C. Phentermine are older, FDA-approved weight loss medications, but they are generally less effective than the newer GLP-1 RA class and are no longer the preferred initial choice.
  - D. Empagliflozin is an SGLT-2 inhibitor. While it is a foundational therapy for heart failure and diabetes and offers a modest weight loss benefit (as opposed to weight gain), it is not a primary, first-line agent recommended for obesity treatment itself.

Ischemic Heart Disease /Coronary Artery Disease

Diagnosis and Management of Patients with Stable Ischemic Heart Disease

- The history is STRONGLY RECOMMENDED as the most essential part of the initial evaluation and includes a detailed description of the symptom of chest pain, classification of the severity of chest pain, and determination of the presence of risk factors and co-morbid conditions.

Table 1. Traditional clinical classification of chest pain

Typical angina (definite)	Meets all three characteristics: • Substernal chest discomfort of characteristic quality and duration; • Provoked by exertion or emotional stress • Relieved by rest and/or nitrates within minutes
Atypical angina (probable)	Meets two characteristics
Non-anginal chest pain	Meets none or only one of the characteristics

Table 2. Classification of angina severity according to the Canadian Cardiovascular Society

Class I	Ordinary activity such as walking or climbing stairs does not cause angina. Angina with strenuous or rapid or prolonged exertion at work or recreation.
Class II	Slight limitation of ordinary activity. Angina on walking or climbing stairs rapidly; walking or stair climbing after meals; in cold or wind; under emotional stress; or during the first few hours after awakening. Walking more than two blocks on the level or climbing more than one flight of ordinary stairs at a normal pace and in normal conditions.
Class III	Marked limitation of ordinary physical activity. Angina on walking one to two blocks on the level, or one flight of stairs in normal conditions and at a normal pace.
Class IV	Inability to carry on any physical activity without discomfort – angina syndrome may be present at rest.

- A focused physical examination is STRONGLY RECOMMENDED during initial evaluation to exclude other conditions associated with angina, search for evidence of non-coronary vascular disease and identify signs of co-morbid conditions; it is also recommended to obtain measurements of the body mass index (BMI) and waist circumference to assist in evaluation of Metabolic Syndrome.
- A resting 12-lead electrocardiogram (ECG) IS RECOMMENDED during initial evaluation, and during or immediately after an episode of chest pain suspected to indicate clinical instability.
- It IS RECOMMENDED that the following initial laboratory tests be performed to establish CV risk factors, identify possible causes of ischemia and determine prognosis:
  - 1. Fasting lipid profile (total cholesterol, high density lipoprotein [HDL] cholesterol, low density lipoprotein [LDL] cholesterol and triglyceride levels);
  - 2. Fasting glucose and/or glycated hemoglobin (HbA1c) level if available; additional oral glucose tolerance test (OGTT) if both are inconclusive;
  - 3. Complete blood count (CBC);
  - 4. Creatinine level with estimation of glomerular filtration rate (GFR);
  - 5. Biochemical markers of myocardial injury (Troponin T or I) if clinical evaluation suggests an Acute Coronary Syndrome (ACS);
  - 6. Thyroid hormone levels if with clinical suspicion of thyroid disorder, and;
  - 7. Liver function tests early after beginning statin therapy.
- The chest x-ray (postero-anterior and lateral views) does not providespecific information for diagnosis, but IS RECOMMENDED in patients with signs or symptoms of congestive heart failure (CHF); aortic dissection and/or aneurysm; valvular heart disease; pericardial disease; or pulmonary disease.
- A transthoracic two-dimensional and Doppler echocardiography IS RECOMMENDED in the initial evaluation of all patients for exclusion of alternative causes of angina; identification of segmental or regional wall motion abnormalities suggestive of CAD; and measurement of LV ejection fraction (LVEF) and LV diastolic function for risk stratification purpose.

- Ambulatory ECG (24-hour) monitoring IS RECOMMENDED in patients with suspected arrhythmia, and may be recommended in patients with suspected vasospastic angina
- It IS STRONGLY RECOMMENDED that clinicians estimate the PTP for SIHD after initial evaluation; such an assessment will determine whether or not to proceed with further non-invasive or invasive testing to establish the diagnosis of SIHD.
- Non-invasive stress testing IS STRONGLY RECOMMENDED in patients with intermediate PTP in order to establish the diagnosis and risk stratification of patients; the incremental information provided by such testing will influence clinical decision-making on subsequent management
- A stress imaging study IS RECOMMENDED as the initial diagnostic and prognostic test, if facilities, resources and local expertise permit, in patients within the higher range of PTP; patients with LVEF less than 50% without typical angina; patients with resting ECG abnormalities and especially symptomatic patients with prior revascularization (percutaneous coronary intervention [PCI] or coronary artery bypass grafting [CABG]). Exercise testing rather than pharmacological testing is recommended whenever possible.

Table 7. Advantages and disadvantages of the stress imaging studies used to diagnose SIHD.

Test	Advantages	Disadvantages
Stress echocardiogram	Identifies affected area of myocardium by its coronary distribution; no ionizing radiation.	Image quality may be suboptimal in obese patients but can be improved with contrast
Stress MPI	Also identifies affected area of myocardium by coronary distribution; highly prognostic of outcomes and allows evaluation of viability.	Exposure to ionizing radiation; poor image quality in very obese patients.
Stress CMR	Evaluates both wall motion and myocardial perfusion; can reliably distinguish between viable and non-viable myocardium; identifies coronary anomalies.	Increased cost of study; not widely available; complex study and requires expertise in methodology in its interpretation.

SIHD=stable ischemic heart disease; MPI=myocardial perfusion imaging; CMR=cardiovascular magnetic resonance.

- An exercise ECG (TET) IS RECOMMENDED as the initial diagnostic and prognostic test, if resources and local expertise for a stress imaging study are not available, in patients with intermediate PTP who have normal resting ECGs and are able to exercise.
- Invasive Coronary Angiography (ICA) IS RECOMMENDED in patients with high PTP either as an initial test or after an initial non-invasive study with stress imaging or TET in specific clinical circumstances; ICA is not recommended in patients who refuse invasive procedures and prefer medical therapy, and those in whom revascularization is not expected to improve functional status or quality of life.
- The overall management of patients with SIHD encompasses lifestyle modification; control and treatment of risk factors; evidence-based pharmacological therapy to improve prognosis and reduce symptoms of angina; patient education about the disease; and revascularization when indicated
- It IS STRONGLY RECOMMENDED that lifestyle modification and treatment of risk factors be integrated into guideline-directed medical treatment (GDMT) to reduce major CV events
- It IS STRONGLY RECOMMENDED that all patients, whether or not revascularization is being considered, receive the following medications to improve prognosis, thereby reducing the risk for MI and death:
  - 1. Aspirin low-dose (80 to 160 mg/day)
  - 2. Clopidogrel in case of aspirin intolerance (75 mg/day)
  - 3. Statins irrespective of LDL-cholesterol levels
  - 4. Beta blockers post-MI
  - 5. ACEIs or ARBs (especially in patients with concomitant HF, hypertension or diabetes)

Table 9. Recommended target levels and intervention for coronary artery disease risk factors.

Risk factor	Target Level	Intervention
Dietary intake	Total caloric intake limited to amount of energy needed to maintain BMI <25 kg/m^2	See healthy diet prescriptions in the section on "Lifestyle modification"
Physical activity	Regular exercise, 3 to 4 times a week, 30 minutes per session	Training programs on aerobic exercise
Smoking	Quit smoking by patient and immediate family members	Programs on smoking cessation (see section on "Smoking")
Hypertension	<140/90 mm Hg for <80 y/o	Antihypertensive drugs, as monotherapy or combination therapy (according to JNC 8 or ESC 2013 Guidelines on Hypertension)
Dyslipidemia	LDL-cholesterol < 1.8 mmol/L or < 70 mg/dL; OR LDL-cholesterol > 50% reduction from baseline when target level cannot be reached	High intensity statin therapy with either rosuvastatin 20 to 40 mg OR atorvastatin 40 to 80 mg
Diabetes mellitus	HbA1c < 7.0% Preferably within the range of <6.5 – 6.9%)	Combination treatment strategy of diabetic diet, regular exercise, appropriate oral hypoglycemic agents OR insulin, if necessary
Weight	BMI < 25 kg/m^2	Combination strategy of healthy diet and regular exercise

BMI=body mass index; JNC 8=Eighth Joint National Committee; ESC=European Society of Cardiology; LDL=low-density lipoprotein; HbA1c=glycated hemoglobin.

- It IS RECOMMENDED that a beta blocker and/or CCB be given as first-line treatment to reduce symptoms of angina. for second-line treatment, it is recommended to add or substitute either a long-acting nitrate, ivabradine, nicorandil, or trimetazidine (in no particular order of preference), when initial treatment with a beta blocker or CCB is unsuccessful in reducing symptoms of angina or causes unacceptable side effects.

Table 10. Pharmacologic treatments in SIHD

	Mechanism of action	Class of Recommend-ations / Level of Evidence	Contraindications
Drugs for event prevention			
Aspirin	Cyclooxygenase-1 inhibitor, thus decreases thromb oxane	IA	Bleeding/Peptic ulcer Hypersensitivity History of allergy
Clopidogrel	P_2Y_{12} inhibitor decreasing platelet aggregation	IB	Same as above
Statins	3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitor	IA	Myopathy Rhabdomyolysis Liver disease
ACEI/ARB	RAAS blockers	IA	Hyperkalemia Renal artery stenosis
Drugs for relief of angina			
Beta blockers	Reduce heart rate, contractility, atrioventricular conduction and ectopic activity	IA	Low heart rate Conduction disorder Asthma/COPD CHF/Cardiogenic shock Vasospastic angina Severe peripheral vascular disease
CCB (heart-rate lowering) -Verapamil -Diltiazem	Vasodilator Reduction of peripheral vascular resistance plus nodal inhibition	IA	Low heart rate Conduction disorder Sick sinus syndrome CHF/ Low blood pressure Cardiogenic shock

CCB (dihydropyridines) -Amlodipine -Felodipine -Nifedipine	Vasodilator Reduction of peripheral vascular resistance	IA	Severe aortic stenosis Obstructive cardiomyopathy Cardiogenic shock
Nitrates	Coronary arteriolar/ venous vasodilator	IIaB	Hypertrophic obstructive cardiomyopathy
Ivabradine	Sinus node If channel inhibitor	IIaB	Low heart rate Heart rhythm disorder Allergy Severe hepatic disease
Nicorandil	Stimulates K+ adenosine triphosphate channels	IIaB	Cardiogenic shock CHF/Low blood pressure
Trimetazidine	3-ketoacyl-coenzyme A thiolase inhibitor,; anti-ischemic metabolic modulator	IIbB	Allergy Parkinson's disease Tremor and movement disorders

SIHD=stable ischemic heart disease; ACEI=angiotensin converting enzyme inhibitor; ARB=angiotensin receptor blocker; RAAS=renin-angiotensin-aldosterone system; COPD=chronic obstructive pulmonary disease; CHF=chronic heart failure; CCB=calcium channel blocker.

- Revascularization with PCI or CABG surgery IS RECOMMENDED for the improvement of survival for patients with high risk of mortality; and the improvement of symptoms for patients with limiting angina. A Heart Team approach IS RECOMMENDED to assist the physician in decision-making regarding preferred revascularization strategy, unless a preferred approach is straightforward

Table 11. Comparison of Revascularization Strategies in Multivessel Disease.[32]

Revascularization Strategy	Advantages	Disadvantages
Percutaneous coronary intervention	• Less invasive • Short hospital stay • Lower initial cost • Easily repeated • Effective in relieving symptoms	• Restenosis • High incidence of incomplete revascularization • Relative inefficacy in patients with severe left ventricular dysfunction • Less favorable outcome in diabetics • Limited to specific anatomical subsets
Coronary artery bypass surgery	• Effective in relieving symptoms • Improved survival in certain subsets • Ability to achieve complete revascularization • Wider applicability (anatomic subsets)	• Cost • Morbidity

- PCI IS RECOMMENDED for relief of angina, despite GDMT, in SIHD patients without high-risk coronary anatomy and in whom procedure risks do not outweigh potential benefit.

- CABG surgery IS RECOMMENDED to improve survival in high-risk patients based on evidence of prognostic benefit. It is also recommended to improve symptoms in patients with limiting angina despite GDMT, or in whom GDMT cannot be implemented because of contraindications or adverse effects to medications

- Non-conventional treatment (e.g., chelation therapy, vitamins C and E supplementation, coenzyme Q, acupuncture, hormonal replacement in postmenopausal women, and herbal medicine) for the purpose of improving CV outcomes IS NOT RECOMMENDED due to lack of supportive evidence.

- It IS RECOMMENDED that follow-up tests should be done in patients with worsening of angina or development of co-morbid conditions despite GDMT with or without revascularization. It is not recommended to do annual or repeat tests at regular intervals in patients without worsening of angina or change in clinical status.
- Patients with SIHD may have typical angina with normal coronary arteries, presenting either as microvascular angina or vasospastic angina, each of which is associated with a different pathophysiology and treatment
  - Microvascular angina
    - Microvascular disease should be considered in patients with typical features of angina in terms of quality, location and duration (although relationship to exercise may be inconsistent) in whom abnormalities of the ECG and stress test results are indicative of ischemia but ICA does not show fixed or dynamic obstructions in the epicardial coronary arteries
  - Vasospastic angina
    - Vasospastic angina (Prinzmetal's angina or variant angina) typically presents as angina at rest, occurring at night and in the early morning hours, and usually relieved by nitrates within minutes. The ECG is classically described as showing ST elevation, but occasionally is associated with ST depression. The 12-lead ECG is recommended during angina to document ST-segment shifts associated with angina symptoms
- The term "refractory angina" is defined as a clinically established chronic stable angina associated with CAD, which cannot be adequately controlled by a combination of medical therapy (e.g., GDMT) and revascularization therapy (e.g., PCI or CABG).
- In asymptomatic adults at risk for CAD, measurement of risk factors and non-invasive stress tests MAY BE RECOMMENDED as screening investigations for the purpose of risk stratification and management principles, as has been described for symptomatic patients

Diagnosis and Management of Patients with Non-ST Elevation Acute Coronary Syndrome

- It IS RECOMMENDED that patients with the following symptoms and signs undergo immediate assessment for the diagnosis of ACS:
  - 1. Chest pain or severe epigastric pain, non-traumatic in origin, with component typical of myocardial ischemia or myocardial infarction (MI): Central or substernal compression or crushing chest pain pressure, tightness, heaviness, cramping, burning, aching sensation;
  - 2. Unexplained indigestion, belching, epigastric pain;
  - 3. Radiating pain in neck, jaw, shoulders, back, or one or both arms;
  - 4. Unexplained syncope;
  - 5. Palpitations;
  - 6. Dyspnea;
  - 7. Nausea and/or vomiting, or;
  - 8. Diaphoresis.
- It IS STRONGLY RECOMMENDED that a 12-lead electrocardiogram (ECG) be obtained immediately within 10 minutes of emergency room (ER) presentation in patients with ongoing chest discomfort.
- It IS RECOMMENDED that quantitative troponin be measured in all patients with chest discomfort consistent with ACS. In patients with initially negative cardiac markers, a repeat determination within 3 hours of presentation increases the sensitivity for MI diagnosis to almost 100%.
- It IS NOT RECOMMENDED to request for total creatine kinase (CK) (without MB isotype), aspartate aminotransferase, beta-hydroxybutyrate dehydrogenase, and/or lactate dehydrogenase as markers for the detection of cardiac injury. High sensitivity troponin I or T (cTNI or cTNT) are the preferred markers of myocardial injury because they are more specific and more sensitive than the traditional cardiac enzymes such as CK or its isoenzyme MB (CKMB). Additionally, troponins are the best biomarker to predict short-term (less than 30 days) outcome with respect to MI and death.
- It IS RECOMMENDED that an echocardiogram be done in all patients suspected to have ACS for evaluation of global and regional left ventricular (LV) function, for ruling in or out differential diagnoses and for prognostic information.
- It MAY BE RECOMMENDED to perform coronary computerized tomography angiography (CTA) to exclude ACS in those with non-diagnostic ECG and troponin, and have a low to intermediate likelihood of CAD.

