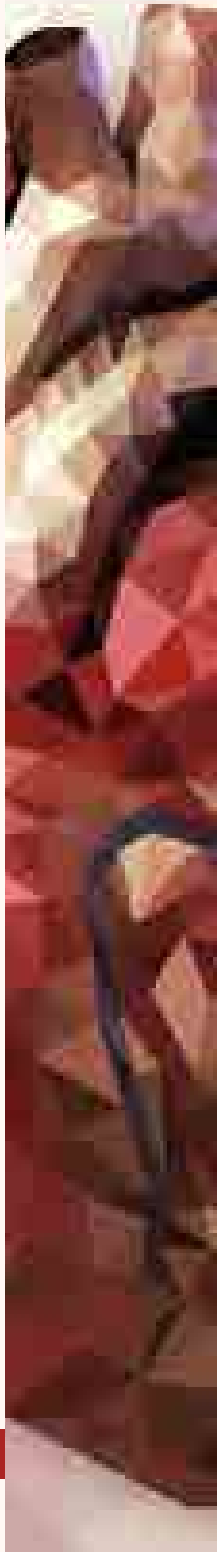

Cardiometabolic Risk Management in Primary Care

Patient-centered translational guide for the Primary Health Care Provider

Sixth edition, 2021

ver 2021.09

Endorsed by: شمس SHMS SAUDI HYPERTENSION MANAGEMENT SOCIETY

معالجة منذرات أمراض القلب والسكر
في الرعاية الصحية الأولية

Cardiometabolic Risk Management in Primary Care

Patient-centered translational guide for the Primary Health Care Provider

Steering Editors
Bader Almustafa, Eman Alsalman and Nada Alfaraj
in collaboration with the editorial team

Sixth edition, 2021
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The electronic copy of these guidelines may be downloaded from Saudi Hypertension Society website. An updated version of the guidelines will be provided on the website.

The pocket guideline as well as the CVR calculator may be ordered from CMRcpg@gmail.com.

بسم الله الرحمن الرحيم

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The individual support and implementation of this work by the health care providers was tremendous and beyond the expectations. It flourished the appetite for continuous work in updating this manuscript and added more value to it.

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Testimonial

from prior edition

" A valuable asset in approaching hypertension and comorbidities in Primary Care. Thanks for all authors and reviewers for their efforts in formulating the guidelines and conducting its training in SHMS "

Saleh Alshurafa
Senior consultant of Pediatric Nephrology
Chair, Board of Directors
Saudi Hypertension Management Society

" The Cardiometabolic Risk guidelines present a formidable document and a large amount of work. Congratulations to the authors on a great effort and I wish well in its implementation "

Lawrie Beilin
Professor of Medicine
University of Western Australia

" It is a very comprehensive, stepwise approach, for the management of CV diseases (prevention and treatment). Congratulations to the team who worked on this project "

Denis Drouin
Clinical Professor of Family Medicine
Faculté de médecine, Université Laval
Quebec, Canada

" I was really impressed by the whole process and by the quality of the document. I congratulate you and your colleagues for this very impressive work. Your document is excellent and reflects a monumental amount of work "

Jean-Pierre Després, Ph.D., FAHA
Scientific Director
International Chair on Cardiometabolic Risk
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" You have done an exhaustive work with great precision and accurate details. Very impressive "

Wajih Rizvi, MD
Consultant Endocrinologist,
Robert wood Johnson-St. Barnabas University Hospital
Assistant Professor Clinical Endocrinology,
University of Medicine & Dentistry New Jersey

" Felicitations for your collaborative work among health care practitioners.
The same message should be carried at all levels of care.
You had the initiative and courage to create a consensus in KSA.
It was a tedious work to lead the production of your CMR, but I suspect great leadership and political skill to bring everyone around the project and support it.
Felicitations for the preparation of the tools at all levels, and having tools for evaluation of your initiative "

Guy Tremblay, MD
Cardiologist and Clinical Professor of Medicine.
Laval University. Québec City, Canada.

" A comprehensive document full with wealth of information and guidance. The Arabic part add strength to guideline content "

Saleh Bawazir, PhD.
Professor of Clinical Pharmacy.
Riyadh, Saudi Arabia.

" Absolutely wonderful guideline "

Tony Heagerty. MD
Professor of Medicine.
Head of Cardiovascular Sciences,
University of Manchester.
Manchester, UK.

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Introduction & Methods

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Cardiometabolic Risk Management Guidelines

Background (Why to have this guideline?)

Cardiometabolic risk factors (CMR) encompasses a cluster of modifiable classic and emerging risk factors and markers that identify individuals at increased risk for cardiovascular disease (CVD) and type-2 diabetes mellitus (DM). It includes factors that make up the definition of metabolic syndrome (MetSyn); in addition to four other factors; smoking, elevated LDL-C, inflammatory markers and insulin resistance.[1,5]

This cluster is very common worldwide, including Saudi Arabia.[2,3,4] Collectively, they form the biggest health problem facing the world today.[4] Their presence is associated with significantly increased CVD morbidity, including coronary heart disease, MI, and stroke. Both total mortality and CV mortality are also significantly more prevalent in subjects with MetSyn compared with subjects without MetSyn. In addition, many non-CV morbidities, such as cancer and arthritis are associated with obesity.[5]

Cardiometabolic Risk[1,5]

- Metabolic Syndrome
- Abdominal obesity
- Elevated BP (≥130/85 mmHg)
- Elevated FBS (≥100 mg; 5.6 mmol/L)
- Elevated S. Tg (>150 mg; 1.7 mmol/L)
- Low HDL (<40; 1 mmol/L)
- Elevated LDL (≥ 130 mg; 3 mmol/L)
- Smoking
- Inflammatory markers
- Insulin resistance

Recently, amidst the COVID-19 pandemic, individuals with CMR are at increased risk of poor outcome.[6]

Nevertheless, Poor access and effectiveness were reported in multiple Saudi Primary Health Care (PHC) facilities.[7,8,9,10]

CMR Guideline adapts international evidence-based guidelines for better adoption in primary care

As part of a quality improvement initiative in Qatif PHC, chronic care services, delivered to hypertensive and diabetic patients, were evaluated using "Chronic Care Model" (CCM). This comprises a thorough assessment of the current situation, including the views of both the service providers and the patients.[10]

As a result, primary care providers claimed that it is so difficult to follow multiple guidelines for the same patient, who usually is having multiple CMR factors, in addition to a hesitancy in following guidelines developed for non primary care providers. They advocated for the development of a common guideline that addresses this issue, and considers the difficulty that nurses facing in following guidelines written in non-native language.[11,12]

It is worth-mentioning that this guideline has been implemented in many practices in different countries. It helped many primary care providers to improve their quality of services and levels of control.[13]

Chronic Care Model (CCM)[13]

CCM is a blueprint for high-quality, patient-centered chronic care. It addresses six elements:

1. Community linkage.
2. Health Care Delivery System.
3. Self-Management Support.
4. Delivery System Design.
5. Decision Support.
6. Clinical Information System.

Prevalence of CMR factors, KSA

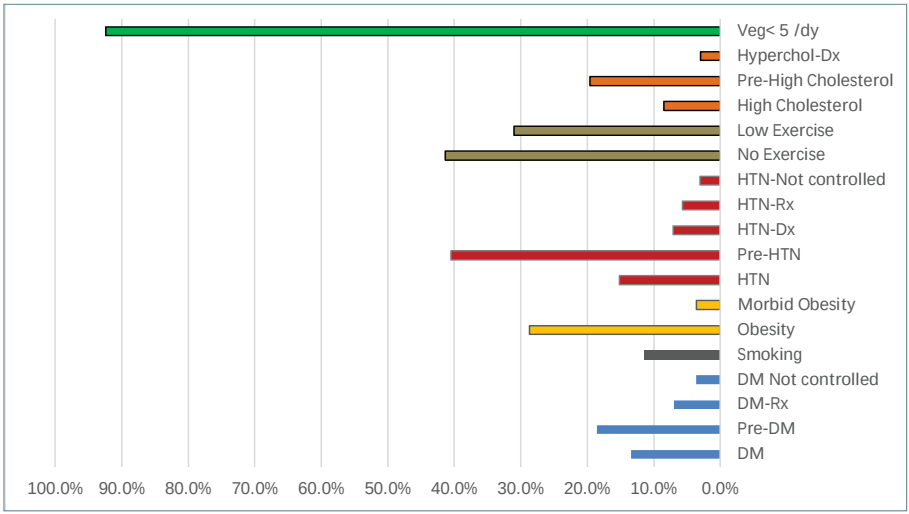

Figure 1. Prevalence of cardiometabolic risk factors in Saudi Arabia, 2015 [14,15,16]

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Scope and Target Population

1. To provide a comprehensive approach to the management of CMR factors in non-pregnant adults.
2. To include nutrition therapy, physical activity recommendations, pharmacological therapy, self-management, as well as prevention and diagnosis of CMR-associated complications.
3. To provide suggestions to the management of the delivery system, the clinical information system and the quality of care, as per the Chronic Care Model.
4. The information contained in this CMR Guideline is intended primarily for PHC providers including physicians, nurses, and other health care professionals.
5. This CMR Guideline is designed to assist clinicians by providing a framework for the evaluation and treatment of CMR patients, and is not intended to replace a clinician's judgment.

Clinical Highlights and Recommendations

1. Focus on cardiovascular risk (CVR) reduction (blood pressure, sugar and lipids control, weight reduction, statin use, aspirin use, and tobacco cessation).
2. Self-management support is necessary for people with CMR to manage their disease.
3. Prevent microvascular complications through annual eye exams, foot risk assessments and foot care counseling, and annual screening for renal function.
4. Screen for renal function by more sensitive tools including albumin creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR).
5. Screen every individual ≥ 35 years of age and obese individuals for CMR factors. Screening of younger individuals may be warranted, if resources allow.
6. Be aware of the common and serious adverse effects of medications used in CMR, including their interactions with food, other comorbidities and other commonly prescribed medications.
7. Involve other community nurses (those involved in vital signs measurement and laboratory results) in chronic care.
8. Use clinical information to identify individuals at higher need of care.
9. Use purposeful encounter forms for documentation and tracking of clinical progress.
10. Use quality indicators and electronic data management for monitoring the performance.
11. Build a nurse-led chronic care.
12. Offer multiple tools for assessing lifestyle and self-management.
13. Screen for depression, anxiety and sleep apnea.
14. Weight reduction is pivotal in managing cardiometabolic risk.

Priority Aims

A multi-factorial intervention targeting hyperglycemia and cardiovascular risk factors is the most effective approach to control the disease and prevent complications. Both individual measures of care as well as comprehensive measures of performance on multi-factorial interventions are recommended. These are unlikely to achieve without having a multi-disciplinary approach, including mainly the chronic care nurse (case manager) and the attending physician.

1. Decrease the percentage of patients with poorly controlled blood sugar, blood pressure (BP) and low density lipoproteins (LDL).
2. Decrease the percentage of high cardiovascular risk.
3. Increase the percentage of patients for whom recommended workup, including glycated hemoglobin (A1c), LDL and ACR are done.
4. Increase the percentage of patients for whom recommended treatment goals are met.
5. Improve self-management skills, including regular follow-up, adoption of healthy lifestyle, weight reduction, and home measurements.

6. Increase the percentage of patients for whom CVR is estimated.
7. Increase the percentage of general patients for whom BP is measured in every visit.
8. Increase the percentage of general patients for whom BMI is calculated once a year at minimum.
9. Increase the percentage of general population at age ≥ 35 years having screened for CMR.
10. Increase the percentage of obese patients (BMI ≥ 30) having screened for CMR.
11. Increase the percentage of diabetic patients with high blood pressure for whom ACEI or ARB is prescribed.
12. Increase the percentage of high CVR patients for whom ASA was prescribed, appropriately.
13. Increase the percentage of high CVR patients for whom statin was prescribed.
14. Decrease the percentage of CV morbidity and mortality.

Methodology

(The process is outlined in page [21])

The guideline development had involved a broad group of primary health care professionals, including physicians, nurse practitioners, specimen-collection nurses, screening nurses, pharmacists, educators and dietitians [iv].

Within the group, a number of people had considerable experience of guideline development, and of health-care administration, as well as of primary health care development and delivery of service.

In general, the evidence analyses used were published evidence-based guidelines, concerned with the screening, management and prevention of hypertension (HTN), DM, dyslipidemia and obesity, from the last five years, where available.

However, members of the group were asked to identify any more recent publications relevant to the section of the guideline allotted to them, and encouraged to review details of papers referred to in the published guidelines. Key evidence-based reviews and meta-analyses were also referenced.

National guidelines were reviewed and matched with particular attention to the quality measures and information management.

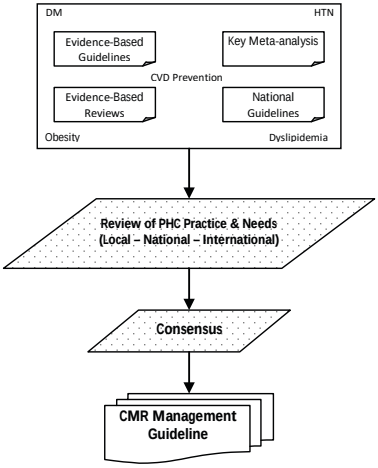


Figure 2. Data Synthesis in CMR Guideline

Each review undergoes peer review before submission to the Steering Committee for review. The Steering Committee develops a consensus statement that considers the clinical evidence, applicability, cost effectiveness and cultural values.