Table 1. Possible non-acute coronary syndrome causes of troponin elevation

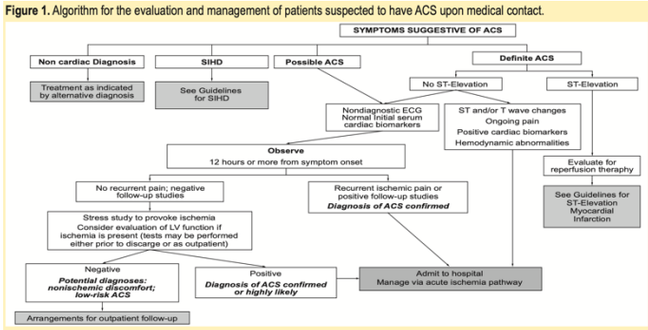
- Chronic or acute renal dysfunction
- Severe congestive heart failure – acute and chronic
- Hypertensive crisis
- Tachy- or bradyarrhythmias
- Pulmonary embolism, severe pulmonary hypertension
- Inflammatory diseases, e.g., myocarditis
- Acute neurologic disease, including stroke, or subarachnoid hemorrhage
- Aortic dissection, aortic valve disease or hypertrophic cardiomyopathy
- Cardiac contusion, ablation, pacing, cardioversion, or endomyocardial biopsy
- Hypothyroidism
- Apical ballooning syndrome (Takotsubo cardiomyopathy)
- Infiltrative diseases (amyloidosis, hemochromatosis, sarcoidosis, scleroderma)
- Drug toxicity, e.g., adriamycin, 5-fluorouracil, trastuzumab, snake venoms
- Burns if affecting > 30% of body surface area
- Rhabdomyolysis
- Critically ill patients, especially with respiratory failure or sepsis

Adapted from the ESC Guidelines for the Management of Acute Coronary Syndromes in Patients Presenting Without Peristent ST Segment Elevation.[6]

- It IS NOT RECOMMENDED to perform stress test in patients with active chest pain.

- It MAY BE RECOMMENDED to perform stress testing in those with non-diagnostic ECG, normal cardiac biomarkers and no active chest pain for more than 12 hours (Figure 1). These tests may be done pre-discharge or on an out-patient basis.

Figure 1. Algorithm for the evaluation and management of patients suspected to have ACS upon medical contact.



- It IS RECOMMENDED that the following management strategies should be instituted:
  - 1. Patients who are admitted with the diagnosis of NTSE-ACS and are stable hemodynamically should be admitted to a unit for bed rest, with continuous ECG monitoring for ischemic and arrhythmia detection. In patients with ongoing rest pain and hemodynamic instability, admission should be to a coronary/intensive care unit where continuous ECG monitoring is provided, frequent assessment of vital and neurologic vital signs may be performed, and where the staff is adept at providing defibrillation and advanced cardiac life support if the need arises.
  - 2. Supplemental oxygen should be administered to patients with UA/NSTEMI for patients with cyanosis or respiratory distress. Finger pulse oximetry or arterial blood gas determination should be administered to confirm adequate arterial oxygen saturation (SaO2 greater than 90%) and continued need for supplemental oxygen in the presence of hypoxemia.

- It IS RECOMMENDED that nitrates (sublingual tablet or spray), followed by intravenous (IV) administration, be administered for the immediate relief of ischemic and associated symptoms.

- It IS NOT RECOMMENDED to administer nitroglycerine (NTG) or other nitrates within 24 hours of sildenafil use or within 48 hours of tadalafil use. The suitable time for nitrate administration after vardenafil use is not determined.

Table 6. Nitroglycerin and nitrates available locally

Compound	Route	Dose/Dosage	Duration of effect
Nitroglycerine	Sublingual tablets	0.3-0.6 mg up to 1.5 mg	1-7 mins
	Spray	0.4 mg as needed	similar to SL tablet
	Transdermal	0.2-0.8 mg/h every 12 h	8-12 h during intermittent therapy
	Intravenous	5-200 mg/min	tolerance in 7-8 hr
Isosorbide dinitrate	Oral	5-80 mg, 2-3 x a day	Up to 8 h
	Oral, slow release	40mg 1 or 2x daily	Up to 8 h
Isosorbide mononitrate	Oral	20 mg twice daily	12-24 hours
	Oral, slow release	60-240 mg orally daily	

- It IS RECOMMENDED to initiate a beta blocker by oral route for all patients within the first 24 hours unless contraindications are present. Use of IV beta blockers should be considered with caution
- It MAY BE RECOMMENDED to use oral long-acting calcium antagonists for recurrent ischemia in the absence of contraindication and when beta blockers and nitrates are maximally used.
- It IS STRONGLY RECOMMENDED that an ACEI should be administered within 24 hours of admission to NSTE-ACS patients with pulmonary congestion, with LVEF less than 40% in the absence of hypotension and other contraindications.
- It is recommended that morphine sulfate be administered IV when symptoms are not immediately relieved with NTG, or when acute pulmonary congestion and/or severe agitation is present.
- It is STRONGLY RECOMMENDED that non-enteric coated aspirin be chewed by patients as soon as possible at initial presentation at an initial dose of 160 to 320 mg followed by 80 to 160 mg daily indefinitely.
- It IS STRONGLY RECOMMENDED to start a P_2Y_{12} inhibitor (ticagrelor, prasugrel or clopidogrel) in addition to aspirin for a period of 12 months unless there are contraindications such as excessive risk of bleeding.
- It IS STRONGLY RECOMMENDED to discontinue ticagrelor and clopidogrel at least 5 days prior to elective CABG, and 7 days for prasugrel, unless CABG or the need for a P_2Y_{12} inhibitor outweighs the risk of bleeding.
- It IS STRONGLY RECOMMENDED to start unfractionated heparin (UFH), enoxaparin or fondaparinux in addition to antiplatelet therapy.
- It MAY BE RECOMMENDED to give tirofiban in high-risk patients undergoing either a conservative or invasive strategy.
- It IS NOT RECOMMENDED to use IV fibrinolytic therapy in patients with UA or in patients without acute ST-segment elevation, a true posterior MI, or a presumed new left BBB.
- It IS RECOMMENDED that an early invasive strategy (as early as possible up to 72 hours) followed by revascularization (PCI or CABG) be used in patients with any of the following high-risk indicators:
  - 1. Recurrent angina/ischemia at rest or with low-level activities despite intensive anti-ischemic therapy;
  - 2. Elevated cardiac biomarkers (Troponin T or Troponin I); or new or presumably new ST-segment depression;
  - 3. Signs or symptoms of HF, or new or worsening mitral regurgitation;
  - 4. High-risk findings from non-invasive testing ;
  - 5. Hemodynamic instability;
  - 6. Sustained ventricular tachycardia;
  - 7. PCI within 6 months;
  - 8. Prior CABG;
  - 9. High-risk score (e.g., using GRACE), and;
  - 10. Reduced LV systolic function (LVEF less than 40%).
- Coronary angiography IS NOT RECOMMENDED in patients with extensive co-morbidities (e.g., liver or pulmonary failure; cancer); in whom the risks of revascularization are not likely to outweigh the benefits; in patients with acute chest pain and a low likelihood of ACS; or in patients who will not consent to revascularization regardless of the findings.
- PCI IS RECOMMENDED for NSTE-ACS patients with 1- to 2-vessel CAD, with or without significant proximal left anterior descending CAD, but with a large area of viable myocardium and high-risk criteria on no- invasive testing.

- CABG IS RECOMMENDED for patients with significant left main disease, and is the preferred revascularization strategy for patients with multi-vessel coronary disease; vessels with lesions not favorable for PCI; depressed systolic function (LVEF lower than 50%); and diabetes.
- In patients initially admitted in hospitals without catheterization facilities and with at least one major high-risk feature as mentioned above, or a high GRACE risk score of over 140, transfer to a hospital with catheterization facilities IS RECOMMENDED
- It IS RECOMMENDED that the following specific instructions should be given upon hospital discharge and for long-term management:
  - Lifestyle modification that includes smoking cessation, achievement or maintenance of optimal weight (body mass index of 18.5 to 24.9 kg/m2), exercise, and diet;
  - Consider referral of patients who are smokers to smoking cessation program or clinic and/or an out-patient cardiac rehabilitation program, and;
  - Continued education about long term follow up, adherence to medications. Any recurrence or change in symptoms should be communicated to the healthcare team.
- It IS STRONGLY RECOMMENDED to maintain patients who were treated medically with aspirin indefinitely, and ticagrelor 90 mg twice daily or clopidogrel 75 mg daily, for 12 months.
- It IS STRONGLY RECOMMENDED to maintain patients who underwent stenting, with aspirin indefinitely, plus ticagrelor 90 mg twice daily or prasugrel 10 mg daily or clopidogrel 75 mg daily, for 12 months in patients with drug-eluting stents, and 6 months in patients with bare metal stents.
- It IS STRONGLY RECOMMENDED that beta blockers be continued indefinitely for all NSTE-ACS patients unless contraindicated. In those with moderate or severe systolic dysfunction, the dosing regimen must be titrated slowly.
- It IS STRONGLY RECOMMENDED to continue ACE inhibition indefinitely in all NSTE-ACS patients who have a LVEF less than 40%, hypertension, diabetes mellitus or HF. In the absence of these aggravating factors, use of ACEIs may still be RECOMMENDED. An ARB may be prescribed if an ACEI cannot be tolerated.
- It IS RECOMMENDED to continue nitrates for ischemic relief.
- It IS RECOMMENDED to continue CCBs as add-on therapy to beta blockers or if the latter are not tolerated for ischemic control.
- It IS RECOMMENDED to obtain a fasting lipid test within 24 hours of admission. Regardless of levels, it IS STRONGLY RECOMMENDED to start on statins in all NSTE-ACS patients. The goals of lipid management in secondary prevention follow those of SIHD.
- It IS RECOMMENDED that hypertension be controlled to a blood pressure of less than 140/90 mm Hg. Tight control of hyperglycemia in diabetes IS RECOMMENDED. The goal is a HbA1c of less than 7%
- It IS STRONGLY RECOMMENDED that patients with multiple risk factors and those who require monitoring during exercise be enrolled in a cardiac rehabilitation program if available.

Diagnosis and Management of Patients with ST Segment Elevation Myocardial Infarction

- It IS STRONGLY RECOMMENDED that patients with possible STEMI symptoms such as chest discomfort, shortness of breath, diaphoresis, nausea, sudden weakness, or syncope should be immediately brought to the emergency room (ER) of a hospital
- It IS STRONGLY RECOMMENDED that a targeted history taking, physical examination and a 12-lead electrocardiogram (ECG) should be taken within 10 minutes of arrival at the ER.
- It IS STRONGLY RECOMMENDED that patients presenting with chest discomfort and ECG finding of at least 0.1 mV ST segment elevation in two contiguous leads should receive reperfusion therapy (e.g., primary PCI or thrombolytics), if not contraindicated.
- It IS RECOMMENDED to observe for ECG tracings that make the diagnosis of acute myocardial infarction (AMI) difficult, such as left bundle branch block (LBBB), ventricular paced rhythm, patients without diagnostic ST segment elevation but with persistent ischemic symptoms, isolated posterior myocardial infarction (MI) and ST segment elevation in lead aVR. In these situations, certain ECG changes are seen such as marked ST elevation and hyperacute T waves, and these require immediate reperfusion therapy.
- It IS RECOMMENDED that laboratory examinations should be performed as part of the management of STEMI patients but should not delay the implementation of reperfusion therapy.
- Unless contraindicated, it IS RECOMMENDED that the following routine treatment measures be administered in STEMI patients upon arrival at the ER:
  - Aspirin 160 to 320 mg tablet (non-enteric coated, chewed);
  - Clopidogrel 300 to 600 mg whether or not fibrinolysis will begiven;
  - Clopidgrel 600 mg or prasugrel 60 mg or ticagrelor 180 mg when a patient will undergo PCI;
  - Nitrates, either via sublingual or intravenous(IV) routes. Nitrates are contraindicated in patients with hypotension or those who took a phosphodiesterase 5 (PDE5) inhibitor within 24 hrs (48 hrs for tadalafil);
  - Morphine 2 to 4 mg IV for relief of chest pain, and;
  - Supplemental oxygen MAY BE RECOMMENDED during the first 6 hours to patients with arterial oxygen saturation of less than 90%
- Reperfusion therapy IS RECOMMENDED to all eligible patients with STEMI with symptom onset within the prior 12 hours.
- It IS STRONGLY RECOMMENDED that patients with STEMI who are hemodynamically and electrically stable, should immediately be transferred to the nearest hospital capable of reperfusion therapy, fibrinolysis or PCI, if expected arrival is within 12 to 24 hours of symptom onset.
- In patients who are hemodynamically and electrically unstable, it IS STRONGLY RECOMMENDED to transfer the patient to a higher level hospital if the physician sees it feasible. If unable to transfer to a reperfusion capable hospital within 12 to 24 hours of symptom onset, it IS RECOMMENDED to admit the patient in the hospital under close monitoring and start guideline directed medical therapy. Once stable the patient should be transferred for risk stratification in a tertiary hospital.
- It IS STRONGLY RECOMMENDED to undergo immediate thrombolysis (unless contraindicated), with a door-to-needle time of less than 60 minutes as a goal. In the absence of contraindications and when PCI is not available, fibrinolytic therapy MAY BE RECOMMENDED for patients with STEMI if there is clinical and/or ECG evidence of ongoing chest pain within 12 to 24 hours of symptom onset and presence of multiple ST segment deviations in several leads or hemodynamic instability.
- Fibrinolytic therapy IS NOT RECOMMENDED to patients with ST depression except when a true posterior (inferobasal) MI is suspected or when associated with ST elevation in lead AvR.
- It IS RECOMMENDED to perform an ECG to patients treated with fibrinolysis, 60 to 90 minutes after administration to determine the presence of failed reperfusion. Urgent transfer to a PCI-capable hospital for coronary angiography
- IS RECOMMENDED for patients who demonstrate evidence of failed reperfusion or reocclusion after fibrinolytic therapy. After successful reperfusion, it MAY BE RECOMMENDED to refer the patient to a tertiary hospital for risk stratification once stable.
- Fibrinolysis IS RECOMMENDED to people with acute STEMI presenting within 12 hours of onset of symptoms if primary PCI cannot be delivered within 120 minutes of the time when fibrinolysis could have been given. In the case of failed reperfusion, offer immediate coronary angiography, with follow-on PCI if indicated. Do not repeat fibrinolytic therapy.
- Primary PCI IS RECOMMENDED in patients with STEMI and ischemic symptoms of less than 12 hours' duration. Primary PCI IS RECOMMENDED in patients with STEMI and ischemic symptoms of less than 12 hours' duration who have contraindications to fibrinolytic therapy, irrespective of the time delay from first medical contact.
- Primary PCI IS RECOMMENDED in patients with STEMI and cardiogenic shock or acute severe heart failure (HF), irrespective of time delay from MI onset.
- It MAY BE RECOMMENDED in patients with STEMI if there is clinical and/or ECG evidence of ongoing ischemia between 12 and 24 hours after symptom onset.
- Bare metal stents (BMS) are RECOMMENDED in patients with high bleeding risk, who are unable to comply with 1 year of double anti-platelet therapy (DAPT), or who anticipate invasive or surgical procedures in the next year.
- Drug-eluting stents (DES) are NOT RECOMMENDED in primary PCI for patients with STEMI who are unable to tolerate or comply with a prolonged course of DAPT because of the increased risk of stent thrombosis with premature discontinuation of one or both agents.
- Therapeutic hypothermia IS RECOMMENDED as soon as possible in comatose or post-arrest patients with STEMI and out-of-hospital cardiac arrest caused by ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT), including patients who underwent primary PCI.
- CABG IS RECOMMENDED in failed PCI with persistent pain or hemodynamic instability in patients with coronary anatomy suitable for surgery. It IS RECOMMENDED in persistent or recurrent ischemia refractory to medical therapy in patients who have coronary anatomy suitable for surgery, and are not candidates for PCI or fibronolytic therapy. It IS RECOMMENDED in patients with STEMI at the time of operative repair of mechanical defects.

- Emergency CABG within 6 hours of symptom onset MAY BE RECOMMENDED in patients with STEMI who do not have cardiogenic shock and are not candidates for PCI or fibrinolytic therapy. The use of mechanical circulatory support MAY BE RECOMMENDED in patients with STEMI who are hemodynamically stable and require urgent CABG
- Aspirin should not be withheld before elective or non-elective CABG after STEMI. In patients where elective CABG is planned, clopidogrel should be withheld for 5 days; ticagrelor for 3 to 5 days; and prasugrel for 7 days. Clopidogrel or ticagrelor should be discontinued at least 24 hours before urgent CABG, if possible. Urgent CABG within 5 days of clopidogrel or ticagrelor administration or within 7 days of prasugrel administration might be considered especially if the benefits outweigh the risks of bleeding. It is reasonable to restart dual antiplatelet therapy as soon as considered safe in relation to the bleeding risk.
- General recommendations for a patient with STEMI in the Coronary Care Unit (CCU): It IS RECOMMENDED that STEMI patients should be immediately admitted to a quiet and comfortable environment with qualified personnel; placed on continuous ECG monitoring and pulse oximetry; and have ready access to facilities for hemodynamic monitoring and defibrillation. Administer aspirin and beta-blockers in adequate dose to control heart rate, and assess the need for intravenous nitroglycerin for control of angina, hypertension and heart failure. When stable for 6 hours, the patient should be reassessed for oxygen need (i.e., saturation of less than 90%) and discontinuation of supplemental oxygen should be considered. Nursing care should be provided by individuals knowledgeable in critical care.
- Risk stratification of STEMI: It IS RECOMMENDED that STEMI patients should be stratified as high risk or low risk
- It IS RECOMMENDED to measure LV ejection fraction (LVEF) in all patients with STEMI.
- It IS STRONGLY RECOMMENDED that a bedside echocardiogram should be done when complications of STEMI are considered, including but not limited to acute mitral regurgitation (MR), ventricular septal perforation, free wall rupture or tamponade, right ventricular involvement, HF or thrombus.
- It IS RECOMMENDED that high-risk patients with mechanical complications of STEMI and/or progressive hypotension should have a pulmonary catheter and intra-arterial pressure monitoring. Intra-aortic balloon pump (IABP) counter pulsation and early revascularization should be considered.
- It IS RECOMMENDED to immediately terminate VF or pulseless VT with 200 J (biphasic) or 360 J (monophasic) defibrillation.
- It IS RECOMMENDED to immediately terminate any hemodynamically significant VT, or VT associated with angina or pulmonary edema with 100 J synchronized cardioversion, and increasing energies if initially unsuccessful.
- It IS RECOMMENDED to terminate sustained VT which is hemodynamically stable and not associated with angina nor pulmonary edema with amiodarone boluses of 150 mg over 10 min, repeated over 15 minutes as needed. Amiodarone infusion can be given at 1mg/kg body weight/min for 6 hours, then 1mg/kg body weight/min for 18 hours, not exceeding 2.2 g in 24 hours.
- It IS RECOMMENDED to immediately terminate atrial fibrillation or flutter with hemodynamic compromise and/or ischemia with 50 to 100 J (atrial flutter) or 120 to 200 J (atrial fibrillation) synchronized cardioversion, and increasing energies if initially unsuccessful. If unresponsive or recurrent, amiodarone infusion or digoxin may be used for rate-control.
- It IS RECOMMENDED to immediately terminate paroxysmal supraventricular tachycardia (SVT) with carotid sinus massage (CSM); if unsuccessful, with intravenous adenosine; or if still unsuccessful and blood pressure permits, verapamil.
- It IS RECOMMENDED to terminate paroxysmal SVTs with 50 J cardioversion if unsuccessful with CSM or medications. Increase energies if initially unsuccessful.
- It IS NOT RECOMMENDED to treat isolated premature ventricular contractions and non-sustained VTs.
- It IS RECOMMENDED to use temporary pacing for symptomatic bradyarrhythmias unresponsive to medical treatment
- It IS RECOMMENDED to do permanent pacing with an appropriately chosen device for the following:
  - a. Persistent 2o atrioventricular (AV) block with bilateral bundle branch block
  - b. Transient high-degree AV block
  - c. Persistent and symptomatic 3o AV block It IS RECOMMENDED to immediately transfer a STEMI patient with persistent 2o AV block with bilateral bundle branch block, transient high-degree AV block, or persistent and symptomatic 3o AV block to a hospital capable on implanting a permanent pacemaker.
- After reperfusion therapy (PCI or fibrinolysis) in patients with STEMI who present with VF or sustained VT after 48 hours, it IS RECOMMENDED to implant an ICD
- It IS RECOMMENDED that aspirin should be used indefinitely in all patients with STEMI with a dosage of 80 to 100 mg/day. It IS RECOMMENDED that clopidogrel 75 mg per day orally should be added to aspirin in patients with STEMI and maintained for at least 14 days.
- It IS RECOMMENDED that patients who are truly intolerant to aspirin can instead receive clopidogrel 75 mg per day as long-term secondary prevention.
- Duration of Dual Antiplatelet Therapy and Antithrombotic Combination Therapies after STEMI DAPT by combining aspirin and an ADP-receptor blocker (clopidogrel, prasugrel or ticagrelor) IS RECOMMENDED in patients with STEMI who are undergoing primary PCI (for up to 12 months) or (clopidogrel) fibrinolysis (for up to 12 months, although the data available pertain only to one month of DAPT), and in those who have not undergone reperfusion therapy (for at least 1 month and up to 12 months).
- Aspirin 160 to 320 mg IS RECOMMENDED before primary PCI. After PCI, aspirin should be continued indefinitely. P_2Y_{12} inhibitor therapy IS RECOMMENDED as a loading dose and maintained for 1 year to patients with STEMI who receive a stent (bare-metal or drug-eluting) during primary PCI using the following doses:
  - Clopidogrel 600 mg loading dose then 75mg daily; or
  - Prasugrel 60 mg loading dose then 10 mg daily; or
  - Ticagrelor 180 mg loading dose then 90 twice a day.
- It MAY BE RECOMMENDED to use 80 mg of aspirin per day in preference to higher maintenance doses after primary PCI.
- Prasugrel IS NOT RECOMMENDED to patients with a history of prior stroke or transient ischemic attack (TIA), and is generally not recommended in patients 75 years of age and older, or in patients with lower body weight, as it was not associated with net clinical benefit.
- Aspirin (160- to 320-mg loading dose) and clopidogrel (300-mg loading dose for ≤75 years of age, 75-mg dose for patients older than 75 years of age) IS
- RECOMMENDED to patients with STEMI who receive fibrinolytic therapy.
- Aspirin should be continued indefinitely and clopidogrel (75 mg daily) should be continued for at least 14 days and up to 1 year in patients with STEMI who receive fibrinolytic therapy. It MAY BE RECOMMENDED to use aspirin 80 mg per day in preference to higher maintenance doses after fibrinolytic therapy.
- It IS RECOMMENDED that oral beta blockers should be started within the first 24 hours in the absence of any contraindication, regardless of the intervention used. Ideal target heart rate is set at 55 to 60 beats per minute. Judicious use of beta-blocker therapy after PCI MAY BE RECOMMENDED
- High-dose statins are RECOMMENDED in all patients during the first 24 hours of admission for STEMI, irrespective of the patient's cholesterol concentration, in the absence of contraindications (allergy, active liver disease). Atorvastatin or rosuvastatin are recommended during the early phase of therapy up to at least four weeks.
- It IS RECOMMENDED to give high-dose rosuvastatin (20 to 40 mg) or atorvastatin (40 to 80 mg) therapy before emergency percutaneous coronary intervention to reduce periprocedural inflammatory response, to reduce myocardial dysfunction, and to prevent contrast-induced nephropathy.
- It IS RECOMMENDED that an ACEI be given to patients within 24 hours, unless contraindicated (hypotension, significant renal failure and known allergy). It IS RECOMMENDED that an ARB be given to patients who are intolerant of ACEIs.
- It IS NOT RECOMMENDED to give calcium channel antagonists early in the course of STEMI as it has been shown to cause harm.
- Ivabradine MAY BE RECOMMENDED among patients with contraindications to beta blockers, to slow the heart rate to target values in STEMI.
- Nitrates, given intravenously, MAY BE RECOMMENDED, during the acute phase in patients with hypertension or HF. Its use is contraindicated among patients with hypotension, right ventricular infarction, or the use of PDE 5 inhibitors in the previous 48 hours. Oral nitrate use IS RECOMMENDED in the acute and stable phase for the control of anginal symptoms
- It IS RECOMMENDED that all patients with ST segment elevation undergo cardiac rehabilitation. If no cardiac rehabilitation personnel and facilities are available, it IS RECOMMENDED to refer the STEMI patient to a hospital with adequate facilities and personnel once stable.

- If the patient has undergone reperfusion therapy with no significant arrhythmias, recurrent ischemia or congestive HF, patient can be safely discharged in less than 5 days.
- It IS RECOMMENDED that patients with STEMI who have not undergone PCI and do not have any high-risk clinical profile be subjected to non-invasive testing before discharge to assess the presence of inducible ischemia. It MAY BE RECOMMENDED that non-invasive testing might be considered to guide the post-discharge exercise prescription.
- Exercise testing IS RECOMMENDED either before discharge (submaximal), early after discharge (within 2 to 3 weeks) or late after discharge (within 3 to 6 weeks) for prognostic, activity prescription, evaluation of medical therapy.

Sample Questions – IHD/CAD

1. Adonis, 65 years old, was recently diagnosed with TYPE 2 DIABETES MELLITUS. He was also noted to be OBESE. Recently, Adonis started to feel anxious because a co-worker died of MYOCARDIAL INFARCTION. To decrease the risk for future MAJOR ACUTE CORONARY EVENTS, what health advice may be given to Adonis?

A. Start supplements --- i.e., multivitamins, omega-3 fatty acids, and calcium.
B. Minimize sodium intake to less than 2,300 mg per day.
C. Reduce the percentage of calories from saturated fat (i.e., less 10% of total calories).
D. Do intermittent fasting to bring his body mass index to normal value.

2. 47/M businessman 20 pack year smoker consulted at your OPD clinic for recurrent chest pain. He described it as "parang mabigat" with radiation to the jaw. It does not last long and is relieved by rest so he was not minding it. He didn't like that it kept coming back which prompted the consult. Your cardiac findings are all normal . Additional work up for this patient includes all of the following EXCEPT:

A. Chest xray
B. Echocardiogram
C. Holter monitoring
D. No exception

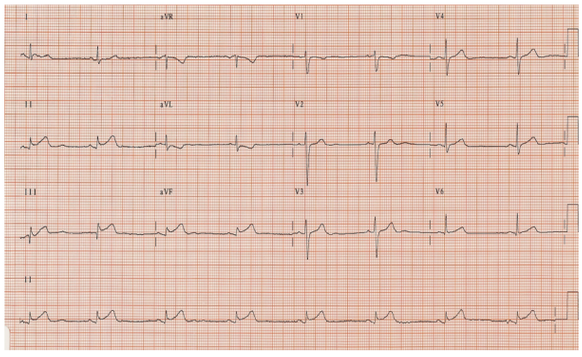
3. 23/F single college student consulted the ER for chest pain. She was completing work on her thesis a few hours prior to consult when she suddenly felt a constricting chest pain non radiating partially relieved when she took a glass of water. She is a non-smoker with no current morbidities. No similar episodes in the past . With the lingering pain, she decided to just consult . What will be your clinical impression?

A. Muscle pain
B. Anxiety
C. Angina pectoris
D. Unstable angina

4. 57/M, hypertensive, came to the ER due to crushing pain on the retrosternal area for 6 hours. Vital signs are normal but the pain is noted to be persistent despite giving nitrates. ECG done showed ST depression leads V1-V3. The following medications are indicated, EXCEPT:

A. Anticoagulant
B. Calcium channel blocker
C. Morphine
D. NSAIDs

5. 56/ housewife came at the ER for chest heaviness. She is currently taking Metoprolol 100mg OD for her Hypertension however irregular taken only when symptomatic. Her BP at present is 100/60 with CR of 50s/min, 02 sats at 92%. She is mildly upset at the ER due the chest heaviness which she scored at 6-7/10. Her ECG is as follows:

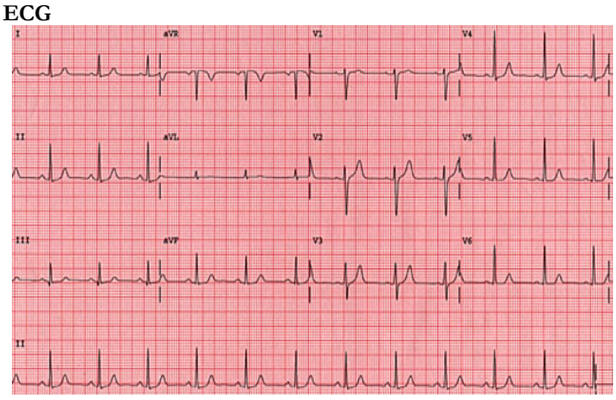


Given the hx, PE and ECG, you first priority is to:

A. immediately transfer the patient to cardiology
B. admit the patient for observation
C. administer streptokinase or tPA intravenously
D. administer O2 immediately

6. 55/male came at the FMC due to left sided chest pain. The pain comes after any strenuous activity even walking; it is described as dull and aching, mainly retrosternal, intermittent, 8/10 on activity, 0/10 on rest, began about 8 months ago and increasingly getting worse ever since, aggravated by any strenuous activity and relieved with rest, associated with nausea, radiates to the left shoulder; no history of pain before 8 months ago and it definitely affects his work as a miner. On consult, he said that the pain seems worse and it did not go away after resting. BP is 120/80, PR 72 and regular, heart sounds are normal and no skip beats nor murmur.

ECG



Which of the ffg statement regarding this patient's management is/are true?

A. recommended to ask for troponin I, CK MB and LDH to detect cardiac injury
B. **immediate cardiac risk stratification based on Hx, PE, and Trop I to be done**
C. procedure such as 2d-echo and treadmill test to be done immediately to detect cardiac injury
D. immediate administration of beta blockers and morphine is recommended for pain relief

Answers & Rationale – IHD/CAD

1. Answer C

- Patients with diabetes and obesity are at very high risk for atherosclerotic cardiovascular disease (ASCVD). A cornerstone of prevention is managing dyslipidemia through diet. The provided dyslipidemia guidelines explicitly recommend that
- **Saturated fat should be <10% of total calories**. This directly targets the atherosclerotic process, which is the underlying cause of most major coronary events. While sodium restriction is important for blood pressure, reducing saturated fat is a more direct intervention for coronary artery disease itself.