The recommendations of the guideline are concordant with those made by most international guidelines, with some minor adaptations to primary care and the national health care system. The process of adaptation is concordant, as well, to that described by the Canadian Medical Association (Adapte, www.adapte.org).

On the other hand, the guideline was evaluated, repeatedly, using the AGREE instrument (www.agreecollaboration.org), by internal and many external reviewers from many institutions nation-wide and internationally.

All references are shown at the bottom of each section.

Grading Strength of Evidence

Strength of the Evidence was graded for most clinical recommendations, as follows:

- [A] Good: Evidence is based on good randomized controlled trials or meta-analyses, or as stated by the source reference.
- [B] Fair = Evidence is based on other controlled trials or randomized controlled trials with minor flaws, or as stated by the source reference.
- [C] Expert opinion = Evidence is based on the consensus of the carefully selected panel of experts in the topic field. There are no studies that meet the criteria for inclusion in the literature review, or as stated by the source reference.
- [D] Low = Evidence based on non-randomized, case-control, or other observational studies, or as stated by the source reference.

Review Process

The guidelines have been reviewed and endorsed by many eminent experts and medical societies, including the Saudi Hypertension Management Society (SHMS), the Saudi General Directorate of Non-Communicable Diseases, the National Guideline Clearinghouse (NGC) in USA, and the International Chair on Cardiometabolic Risk in Canada. Further reviews were gathered from many experts, worldwide, before the publication of new editions.

It has been presented in multiple international conferences in Riyadh, Dammam, Jeddah, Berlin, Istanbul, Abu-Dhabi, Manama, Vancouver, Singapore, Cancun, Seoul, Athens, Milan, Brussels, Venice, Dubai, Madrid and Beijing.

Update plan

Update of these guidelines is a major task of the developing steering team. A full review is agreed to be carried out every three to five years. However, annual review is done for the online version.

Readers and users of the guidelines are encouraged to submit their comments and suggestions. Major suggestions & contributions will be discussed and seriously considered for inclusion in the next edition. Acknowledgment of this contribution will be stated, as well.

Language of the guideline

English is the main language of the guideline. However, many pages have been written or translated into Arabic, to facilitate their implementation by the users, especially non-English speakers. These include recommendations related to lifestyle management and information management.

On the other hand, translation of the whole guideline to Arabic or any other language is open for the user to take over. Their contribution, in this regard, will be appreciated and their names will be included in future editions.

Implementation Tools

Multiple implementation tools are provided. These include:

1. Encounter Forms: These can be found in Chapter 6 (Non-Pharmacological Management), Chapter 7 (Extra Tools) and Chapter 9 (Information & Quality Management).
2. Registers Dairies: These can be found in Chapter 9 (Information & Quality Management).
3. Quality Indicators: Found in Chapter 9 (Information & Quality Management).
4. Patient Educational and Self Management Resources: Found in Chapter 6 (Non-Pharmacological Management) and Chapter 7 (Extra Tools).

5. Quick Reference Guide is supplemented.
6. Electronic access to many on-line resources and translations are offered. It is easily recognized by QR code and clickable dynamic links.
7. Clinical Algorithms are multiple in this guideline. A list of these are found in “List of Algorithms” on page x.

Training Plan

Training modules have been developed to orient and train health care providers on the required skills to manage cardiometabolic risk. Many of these modules were supplemented by competency exams and certificates, to ensure acquirement of needed skills. They may be requested by contact to the developing team. The modules are:

1. BP measurement Competency Certificate.
2. Cardiovascular Risk Calculation Certificate.
3. Intensive Cardiometabolic Course for doctors.
4. Intensive Cardiometabolic Course for nurses and educators.
5. Hypertension management course.
6. Diabetes management course.
7. Obesity management course.
8. Cardiometabolic management course.
9. Insulin management.
10. Drug therapy course for nurses and educators.
11. Foot assessment workshop.
12. Urgent care course.
13. ECG recording workshop.
14. ECG Basic reading workshop.
15. ECG Clinical Interpretation workshops.
16. Depression recognition & management in chronic care.
17. Information management workshop.
18. Communication skills workshop.
19. Behavioral assessment workshop.
20. Behavioral change workshop.
21. How to prescribe exercise workshop.
22. Weight reduction counseling.
23. Smoking cessation workshop.
24. Diet content review.
25. Presentation and attitude changing skills.
26. Campaign management skills.
27. Preventive measures in CMR patients.
28. Nurse Practitioners: Intensive Introductory Course.
29. Quality management workshop.
30. CVDEMS Training workshops.

Expected barriers in implementation

Few barriers may hamper the dissemination and implementation of this guideline. These include the difficulty in affording:

1. Stable, trained team assigned for chronic care.
2. Effective information management system.
3. Stationary such as guideline printing, educational material and encounter forms.

4. Laboratory tests such as ACR and A1C.
5. Apparatus such as proper cuffs, tuning forks, sensory mono-filaments and home monitoring devices.
6. Medications.
7. Good coordination with ophthalmologists and dentists for routine eye and oral screening.
8. Effective referral to specialists, including cardiology, nephrology, diabetology and psychiatry, once needed.
9. Continuous quality monitoring and improvement steps.

Conflict of Interest

There are no financial or conflict of interest matters to disclose. The guideline was entirely supported financially by the authors and was developed without any involvement of industry.

How to use this guideline?

- If you are looking for a background or details of a specific procedure or subject:
  1. Locate the procedure or the subject in the general algorithm pages [24] and [25] or locate it in the table of contents.[viii]
  2. Follow through, as directed.
  3. Red-colored superscript numbers refer to page numbers in this guideline.
- If you are starting the care for a patient:
  1. Start in the general screening algorithm[24], or the chronic management algorithm[25].
  2. Find the procedure that you want to start from.
  3. Follow through the flow chart.
  4. Refer to the pages (shown in red-colored superscript) for further explanation of each procedure.
- Red-colored page numbers are hyperlinked.
- Extra resources are available on-line. They may be accessed by clicking or scanning QR-codes shown in some pages.

What is new in this edition?

- New updates are listed and continuously updated, online. You may review streamlined update by scanning or clicking the side QR-code.

Outline of CMR Guidelines Development

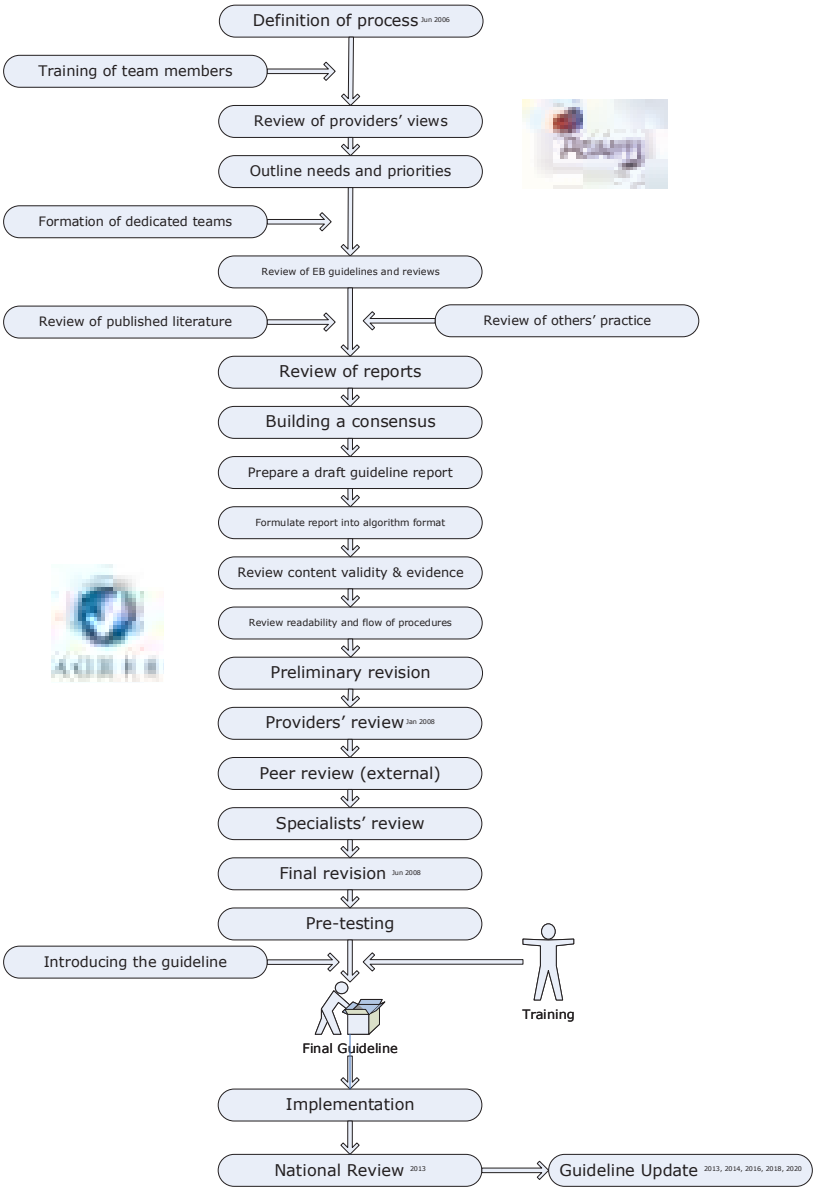
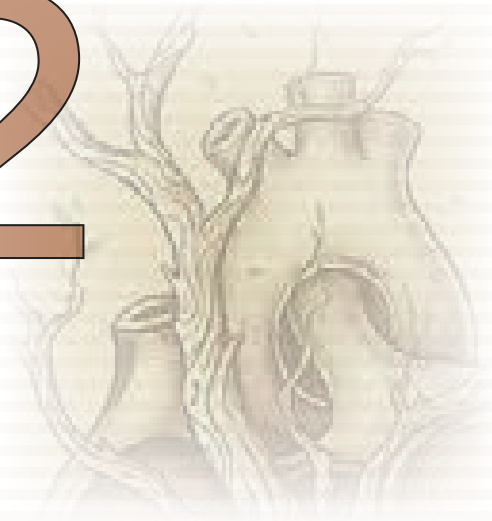


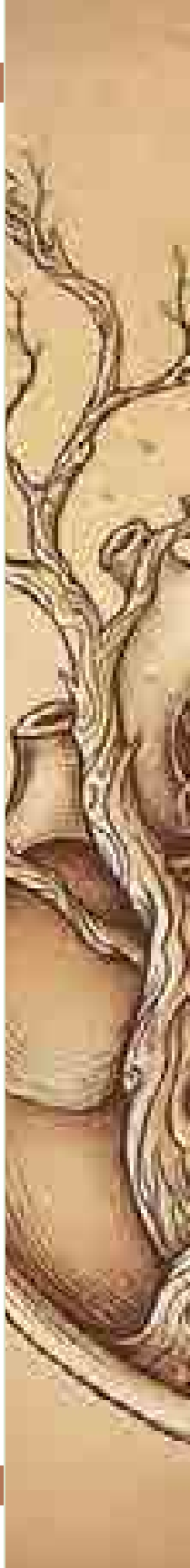
Figure 3. Outline of the development of the CMR Guidelines.