2. Answer C

- Ambulatory ECG (24-hour) monitoring IS RECOMMENDED in patients with suspected arrhythmia, and may be recommended in patients with suspected vasospastic angina.
- The chest x-ray (postero-anterior and lateral views) does not provide specific information for diagnosis, but IS RECOMMENDED in patients with signs or symptoms of congestive heart failure (CHF); aortic dissection and/ or aneurysm; valvular heart disease; pericardial disease; or pulmonary disease.
- A transthoracic two-dimensional and Doppler echocardiography IS RECOMMENDED in the initial evaluation of all patients for exclusion of alternative causes of angina; identification of segmental or regional wall motion abnormalities suggestive of CAD; and measurement of LV ejection fraction (LVEF) and LV diastolic function for risk stratification purpose
- The patient's symptoms are classic for stable angina pectoris. According to the guideline, the recommended initial workup for a patient with suspected Stable Ischemic Heart Disease (SIHD) includes a **chest X-ray** and a **2D echocardiogram** to assess for cardiac abnormalities and rule out other causes of chest pain. **Holter monitoring** is a 24-hour ambulatory ECG used to detect arrhythmias and is not part of the standard initial evaluation for stable exertional chest pain unless palpitations or syncope are a primary complaint.

3. Answer B

- The patient's demographic (young female with no risk factors) and the clinical context (high stress from thesis work) make an ischemic cause like angina extremely unlikely. The symptoms of sudden, constricting chest pain are classic for an **anxiety** or panic attack, which is a common diagnosis in this situation

4. Answer D

- Changes in ECG in patients with NST-ACS may include ST depression, transient ST-elevation or new T wave inversion. Early hospital care include giving nitrates, beta-blockers, CCBs, cholesterol management, along with initial antiplatelet and anticoagulant therapy. For analgesic, morphine sulfate may be given IV in the absence of contraindication. On the other hand, NSAIDS should not be initiated due to the increased risk of MACE associated with their use.

5. Answer D

- Statement 4: Initial tx of STEMI in the ER
  - It is recommended that the ffg should be administered upon arrival at the ER
    - Supplemental oxygen during the first 6 hours
    - Aspirin 160 – 325 mg tablet (non- enteric coated, chewed)
    - Nitrates, sublingual or IV (contraindicated in patients with hypotension or those who took sildenafil within 24 hrs)
    - Morphine 2-4 mg IV for relief of chest pain

6. Answer B

- **Statement 6:**"It IS RECOMMENDED for patients who present with chest discomfort or other ischemic symptom to undergo early risk stratification for risk of cardiovascular events (e.g. death or MI) based on an integration of the patient's history, physical examination, ECG findings and result of cardiac biomarkers."
- Statement 5:Although troponin I is recommended to detect cardiac injury, CK, SGOT and LDH are not recommended biomarkers for Unstable angina/NSTEMI
- **Statement 3:** treadmill test is not recommended within 48 hours
- **Statement 8-12:** nitrates are the initial treatment for chest pains; Beta blockers, and morphine are given if chest pain is not relieved with nitrates

Heart Failure

2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

Chronic heart failure

- The original 2021 ESC HF Guidelines adopted the classification of chronic HF according to LVEF

Definition of heart failure with reduced ejection fraction, mildly reduced ejection fraction, and preserved ejection fraction

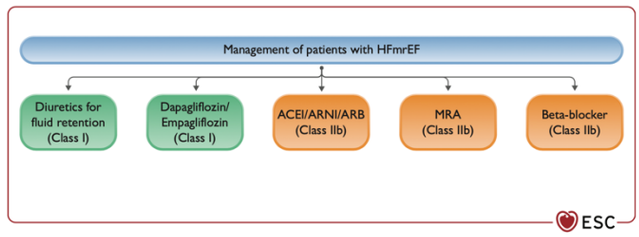
Type of HF		HFrEF	HFmrEF	HFpEF
Criteria	1	Symptoms ± signs[a]	Symptoms ± signs[a]	Symptoms ± signs[a]
	2	LVEF ≤40%	LVEF 41–49%[b]	LVEF ≥50%
	3	–	–	Objective evidence of cardiac structural and/or functional abnormalities consistent with the presence of LV diastolic dysfunction/raised LV filling pressures, including raised natriuretic peptides[c]

- **HF**, heart failure
  - **HFmrEF**, heart failure with mildly reduced ejection fraction
  - **HFpEF**, heart failure with preserved ejection fraction
  - **HFrEF**, heart failure with reduced ejection fraction
  - **LV**, left ventricle
  - **LVEF**, left ventricular ejection fraction.
- [a]Signs may not be present in the early stages of HF (especially in HFpEF) and in optimally treated patients.
- [b]For the diagnosis of HFmrEF, the presence of other evidence of structural heart disease (e.g. increased left atrial size, LV hypertrophy, or echocardiographic measures of impaired LV filling) makes the diagnosis more likely.
- [c]For the diagnosis of HFpEF, the greater the number of abnormalities present, the higher the likelihood of HFpEF.

Recommendation for the treatment of patients with symptomatic heart failure with mildly reduced ejection fraction

- An SGLT2 inhibitor: *sodium–glucose co-transporter 2* (dapagliflozin or empagliflozin) is **recommended** in patients with HFmrEF to reduce the risk of ***HF hospitalization or CV death***

Management of patients with heart failure with mildly reduced ejection fraction.

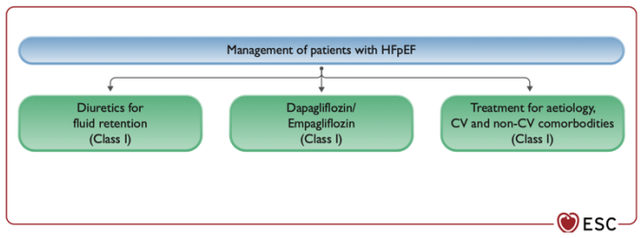


- ACE-I, angiotensin-converting enzyme inhibitor;
- ARB, angiotensin receptor blocker;
- ARNI, angiotensin receptor–neprilysin inhibitor
- MRA, mineralocorticoid receptor antagonist.

Recommendation for the treatment of patients with symptomatic heart failure with preserved ejection fraction

- An SGLT2 inhibitor (dapagliflozin or empagliflozin) is **recommended** in patients with HFpEF to reduce the risk of HF hospitalization or CV death

Management of patients with heart failure with preserved ejection fraction.



Acute heart failure

Medical therapy

Recommendation for pre-discharge and early post-discharge follow-up of patients hospitalized for acute heart failure

- An **intensive strategy of initiation** and **rapid up-titration** of evidence-based treatment *before discharge* and during frequent and careful *follow-up visits* in the **first 6 weeks following a HF hospitalization** is **recommended** to reduce the risk of HF rehospitalization or death

Comorbidities

Recommendations for the prevention of heart failure in patients with type 2 diabetes mellitus and chronic kidney disease

- In patients with T2DM and CKD, **SGLT2 inhibitors** are recommended to reduce the risk of HF hospitalization or CV death
- In patients with T2DM and CKD, **finerenone** is **recommended** to reduce the risk of HF hospitalization

Recommendations for the management of iron deficiency in patients with heart failure

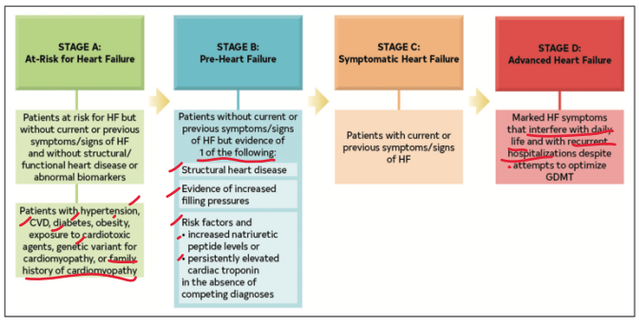
- **Intravenous iron supplementation** is **recommended** in symptomatic patients with HFrEF and HFmrEF, and iron deficiency, to alleviate HF symptoms and improve quality of life
- **Intravenous iron supplementation with *ferric carboxymaltose or ferric derisomaltose*** should be considered in symptomatic patients with HFrEF and HFmrEF, and iron deficiency, to reduce the risk of HF hospitalization.

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

DEFINITION OF HF

- HF is a complex clinical syndrome with symptoms and signs that result from any structural or functional impairment of ventricular filling or ejection of blood.

Stages of HF



Stages	Definition and Criteria
Stage A: At Risk for HF	At risk for HF but without symptoms, structural heart disease, or cardiac biomarkers of stretch or injury (eg, patients with hypertension, atherosclerotic CVD, diabetes, metabolic syndrome and obesity, exposure to cardiotoxic agents, genetic variant for cardiomyopathy, or positive family history of cardiomyopathy).
Stage B: Pre-HF	No symptoms or signs of HF and evidence of 1 of the following: *Structural heart disease** Reduced left or right ventricular systolic function Reduced ejection fraction, reduced strain Ventricular hypertrophy Chamber enlargement Wall motion abnormalities Valvular heart disease *Evidence for increased filling pressures** By invasive hemodynamic measurements By noninvasive imaging suggesting elevated filling pressures (eg, Doppler echocardiography) *Patients with risk factors and* *Increased levels of BNPs* or* *Persistently elevated cardiac troponin* in the absence of competing diagnoses resulting in such biomarker elevations such as acute coronary syndrome, CKD, pulmonary embolus, or myopericarditis
Stage C: Symptomatic HF	Structural heart disease with current or previous symptoms of HF.
Stage D: Advanced HF	Marked HF symptoms that interfere with daily life and with recurrent hospitalizations despite attempts to optimize GDMT.

BNP indicates B-type natriuretic peptide; CKD, chronic kidney disease; CVD, cardiovascular disease; GDMT, guideline-directed medical therapy; and HF, heart failure.
*For thresholds of cardiac structural, functional changes, elevated filling pressures, and biomarker elevations, refer to Appendix 3.

New York Heart Association (NYHA) Classification

- The NYHA classification is used to characterize symptoms and functional capacity of patients with ***symptomatic (stage C) HF or advanced HF (stage D)***.
  - It is a subjective assessment by a clinician and can change over time.
  - Clinicians specify NYHA classification at baseline after the initial diagnosis and after treatment through the continuum of care of a patient with HF.
  - Although a patient with symptomatic HF (stage C) may become asymptomatic with treatment (NYHA class I), that patient will still be categorized as stage C HF.
  - Patients with stage C HF can be classified according to the trajectory of their symptoms.

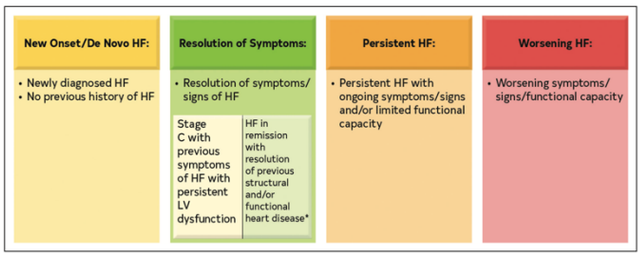


Figure 2. Trajectory of Stage C HF.
The trajectory of stage C HF is displayed. Patients whose symptoms and signs of HF are resolved are still stage C and should be treated accordingly. If all HF symptoms, signs, and structural abnormalities resolve, the patient is considered to have HF in remission. HF indicates heart failure; and LV, left ventricular. *Full resolution of structural and functional cardiac abnormalities is uncommon.

Classification of HF by Left Ventricular Ejection Fraction (LVEF)

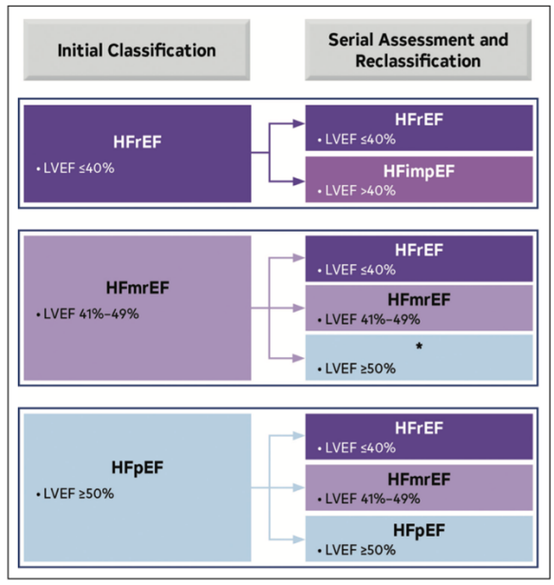
- LVEF is considered important in the classification of patients with HF because of differing prognosis and response to treatments and because most clinical trials select patients based on ejection fraction (EF).

Type of HF According to LVEF	Criteria
HFrEF (HF with reduced EF)	LVEF ≤40%
HFimpEF (HF with improved EF)	Previous LVEF ≤40% and a follow-up measurement of LVEF >40%
HFmrEF (HF with mildly reduced EF)	LVEF 41%–49% Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)
HFpEF (HF with preserved EF)	LVEF ≥50% Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)

Please see Appendix 3 for suggested thresholds for structural heart disease and evidence of increased filling pressures.

HF indicates heart failure; LV, left ventricular; and LVEF, left ventricular ejection fraction.

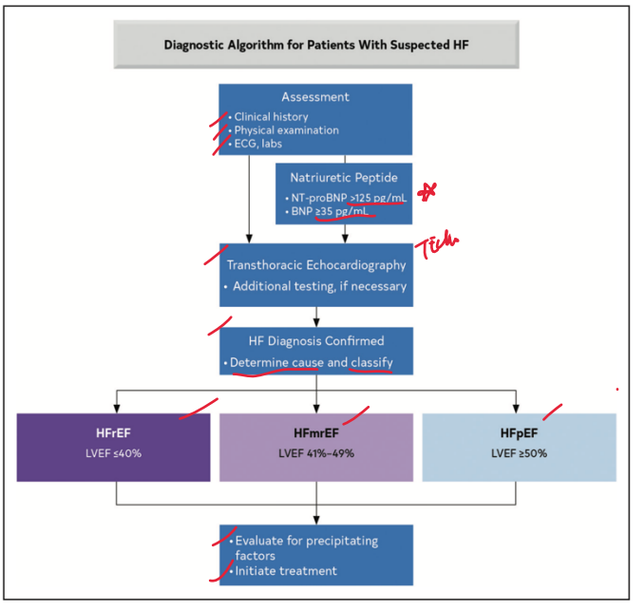
The classification for baseline and subsequent LVEF is shown



- Patients with HFrEF who improve their LVEF to >40% are considered to have HFimpEF and **should continue HFrEF treatment**.
- **There is limited evidence to guide treatment for patients who improve their LVEF from mildly reduced (41%-49%) to ≥50%.*
  - It is unclear whether to treat these patients as HFpEF or HFmrEF.

Diagnostic Algorithm for Classification of HF According to LVEF

- Structural and functional alterations of the heart as the underlying cause for the clinical presentation support the diagnosis of HFmrEF and HFpEF1
- The criteria for diagnosis of HFmrEF and HFpEF require evidence of increased LV filling pressures at rest, exercise, or other provocations.
- The criteria can be fulfilled with findings of elevated levels of natriuretic peptides, echocardiographic diastolic parameters such as an E/e' ≥15 or other evidence of elevated filling pres- sures, or invasive hemodynamic measurement at rest or exercise.
- Evidence of structural heart disease (eg, LV structural or functional alterations) may be used to further support the diagnosis of HFpEF.
- Key structural alterations are an increase in left atrial size and volume (left atrial volume index) and/or an increase in LV mass (LV mass index).
- Exercise stress testing with echocardiographic evaluation of diastolic parameters can be helpful if the diagnosis remains uncertain.
- Alternatively, or in addition, invasive hemodynamics at rest or with exercise, with assessment of filling pressures (pulmonary capillary wedge pressure or LV end diastolic pressures, pulmonary artery [PA] pressures, stroke volumes, and cardiac output) can be performed to help further establish the diagnosis.
- The diagnosis of HFpEF is often challenging.
  - A clinical composite score to diagnose HFpEF, the H2FPEF score, integrates these predictive variables:
    - obesity, atrial fibrillation (AF)
    - age >60 years
    - treatment with ≥2 antihypertensive medications,
    - echocardiographic E/e' ratio >9,
    - echocardiographic PA systolic pressure >35 mm Hg.
    - A weighted score based on these 6 variables was used to create the composite score ranging from 0 to 9.
    - A score between 2 and 5 may require further evaluation of hemodynamics with exercise echocardiogram or cardiac catheterization to confirm or negate a diagnosis of HFpEF.
    - The use of this H2FPEF score may help to facilitate discrimination of HFpEF from noncardiac causes of dyspnea and can assist in determination of the need for further diagnostic testing in the evaluation of patients with unexplained exertional dyspnea.
- The European Society of Cardiology has developed a diagnostic algorithm.
- This involves a pretest that assesses for HF symptoms and signs, typical clinical demographics (obesity, hypertension, diabetes, elderly, AF), and diagnostic laboratory tests, ECG, and echocardiography.
- In the absence of overt noncardiac causes of breathlessness, HFpEF can be suspected if there is a normal LVEF, no significant heart valve disease or cardiac ischemia, and at least 1 typical risk factor.
- The score used functional, morphological, and biomarker domains.
- The points score assigns 2 points for a major criterion or 1 point for a minor criterion within each domain, with a maximum of 2 points for each domain.



- BNP - B-type natriuretic peptide
- NT-proBNP - N-terminal pro-B type natriuretic peptide.

Cause of HF

- The common causes of HF include
  - ischemic heart disease and myocardial infarction (MI),
  - hypertension,
  - valvular heart disease (VHD)
- Other causes can include
  - familial or genetic cardiomyopathies
  - amyloidosis
  - cardiotoxicity with cancer or other treatments or substance abuse such as alcohol, cocaine, or methamphetamine;
  - tachycardia
  - right ventricular (RV) pacing or stress-induced cardiomyopathies
  - peripartum cardiomyopathy
  - myocarditis
  - autoimmune causes
  - sarcoidosis
  - iron overload, including hemochromatosis
  - thyroid disease and other endocrine metabolic and nutritional causes

Other Potential Nonischemic Causes of HF

Cause
Chemotherapy and other cardiotoxic medications
Rheumatologic or autoimmune
Endocrine or metabolic (thyroid, acromegaly, pheochromocytoma, diabetes, obesity)
Familial cardiomyopathy or inherited and genetic heart disease
Heart rhythm–related (eg, tachycardia-mediated, PVCs, RV pacing)
Hypertension
Infiltrative cardiac disease (eg, amyloid, sarcoid, hemochromatosis)
Myocarditis (infectious, toxin or medication, immunological, hypersensitivity)
Peripartum cardiomyopathy
Stress cardiomyopathy (Takotsubo)
Substance abuse (eg, alcohol, cocaine, methamphetamine)

Clinical Assessment: History and Physical Examination

- In patients with HF, vital signs and evidence of clinical congestion should be assessed at each encounter to guide overall management, including adjustment of diuretics and other medications.
- In patients with symptomatic HF, clinical factors indicating the presence of advanced HF should be sought via the history and physical examination.
- In patients with cardiomyopathy, a 3-generation family history should be obtained or updated when assessing the cause of the cardiomyopathy to identify possible inherited disease.1
- In patients presenting with HF, a thorough history and physical examination should direct diagnostic strategies to uncover specific causes that may warrant disease-specific management.
- In patients presenting with HF, a thorough history and physical examination should be obtained and performed to identify cardiac and noncardiac disorders, lifestyle and behavioral factors, and social determinants of health that might cause or accelerate the development or progression of HF.
- The history and physical examination remain a cornerstone in the assessment of patients with HF.
- The history and physical examination provide information about the cause of an underlying cardiomyopathy, including the possibility of an inherited cardiomyopathy as ascertained by a family history or a condition requiring disease-specific therapy like amyloid heart disease, as well as reasons why a previously stable patient developed acutely decompensated HF.
- A critical component of the history and physical examination is to assess for clinical congestion (ie, those signs and symptoms resulting from elevated cardiac filling pressures).
- Congestion is a target for medication adjustment and is as- sociated with quality of life (QOL) and prognosis.
- The history and physical examination also allow for the determination of clinical clues that suggest the patient has advanced HF, which may warrant referral to an advanced HF center.

Initial Laboratory and Electrocardiographic Testing

- For patients presenting with HF, the specific cause of HF should be explored using additional laboratory testing for appropriate management.
- For patients who are diagnosed with HF, laboratory evaluation should include complete blood count, urinalysis, serum electrolytes, blood urea nitrogen, serum creatinine, glucose, lipid profile, liver function tests, iron studies, and thyroid-stimulating hormone to optimize management.
- For all patients presenting with HF, a 12-lead ECG should be performed at the initial encounter to optimize management.
- Laboratory evaluation with complete blood count, urinalysis, serum electrolytes (including sodium, potassium, calcium, and magnesium), blood urea nitrogen, serum creatinine, glucose, fasting lipid profile, liver function tests, iron studies (serum iron, ferritin, transferrin saturation), and thyroid-stimulating hormone level and electrocardiography is part of the standard diagnostic evaluation of a patient with HF.
- In addition to routine assessment, specific diagnostic testing and evaluation is often necessary to identify specific cause and other comorbidities in patients with HF.

Selected Potential Causes of Elevated Natriuretic Peptide Levels

Cardiac
HF, including RV HF syndromes
ACS
Heart muscle disease, including LVH
VHD
Pericardial disease
AF
Myocarditis
Cardiac surgery
Cardioversion
Toxic-metabolic myocardial insults, including cancer chemotherapy

Noncardiac
Advancing age
Anemia
Renal failure
Pulmonary: Obstructive sleep apnea, severe pneumonia
Pulmonary embolism, pulmonary arterial hypertension
Critical illness
Bacterial sepsis
Severe burns

Use of Biomarkers for Prevention, Initial Diagnosis, and Risk Stratification

- In patients presenting with dyspnea, measurement of B-type natriuretic peptide (BNP) or N-terminal prohormone of B-type natriuretic peptide (NT-proBNP) is useful to support a diagnosis or exclusion of HF.
- In patients with chronic HF, measurements of BNP or NT-proBNP levels are recommended for risk stratification.
- In patients hospitalized for HF, measurement of BNP or NT-proBNP levels at admission is recommended to establish prognosis.
- In patients at risk of developing HF, BNP or NT-proBNP–based screening followed by team-based care, including a cardiovascular specialist, can be useful to prevent the development of LV dysfunction or new-onset HF.

5. In patients hospitalized for HF, a predischarge BNP or NT-proBNP level can be useful to inform the trajectory of the patient and establish a post-discharge prognosis.

- Assays for BNP and NT-proBNP are frequently used to establish the presence and severity of HF. In general, BNP and NT-proBNP levels are similar, and either can be used in patient care settings as long as their respective absolute values and cut-points are not used interchangeably.
- Obesity is associated with lower levels of BNP and NT-proBNP thereby reducing their diagnostic sensitivity.
- A substantial evidence base supports the use of natriuretic peptide biomarkers for excluding HF as a cause of symptoms in ambulatory and emergency department settings.
- Although a reduction in BNP and NT-proBNP has been associated with better outcomes, the evidence for treatment guidance using serial BNP or NT-proBNP measurements remains insufficient.
- Lastly, a widening array of biomarkers including markers of myocardial injury, inflammation, oxidative stress, vascular dysfunction, and matrix remodeling have been shown to provide incremental prognostic information over natriuretic peptides but remain without evidence of an incremental management benefit.

Examples of Factors Implicating Possible Genetic Cardiomyopathy

Phenotypic Category	Patient or Family Member Phenotypic Finding*	Ask Specifically About Family Members* With
Cardiac morphology	Marked LV hypertrophy	Any mention of cardiomyopathy, enlarged or weak heart, HF.
	LV noncompaction	Document even if attributed to other causes, such as alcohol or peri-partum cardiomyopathy
	Right ventricular thinning or fatty replacement on imaging or biopsy	
Findings on 12-lead ECG	Abnormal high or low voltage or conduction, and repolarization, altered RV forces	Long QT or Brugada syndrome
Dysrhythmias	Frequent NSVT or very frequent PVCs	ICD
	Sustained ventricular tachycardia or fibrillation	Recurrent syncope Sudden death attributed to "massive heart attack" without known CAD Unexplained fatal event such as drowning or single-vehicle crash
	Early onset AF	"Lone" AF before age 65 y
	Early onset conduction disease	Pacemaker before age 65 y
Extracardiac features	Skeletal myopathy Neuropathy Cutaneous stigmata Other possible manifestations of systemic syndromes	Any known skeletal muscle disease, including mention of Duchenne and Becker's, Emory-Dreifuss limb-girdle dystrophy Systemic syndromes: Dysmorphic features Mental retardation Congenital deafness Neurofibromatosis Renal failure with neuropathy

AF indicates atrial fibrillation; CAD, coronary artery disease; LV, left ventricular; NSVT, nonsustained ventricular tachycardia; PVC, premature ventricular contraction; and RV, right ventricular.
*Note that genetic cause is more likely when the person is younger at the onset of events. However, the cardiac morphology and peripheral manifestations of hereditary amyloidosis may present in later life, unlike most other inherited cardiomyopathies.

Genetic Evaluation and Testing

- In first-degree relatives of selected patients with genetic or inherited cardiomyopathies, genetic screening and counseling are recommended to detect cardiac disease and prompt consideration of treatments to decrease HF progression and sudden death.
- In select patients with nonischemic cardiomyopathy, referral for genetic counseling and testing is reasonable to identify conditions that could guide treatment for patients and family members.
- In patients in whom a genetic or **inherited cardiomyopathy** is suspected, a family history should be performed, including at least ***3 generations and ideally diagrammed as a family tree pedigree***
- Genetic variants have been implicated in 25% to 40% of patients with DCM with a positive family history but also in 10% to 30% of patients without a recognized family history.
- Phenotype and family history are important for identifying patients in whom genetic testing is most likely to yield clinically actionable information
- ***Presentation of DCM with conduction disease or ventricular arrhythmias raises concern of sarcoidosis and arrhythmogenic cardiomyopathy***, which is of particular concern because of the risk of sudden death in patients and families.
- No controlled studies have shown clinical benefits of genetic testing for cardiomyopathy, but **genetic testing contributes to risk stratification and has implications for treatment**, currently most often for decisions regarding defibrillators for primary prevention of sudden death and regarding exercise limitation for hypertrophic cardiomyopathy and the desmosomal variants.
- Consultation with a trained counselor before and after genetic testing helps patients to understand and weigh the implications of possible results for their own lives and those of family members, including possible discrimination on the basis of genetic information.
- Unless shown to be free of the genetic variant(s) implicated in the proband, first-degree relatives of affected probands should undergo periodic screening with echocardiography and electrocardiography

Evaluation With Cardiac Imaging

- In patients with suspected or new-onset HF, or those presenting with acute decompensated HF, a chest x-ray should be performed to assess heart size and pulmonary congestion and to detect alternative cardiac, pulmonary, and other diseases that may cause or contribute to the patient's symptoms.
- In patients with suspected or newly diagnosed HF, transthoracic echocardiography (TTE) should be performed during initial evaluation to assess cardiac structure and function.
- Cardiac imaging has a key role in the **initial evaluation** of individuals with suspected HF and, when indicated, in the serial assessment of patients with HF.
- After a complete history and physical examination, a com- prehensive **TTE is the most useful initial diagnostic test** given the vast amount of diagnostic and prognostic information provided.
- The **determination of LVEF is a fundamental step** to classify HF and to guide evidence-based pharmacological and device-based therapy.
- In certain situations, the echocardiogram is unable to accurately assess cardiac structure and/or function or more information is needed to determine the cause of the cardiac dysfunction.
- Other imaging modalities, such as CMR, SPECT or radionuclide ventriculography, PET, or cardiac CT or invasive coronary angiography, can provide additional and complementary information to cardiac ultrasound.
- In general, cardiac imaging tests, including repeat tests, are performed only when the results have a meaningful impact on clinical care.

Invasive Evaluation

- In patients with HF, endomyocardial biopsy may be useful when a specific diagnosis is suspected that would influence therapy.
- In selected patients with HF with persistent or worsening symptoms, signs, diagnostic parameters, and in whom hemodynamics are uncertain, invasive hemodynamic monitoring can be useful to guide management.
- In patients with HF, routine use of invasive hemodynamic monitoring is not recommended.
- For patients undergoing routine evaluation of HF, endomyocardial biopsy should not be performed because of the risk of complications.
- Invasive evaluation of patients with HF may provide important clinical information to determine the cause of HF and treatment options.
- Routine **right heart catheterization does not provide** sufficient information to guide treatment decisions.
  - However, hemodynamic evaluation with right heart catheterization and monitoring in the setting of acute respiratory distress, systemic hypoperfusion including cardiogenic shock, or when hemodynamics are uncertain, **may guide treatment decisions**.
- **Coronary angiography** may be useful in patients who are candidates for *revascularization*
- **Endomyocardial biopsy** may be advantageous in patients with HF in which a histological diagnosis, such as *amyloidosis or myocarditis*, may influence treatment decisions.

Wearables and Remote Monitoring (Including Telemonitoring and Device Monitoring)

- In selected adult patients with NYHA class III HF and history of a HF hospitalization in the past year or elevated natriuretic peptide levels, on maximally tolerated stable doses of GDMT with optimal device therapy, the usefulness of wireless monitoring of PA pressure by an implanted hemodynamic monitor to reduce the risk of subsequent HF hospitalizations is uncertain.
- In patients with NYHA class III HF with a HF hospitalization within the previous year, wireless monitoring of the PA pressure by an implanted hemodynamic monitor provides uncertain value.
- HF is a chronic condition punctuated by periods of instability.
- Despite close longitudinal monitoring via in-person visits, event rates remain high, affording a potential role for remote monitoring strategies to improve clinical outcomes.
- Strategies tested in randomized trials include an:
  - implantable PA pressure sensor (CardioMEMS),
  - noninvasive telemonitoring
  - or monitoring via existing implanted electronic devices (ICDs or CRT-Ds).

- Results from a single randomized trial, and subsequent observational studies, support consideration of an implantable PA sensor in selected patients with HF to reduce the risk of HF hospitalization.
- In contrast, a recent trial testing a PA pressure sensor did not meet its primary endpoint.
- Results from previous clinical trials do not support the alternative remote monitoring strategies (eg, noninvasive telemonitoring or remote monitoring of physiological parameters such as patient activity, thoracic impedance, heart rate) for this purpose.

Exercise and Functional Capacity Testing

- In patients with HF, assessment and documentation of NYHA functional classification are recommended to determine eligibility for treatments.
- In selected ambulatory patients with HF, cardiopulmonary exercise testing (CPET) is recommended to determine appropriateness of advanced treatments (eg., LVAD, heart transplant).
- In ambulatory patients with HF, performing a CPET or 6-minute walk test is reasonable to assess functional capacity.
- In ambulatory patients with unexplained dyspnea, CPET is reasonable to evaluate the cause of dyspnea.
- Functional impairment and exercise intolerance are common in HF.
- **CPET and the 6-minute walk test** are standardized, reliable, and reproducible tests to ***quantify functional capacity***.
- The **NYHA functional classification** can be used to grade the severity of functional limitation based on patient report of symptoms experienced with activity and is used to define candidates for certain treatments.