2

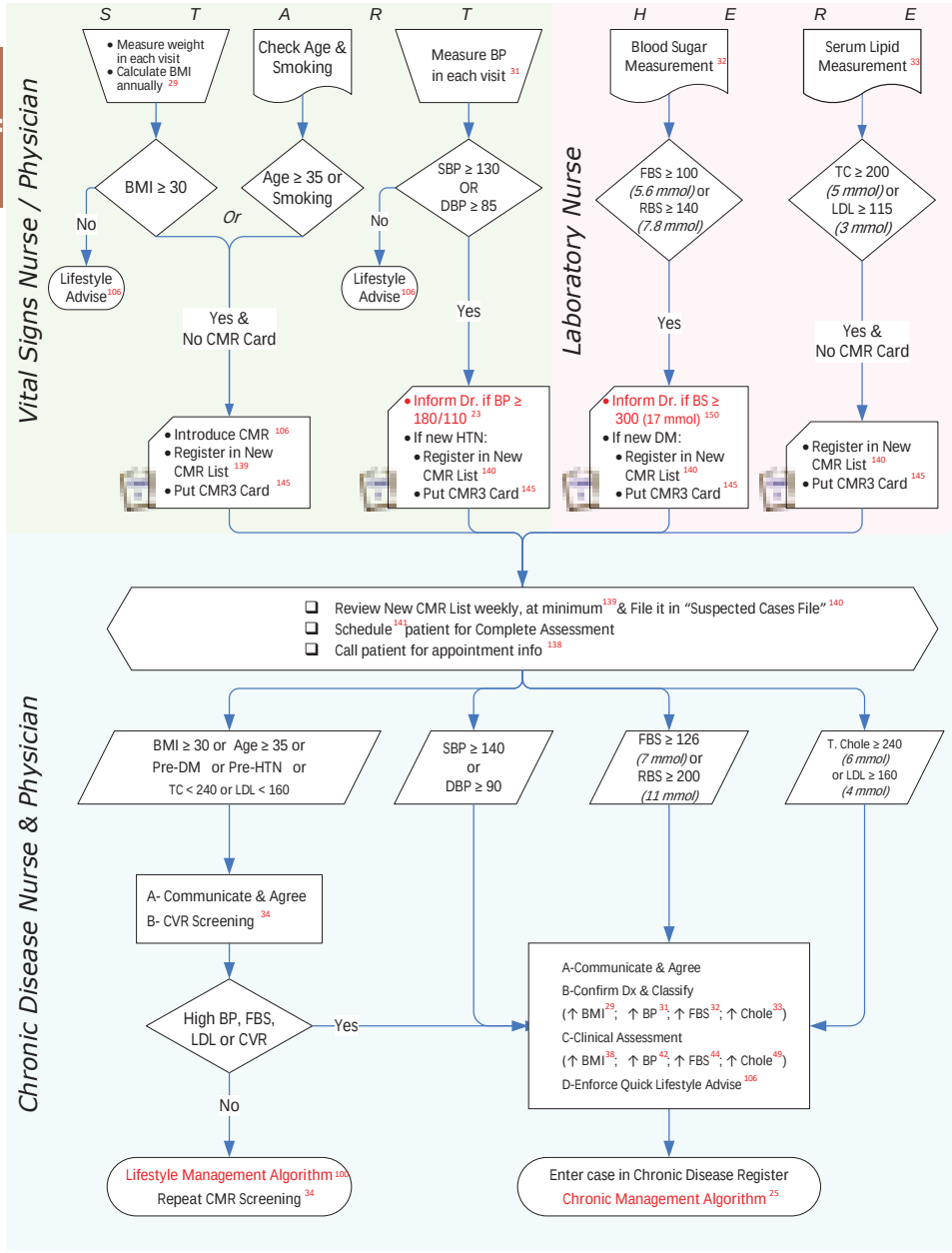


General Algorithms

الخرائط العامة

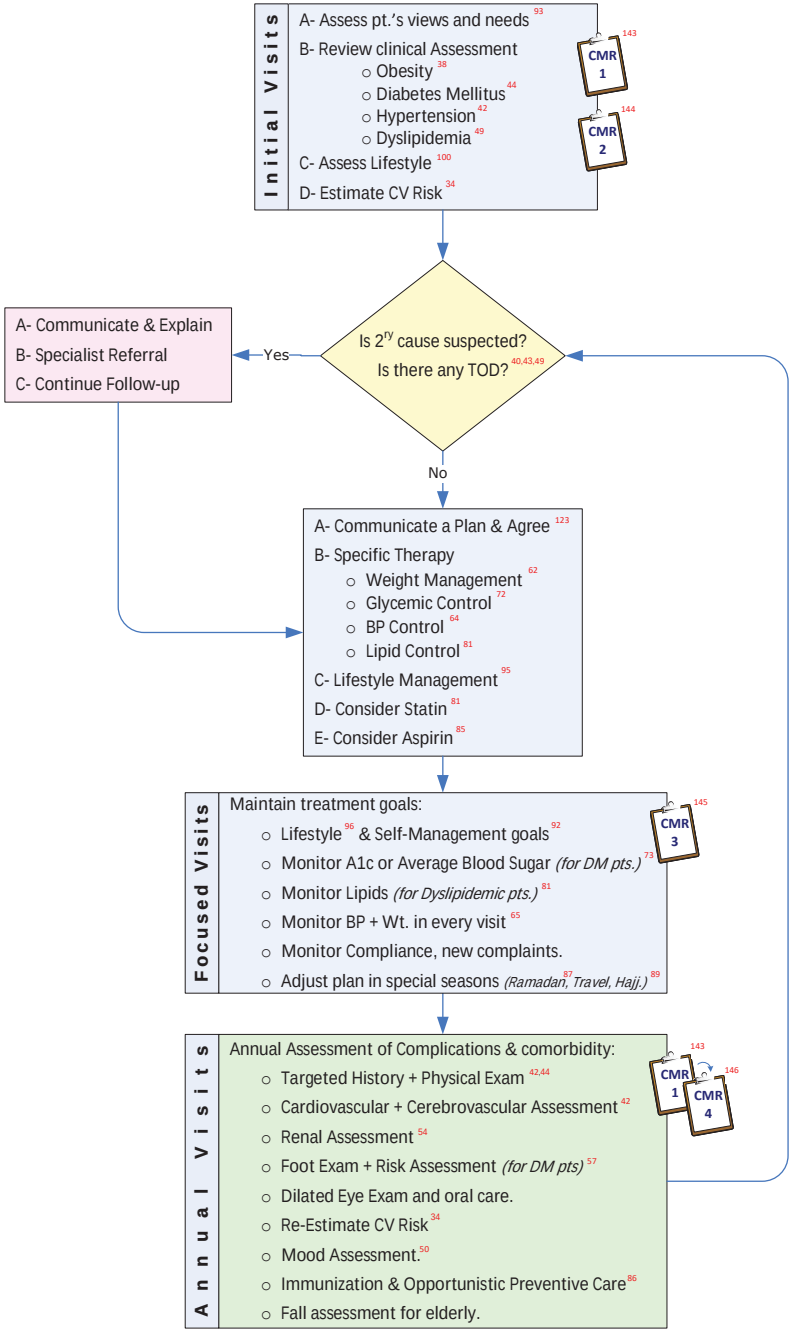


Case Identification Algorithm



- **Superscript numbers ([99]) refer to page numbers in this guideline.**
- **Superscript alphabets ([A]) refer to a note in the same page.**
- **Underscript italic letters between large brackets ($_{[A]}$) refer to level of recommendation.**
- **CVR: CardioVascular Risk.**

Chronic Management Algorithm



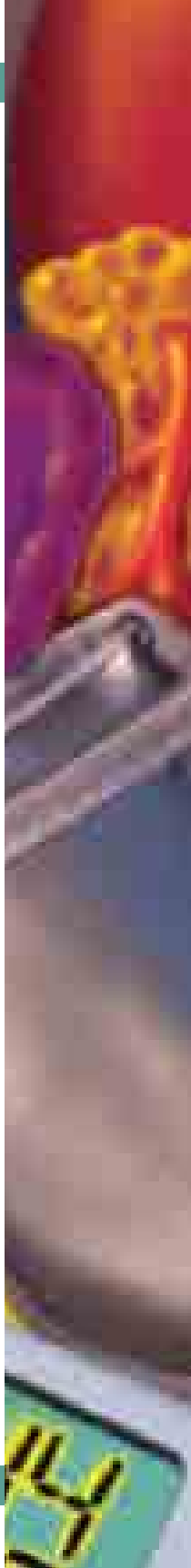
The encounter form that may be used at this step.

CVR, Cardiovascular Risk; RF, Risk Factor; TOD, Target Organ Damage

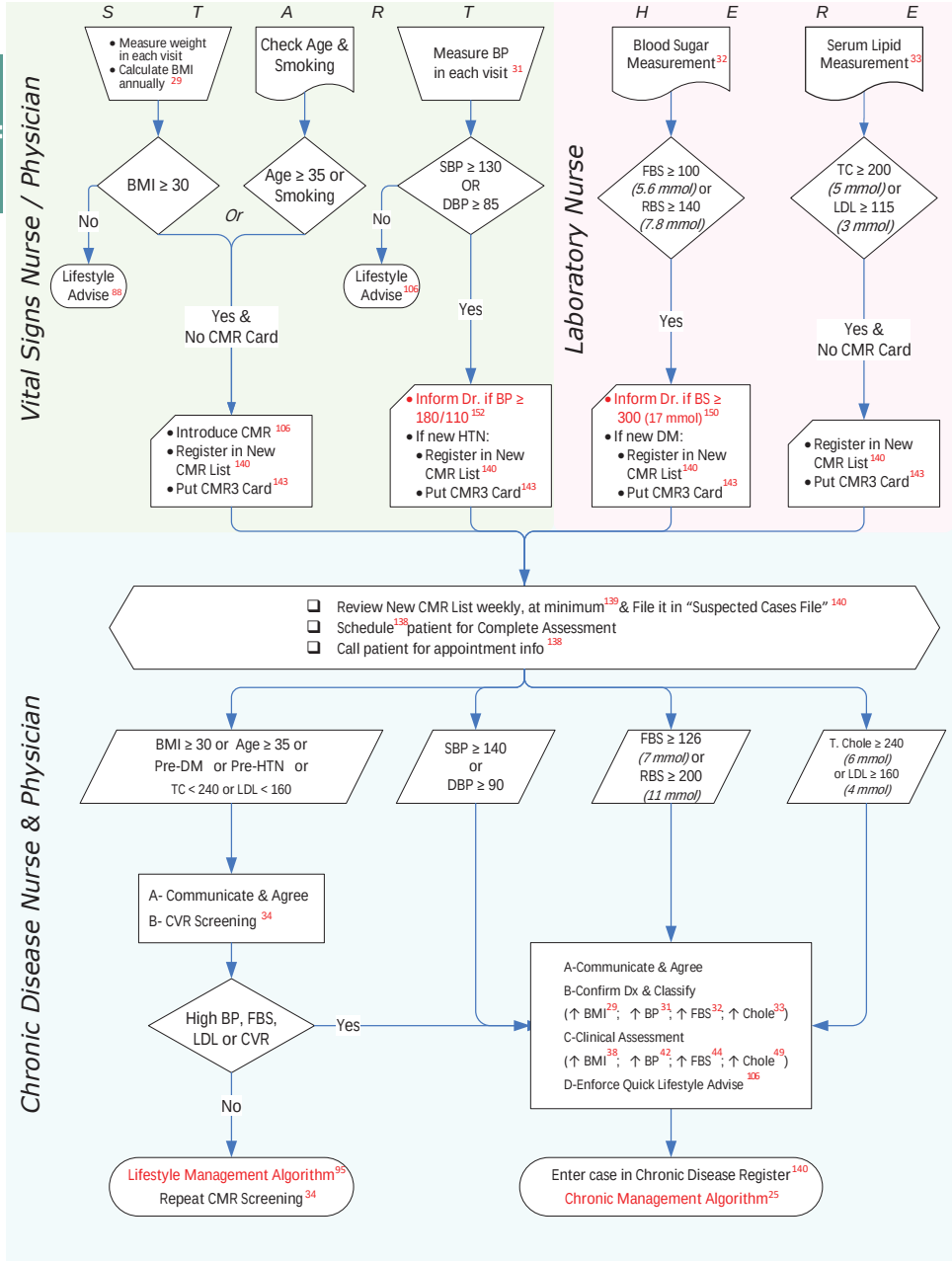
3

Screening

اكتشاف الحالات



Case Identification Algorithm



Superscript numbers ([99]) refer to page numbers in this guideline.
Superscript alphabets ([A]) refer to a note in the same page.
Underscript italic letters between large brackets ($_{[A]}$) refer to levels of recommendation.
CVR: CardioVascular Risk.

Obesity: Screening & Classification

1. Measure weight in each clinic visit. [A]
2. Calculate body mass index (BMI) at least once each year. [C]

   $BMI = weight \div height^2$ OR $BMI = kg \div m \div m$

   Example: Weight = 70 kg and Height = 1.60 m. Then,

   $BMI = 70 \div 1.6^2$ OR $BMI = 70 \div 1.6 \div 1.6 = 27.34$
3. Waist circumference should be measured to estimate disease risk for patients who have normal or overweight BMI scores. [B]

Classification of Overweight and Obesity by BMI, Waist Circumference, and Disease Risk*

Obesity Class	BMI (kg/m^2)	Disease Risk* (Relative to Normal Weight and Waist Circumference)		Action
		Men ≤40 in (≤ 102 cm)# Women ≤ 35 in (≤ 88 cm)#	> 40 in (> 102 cm) > 35 in (> 88 cm)	
Underweight	< 18.5	-	-	Advise for Good Lifestyle [106]
Normal†	18.5–24.9	-	-	Advise for Good Lifestyle [106]
Overweight	25.0–29.9	Increased	High	Advise for Lifestyle Change [96]
Obesity I	30.0–34.9	High	Very High	Evaluate within 2 months [34]
Obesity II	35.0–39.9	Very High	Very High	Evaluate within 2 months [34]
Obesity III	≥ 40	Extremely High	Extremely High	Evaluate within 2 months [34]

* Disease risk for type 2 diabetes, hypertension, and CVD.

† Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

These values have not been validated in Middle Eastern population.

How is waist circumference measured?

4. Locate the top of the hip bone. Place the tape measure evenly around the bare abdomen above the level of this bone (midpoint between the lower margin of the least palpable rib and the top of the iliac crest).
5. Use a stretch-resistant tape, with the tape parallel to the floor.
6. Read the tape measure and record the waist circumference in inches or centimeters.
7. The subject should stand with feet close together, arms at the side and should wear little clothing.
8. The subject should be relaxed, and the measurements should be taken at the end of a normal expiration.
9. Each measurement should be repeated twice; if the measurements are within 1 cm of one another, the average should be calculated. If the difference between the two measurements exceeds 1 cm, the two measurements should be repeated.

BMI CALCULATOR

What is the cut-off level for waist circumference?

Two action levels are recommended:

1. **Action level 1: WC ≥ 94 cm in men and ≥ 80 cm in women represents the threshold at which no further weight should be gained.**
2. **Action level 2: WC ≥ 102 cm in men and ≥88 cm in women represents the threshold at which weight reduction should be advised.**

References:

1. Piepoli MF, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European heart journal. 2016 May 23;37(29):2315-81.
2. Waist circumference and waist–hip ratio: report of a WHO expert consultation, Geneva, 8–11 December 2008.
3. Jensen MD,et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. Circulation. 2014 Jun 24;129(25 SUPPL. 1).
4. Al-Shehri FS, et al. Prevention and management of obesity: Saudi guideline update. Saudi Journal of Obesity. 2016 Jan 1;4(1):25.
5. Schutz, Dominique Durrer, et al. "European practical and patient-centred guidelines for adult obesity management in primary care." Obesity facts 12.1 (2019): 40-66.

Hypertension: Screening, Classification & Diagnosis

1. Blood pressure should be measured, as per standards [111], in each visit to the clinic.
2. If an elevated blood pressure reading has been obtained, the blood pressure level should be re-checked.
3. Confirmation of hypertension (persistent high BP) is based on the initial visit plus two follow-up visits with at least 2 blood pressure readings at each visit, over a period of 1 to several weeks.

Definitions, classification and actions of blood pressure levels (mmHg), based on o□ce measurements.

Category [A]	Systolic	Diastolic	Action
Optimal	< 120	< 80	Advise for Good Lifestyle [106]
Normal	120 – 129	80 – 84	Advise for Good Lifestyle [106]
High normal (Pre-Hypertension)	130 – 139	85 – 89	Advise for Lifestyle Change [96]
Grade 1 hypertension	140 - 159	90 – 99	Evaluate and Confirm [42] within 2 months
Grade 2 hypertension	160 - 179	100 – 109	Evaluate and Confirm [42] within 1 month
Grade 3 hypertension	≥ 180	≥ 110	Evaluate and treat [42] immediately
Isolated systolic hypertension	≥ 140	< 90	B
Hypertensive Urgency: Grade 3 HTN without signs of Acute TOD	≥ 180	≥ 110	Evaluate and treat [152] immediately
Hypertensive Urgency: Grade 3 HTN without signs of Acute TOD	≥ 220	≥ 120	Evaluate, treat and consider admission [152]
Hypertensive Emergency: Grade 3 HTN with suspicious signs of Acute TOD	≥ 180	≥ 110	Evaluate, Call Ambulance, Stabilize, Treat immediately and Refer immediately [152]

A When a patient's systolic and diastolic blood pressures fall into different categories, the higher category should apply.

B Isolated systolic hypertension can also be graded (grades 1, 2, 3) according to systolic blood pressure values in the ranges indicated, provided diastolic values are < 90 mmHg.

4. It is highly recommended obtaining BP measurements outside the clinical setting, if affordable, for diagnostic confirmation before starting treatment. *[A]* This may be extendable to include individuals with BP ≥130/85. It helps in differentiating different types of hypertension:

Type	Office [111]	AOBPM [113]	Home [112]	Ambulatory BP [113]		
				Awake	24-h	Sleep
Sustained	≥ 140/90	≥ 135/85	≥ 135/85	≥ 135/85	≥ 130/80	≥ 120/70
White coat [71]	≥ 140/90	< 135/85	< 135/85	< 135/85	< 130/80	-
Masked	< 140/90	-	≥ 135/85	≥ 135/85	≥ 130/80	-

References:

1. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
2. Williams, Bryan, et al. "2018 ESC/ESH Guidelines for the management of arterial hypertension" European heart journal 39.33 (2018): 3021-3104.
3. Siu, Albert L. "Screening for high blood pressure in adults: US Preventive Services Task Force recommendation statement." Annals of internal medicine 163.10 (2015): 778-786.
4. Rabi, Doreen M., et al. "Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children." Canadian Journal of Cardiology 36.5 (2020): 596-624.
5. Gabb GM, Mangoni AA, Arnolda L. Guideline for the diagnosis and management of hypertension in adults—2016. The Medical Journal of Australia. 2017 Feb 20;206(3):141.
6. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.

Diabetes Mellitus: Screening, Classification & Diagnosis

Criteria for testing for diabetes in asymptomatic adult individuals:

1. Testing for diabetes should be considered in all individuals at age 45 years and above, particularly in those with a BMI ≥ 25 kg/m2 *[B]*, and, if normal, should be repeated at 3-year intervals. *[C]*
2. Testing should be considered at a younger age or be carried out more frequently in individuals who are overweight (BMI ≥ 25 kg/m2) and have additional risk factors: *[B]*

- are habitually physically inactive.
- have a first-degree relative with diabetes.
- have delivered a baby weighing ≥ 4 kg or have been diagnosed with GDM.
- are hypertensive (≥ 140/90 mmHg), or on anti-HTN medications.
- have an HDL cholesterol level < 35 mg/dl (0.9 mmol/L) or a triglyceride level > 250 mg/dl (2.8 mmol/L).
- on previous testing, had IGT, IFG or A1C ≥ 5.7%.
- have other clinical conditions associated with insulin resistance (e.g. polycystic ovary syndrome (PCOS) or acanthosis nigricans).
- have a history of vascular disease (e.g. stroke, CHD, PVD).

Definitions, classification and actions of blood sugar levels (mg/dL)

Category	Fasting Blood Sugar (FBS)	Oral Glucose Tolerance Test (OGTT)	Random Blood Sugar (RBS)	A1c	Action
Normal	< 100 mg/dL (5.6 mmol/l)	< 140 mg/dL (7.8 mmol/l)	A	< 5.7 %	Advise for Good Lifestyle [106]
Pre-diabetes	100 – 125 mg/dL (5.6–6.9 mmol/l) [D]	140 – 199 mg/dL (7.8–11 mmol/l) [E]	A	5.7–6.4 %	Advise for Lifestyle Change [106]
Diabetes Mellitus					
Asymptomatic[B]:	≥ 126 mg/dL [B] (6.9 mmol/l)	≥ 200 mg/dL [B] (11 mmol/l)	≥ 200 mg/dL [B] (11 mmol/l)	≥ 6.5 % [B]	Evaluate [44] and Confirm within 1 week
Symptomatic[C]:	≥ 126 mg/dL (6.9 mmol/l)	≥ 200 mg/dL (11 mmol/l)	≥ 200 mg/dL (11 mmol/l)	≥ 6.5 %	Evaluate [150] immediately
How Performed:	Blood sugar is measured after at least an 8 hour fast (no caloric intake).	75-g glucose drink is ingested after > 8 hour fast; blood sugar is measured at 2 hours.	Blood sugar is measured at any time regardless of eating.	A1c is measured at any time regardless of eating.	

A Not appropriate for ruling out DM.
B Test must be confirmed by repeating on a different day.
C The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.
D Impaired fasting glucose.
E Impaired glucose tolerance.

The American Diabetes Association endorse the use of A1c of 6.5% or higher as the primary criterion for the diagnosis of diabetes. However, the use of A1c for the diagnosis of diabetes has several limitations. These are:

- It is not recommended for diagnosing DM-I or gestational DM.
- It may be misleading in the setting of various hemoglobinopathies, iron deficiency, hemolytic anemias, thalassemias, spherocytosis, and severe hepatic and renal disease. Review page [73] for further details.

References:

1. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
2. International Diabetes Federation. Recommendations For Managing Type 2 Diabetes In Primary Care, 2017.

Dyslipidemia: Screening, Classification & Diagnosis

1. Screening lipids may be done non-fasting. Once found high, however, complete lipoprotein profile (T. Chole, S. Tg, LDL and HDL) must be obtained after 12-hour fast.
2. Keeping tourniquet in place longer than 3 mins may cause 5% variation in lipid values.
3. If lipid measurement is high, one more measurement should be taken, within 1-12 weeks, prior to classifying risk, initiating drug treatment or starting an intensive lifestyle treatment.
4. If the total cholesterol level varies more than 30 - 40 mg/dL (1 mmol) in the two measurements, a third measurement should be taken and the average of the three measurements should be used as the baseline measure.
5. Diagnosis and reason for re-test have to be noted on the lab request.

Primary CVD Prevention: Intervention to dyslipidemia as a function of CVR and baseline[a] LDL

CV Risk	LDL levels					
	<55 mg/dL < 1.4 mmol/L	55 -< 70 mg/dL 1.4 -< 1.8 mmol/L	70 - < 100 mg/dL 1.8-< 2.6 mmol/L	100-< 116 mg/dL 2.6-< 3 mmol/L	116-< 190 mg/dL 3-< 4.9 mmol/L	>=190 mg/dL >= 4.9 mmol/L
Average risk	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Lifestyle intervention+ consider Drug [A]	Lifestyle + Drug intervention [A]
Low-Moderate added risk	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [A]	Lifestyle intervention + consider Drug [A]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]
High added risk	Healthy Lifestyle [A]	Healthy Lifestyle [A]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]
Very high added risk	Healthy Lifestyle [B]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]

Reproduced from 2019 ESC/EAS Guidelines for the Management of Dyslipidaemias.

[a] Refers to LDL-C level in a person not taking any lipid-lowering medication, or to the extrapolated baseline value for those who are on current treatment.

References:

1. MA Williamson, LM Snyder. Wallach's Interpretation of Diagnostic Tests 2015. 10th Edition. Lippincott Williams & Wilkins; 2015.
2. Mach, François, et al. "2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS)." European heart journal 41.1 (2020): 111-188.
3. Bibbins-Domingo K, et al. Statin use for the primary prevention of cardiovascular disease in adults: US Preventive Services Task Force recommendation statement. JAMA. 2016 Nov 15;316(19):1997-2007.
4. Al Sayed N, et al. Consensus clinical recommendations for the management of plasma lipid disorders in the Middle East. International journal of cardiology. 2016 Dec 15;225:268-83.
5. Grundy, Scott M., et al. "2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines." Journal of the American College of Cardiology 73.24 (2019): e285-e350.

Cardiovascular Risk (CVR) Screening

- **Assess CVR for:**
  1. Individuals at age of 45 years and over (preferably, at age of 35 for male). [C]
  2. All obese individuals and smokers. [C]
  3. Individuals with family history of premature (M<55; F<65 years) CVD, premature sudden death or familial hyperlipidaemia, in 1st degree relatives. [C]
  4. Individuals with high BP, DM, dyslipidemia or comorbidities increasing CV risk. [C]
- **Repeat CVR assessment:**
  - Each 5 years for average and low-add risk individuals. [C]
  - Annually for intermediate and high risk individuals, hypertensive, diabetic and dyslipidemic individuals. [C]
- **Use CMR1 (CMR Encounter Form no. 1) to help you in the assessment.** [143]

Aim:

To identify individuals at high risk to develop cardiovascular disease (CVD). These include individuals with DM, Hypertension, Hypercholesterolemia, morbid Obesity and multiple risk factors for CVD.

Rationale:

Early detection and intervention help to reduce morbidity, improve quality of life and lower CV mortality.

How:

1. Take history of:
   - Sedentary lifestyle (Assess level of exercise). [116]
   - DM, HTN, Dyslipidemia and vascular disease.
   - Smoking.
2. Is there a family history of premature CV disease/death (age M<55; F<65 years)
3. Measure:

   a. BMI ± waist circumference [29] b. BP c. FBS [32] and Lipid profile [33]

   - BP represents the average persistent blood pressure level.
   - In masked and white coat hypertension, the use of HBPM or ABPM may be more appropriate, after adjustment. [31]
   -
4. Stratify CVR risk:
   - Management of hypertension, hypercholesterolemia and obesity are related to the quantification of total CV risk; i.e. the chance to develop a major CV event (stroke or MI) in 10 years.
   - An increase in CVR must be considered in patients with CMR and chronic inflammatory diseases, chronic obstructive pulmonary disease (COPD), psychiatric disorders, and psychosocial stress.
   - Hyperuricemia may acts as an independent risk factor for CVD.

References:

1. Saudi Hypertension Management Guidelines, 4th Edition. Saudi Hypertension Management Society, Riyadh 2018.
2. Piepoli MF, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European heart journal. 2016 May 23;37(29):2315-81.
3. MT Cooney, AL Dudina, R D'Agostino, IM Graham. Risk Prediction in Cardiovascular Medicine. Circulation. 2010;122:300-310.
4. Williams, Bryan, et al. "2018 ESC/ESH Guidelines for the management of arterial hypertension" European heart journal 39.33 (2018): 3021-3104.
5. Mach, François, et al. "2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS)." European heart journal 41.1 (2020): 111-188.
6. Unger, Thomas, et al. "2020 International Society of Hypertension global hypertension practice guidelines." Hypertension 75.6 (2020): 1334-1357.

Cardiovascular Risk Stratification

Match Level of blood pressure in the columns with other risk factors in the rows.

Stratification of CVR to estimate prognosis.