Initial and Serial Evaluation: Clinical Assessment: HF Risk Scoring

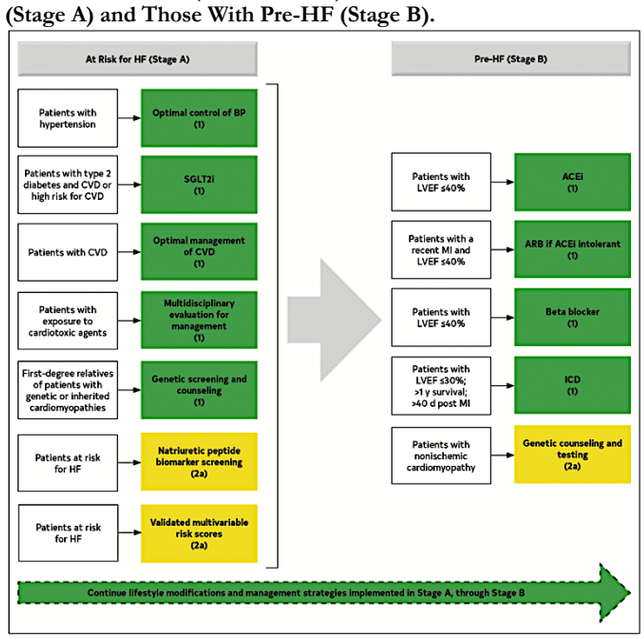
- In ambulatory or hospitalized patients with HF, validated multivariable risk scores can be useful to estimate subsequent risk of mortality.
- Clinicians should routinely assess a patient's risk for an adverse outcome to guide discussions on prognosis, goals of care, and treatment decisions.
- Several predictive models of outcomes of patients with HF have been developed and validated using data from clinical trials, registries, and population-based cohorts.
- The best performing models have focused on predicting short- and long-term mortality, whereas predictive models for hospitalization or readmission for HF have generally had poor or modest discrimination.
- Predictive models may also assess the risk of incident HF among the general population and should be considered in the prevention of HF.
- In the course of standard evaluation, clinicians should routinely assess the patient's potential for adverse outcome, because accurate risk stratification may help guide therapeutic decision- making, including a more rapid transition to advanced HF therapies.
- Several methods objectively assess risk,including biomarker testing, as well as various multivariable clinical risk scores, and some that include machine learning.
- These risk scores are for use in ambulatory, hospitalized patients, and the general population.

STAGE A (PATIENTS AT RISK FOR HF)

Patients at Risk for HF (Stage A: Primary Prevention)

- In patients with hypertension, blood pressure should be controlled in accordance with GDMT for hypertension to prevent symptomatic HF.
- In patients with type 2 diabetes and either established CVD or at high cardiovascular risk, SGLT2i should be used to prevent hospitalizations for HF.
- In the general population, healthy lifestyle habits such as regular physical activity, maintaining normal weight, healthy dietary patterns, and avoiding smoking are helpful to reduce future risk of HF.
- For patients at risk of developing HF, natriuretic peptide biomarker–based screening followed by team-based care, including a cardiovascular specialist optimizing GDMT, can be useful to prevent the development of LV dysfunction (systolic or diastolic) or new-onset HF.
- In the general population, validated multivariable risk scores can be useful to estimate subsequent risk of incident HF.
- Healthy lifestyle habits such as maintaining regular physical activity; normal weight, blood pressure, and blood glucose levels; healthy dietary patterns, and not smoking reduce primordial risk and have been associated with a lower lifetime risk of developing HF.
- The AHA/ ACC primary prevention guidelines provide recommendations for diet, physical activity, and weight control, all of which have been associated with the risk of HF.
- Blood pressure is an important risk factor for HF, and a **treatment goal of <130/80 mm Hg is recommended for those with a CVD risk of ≥10%.**
- Multiple RCTs have found that patients with diabetes and CVD without HF have improved survival and reduced HF hospitalizations with SGLT2i.
- Patients at risk for HF screened with BNP or NT-proBNP followed by collaborative care, diagnostic evaluation, and treatment in those with elevated levels can reduce combined rates of LV systolic dysfunction, diastolic dysfunction, and HF.

Recommendations (Class 1 and 2a) for Patients at Risk of HF (Stage A) and Those With Pre-HF (Stage B).



STAGE B (PATIENTS WITH PRE-HF)

Management of Stage B: Preventing the Syndrome of Clinical HF in Patients With Pre-HF

- In patients with LVEF ≤40%, ACEi should be used to prevent symptomatic HF and reduce mortality.
- In patients with a recent or remote history of MI or ACS, statins should be used to prevent symptomatic HF and adverse cardiovascular events.
- In patients with a recent MI and LVEF ≤40% who are intolerant to ACEi, ARB should be used to prevent symptomatic HF and reduce mortality.
- In patients with a recent or remote history of MI or acute coronary syndrome (ACS) and LVEF ≤40%, evidence-based beta blockers should be used to reduce mortality.
- In patients who are at least 40 days post-MI with LVEF ≤30% and NYHA class I symptoms while receiving GDMT and have reasonable expectation of meaningful survival for >1 year, an ICD is recommended for primary prevention of sudden cardiac death (SCD) to reduce total mortality.
- In patients with LVEF ≤40%, beta blockers should be used to prevent symptomatic HF.
- In patients with LVEF <50%, thiazolidinediones should not be used because they increase the risk of HF, including hospitalizations.
- In patients with LVEF <50%, non-Dihydropyridine calcium channel blockers with negative inotropic effects may be harmful.
- In general, all recommendations for patients with stage A HF also apply to those with stage B HF.
- Stage B (pre-HF) represents a phase of **clinically asymptomatic structural and functional cardiac abnormalities** that increases the risk for symptomatic HF.
- Identifying individuals with stage B HF provides an opportunity to initiate lifestyle modification and pharmacological therapy that may prevent or delay the transition to symptomatic HF (stage C/D).
- Several ACC/AHA clinical practice guidelines address appropriate management of patients with stage B HF
- Although multiple studies highlight the increased HF risk associated with asymptomatic LV systolic and diastolic dysfunction identified by noninvasive imaging, beneficial pharmacotherapy for asymptomatic LV systolic dysfunction, such as inhibitors of the renin-angiotensin system and beta blockers, have been predominantly observed in individuals with depressed LVEF (LVEF <35%–40%).

- Studies of specific treatments to alter the onset of HF in the set- ting of asymptomatic cardiac dysfunction with preserved LVEF (eg, abnormalities of myocardial deformation or diastolic dysfunction) have been limited. Several comorbid conditions, including diabetes, obesity, and hypertension, have been associated with asymptomatic LV dysfunction and with progression of asymptomatic LV dysfunction to symptomatic HF.
- Accordingly, these comorbidities are controlled according to current clinical practice guidelines.
- The benefits of mineralocorticoid receptor antagonists (MRA) after MI have mostly been shown in patients with symptomatic HFrEF.

Other ACC/AHA Clinical Practice Guidelines Addressing Patients With Stage B HF

Consideration	Reference
Patients with an acute MI who have not developed HF symptoms treated in accordance with GDMT	2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction[51] 2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes[52]
Coronary revascularization for patients without symptoms of HF in accordance with GDMT	2015 ACC/AHA/SCAI Focused Update on Primary Percutaneous Coronary Intervention for Patients With ST-Elevation Myocardial Infarction: An Update of the 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention and the 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction[53] (This guideline has been replaced by Lawton, 2021.[54]) 2014 ACC/AHA/AATS/PCNA/SCAI/STS Focused Update of the Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease[55] 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery[56] (This guideline has been replaced by Lawton, 2021.[54])
Valve replacement or repair for patients with hemodynamically significant valvular stenosis or regurgitation and no symptoms of HF in accordance with GDMT	2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease.[57,58]
Patients with congenital heart disease that may increase the risk for the development of HF	2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease[59]

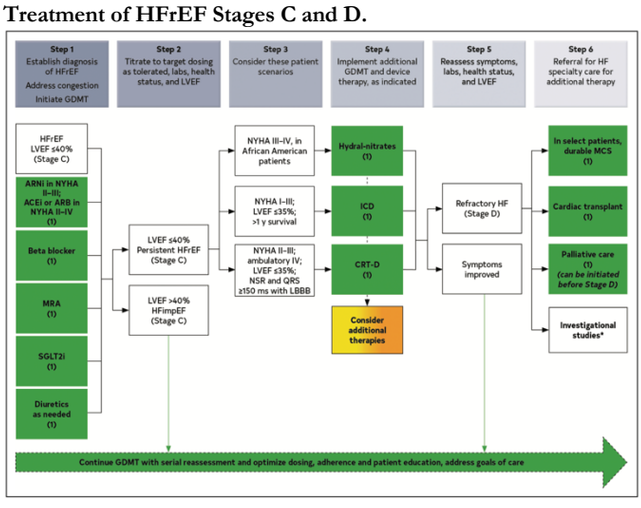
AATS indicates American Association for Thoracic Surgery; ACC, American College of Cardiology; ACCF, American College of Cardiology Foundation; AHA, American Heart Association; GDMT, guideline-directed medical therapy; HF, heart failure; MI, myocardial infarction; PCNA, Preventive Cardiovascular Nurses Association; SCAI, Society for Cardiovascular Angiography and Interventions; and STS, The Society of Thoracic Surgeons.

STAGE C HF

Nonpharmacological Interventions

- Patients with HF should receive care from multidisciplinary teams to facilitate the implementation of GDMT, address potential barriers to self-care, reduce the risk of subsequent rehospitalization for HF, and improve survival.
- Patients with HF should receive specific education and support to facilitate HF self-care in a multidisciplinary manner.
- In patients with HF, vaccinating against respiratory illnesses is reasonable to reduce mortality.
- In adults with HF, screening for depression, social isolation, frailty, and low health literacy as risk factors for poor self-care is reasonable to improve management.
- Because of the complexity of HF management and coordination of other health and social services required, HF care is ideally provided by **multidisciplinary teams** that include
  - ***cardiologists, nurses, and pharmacists who specialize in HF as well as dieticians, mental health clinicians, social workers, primary care clinicians, and additional specialists.***
- **Self-care** in HF comprises treatment adherence and health maintenance behaviors.
- Patients with HF should learn to take medications as prescribed, restrict sodium intake, stay physically active, and get vaccinations.
  - They also should understand how to monitor for signs and symptoms of worsening HF, and what to do in response to symptoms when they occur.
- Knowledge alone is insufficient to improve self-care.
- Patients with HF need time and support to gain skills and overcome barriers to effective self-care.
- Measures listed as Class 1 recommendations for patients in stages A and B are recommended where appropriate for patients in stage C.
- GDMT, should be the main-stay of pharmacological therapy for HFrEF.

Treatment of HFrEF Stages C and D.



- *GDMT -guideline-directed medical therapy*

Dietary Sodium Restriction

- For patients with stage C HF, avoiding excessive sodium intake is reasonable to reduce congestive symptoms.
- Restricting dietary sodium is a common nonpharmacological treatment for patients with HF symptomatic with congestion, but specific recommendations have been based on low-quality evidence.
- The AHA currently recommends a reduction of sodium intake to **<2300 mg/d** for *general cardiovascular health promotion*;
  - however, there are no trials to support this level of restriction in patients with HF.
  - Sodium restriction can result in poor dietary quality with inadequate macronutrient and micronutrient intake.
- Nutritional inadequacies have been associated with clinical instability, but routine supplementation of oral iron, thiamine, zinc, vitamin D, or multivitamins **has not proven beneficial**.
- The **DASH diet** is rich in antioxidants and potassium, can achieve sodium restriction *without compromising nutritional adequacy* when accompanied by dietary counseling, and may be **associated with reduced hospitalizations for HF**.

Potential Barriers to Effective HF Self-Care and Example Interventions

Potential Barrier	Example Screening Tools	Example Interventions
Medical Barriers		
Cognitive impairment[48–50]	Mini-Cog Mini-Mental State Examination (MMSE) Montreal Cognitive Assessment (MoCA)	Home health aide Home meal deliveries Adult day care Geriatric psychiatry referral Memory care support groups
Depression[51,52]	Hamilton Depression Rating Scale (HAM-D) Beck Depression Inventory-II (BDI-II) Patient Health Questionnaire-9 (PHQ-9)	Psychotherapy Selective serotonin reuptake inhibitors Nurse-led support
Substance use disorders[53]	Tobacco, Alcohol, Prescription medication, and other Substance use (TAPS)	Referral to social work services and community support partners Referral for addiction psychiatry consultation
Frailty[54]	Fried frailty phenotype	Cardiac rehabilitation Registered dietitian nutritionist evaluation for malnutrition
Social Barriers		
Financial burden of HF treatments[55]	COmprehensive Score for financial Toxicity–Functional Assessment of Chronic Illness Therapy (COST-FACIT)	PharmD referral to review prescription assistance eligibilities
Food insecurity[56,57]	Hunger Vital Sign, 2 items US Household Food Security Survey Module, 6 items	Determine eligibility for the Supplemental Nutrition Assistance Program (SNAP) Connect patients with community partners such as food pantries/food banks Home meal deliveries Registered dietitian nutritionist evaluation for potential malnutrition
Homelessness or housing insecurity[58–60]	Homelessness Screening Clinical Reminder (HSCR)	Referral to local housing services Connect patients with community housing partners
Intimate partner violence or elder abuse[61,62]	Humiliation, Afraid, Rape, Kick (HARK) questionnaire Partner Violence Screen (PVS) Woman Abuse Screening Tool (WAST)	Referral to social work services and community support partners
Limited English proficiency or other language barriers[63]	Routinely inquire in which language the patient is most comfortable conversing	Access to interpreter services covering a wide range of languages, ideally in person or, alternatively, via video platform Printed educational materials in a range of appropriate languages
Low health literacy[64]	Short Assessment of Health Literacy (SAHL) Rapid Estimate of Adult Literacy in Medicine–Short Form (REALM-SF) Brief Health Literacy Screen (BHLS), 3 items	Agency for Healthcare Research and Quality (AHRQ) Health Literacy Universal Precautions Toolkit Written education tools provided at sixth grade reading level or below Graphic educational documents
Social isolation or low social support[65]	Patient-Reported Outcomes Measurement Information System (PROMIS) Social Isolation Short Form	Determine eligibility for home care services Support group referral
Transport limitations	No validated tools currently available.	Referral to social work services Determine eligibility for insurance or state-based transportation, or reduced-cost public transportation Maximize opportunities for telehealth visits and remote monitoring

Management of Stage C HF: Activity, Exercise Prescription, and Cardiac Rehabilitation

- For patients with HF who are able to participate, exercise training (or regular physical activity) is recommended to improve functional status, exercise performance, and QOL.
- In patients with HF, a cardiac rehabilitation program can be useful to improve functional capacity, exercise tolerance, and health-related QOL.
- **Exercise training** in patients with HF *is safe and has numerous benefits.*
  - In a major trial of exercise and HF, exercise training was associated with a reduction in CVD mortality or hospitalizations in the exercise training group after adjustment for risk factors.
- Meta-analyses show that **cardiac rehabilitation** *improves functional capacity, exercise duration, and health-related QOL.*
  - A cardiac rehabilitation program for patients with HF usually includes
    - medical evaluation
    - education regarding the importance of medical adherence
    - dietary recommendations
    - psychosocial support
    - an exercise training and physical activity counseling program.
- Patients with HF on optimal GDMT, who are in stable medical condition and are able to participate in an exercise program, are candidates for an exercise rehabilitation program.