Other Risk Factors & Disease History	Blood Pressure (mmHg)				
	Normal: SBP 120–129 or DBP 80–84	**Pre-HTN: SBP 130–139 or DBP 85–89**	**Grade 1: SBP 140–159 or DBP 90–99**	**Grade 2: SBP 160–179 or DBP 100–109**	**Grade 3: SBP > 180 or DBP > 110**
No Other CVR Factors [A]	Average risk	Low added risk	Low added risk	Moderate added risk	**High added risk**
1-2 CVR Factors [A]	Low added risk	Low added risk	Moderate added risk	Moderate-High added risk	**High added risk**
≥3 CVR Factors [A]**, or MetSyn** [D]**,**	Low-Moderate added risk	Low-Moderate added risk	Moderate-High added risk	**High added risk**	**High added risk**
TOD [B] **or DM** [34]	Moderate-High added risk	Moderate-High added risk	**High added risk**	**High added risk**	**High-Very High added risk**
CVRD [C]**, FH** [49]	**High added risk**	**Very High added risk**	**Very High added risk**	**Very High added risk**	**Very High added risk**

CVRD, established CV or renal disease; DBP, diastolic blood pressure; SBP, systolic blood pressure; MetSyn, Metabolic syndrome; TOD, target organ damage; FH, familial Hypercholesterolemia.

Note: Alternatively, other CVR calculators or tables may be used, to estimate the risk.

A. Risk Factors (RF)

- Age (M > 55 years; F > 65 years)
- Systolic and diastolic BP levels
- Pulse pressure (SBP>160 + DBP<70 in elderly)
- Obesity (WC > 102 M, > 88 F) or BMI ≥ 30 [29]
- Smoking
- Family history of premature CV disease (M <55 ; F <65 years)
- Impaired FBS or Impaired GTT [32]
- Dyslipidemia:
  - TC ≥ 190 mg/dl (4.9 mmol/L); or
  - LDL-C ≥ 115 mg/dl (3 mmol/L); or
  - HDL-C: M < 40 mg/dl (1 mmol/L); F < 46 mg/dl (1.2 mmol/L); or
  - TG >150 mg/dl (1.7 mmol/L)

B. Sub-clinical Target Organ Damage (TOD)

- LVH (by ECG or Echo)
- S. creatinine > 1.2 mg/dl
- Low eGFR or CrCl <60 [54]
- Ankle/brachial BP index < 0.9 (if available)
- 24hr-microalbuminuria ≥30, or ACR >30 [54]
- Carotid wall thickening or plaque

C. Established CV or Renal Disease (CVRD)

- CVA: ischaemic stroke; cerebral hemorrhage; TIA
- Heart disease: MI; angina; coronary revascularization; heart failure
- Renal disease: eGFR <30 mL/min/1.73m^2 ; proteinuria (> 300 mg/24 h)
- Peripheral artery disease
- Advanced retinopathy: hemorrhages or exudates, papilloedema

D. Metabolic Syndrome (MetSyn)

The cluster of 3 out of the following risk factors indicates the presence of MetSyn:

- Abdominal obesity [29]
- BP ≥ 130/85 mmHg
- Impaired FBS ≥ 100 mg/dL (5.6 mmol/l) [32]
- High TG > 150 mg/dl (1.7 mmol/L)
- Low HDL-cholesterol < 40 mg/dl (1 mmol/L)

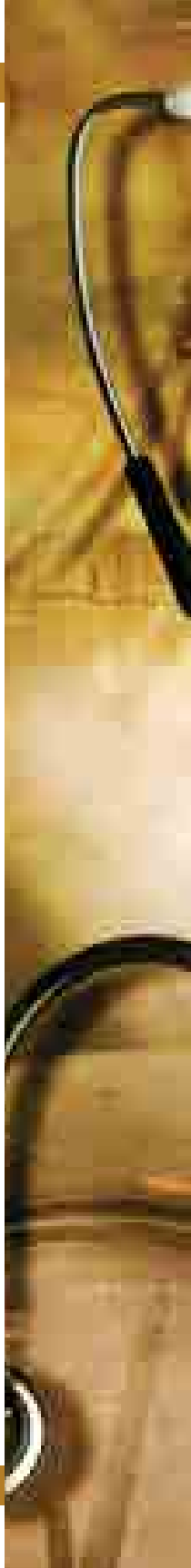
References:

1. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
2. The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). 2018 ESH/ESC Guidelines for the management of arterial hypertension. European Heart Journal 2018;00:1–98.
3. Mach, François, et al. "2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS)." European heart journal 41.1 (2020): 111-188.
4. MT Cooney, AL Dudina, R D'Agostino, IM Graham. Risk Prediction in Cardiovascular Medicine. Circulation. 2010;122:300-310.

4

Assessment

تقييم الحالات



Assessment of Obesity

This assessment has to be done in the initial and the total assessment visits.

Assessment helps in finding answers to:

1. What is the class of the obesity?
2. What other CV risk factors does the patient have? [34]
3. What is the risk to develop CVD? [34]
4. Is there any comorbid condition? e.g. depression [50], eating disorders [38], sleep apnea [110], arthritis, and use of medication. [40]
5. Is it a secondary obesity? [40]
6. How much does the obesity affecting the individual's quality of life? e.g., mobility, self-esteem, socialization.
7. Discuss Lifestyle. [95]
8. Discuss environmental, social and family factors, including family history of obesity and comorbidity.
9. Is the individual aware of the health consequences of obesity, modalities of of treatment and their benefits? [39]
10. Was there any attempt to lose weight? Why not effective?
11. Is the individual ready to start change? [100]
12. Is the individual a candidate for medication therapy or surgical interventions? [62]
13. Is there any indication for specialist referral?

Classify Obesity

Waist Circumference [29] should be measured, at least, in overweight persons to better classify obesity.

Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risk*

Obesity Class	BMI (kg/m^2)	Disease Risk* (Relative to Normal Weight and Waist Circumference)	
		Men ≤40 in (≤ 102 cm)#	> 40 in (> 102 cm)
		Women ≤ 35 in (≤ 88 cm)#	> 35 in (> 88 cm)
Underweight	< 18.5	-	-
Normal†	18.5–24.9	-	-
Overweight	25.0–29.9	Increased	High
Obesity I	30.0–34.9	High	Very High
Obesity II	35.0–39.9	Very High	Very High
Obesity III	≥ 40	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.
† Increased waist circumference can also be a marker for increased risk even in persons of normal weight.
# These values have not been validated in Middle Eastern population.

Binge-eating Disorder Questionnaire

Referral for specialist psychological assessment should be considered where binge-eating disorder is suspected and the patient answers "Yes" to all of the following four questions: *[C]*

1. Are there times during the day when you could not have stopped eating, even if you wanted to?
2. Do you ever find yourself eating unusually large amounts of food in a short period of time?
3. Do you ever feel extremely guilty or depressed afterwards?
4. Do you ever feel more determined to diet or to eat healthier after the eating episode?

Comorbidities associated with overweight and obesity

Cardiovascular • Hypertension (17%) • Heart failure • Coronary artery diseases (17%) • Varicose veins • Pulmonary embolism	**Musculoskeletal** • Osteoarthritis (knee and hip) (24%) • Immobility • Low back pain • Hyperuricemia and gout
Endocrine • Metabolic syndrome • DM-2 (61%) • Dyslipidemia • Polycystic ovarian syndrome • Reduced fertility and menstrual disorders • Breast (11%) and uterine cancer (34%) • Pregnancy complications	**Respiratory** • Dyspnea • Obstructive sleep apnea [110] • Hyperventilation syndrome • Pickwickian syndrome • Asthma
Gastrointestinal • Gastro-esophageal reflux diseases • Fatty liver disease • Cholelithiasis (30%) • Hernias • Pancreatitis • Colonic cancer	**Cutaneous** • Stretch marks • Status pigmentation of the legs • Lymphedema • Cellulitis • Intertrigo and carbuncles • Acanthosis nigricans • Skin tags
Genitourinary • Urinary stress incontinence • Obesity related glomerulopathy	**Psychological** • Depression/ low self esteem • Body image disturbances • Social stigmatization
Neurologic • Stroke • Idiopathic intracranial hypertension • Meralgia parasthetica • Dementia	**Surgical** • Increased surgical risk • Increased post operative complications

Health benefits of weight loss in adult

- Improved lipid profile.
- Reduced osteoarthritis-related disability.
- Reduced BP.
- Improved glycemic control.
- Reduction in risk of DM-2.
- Reduced all-cause, cancer and diabetes related mortality.
- Improved lung function in patients with asthma.

References:

1. Piepoli MF, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European heart journal. 2016 May 23;37(29):2315-81.
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3. S Wharton et al. Obesity in adults: a clinical practice guideline. CMAJ 2020 August 4;192:E875-91.

Secondary causes of obesity

1. Hypothyroidism
2. Cushing's syndrome
3. Insulinoma
4. Hypothalamic obesity
5. Polycystic ovarian syndrome
6. Genetic syndromes (e.g., Prader-Willi syndrome, Alström syndrome, Bardet-Biedl syndrome, Cohen syndrome, Börjeson-Forssman-Lehmann syndrome, Fröhlich syndrome)
7. Growth hormone deficiency
8. Oral contraceptive use
9. Medication-related (eg, phenothiazines, sodium valproate, carbamazepine, tricyclic antidepressants, lithium, glucocorticoids, megestrol acetate, thiazolidinediones, sulphonylureas, insulin, adrenergic antagonists, serotonin antagonists [especially cyproheptadine])
10. Eating disorders (especially binge-eating disorder, bulimia nervosa, night-eating disorder)
11. Hypogonadism
12. Pseudohypoparathyroidism

Table 1. Diagnostic evaluation of obese patient

All obese patients	• BP measurement & heart rate. • FBS and lipid profile. • TSH • Liver and renal function tests
Suspected **Obstructive Sleep Apnea** [110] (daytime sleepiness, loud snoring, gasping or choking episodes during sleep and awakening headaches)	• Measurement of neck circumference (>17 inches in men, >16 inches in women) • Polysomnography for oxygen desaturation, apnea and hypopneic events. • ENT examination for upper airway obstruction
Suspected **Alveolar Hyperventilation (Pickwickian) syndrome** (Hypersomnolence, right sided heart failure including elevated JVP, hepatomegaly and lower limb edema)	• Polysomnography (to rule out obstructive sleep apnea) • CBC to rule out polycythemia. • Blood gases (Pco2 often elevated) • Chest X-ray (enlarged heart and elevated hemi-diaphragm) • ECG: right atrial and right ventricular enlargement • Pulmonary Function Test: reduced vital capacity and respiratory reserve volume.
Suspected **Hypothyroidism**	• TSH
Suspected **Cushing's syndrome** (moon face, thin skin that bruise easily, severe fatigue, striae)	• Dexamethasone suppression test. • 24-h urinary free cortisol.
Suspected **Polycystic Ovarian Syndrome** (oligomenorrhea, hirsutism, enlarged ovaries may be palpable, hypercholesterolemia, impaired glucose tolerance, persistent acne and androgenic alopecia)	• Morning blood draw for total testosterone, free and weakly testosterone, dehydroepiandrosterone (DHEAS), prolactine, TSH and early morning 17-hydroxyprogesteron.

Table 2. Medications that interfere with weight loss or induce weight gain.

Medication Class	Alternatives
Antipsychotics/ Mood Stabilizers • Phenothiazines • Atypical antipsychotics: Clozapine > olanzapine > risperidone = quetiapine • Lithium	Ziprasidone, Aripiprazole.
Antidepressants: • Sedating tricyclics: Amitriptyline > imipramine • Monoamine oxidase inhibitors (non-selective): Isocarboxazid, Phenelzine, tranylcypromine • Selective serotonin reuptake inhibitors: Paroxetine > citalopram, fluvoxamine, sertraline • Mirtazapine	Nefazodone, Bupropion, Venlafaxine
Antiepileptics: • Gabapentin, Valproate, Carbamazepine, Pregabalin	Lamotrigine, Topiramate
Antiepileptics/antipsychotics used in bipolar disorder • Valproate, Carbamzepine, Clozapine, Olanzapine, Risperidone	Lamotrigine, Topiramate, Ziprasidone
Steroid hormones: • Hormonal contraceptives • Corticosteroids	Yasmin Barrier methods NSAIDs
Progestational steroids: • Megestrol acetate	Weight loss, Aromatase inhibitors
Antidiabetic agents: • Insulin • Sulfonylureas • Thiazolidinediones	Metformin, Acarbose, DPP4 inhibitors, SGLT2 inhibitors
Antihypertensives: • Beta and alpha-1 adrenergic blocking agents	ACEI, ARB, diuretics, CCB
• Antihistamines: • Cyproheptadine	Diphenhydramine, Decongestants, inhaler

References:

1. Piepoli MF, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European heart journal. 2016 May 23;37(29):2315-81.
2. Schutz, Dominique Durrer, et al. "European practical and patient-centred guidelines for adult obesity management in primary care." Obesity facts 12.1 (2019): 40-66.
3. S Wharton et al. Obesity in adults: a clinical practice guideline. CMAJ 2020 August 4;192:E875-91.
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5. Garvey WT, et al. American Association of Clinical Endocrinologists and American College of Endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. Endocrine Practice. 2016 Jul;22(s3):1-203.

Assessment of Hypertension

This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.

Use CMR Encounter Form no. 2 (CMR-2) to help you in the assessment.[144]

Assessment helps in finding answers for:

1. What is the level of the BP? [31]
2. Is it a secondary HTN? [42]
3. What other CV risk factors does the patient have? [34]
4. Is there any complication (TOD)? [34]
5. What is the current management, if any?
6. How is the quality of life?
7. What is the risk to develop CVD? [34]

Medical history

- Duration and previous levels of high BP.
- Previous admissions and visits to the ER.
- History of target organ damage (sub-clinical TOD/CVRD).[34]
- Symptoms of TOD:
  - **CNS and eyes: headache, vertigo, impaired vision, transient ischemic attacks, sensory or motor deficit;**
  - **Heart: palpitation, chest pain, shortness of breath, swollen ankles;**
  - **Kidney: thirst, polyuria, nocturia, hematuria;**
  - **Peripheral arteries: cold extremities, intermittent claudication.**
- Risk factors for CVD.[34]
- Lifestyle (including amount of physical exercise, dietary habits, smoking, alcohol intake and psychosocial factors that might influence the management of hypertension).[95]
- Previous antihypertensive therapy: drugs used; efficacy and adverse effects; herbs & other traditional therapy.
- Use of other medications and drugs that might raise the BP.[44]
- Features of secondary hypertension.[44]
- History of snoring and sleep apnea.[110]
- Family history of HTN, Premature CVD, Premature sudden death (M<55;F<65 years), and chronic kidney or endocrine diseases.

Physical examination

- Measure BP correctly (2 or more BP measurements separated by 2 minutes with the patient seated).[111]
- Measure BP after standing for at least 2 minutes, in elderly and diabetic patients.
- Verify BP in the contralateral arm; if values are different, the higher value should be used. This arm will be your reference arm in subsequent visits.*[C]*
- Measure BMI and waist circumference. [29]
- Look for signs of target organ damage:
  - **Brain: murmurs over neck arteries, motor or sensory defects, gait and cognition.**
  - **Retina: Refer to ophthalmology for fundoscopic abnormalities.**
  - **Heart: location and characteristics of apical impulse, abnormal cardiac rhythms, Ventricular gallop, pulmonary rales or bronchospasm, dependent edema.**
  - **Peripheral arteries: diminished or absent peripheral arterial pulsations, carotid bruits, radio-femoral pulse delay and edema; cold extremities and ischemic skin lesions.**
- Look for features of secondary hypertension.[44]
- In suspected white-coat HTN (WCH) [71], use home BP measurement (HBPM) [112] or refer the patient for ambulatory (24-hr) BP measurement (ABPM) [113]. Please note

that cut-off values for high BP are, in these measurements, different from clinic-based values.[31]

Laboratory work up

- Fasting blood sugar.[D]
- Lipid profile (total cholesterol, LDL, HDL and s. triglyceride).[D]
- Serum creatinine and GFR estimation. [54]
- Serum potassium and sodium.[D]
- Urinalysis.[D]
- Serum uric acid.
- Hemoglobin and hematocrit.
- Electrocardiogram.[C]
- Microalbuminuria.

When to suspect of secondary hypertension?

- Onset of hypertension at <30 years.
- Onset of diastolic hypertension in older adults (age ≥65 y).
- Abrupt onset of hypertension.
- Exacerbation of previously controlled hypertension.
- Severe (grade 3) hypertension or a hypertension emergency.
- Resistant hypertension.[71]
- Drug-induced hypertension.[44]
- Disproportionate TOD for degree of hypertension.
- Unprovoked or excessive hypokalemia
- Clinical or biochemical features suggestive of 2ry cause.[44]

Medications and Other Substances That May Cause Elevated BP

- Contraceptive pills, NSAID's, steroids,
- Sympathomimetics, nasal decongestants (phenylephrine, pseudoephedrine)
- Appetite suppressants, licorice.
- Cyclosporine, erythropoietin.
- Antidepressants (MAOIs, SNRIs, TCAs).
- Antipsychotics (clozapine, olanzapine).
- Tacrolimus, cocaine, amphetamines.
- Dietary supplements and medicines (ephedra, ma huang, bitter orange, St. John's wort).

References:

1. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
2. Williams, Bryan, et al. "2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the management of arterial hypertension of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH)." European heart journal 39.33 (2018): 3021-3104.
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5. Rabi, Doreen M., et al. "Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children." Canadian Journal of Cardiology 36.5 (2020): 596-624.

Secondary Hypertension: Causes and Clinical Features.

Causes	Clinical Features	Screening
Obstructive sleep apnoea	• Snoring; obesity; • Morning headache; daytime somnolence	• STOP-BANG Score [110] , or • Epworth score, or • Berlin Score. • Overnight oximetry
Renal parenchymal disease	• Family hx of polycystic kidney disease; analgesic abuse. • Episodes of blood or proteins in the urine, urinary infections. • ↑ S. creatinine, urinary sediment or casts. • Abnormal renal USS.	• RFT • Urinalysis. • Renal USS.
Renovascular HTN	• Initial onset age <30 or >50 years. • BP over 180/110. • Sudden worsening of previously controlled BP. • Hemorrhages and exudates in the fundi. • Abdominal/ carotid/ femoral bruit. • Women of child bearing age. • Unexplained episodes of pulmonary edema. • Acute decline in renal function (↑ S. Cr.) with ACEI or ARB. • Unexplained decline in renal function.	• Renal Duplex Doppler ultrasound. • MRA. • Abdominal CT.
Primary Aldosteronism	• Family history of early-onset HTN or stroke. • Weakness, cramps, polyuria. • K^+ < 3.5 or diuretic-induced ↓K^+ (< 3.0). • Resistant hypertension. • Obstructive sleep apnea.[110] • Incidental adrenal mass. • Arrhythmias.	• Plasma ARR under standardized conditions.
Pheo-chromocytoma or Paraganglioma	• Episodic symptoms: headache, flushing, sweating, pallor and palpitations. • Extremely labile BP. • Skin stigmata of neurofibromatosis. • BP surges precipitated by ß-blockers, metoclopramide, sympathomimetics, opioids, and tricyclic antidepressants). • Family history.	• Plasma or 24-h urinary fractionated metanephrines. • CT Abdomen/ pelvis.
Cushing's syndrome	• Moon face, central obesity, skin atrophy, striae and bruising. • Dorsal and supraclavicular fat pad • Proximal muscle weakness	• Dexamethasone suppression test. • 24-h urinary free cortisol.
Acromegaly (rare)	• Tall stature, typical facies with prominent lower jaw, broad hands, frontal bossing.	• Serum GH≥1 ng/mL during oral glucose load
Coarctation of the aorta	• Delayed or weak femoral pulses. • High BP in upper limbs but not in lower limbs.	• Echocardiogram.
Thyroid disease	• Symptoms and signs of hyper- or hypothyroid. • Thyromegaly or thyroid nodule	• TFT

Assessment of Hypertension
Medical History
Duration & level of high BP
Admissions & ER visits
Target organ damage (TOD/ACC)
Neurological
Headache
Vertigo
TIA
Sensory/motor deficit
Heart
Palpitation
Chest pain
SOB
Swollen ankles
Kidney
Thirst
Polyuria
Nocturia
Hematuria
Peripheral arteries
Cold extremities
Intermittent claudication
TOD Symptoms
CVD risk factors
Lifestyle
Stress
Previous antihypertensive therapy
Medications & herbs raising BP
Features of 2ry hypertension
Snoring & sleep apnea
Family Hx
Hypertension
Premature CVD
Preamature sudden death
Chronic kidney or endocrine disease
Physical Examination
Correct BP measurement
Sitting
Standing
≥ 2 BP measurement with 2 minutes interval
Out of office BP
Verification in contralateral arm
BMI & waist circumference
Brain
Murmur over neck arteries
Sensory/motor deficit
Retina
Ophthalmology referral for fundoscopic exam
Heart
Apical impulse
Abnormal cardiac rhythms
Ventricular gallop
Pulmonary rales or bronchospasms
Peripheral arteries
Dependent edema
Diminished pulsation
Carotid bruit
Radio-femoral delay
Cold extremity
Ischemic skin changes
Features of 2ry hypertension
Laboratory Work Up
Fasting blood sugar
Lipid profile
Serum uric acid & calcium
Serum creatinine & eGFR
Serum potassium & sodium
Hemoglobin & hematocrit
Urinalysis
ECG
C-reactive protein
Albumin/creatinine ratio or 24-hr-urine for albumin

Assessment of Diabetes Mellitus

This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.

Use CMR Encounter Form no. 2 (CMR-2) to help you in the assessment.[144]

Assessment helps in finding answers for:

1. What is the type of DM?
2. Is it secondary?
3. What are the other CVD risk factors patient has?
4. What are the complications he has?
5. What is the current management, if any?
6. Is his DM controlled?
7. How is his quality of life?
8. What is the risk to develop CVD? [34]

Medical History

1. Symptoms and results of laboratory tests.
2. Current treatment of diabetes, including medications, meal plan, and results of glucose monitoring.
3. Frequency, severity, and cause of acute complications such as ketoacidosis and hypoglycemia (incl. ER visits and admissions).
4. Prior or current infections, particularly skin, foot, dental, and genitourinary infections.
5. Specific system history:
    6. Symptoms and treatment of chronic eye, kidney or nerve disease.
    7. Genitourinary and gastrointestinal function.
    8. Heart, peripheral vascular, foot, and cerebrovascular complications associated with DM.
9. Use of medications and herbs that may affect blood glucose levels.
10. Risk factors for CVD, including smoking, hypertension, obesity, dyslipidemia, and family history.
11. History and treatment of other conditions, including endocrine and eating disorders.
12. Assessment for mood disorder.[50]
13. Family history of diabetes and other endocrine disorders.
14. Cultural, psychosocial, educational, and economic factors that might influence the management of diabetes.?
15. Nutritional habits [97], weight history and physical activity [116].
16. Tobacco, alcohol, and/or controlled substance use. [99]
17. Contraception and reproductive and sexual history.
18. Immunization against influenza and pneumococcus.

Physical examination

1. BMI and waist circumference. [29]
2. Blood pressure determination, including orthostatic measurements (sitting and standing).
3. Inspect eyes for xanthelasmata, cataract or ophthalmoplegia.
4. Fundoscopic examination, by an ophthalmologist.
5. Oral examination (for signs of redness, bleeding, halitosis, accumulation of debris around the teeth, gingival recession with exposed root surfaces, separation of teeth, and tooth mobility.)

6. Thyroid palpation.
7. Cardiac examination.
8. Abdominal examination (e.g. for organomegaly).
9. Evaluation of pulses by palpation of dorsalis pedis and post. tibial; and auscultation of carotids.
10. Hand and finger examination.
11. Foot examination.[57]
12. Skin examination (for acanthosis nigricans, insulin-injection sites, infections, and lipodystrophy, xanthelasma and skin breakdown).
13. Neurological examination.
14. Signs of diseases that can cause secondary diabetes (e.g. hemochromatosis, pancreatic disease).

Laboratory evaluation

1. Average FBS (≥ 3 readings in the last one week.)
2. Glycated hemoglobin (A1C)
3. Fasting lipid profile (total cholesterol, HDL, triglycerides, and LDL), LFT (with further evaluation for fatty liver or hepatitis, if abnormal).
4. Serum creatinine and calculated GFR (eGFR) or Cr. clearance; ± ACR (albumin-creatinine ratio).[54]
5. Thyroid-stimulating hormone (TSH), if clinically indicated.
6. Electrocardiogram in adults.
7. Urinalysis for ketone, protein, and sediment.