Diuretics and Decongestion Strategies in Patients With HF

- In patients with HF who have fluid retention, diuretics are recommended to relieve congestion, improve symptoms, and prevent worsening HF.
- . For patients with HF and congestive symptoms, addition of a thiazide (eg., metolazone) to treatment with a loop diuretic should be reserved for patients who do not respond to moderate or high-dose loop diuretics to minimize electrolyte abnormalities.
- Bumetanide, furosemide, and torsemide
  - inhibit reabsorption of sodium or chloride at the **loop of Henle**
- thiazide and thiazide-like diuretics
  - act in the distal convoluting tubule
- potassium-sparing diuretics (eg, spironolactone)
  - act in in the collecting duct
- **Loop diuretics are the preferred diuretic agents for use in most patients with HF.**
- **Thiazide diuretics** such as chlorthalidone or hydrochlorothiazide may be considered in patients with **hypertension and HF and mild fluid retention**.
- Metolazone or chlorothiazide may be added to loop diuretics in patients with refractory edema unresponsive to loop diuretics alone.
- Diuretics should be prescribed to patients who have evidence of congestion or fluid retention.
- In any patient with a history of congestion, **maintenance diuretics should be considered** to avoid recurrent symptoms.
- The treatment goal of diuretic use is to eliminate clinical evidence of fluid retention, using the lowest dose possible to maintain euvolemia.
- With the exception of **MRAs**, the effects of diuretics on morbidity and mortality are uncertain.
- As such, **diuretics should not be used in isolation** but always combined with other GDMT for HF that reduces hospitalizations and prolongs survival.
- **Hyponatremia** complicates HF management.
  - If reversing potential causes and free water restriction do not improve hyponatremia
    - **vasopressin antagonists** may be helpful in the *acute management* of volume overload to **decrease congestion while maintaining serum sodium**.

Commonly Used Oral Diuretics in Treatment of Congestion for Chronic HF

Drug	Initial Daily Dose	Maximum Total Daily Dose	Duration of Action
Loop diuretics			
Bumetanide	0.5–1.0 mg once or twice	10 mg	4–6 h
Furosemide	20–40 mg once or twice	600 mg	6–8 h
Torsemide	10–20 mg once	200 mg	12–16 h
Thiazide diuretics			
Chlorthiazide	250–500 mg once or twice	1000 mg	6–12 h
Chlorthalidone	12.5–25 mg once	100 mg	24–72 h
Hydrochlorothiazide	25 mg once or twice	200 mg	6–12 h
Indapamide	2.5 mg once	5 mg	36 h
Metolazone	2.5 mg once	20 mg	12–24 h

Pharmacological Treatment* for HFrEF

Renin-Angiotensin System Inhibition With ACEi or ARB or ARNi

- In patients with HFrEF and NYHA class II to III symptoms, the use of ARNi is recommended to reduce morbidity and mortality.
- In patients with previous or current symptoms of chronic HFrEF, the use of ACEi is beneficial to reduce morbidity and mortality when the use of ARNi is not feasible.
- In patients with previous or current symptoms of chronic HFrEF who are intolerant to ACEi because of cough or angioedema and when the use of ARNi is not feasible, the use of ARB is recommended to reduce morbidity and mortality.
- In patients with previous or current symptoms of chronic HFrEF, in whom ARNi is not feasible, treatment with an ACEi or ARB provides high economic value.
- In patients with chronic symptomatic HFrEF NYHA class II or III who tolerate an ACEi or ARB, replacement by an ARNi is recommended to further reduce morbidity and mortality.
- In patients with chronic symptomatic HFrEF, treatment with an ARNi instead of an ACEi provides high economic value.
- ARNi should not be administered concomitantly with ACEi or within 36 hours of the last dose of an ACEi.
- ARNi should not be administered to patients with any history of angioedema.
- ACEi should not be administered to patients with any history of angioedema.
- Inhibition of the renin-angiotensin system is **recommended to reduce morbidity and mortality for patients with HFrEF**,
  - **ARNi, ACEi, or ARB are recommended as first-line therapy**.
    - If patients have chronic symptomatic
- **HFrEF with NYHA class II or III** symptoms and they ***tolerate*** an ACEi or ARB, they **should be switched** to an **ARNi** because of improvement in morbidity and mortality.
- An ARNi is recommended as de novo treatment in hospitalized patients with acute HF before discharge given improvement in health status, reduction in the prognostic biomarker NT-proBNP, and improvement of LV remodeling parameters compared with ACEi/ARB.
- Although data are limited, the use of an ARNi may be efficacious as de novo treatment in patients with symptomatic chronic HFrEF to simplify management.
- ARB may be used as an alternative to ACEi in the setting of intolerable cough, or as alternatives to ACEi and ARNi in patients with a history of angioedema.
- If patients are switched from an ACEi to an ARNi or vice versa, there **should be at least 36 hours between** ACEi and ARNi doses.

Beta Blockers

- In patients with HFrEF, with current or previous symptoms, use of 1 of the 3 beta blockers proven to reduce mortality (eg., bisoprolol, carvedilol, sustained-release metoprolol succinate) is recommended to reduce mortality and hospitalizations.
- In patients with HFrEF, with current or previous symptoms, beta-blocker therapy provides high economic value.
- Treatment with beta blockers reduces the risk of death and the combined risk of death or hospitalization in patients with HFrEF.
- In addition, this treatment can improve LVEF, lessen the symptoms of HF, and improve clinical status.
- Clinical trials have shown that **beta blockers should be prescribed to all patients when HFrEF is diagnosed**, including in-hospital, unless contraindicated or not tolerated.
  - These benefits of beta blockers were observed in patients with or without CAD, and in patients with or without diabetes, older patients, as well as in women and across racial and ethnic groups but not in patients with AF.
- Even if symptoms do not improve, long-term treatment should be maintained to **reduce the risk of major cardiovascular events**.
- Beta blockers should be initiated at low doses, and every effort should be made to achieve the target doses of the beta blockers shown to be effective in major clinical trials, as tolerated

Mineralocorticoid Receptor Antagonists (MRAs)

- In patients with HFrEF and NYHA class II to IV symptoms, an MRA (spironolactone or eplerenone) is recommended to reduce morbidity and mortality, if eGFR is >30 mL/min/1.73 m2 and serum potassium is <5.0 mEq/L. Careful monitoring of potassium, renal function, and diuretic dosing should be performed at initiation and closely monitored thereafter to minimize risk of hyperkalemia and renal insufficiency.
- In patients with HFrEF and NYHA class II to IV symptoms, MRA therapy provides high economic value.
- In patients taking MRA whose serum potassium cannot be maintained at <5.5 mEq/L, MRA should be discontinued to avoid life-threatening hyperkalemia.
- MRA (also known as aldosterone antagonists or anti-mineralocorticoids) show consistent improvements in all-cause mortality, HF hospitalizations, and SCD across a wide range of patients with HFrEF.
- Patients at risk for renal dysfunction or hyperkalemia require close monitoring, and **eGFR ≤30 mL/min/1.73 m2 or serum potassium ≥5.0 mEq/L** are **contraindications** to MRA initiation.
  - Because of the higher selectivity of eplerenone for the aldosterone receptor, adverse effects such as gynecomastia and vaginal bleeding are observed less often in patients who take eplerenone than in those who take spironolactone.

Sodium-Glucose Cotransporter 2 Inhibitors

- In patients with symptomatic chronic HFrEF, SGLT2i are recommended to reduce hospitalization for HF and cardiovascular mortality, irrespective of the presence of type 2 diabetes.

- In patients with symptomatic chronic HFrEF, SGLT2i therapy provides intermediate economic value.
- Several RCTs in patients with type 2 diabetes and either established CVD or high risk for CVD have shown that **SGLT2i prevent HF hospitalizations compared with placebo**.
- several trials showed the benefit of SGLT2i (dapagliflozin and empagliflozin

Hydralazine and Isosorbide Dinitrate

- For patients self-identified as African American with NYHA class III-IV HFrEF who are receiving optimal medical therapy, the combination of hydralazine and isosorbide dinitrate is recommended to improve symptoms and reduce morbidity and mortality.
- For patients self-identified as African American with NYHA class III to IV HFrEF who are receiving optimal medical therapy with ACEi or ARB, beta blockers, and MRA, the combination of hydralazine and isosorbide dinitrate provides high economic value.
- In patients with current or previous symptomatic HFrEF who cannot be given first-line agents, such as ARNi, ACEi, or ARB, because of drug intolerance or renal insufficiency, a combination of hydralazine and isosorbide dinitrate might be considered to reduce morbidity and mortality.
- Two RCTs, V-HeFT I (Vasodilator Heart Failure Trial) and A-HeFT (African-American Heart Failure Trial), established benefit of the combination of hydralazine-isosorbide dinitrate in self-identified African Americans.

Other Drug Treatment

- In patients with HF class II to IV symptoms, omega-3 polyunsaturated fatty acid (PUFA) supplementation may be reasonable to use as adjunctive therapy to reduce mortality and cardiovascular hospitalizations.
- In patients with HF who experience hyperkalemia (serum potassium level ≥5.5 mEq/L) while taking a renin-angiotensin-aldosterone system inhibitor (RAASi), the effectiveness of potassium binders (patiromer, sodium zirconium cyclosilicate) to improve outcomes by facilitating continuation of RAASi therapy is uncertain.
- In patients with chronic HFrEF without a specific indication (eg, venous thromboembolism [VTE], AF, a previous thromboembolic event, or a cardioembolic source), anticoagulation is not recommended.
- Trials in prevention of CVD, including HF, showed that **omega-3 PUFA supplementation** results in a 10% to 20% risk reduction in fatal and nonfatal cardiovascular events when used with other evidence-based therapies.
- Hyperkalemia is common in HF and can lead to arrhythmias and underuse of GDMT.
- Two newer gastrointestinal potassium-binding agents—patiromer and sodium zirconium cyclosilicate—have been shown to lower potassium levels and enable treatment with a RAASi in patients with HF.

Drugs of Unproven Value or That May Worsen HF

- In patients with HFrEF, dihydropyridine calcium channel-blocking drugs are not recommended treatment for HF.1,2
- In patients with HFrEF, vitamins, nutritional supplements, and hormonal therapy are not recommended other than to correct specific deficiencies.
- In patients with HFrEF, non-Dihydropyridine calcium channel-blocking drugs are not recommended.
- In patients with HFrEF, thiazolidinediones increase the risk of worsening HF symptoms and hospitalizations.
- In patients with HF class II to IV symptoms, omega-3 polyunsaturated fatty acid (PUFA) supplementation may be reasonable to use as adjunctive therapy to reduce mortality and cardiovascular hospitalizations.
- . In patients with type 2 diabetes and high cardiovascular risk, the dipeptidyl peptidase-4 (DPP-4) inhibitors saxagliptin and alogliptin increase the risk of HF hospitalization and should be avoided in patients with HF.
- In patients with HFrEF, NSAIDs worsen HF symptoms and should be avoided or withdrawn whenever possible.
- Although there is strong evidence for benefit with selected medications for HFrEF
- These recommendations are not exhaustive but focus on the most relevant and commonly encountered medications in the management of patients with HFrEF: calcium channel blockers; antiarrhythmic agents; NSAIDs; medications for treatment of type 2 diabetes including thiazolidinediones and DPP-4 inhibitors; and vitamins, hormones, and nutritional supplements.

Selected Prescription Medications That May Cause or Exacerbate HF

Drug or Therapeutic Class	Associated With HF		Magnitude of HF Induction or Precipitation	LOE for HF Induction or Precipitation	Possible Mechanism(s)	Onset
	Causes Direct Myocardial Toxicity	Exacerbates Underlying Myocardial Dysfunction				
COX, nonselective inhibitors (NSAIDs)		X	Major	B	Prostaglandin inhibition leading to sodium and water retention, increased systemic vascular resistance, and blunted response to diuretics	Immediate
COX, selective inhibitors (COX-2 inhibitors)		X	Major	B		
Thiazolidinediones		X	Major	A	Possible calcium channel blockade	Intermediate
Saxagliptin		X	Major	A	Unknown	Intermediate to delayed
Alogliptin		X	Major	A		
Flecainide		X	Major	A	Negative inotrope, proarrhythmic effects	Immediate to intermediate
Disopyramide		X	Major	B		
Sotalol		X	Major	A	Proarrhythmic properties, beta blockade	Immediate to intermediate
Dronedarone		X	Major	A	Negative inotrope	
Alpha-1 blockers						
Doxazosin		X	Moderate	B	Beta-1-receptor stimulation with increases in renin and aldosterone	Intermediate to delayed
Diltiazem		X	Major	B	Negative inotrope	Immediate to intermediate
Verapamil		X	Major	B		
Nifedipine		X	Moderate	C		

COX indicates cyclo-oxygenase; HF, heart failure; LOE, Level of Evidence; and NSAID, nonsteroidal anti-inflammatory drug.
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GDMT Dosing: Sequencing and Uptitration

- In patients with HFrEF, titration of guideline directed medication dosing to achieve target doses showed to be efficacious in RCTs is recommended, to reduce cardiovascular mortality and HF hospitalizations, unless not well tolerated.
- In patients with HFrEF, titration and optimization of guideline-directed medications as frequently as every 1 to 2 weeks depending on the patient's symptoms, vital signs, and laboratory findings can be useful to optimize management.
- Clinical trials of ACEi, ARB, ARNi, beta blockers, and most other HFrEF medications had therapy initiated at low dose by trial protocol.
- If the initial dose was tolerated, the protocol would then direct the uptitration of medication dose over time to a specified target dose unless not well tolerated.
- Even if symptoms improved or other indicators of response were shown at lower doses, the medication dose would still be increased to the trial-defined target doses.
- Because these target doses were the ones that established the efficacy and safety of these medications in HFrEF and serve as the basis of the guideline recommendations use of these target doses is recommended, if tolerated.
- Use of all 4 drug classes has been estimated to reduce all-cause mortality by 73% compared with no treatment.
- If the target dose cannot be achieved or is not well tolerated, then the highest tolerated dose is recommended.
- There are no direct data showing that use of lower doses of HFrEF medications among patients, where higher target doses could be tolerated, would produce the same or simi-lar degree of clinical benefit. In trials that have evaluated dose response for outcomes, composite event rates were lower with target doses compared with lower dose.

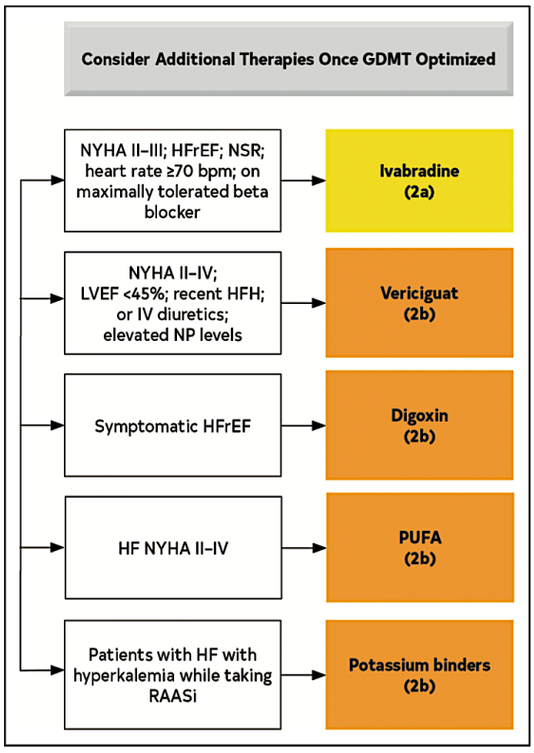
Drugs Commonly Used for HFrEF (Stage C HF)