Etiologic classification of diabetes mellitus

1. Type 1 diabetes (β-cell destruction, usually leading to absolute insulin deficiency).
2. Type 2 diabetes (with variable degree of insulin resistance and secretory defect).
3. Other specific types:
    a. Genetic defects of β-cell function (neonatal DM, MODY).
    b. Genetic defects in insulin action.
    c. Diseases of the exocrine pancreas, such as pancreatitis, cancer and cystic fibrosis.
    d. Endocrinopathies.
    e. Drug- or chemical-induced (steroids, OCP, in HIV & organ transplant).
    f. Infections.
    g. Uncommon forms of immune-mediated diabetes.
    h. Other genetic syndromes sometimes associated with diabetes.
    i. Gestational diabetes mellitus (GDM)

Reference:

1. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
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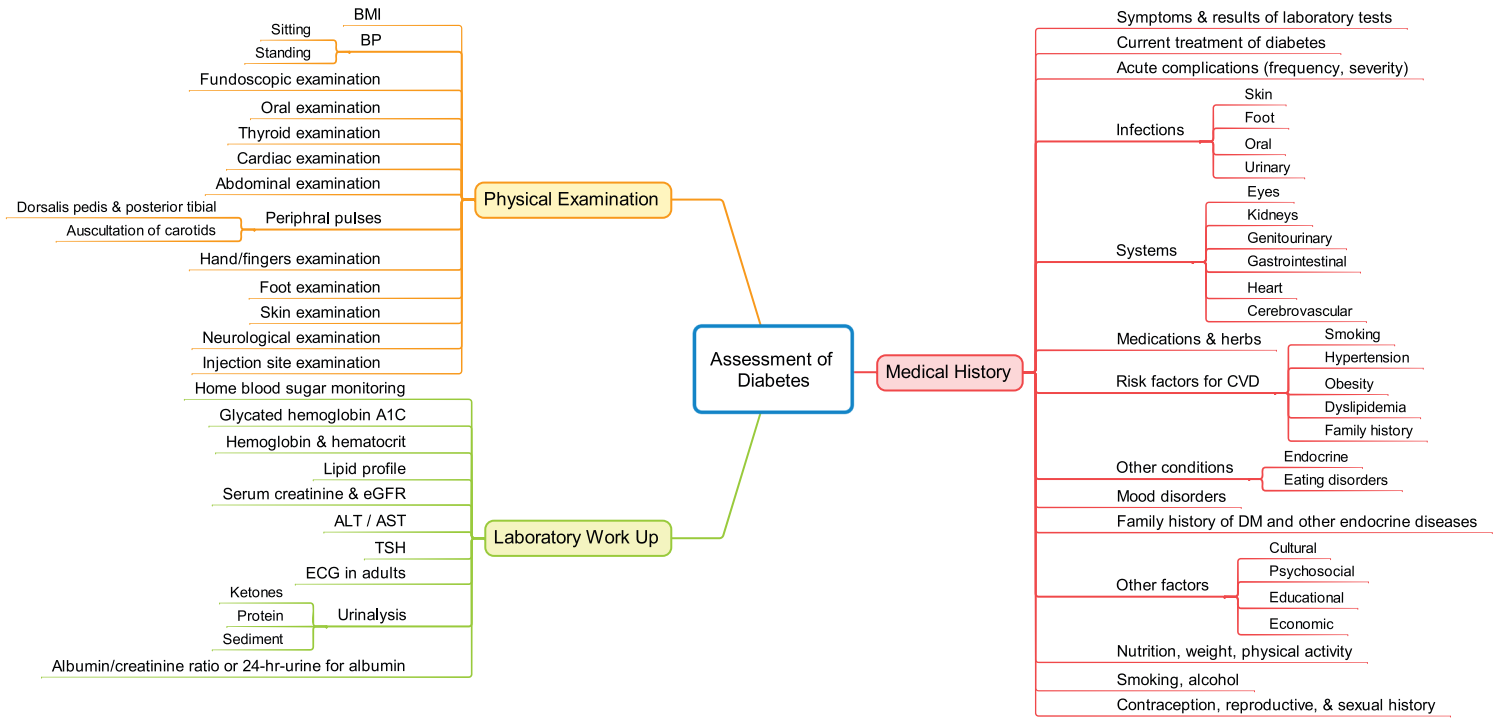
Assessment of Diabetes
Medical History
Symptoms & results of laboratory tests
Current treatment of diabetes
Acute complications (frequency, severity)
Infections
Skin
Foot
Oral
Urinary
Systems
Eyes
Kidneys
Genitourinary
Gastrointestinal
Heart
Cerebrovascular
Medications & herbs
Risk factors for CVD
Smoking
Hypertension
Obesity
Dyslipidemia
Family history
Other conditions
Endocrine
Eating disorders
Mood disorders
Family history of DM and other endocrine diseases
Other factors
Cultural
Psychosocial
Educational
Economic
Nutrition, weight, physical activity
Smoking, alcohol
Contraception, reproductive, & sexual history
Physical Examination
BMI
BP
Sitting
Standing
Fundoscopic examination
Oral examination
Thyroid examination
Cardiac examination
Abdominal examination
Peripheral pulses
Dorsalis pedis & posterior tibial
Auscultation of carotids
Hand/fingers examination
Foot examination
Skin examination
Neurological examination
Injection site examination
Laboratory Work Up
Home blood sugar monitoring
Glycated hemoglobin A1C
Hemoglobin & hematocrit
Lipid profile
Serum creatinine & eGFR
ALT / AST
TSH
ECG in adults
Urinalysis
Ketones
Protein
Sediment
Albumin/creatinine ratio or 24-hr-urine for albumin

Assessment of Dyslipidemia

This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.

Use CMR Encounter Form no. 2 (CMR-2) to help you in the assessment.[144]

Measurement:

- Two fasting lipoprotein measurements should be taken to classify the patient's CV risk, prior to initiating drug treatment or intensive lifestyle treatment[B]. If the total cholesterol level varies more than 30 - 40 mg/dL (> 16%) in the two samples a third sample should be taken and the average of the three samples should be used as the baseline measure.
- Abnormal lipid test results should always be confirmed with a new specimen, within 1–8 weeks later, before beginning or changing therapy.
- The sample should not be performed during stress or acute illness, e.g. recent MI, stroke, pregnancy, trauma, weight loss, use of certain drugs; should not performed on hospitalized patients until 2-3 months after illness.

Secondary Dyslipidemia

It must be ruled out through medical, dietary, family history and physical evaluation to determine additional risk factors and any genetic factors. Laboratory testing including FBS, LFT, RFT, TSH (other endocrine function test if indicated), erythrocyte volume and urinalysis must be done in addition to clinical evaluation.

A: Selected Causes of Secondary Dyslipidemia

Increased LDL level	Increased triglyceride level	Decreased HDL level
• Diabetes mellitus • Hypothyroidism • Nephrotic syndrome • Obstructive liver disease • Anabolic steroids • Progestins • Beta-adrenergic blockers • Thiazides	• Diabetes mellitus • Hypothyroidism • Abdominal Obesity • Alcoholism • Renal insufficiency • Beta-adrenergic blockers • Bile acid binding resins • Estrogens	• Diabetes mellitus • Cigarette smoking • Abdominal Obesity • Hypertriglyceridemia • Uremia • Menopause • Puberty (in males) • Anabolic steroids • Beta-adrenergic blockers • Progestins

LDL=low-density lipoprotein; HDL=high-density lipoprotein.

Familial Hypercholesterolemia (FH):

Consider the possibility of a FH genetic disorder in patients with:

- TC≥ 300 mg/dL (7.8 mmol/L) or LDL ≥ 190 mg/dL (5 mmol/L). In children, >150 mg/dL (>4 mmol/L).
- Family history of premature CVD.
- Premature coronary heart disease.
- Relatives who have tendon xanthomas.
- First-degree relatives of familial Hypercholesterolemia patients.

FH is considered High CVR. If associated with another major CVR factor or CVD, it is Very High CVR.

References

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Screening for Depression & Anxiety

Why to screen for depression & Anxiety?

1. Depression is the most frequently cited psychological disorder associated with diabetes. It is roughly three times more prevalent in those with diabetes (15-20% of people) than in those without diabetes.
2. Masked hypertension is more prevalent in those with anxiety. It may reflect a sign of secondary hypertension, as well. Depression is a common side effect of multiple blood pressure lowering agents.
3. Depression has been linked to poor glycemic control, less optimal lifestyle and self-care habits, higher obesity, and higher morbidity and mortality.
4. Screening improves the accurate identification of depressed patients in PHC.
5. Providers may mislabel lack of attention to self-care as non-compliant behavior when, in fact, it may indicate the need to screen for depression.
6. Early recognition of depression symptoms, prompt treatment, and referral lead to improved self-care and quality of life and decreases clinical morbidity.
7. Older adults ≥65 years of age with diabetes should be considered a high-priority population for depression screening and treatment. *[B]*

How to screen for depression?

1. Asking two simple questions about mood and anhedonia may be as effective as using any of the longer screening instruments:
   - **"Over the past two weeks have you felt down, depressed, or hopeless?", and**
   - **"Over the past two weeks, have you felt little interest or pleasure in doing things?"**
2. Use formal screening tools, such as PHQ-9 questionnaire [52]

Interpreting PHQ-9 Depression Screening Tool

1. Identify whether answers to questions 1 and 2 are shaded.
2. Count the number of shaded answers, all over.
3. Identify the type of depression in Table 3.
4. Identify and monitor severity of depression every 2-4 weeks, as per Table 4. Consult a specialist if there is no improvement.

Table 3. Identify the type of depression

No. of shaded answers	Q1 or Q2 is shaded	Q1 & Q2 are not shaded
≥ 5 answers	Major depressive disorder (Refer to Specialist)	No Depression
2-4 answers	Other depressive disorder (Discuss result with pt. & monitor severity)	No Depression
0-1 answers	No Depression	No Depression

Table 4. Severity of depression

Total Score	Depression Severity	Action
1 – 4	Minimal depression	None
5 – 9	Mild depression	Watchful waiting, repeat PHQ-9 at follow-up visit
10 – 14	Moderate depression	Counseling, FU ± Pharmacotherapy
15 – 19	Moderately severe depression	Pharmacotherapy or Psychotherapy
20 – 27	Severe depression	Immediate Pharmacotherapy ±Referral to Psychiatry

How to screen for Anxiety?

1. Asking two simple questions about anxiety (GAD-2) is a quick tool to screen for generalized anxiety disorder:
   - **Over the last 2 weeks, how often have you been bothered by the following problems?**
     - **a. "Feeling nervous, anxious or on edge" and**
     - **b. "Not being able to stop or control worrying".**
3. Use a little longer screening tool, such as GAD-7 questionnaire [53] Using GAD-7 Score at Cut-off score of ≥10 helps identifying multiple anxiety disorders Table 5:

Table 5. Diagnostic Testing Accuracy of GAD-7

Disorder	Sensitivity	Specificity	+ve Likelihood Ratio
Generalized Anxiety Disorder	89%	82%	5.1
Panic Disorder	74%	81%	3.9
Social Anxiety Disorder	72%	80%	3.6
Post-Traumatic Stress Disorder	66%	81%	3.5
Any anxiety disorder	68%	88%	5.5

Interpreting GAD-7 Anxiety Screening Tool:

- Using a cut-off of 8, the GAD-7 has a sensitivity of 92% and specificity of 76% for diagnosis of generalized anxiety disorder.
- Identify and monitor severity of depression, as per Table 6. Consult a specialist, accordingly.

Table 6. Severity of anxiety

Total Score	Anxiety Severity	Action
0 – 4	Minimal anxiety	None, Re-Screen annually
5 – 9	Mild anxiety	Provide general feedback. Repeat GAD-7 at FU
10 – 14	Moderate anxiety	Further Evaluation + Referral to Psychiatry
>= 15	Severe anxiety	Further Evaluation + Referral to Psychiatry

References:

1. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
2. B Arroll et al. Validation of PHQ-2 and PHQ-9 to Screen for Major Depression in the Primary Care. Ann Fam Med 2010;8:348-353.
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9. Spitzer, Robert L., et al. "A brief measure for assessing generalized anxiety disorder: the GAD-7." Archives of internal medicine 166.10 (2006): 1092-1097.
10. Plummer, Faye, et al. "Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis." General hospital psychiatry 39 (2016): 24-31.
11. Kroenke, Kurt, et al. "Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection." Annals of internal medicine 146.5 (2007): 317-325.

PHQ-9 Quick Depression Assessment Questionnaire

Description

A validated form for the screening of depression.

Who is in charge?

Self administered.

When to use?

Initial and annual assessment of CMR patients.

CMR34

استبانة
PHQ-9

الاسم _____ السجل المدني _____ الملف _____ التاريخ / /

خلال الأسبوعين الماضيين، هل عانيت من الشاكل التالية:	أبدا	أقل من أسبوع	أكثر من أسبوع	كل يوم تقريبا
١. قلة الإهتمام أو الإستمتاع بممارسة الأعمال اليومية، مثل عمل البيت أو مشاهدة التلفاز؟	٠	١	٢	٣
٢. الشعور بالحزن أو ضيق الصدر أو اليأس؟	٠	١	٢	٣
٣. صعوبة في النوم، أو نوم متقطع، أو النوم أكثر من المعتاد؟	٠	١	٢	٣
٤. الشعور بالتعب أو الإرهاق، حتى مع أقل مجهود؟	٠	١	٢	٣
٥. قلة الشهية أو الزيادة في تناول الطعام عن المعتاد؟	٠	١	٢	٣
٦. الشعور بعدم الرضا عن النفس، أو الشعور بالفشل أو الإحباط؟	٠	١	٢	٣
	٠	١	٢	٣
من الحركة؟	٠	١	٢	٣
وذلك،	٠	١	٢	٣
	=	+	+	

النقاط

خطة

Designed by the Cardiometabolic Risk Management Guideline Team CMRcpg@gma
Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (

CMR34

PHQ-9
Questionnaire

NAme _____ ID _____ MR# _____ Date / /

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things?	0	1	2	3
2. Feeling down, depressed, or hopeless?	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much?	0	1	2	3
4. Feeling tired or having little energy?	0	1	2	3
5. Poor appetite or overeating?	0	1	2	3
6. Feeling bad about yourself, or that you are a failure or have let yourself or your family down?	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching TV?	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual?	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way?	0	1	2	3
Total score	=	+	+	

Depression Level

Total Score	Depression Severity	Action
1 – 4	Minimal depression	
5 – 9	Mild depression	
10 – 14	Moderate depression	
15 – 19	Moderately severe depression	
20 – 27	Severe depression	

Designed by the Cardiometabolic Risk Management Guideline Team CMRcpg@gmail.com.
Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). Copyright© 1999 Pfizer Inc.

CMR-34 PHQ-9 Depression Screening Questionnaire

GAD-7 Generalized Anxiety Disorder Questionnaire

Description

A validated form for the screening of depression.