Drug	Initial Daily Dose(s)	Target Doses(s)	Mean Doses Achieved in Clinical Trials	References
ACEi				
Captopril	6.25 mg 3 times daily	50 mg 3 times daily	122.7 mg total daily	19
Enalapril	2.5 mg twice daily	10–20 mg twice daily	16.6 mg total daily	3
Fosinopril	5–10 mg once daily	40 mg once daily	NA	...
Lisinopril	2.5–5 mg once daily	20–40 mg once daily	32.5–35.0 mg total daily	17
Perindopril	2 mg once daily	8–16 mg once daily	NA	...
Quinapril	5 mg twice daily	20 mg twice daily	NA	...
Ramipril	1.25–2.5 mg once daily	10 mg once daily	NA	...
Trandolapril	1 mg once daily	4 mg once daily	NA	...
ARB				
Candesartan	4–8 mg once daily	32 mg once daily	24 mg total daily	20
Losartan	25–50 mg once daily	50–150 mg once daily	129 mg total daily	18
Valsartan	20–40 mg once daily	160 mg twice daily	254 mg total daily	21
ARNi				
Sacubitril-valsartan	49 mg sacubitril and 51 mg valsartan twice daily (therapy may be initiated at 24 mg sacubitril and 26 mg valsartan twice daily)	97 mg sacubitril and 103 mg valsartan twice daily	182 mg sacubitril and 193 mg valsartan total daily	22
Beta blockers				
Bisoprolol	1.25 mg once daily	10 mg once daily	8.6 mg total daily	1
Carvedilol	3.125 mg twice daily	25–50 mg twice daily	37 mg total daily	23
Carvedilol CR	10 mg once daily	80 mg once daily	NA	...
Metoprolol succinate extended release (metoprolol CR/XL)	12.5–25 mg once daily	200 mg once daily	159 mg total daily	11
Mineralocorticoid receptor antagonists				
Spironolactone	12.5–25 mg once daily	25–50 mg once daily	26 mg total daily	6
Eplerenone	25 mg once daily	50 mg once daily	42.6 mg total daily	13
SGLT2i				
Dapagliflozin	10 mg once daily	10 mg once daily	9.8 mg total daily	8
Empagliflozin	10 mg once daily	10 mg once daily	NR	9
Isosorbide dinitrate and hydralazine				
Fixed dose combination	20 mg isosorbide dinitrate and 37.5 mg hydralazine 3 times daily	40 mg isosorbide dinitrate and 75 mg hydralazine 3 times daily	90 mg isosorbide dinitrate and ~175 mg hydralazine total daily	10
Isosorbide dinitrate and hydralazine	20–30 mg isosorbide dinitrate and 25–50 mg hydralazine 3–4 times daily	120 mg isosorbide dinitrate total daily in divided doses and 300 mg hydralazine total daily in divided doses	NA	24
I$_f$ Channel inhibitor				
Ivabradine	5 mg twice daily	7.5 mg twice daily	12.8 total daily	25–27
Soluble guanylate cyclase stimulator				
Vericiguat	2.5 mg once daily	10 mg once daily	9.2 mg total daily	28
Cardiac glycoside				
Digoxin	0.125–0.25 mg daily (modified according to monogram)	Individualized variable dose to achieve serum digoxin concentration 0.5–<0.9 ng/mL	NA	29,30

Additional Medical Therapies

Management of Stage C HF: Ivabradine

- For patients with symptomatic (NYHA class II to III) stable chronic HFrEF (LVEF ≤35%) who are receiving GDMT, including a beta blocker at maximum tolerated dose, and who are in sinus rhythm with a heart rate of ≥70 bpm at rest, ivabradine can be beneficial to reduce HF hospitalizations and cardiovascular death.
- Heart rate is a strong predictor of cardiovascular outcomes in the general population and in patients with CVD, including HF.
- The SHIFT (Ivabradine and Outcomes in Chronic Heart Failure) trial tested the hypothesis that reducing heart rate in patients with HF improves cardio- vascular outcomes.
- SHIFT demonstrated the efficacy of ivabradine, a sinoatrial node modulator that selectively inhibits the If current, in reducing the composite endpoint of cardiovascular death or HF hospitalization in patients with HF.



Pharmacological Treatment for Stage C HFrEF: Digoxin

- In patients with symptomatic HFrEF despite GDMT (or who are unable to tolerate GDMT), digoxin might be considered to decrease hospitalizations for HF.
- To date, there has been only 1 large-scale, RCT of digoxin in patients with HF.
- This trial, which predated current GDMT, primarily enrolled patients with NYHA class II to III HF and showed that treatment with digoxin for 2 to 5 years had no effect on mortality but modestly reduced the combined risk of death and hospitalization.
- The trial also found no significant effect on health-related QOL in a subset of the trial patients.
- The effect of digoxin on hospitalizations has been supported by retrospective analyses and meta-analyses.
- Additionally, observational studies and retrospective analyses have shown improvement in symptoms and exercise tolerance in mild to moderate HF; however, they have mostly shown either lack of mortality benefit or increased mortality associated with digoxin.
- The benefit in patients on current GDMT is unclear because most trials preceded current GDMT.
- Thus, use of digoxin requires caution in patients with HF and is reserved for those who remain symptomatic despite optimization of GDMT.

Pharmacological Treatment for Stage C HFrEF: Soluble Guanylyl Cyclase Stimulators

- In selected high-risk patients with HFrEF and recent worsening of HF already on GDMT, an oral soluble guanylate cyclase stimulator (vericiguat) may be considered to reduce HF hospitalization and cardiovascular death.
- In patients with progression of HFrEF despite GDMT, there may be a role for novel therapeutic agents.
- Oral soluble guanylyl cyclase stimulator (eg, vericiguat) di- rectly binds and stimulates sGC and increases cGMP production.
- cGMP has several potentially beneficial effects in patients with HF, including vasodilation, improvement in endothelial function, as well as decrease in fibrosis and remodeling of the heart.
- The VICTORIA (Vericiguat Global Study in Subjects with Heart Failure with Reduced Ejection Fraction) trial randomized 5050 higher-risk patients with worsening HFrEF to vericiguat versus placebo.

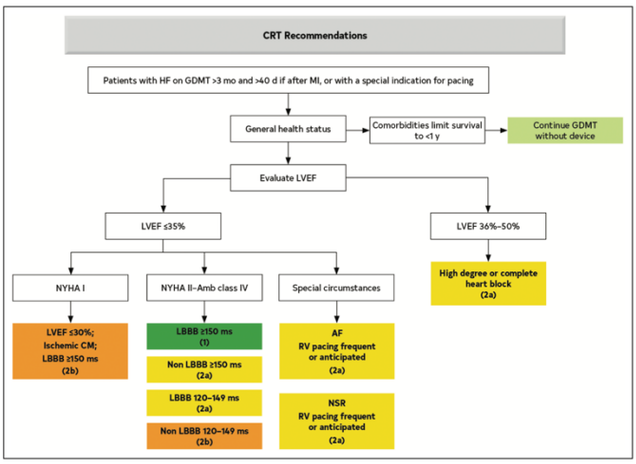
Device and Interventional Therapies for HFrEF

ICDs and CRTs

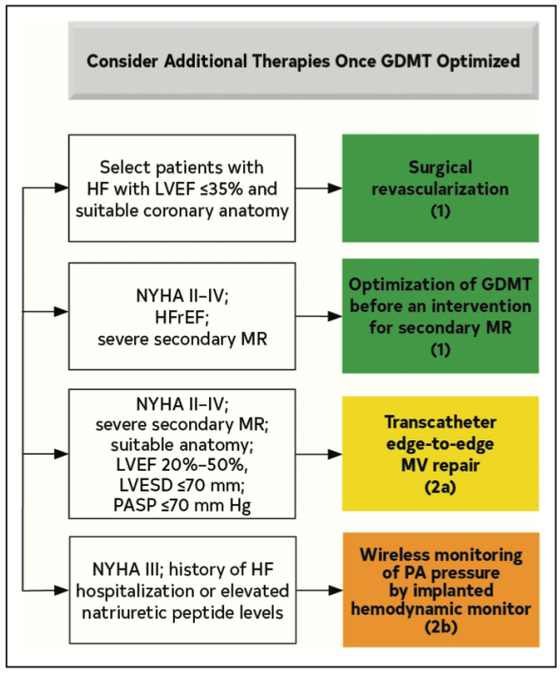
- In patients with nonischemic DCM or ischemic heart disease at least 40 days post-MI with LVEF ≤35% and NYHA class II or III symptoms on chronic GDMT, who have reasonable expectation of meaningful survival for >1 year, ICD therapy is recommended for primary prevention of SCD to reduce total mortality.
- A transvenous ICD provides high economic value in the primary prevention of SCD particularly when the patient's risk of death caused by ventricular arrythmia is deemed high and the risk of nonarrhythmic death (either cardiac or noncardiac) is deemed low based on the patient's burden of comorbidities and functional status.
- In patients at least 40 days post-MI with LVEF ≤30% and NYHA class I symptoms while receiving GDMT, who have reasonable expectation of meaningful survival for >1 year, ICD therapy is recommended for primary prevention of SCD to reduce total mortality.
- For patients who have LVEF ≤35%, sinus rhythm, left bundle branch block (LBBB) with a QRS duration ≥150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT is indicated to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.
- For patients who have LVEF ≤35%, sinus rhythm, LBBB with a QRS duration of ≥150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT implantation provides high economic value.
- For patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with a QRS duration ≥150 ms, and NYHA class II, III, or ambulatory class IV symptoms on GDMT, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.
- In patients with high-degree or complete heart block and LVEF of 36% to 50%, CRT is reasonable to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.
- For patients who have LVEF ≤35%, sinus rhythm, LBBB with a QRS duration of 120 to 149 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.16–
- In patients with AF and LVEF ≤35% on GDMT, CRT can be useful to reduce total mortality, improve symptoms and QOL, and increase LVEF, if: a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) atrioventricular nodal ablation or pharmacological rate control will allow near 100% ventricular pacing with CRT.
- For patients on GDMT who have LVEF ≤35% and are undergoing placement of a new or replacement device implantation with anticipated requirement for significant (>40%) ventricular pacing, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.1
- In patients with genetic arrhythmogenic cardiomyopathy with high-risk features of sudden death, with EF ≤45%, implantation of ICD is reasonable to decrease sudden death.
- For patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with QRS duration of 120 to 149 ms, and NYHA class III or ambulatory class IV on GDMT, CRT may be considered to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.
- For patients who have LVEF ≤30%, ischemic cause of HF, sinus rhythm, LBBB with a QRS duration ≥150 ms, and NYHA class I symptoms on GDMT, CRT may be considered to reduce hospitalizations and improve symptoms and QOL.
- In patients with QRS duration <120 ms, CRT is not recommended.
- In patients with QRS duration <120 ms, CRT is not recommended.36–41For patients with NYHA class I or II symptoms and non-LBBB pattern with QRS duration <150 ms, CRT is not recommended.
- For patients with NYHA class I or II symptoms and non-LBBB pattern with QRS duration <150 ms, CRT is not recommended.
- For patients whose comorbidities or frailty limit survival with good functional capacity to <1 year, ICD and cardiac resynchronization therapy with defibrillation (CRT-D) are not indicated.
- RCTs have informed the decisions regarding cardiac implantable devices (ICDs and CRTs) over the past 20 years.
- In fact, the seminal RCTs for ICDs and CRTs are unlikely to be repeated. Subgroup analyses of these trials have also informed decisions, but these

were not the primary endpoints of these studies and thus should be interpreted with caution.
GDMT is optimized before ICD and CRT implantation to assess whether the LVEF improves.

Algorithm for CRT Indications in Patients With Cardiomyopathy or HFrEF.



Additional Device Therapies.



Other Implantable Electrical Interventions

- Autonomic nervous system modulation is intriguing as a treatment for HFrEF because of the heightened sympathetic response and decreased parasympathetic response in HF.
- Trials of device stimulation of the vagus nerve, spinal cord, and baroreceptors have had mixed responses.
- An implantable device that electrically stimulates the baroreceptors of the carotid artery has been approved by the FDA for the improvement of symptoms in patients with advanced HF who are unsuited for treatment with other HF devices including CRT.
- In a prospective, multicenter, RCT with a total of 408 patients with current or recent NYHA class III HF, LVEF ≤35%, baroreceptor stimulation was associated with improvements in QOL, exercise capacity, and NT-proBNP levels.
- To date, there are no mortality or hospitalization rates results available with this device.
- Although early trials of vagus nerve stimulation were positive, the largest and latest trial did not show a reduction in mortality and HF hospitalizations.
- Multisite LV pacing studies initially were promising.
- However, more recent data have not confirmed benefit, and the larger phase 2 trial was terminated early for low probability of benefit.
- His bundle and left bundle pacing are attractive because they use the intrinsic con- duction system. In observational data, there does appear to be a benefit over RV pacing; however, comparisons to CRT are limited.9,10 Cardiac contractility modulation (CCM), a device-based therapy that involves applying relatively high-voltage, long-duration electric signals to the RV septal wall during the absolute myocardial refractory period, has been associated with augmentation of LV contractile performance.
- CCM is FDA-approved for patients with NYHA class III with LVEF of 25% to 45% who are not candidates for CRT.
- Four RCTs have shown benefits in exercise capacity and QOL but, as of yet, no benefits in death or hospitalizations.
- Most patients in these trials were class III CHF.

Revascularization for CAD

- In selected patients with HF, reduced EF (EF ≤35%), and suitable coronary anatomy, surgical revascularization plus GDMT is beneficial to improve symptoms, cardiovascular hospitalizations, and long-term all-cause mortality.
- CAD is commonly associated with HF, necessitating revascularization in selected patients with angina or HF symptoms. Data from the STICH Trial showed that, compared with optimal medical management alone, CABG surgery plus GDMT did not reduce the primary endpoint of all-cause mortality at a median of 56 months; how- ever, at 10 years' follow-up, CABG+GDMT resulted in significant reductions in all-cause mortality, cardiovascular mortality, and death from any cause or cardiovascular hospitalization in patients with LVEF ≤35% and ischemic cardiomyopathy.
- Furthermore, a retrospective analysis showed significant reductions in first and recur- rent all-cause, cardiovascular, and HF hospitalizations at 10 years in patients receiving CABG+ optimal medical therapy compared with optimal medical therapy alone.
- Similar benefits from percutaneous coronary intervention revascularization, in this cohort, have not yet been shown in an RCT, although the REVIVED-BCIS2 (Study of Efficacy and Safety of Percutaneous Coronary Intervention to Improve Survival in Heart Failure) trial, which com- pares percutaneous coronary intervention with medical therapy in a similar population, is ongoing.
- Recent data continue to show a benefit of CABG over percutaneous coronary intervention in patients with diabetes, CAD, and LV dysfunction and in patients with left main CAD and moderate or severe LV dysfunction.

Valvular Heart Disease

- In patients with HF, VHD should be managed in a multidisciplinary manner in accordance with clinical practice guidelines for VHD to prevent worsening of HF and adverse clinical outcomes.
- In patients with chronic severe secondary MR and HFrEF, optimization of GDMT is recommended before any intervention for secondary MR related to LV dysfunction.
- GDMT applies to all patients with HFrEF, irrespective of the presence of VHD.
- Significant valve disease warrants evaluation by a multidisciplinary team with expertise in VHD, and management should proceed in accordance with the VHD guidelines.

Mitral Regurgitation

- Optimization of GDMT can improve secondary MR associated with LV dysfunction and obviate the need for intervention.
- Therefore, optimizing GDMT and re- assessing MR before MV interventions are important. Patients with persistent severe secondary MR despite GDMT may benefit from either surgical or transcatheter repair, depending on clinical scenario. Thus, patient- centric conversation with a multidisciplinary cardiovascular team that includes a cardiologist with expertise in HF is essential when considering MV intervention.
- Two RCTs of transcatheter mitral valve edge-to-edge repair (TEER) in patients with HFrEF and severe sec- ondary MR have been performed.
- The COAPT trial showed significant reduction in HF and all-cause mortality in patients treated with TEER and GDMT com- pared with GDMT alone, while MITRA-FR (Multicentre Study of Percutaneous Mitral Valve Repair MitraClip Device in Patients With Severe Secondary Mitral Regurgitation) showed no benefit of TEER over GDMT in reducing death or hospitalization.
- Specifically, trans- catheter edge-to-edge MV repair has been shown to be beneficial in patients with persistent symptoms despite GDMT, appropriate anatomy on transesophageal echo- cardiography and with LVEF between 20% and 50%, LVESD ≤70 mm, and pulmonary artery systolic pressure ≤70 mm Hg6
- Optimal management of secondary MR may depend on the degree of MR relative to LV remodeling.
- Disproportionate MR(MRout of proportion to LV remodeling) may respond better to procedural interventions that reduce MR, such as CRT, TEER, and MV surgery.