Who is in charge?

Self administered.

When to use?

Initial and annual assessment of CMR patients.

CMR33

استبانة
GAD-7

الاسم _____ السجل المدني _____ الملف _____ التاريخ / /

خلال الأسبوعين الماضيين: كم مرة أقلقتك المشاكل التالية؟	أبدا	بعض الأيام	أكثر من نصف الأيام	كل يوم تقريبا
١. الشعور بالغضب أو القلق أو الانفعال الشديد.	٠	١	٢	٣
٢. عدم القدرة على إنهاء القلق أو التحكم فيه.	٠	١	٢	٣
٣. القلق المفرط على أشياء مختلفة.	٠	١	٢	٣
٤. الصعوبة في الاسترخاء.	٠	١	٢	٣
٥. شدة الاضطراب لدرجة صعوبة البقاء في هدوء.	٠	١	٢	٣
	٠	١	٢	٣
	٠	١	٢	٣
	=	+	+	

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Designed by the Cardiometabolic Risk Management Guideline Team CMRcpg@gmail.com.
Adapted from Spitzer, Williams, Kroenke, et al. Primary Care Evaluation of Mental Disorders Patien

CMR33

GAD-7
Questionnaire

NAme _____ ID _____ MR# _____ Date / /

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge.	0	1	2	3
2. Not being able to stop or control worrying.	0	1	2	3
3. Worrying too much about different things.	0	1	2	3
4. Trouble relaxing.	0	1	2	3
5. Being so restless that it is hard to sit still.	0	1	2	3
6. Becoming easily annoyed or irritable.	0	1	2	3
7. Feeling afraid, as if something awful might happen.	0	1	2	3
Total score	=	+	+	

Anxiety Level

Total Score	Anxiety Level	Action
0 – 4	Minimal	
5 – 9	Mild	
10 – 14	Moderate	
>= 15	Severe	

Designed by the Cardiometabolic Risk Management Guideline Team CMRcpg@gmail.com.
Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). Copyright© 1999 Pfizer Inc.

CMR-33 GAD-7 Anxiety Screening Questionnaire

Assessing Renal Function in CMR

Aim

Early recognize and approach chronic kidney disease (CKD).

Definition

Abnormality of kidney **structure** or **function** for ≥ 3 months. This includes ≥1 of:

1. eGFR< 60, estimated by CKD-EPI or MDRD. See "eGFR Calculator".
2. Albuminuria (see Table 7). *convertor*
3. Abnormal urinalysis, including **unexplained** (e.g. urolith, UTI, vaginal) hematuria, pyuria, cellular casts, tubular concentrating defects, and insufficient renal acidification.
4. Abnormal renal imaging.
5. Known Kidney disease.

Table 7. Categories of Albuminuria & Proteinuria.

	A1 NL - mild ↑	A2 Mod ↑	A3 Severe ↑
AER (mg/24 hours)	<30	30 - 300	>300
PER (mg/24 hours)	<150	150 - 500	>500
ACR:			
(mg/mmol)	<3	3 - 30	>30
(mg/g)	<30	30 - 300	>300
PCR:			
(mg/mmol)	<15	15 - 50	>50
(mg/g)	<150	150 - 500	>500
Protein reagent strip	Neg - Trace	Trace to +	> +

ACR, albumin-to-creatinine ratio; AER, albumin excretion rate; PCR, protein-to-creatinine ratio; PER, protein excretion rate.
AER , PER: in timed urine collection.
ACR, PCR, Strip: in spot urine sample.
Relationships among measurement methods within a category are not exact.
The conversions are rounded for pragmatic reasons.
ACR <10 mg/g = "normal" ; ACR 10–30 mg/g = "high normal."
ACR >2200 mg/g = "nephrotic."

Reproduced from KODIGO 2012.

Screening

Screening in CMR patients include Urinalysis, eGFR and ACR (or PCR).

Albuminuria Convertor

eGFR Calculator

Evaluation of CKD

- Full review of Hx n PE for identifiable causes, including nephrotoxins (NSAID, recent medications, herbals, ...), recent systemic infections, autoimmune diseases.
- CBC, bone profile, urinalysis, ACR, RFT, Lipids, A1c.
- Renal Ultrasound scan.

Staging of CKD and Approach

Table 8. Prognosis of CKD and action recommended.

Stage (eGFR) ml/min/1.73 m²			ACR		
			A1	A2	A3
			<30 mg/g <3 mg/mmol	30-299 mg/g 3-29 mg/mmol	≥300 mg/g ≥30 mg/mmol
	G1	≥90	Evaluate for CKD, Control CMR X1	+ Treat, tight Control CMR, Monitor	+ Refer Monitor X2
	G2	60-89	Evaluate for CKD, Control CMR X1	+ Treat, tight Control CMR, Monitor	+ Refer Monitor X2
	G3a	45-59	+ Treat, tight Control CMR, Monitor X1	+ Treat, tight Control CMR, Monitor X2	+ Refer Monitor X3
	G3b	30-44	+ Treat, tight Control CMR, Monitor X2	+ Treat, tight Control CMR, Monitor X2	+ Refer Monitor X3
	G4	15-29	+ Refer Monitor X3	+ Refer Monitor X3	+ Refer Monitor X4
	G5	<15	+ Refer Monitor X4	+ Refer Monitor X4	+ Refer Monitor X4

Reproduced with modification from KDIGO and ADA. Colors depict prognosis from best to worst (green, yellow, orange, pink, dark red). X2, X3, X4: frequency of renal assessment per year, suggested.

Referral to Nephrologist

a. Acute kidney injury (recent uncorrected ↑ Cr.> 1.5x or acute oliguria).
b. CKD Stage, as per Table 8.
c. Fam Hx of kidney disease.
d. Refractory BP.
e. Urinary RBC casts or unexplained RBC> 20/hpf.
f. Persistent abnormal ↑/↓ K+ ; Abnormal ↑/↓ Bone Profile.
g. Unexplained or Renal Anemia.
h. Progressing CKD (↓ eGFR> 25% from baseline; or ↓ 5 ml/min/1.73 m² per year).
i. Recurrent or extensive nephrolithiasis.

References:

1. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney international. 2013 Sep 1;84(3):S1-163.
2. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
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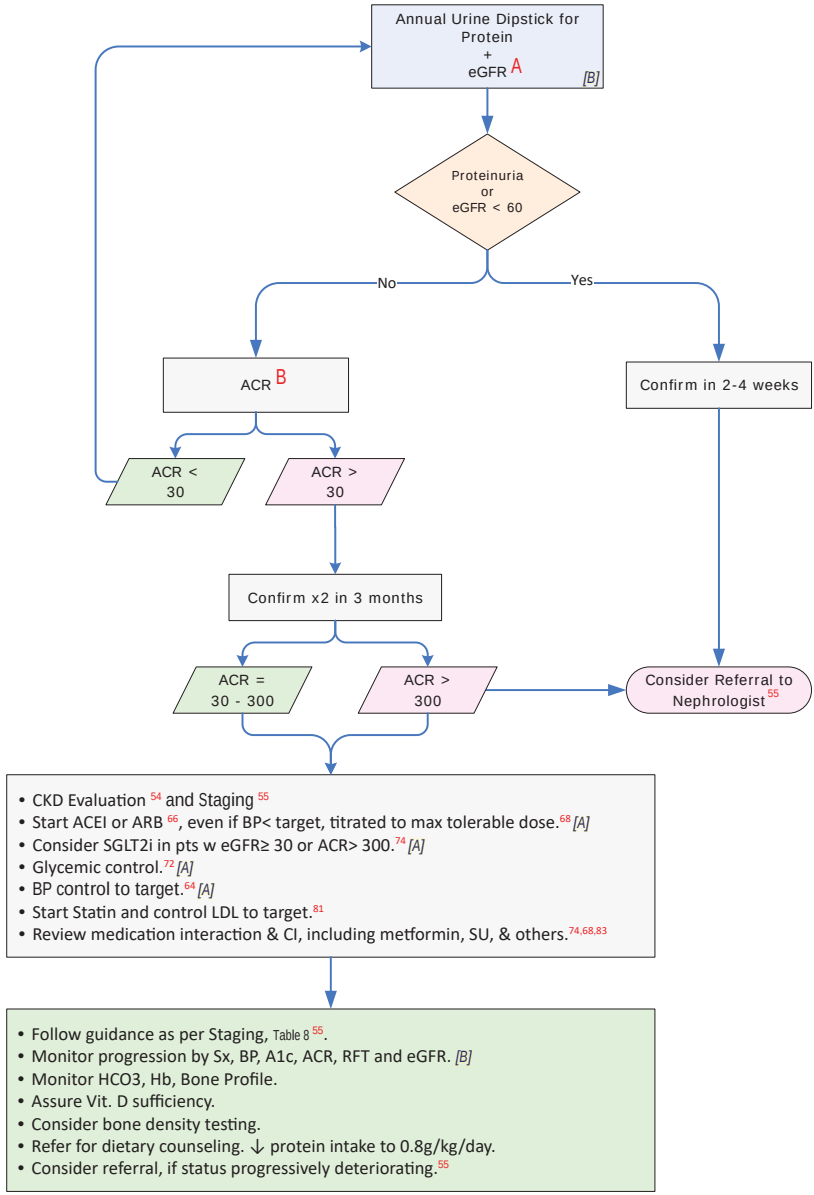
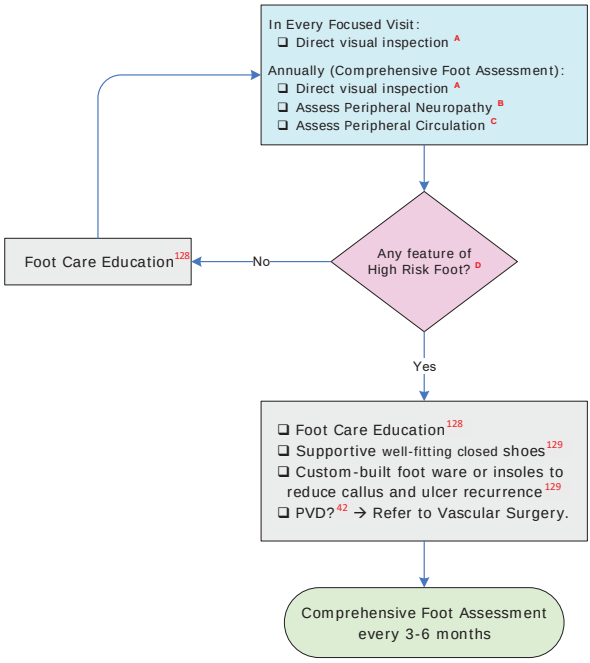
4. Johnson, David W., et al. "Chronic kidney disease and measurement of albuminuria or proteinuria: a position statement." Medical Journal of Australia 197.4 (2012): 224-225.
5. Sumida, Keiichi, et al. "Conversion of Urine Protein–Creatinine Ratio or Urine Dipstick Protein to Urine Albumin–Creatinine Ratio for Use in Chronic Kidney Disease Screening and Prognosis: An Individual Participant–Based Meta-analysis." Annals of internal medicine (2020).
6. Martínez-Castelao, Alberto, et al. "Consensus document for the detection and management of chronic kidney disease." Nefrologia 34.2 (2014): 243-62.

Renal Function Assessment Algorithm



A- Estimated GFR using CKD-EPI or MDRD formulas. See "eGFR Calculator" on page 54.
B- ACR = Urinary Albumin-Creatinine Ratio, expressed as mg/g. See Table 7 on page 54 for equivalents.

Foot Care in Diabetes Mellitus



Comprehensive Foot Assessment

A- Direct Visual Foot Inspection

Any foot deformity:

- Toe deformity
- Bunions
- Charcot foot
- Foot drop
- Prominent Metatarsal Heads

Note Skin & Nail changes:

- Callus
- Ulcer
- Redness
- Warmth
- Maceration
- Fissure
- Swelling
- Dryness
- Taenia

B- Assessing Peripheral Neuropathy

1. Use either the Semmes-Weinstein mono-filament or a tuning fork.
2. Have the patient look away or close eyes.
3. Hold the filament perpendicular to the skin.
4. Avoiding any ulcers, calluses or sores, touch the monofilament to the skin until it bends. Hold in place for approximately 1-2 seconds, then gently remove it.
5. Test the sites shown on the diagram.
6. Lack of sensation at any site may indicate diabetic neuropathy.

C- Assessing Foot Circulation

Palpate:

- Posterior tibial B/L
- Dorsalis pedis B/L

D- High Risk Foot

Any features of:

- Peripheral Neuropathy R1
- Peripheral arterial disease R2
- Onychomycosis R2
- Previous amputation R3
- Previous/Current Ulceration R3
- Structural foot deformity R2
- Extensive Plantar callus R2

R1-3 refers to Risk Category

References:

1. Boulton AJM, Armstrong DG, Kirsner RS, et al. Diagnosis and Management of Diabetic Foot Complications. Arlington, Va., American Diabetes Association, 2018.
2. Mishra SC, Chhatbar KC, Kashikar A, Mehndiratta A. Diabetic foot. BMJ. 2017 Nov 16;359:j5064.
3. Ibrahim, Ammar. "IDF Clinical Practice Recommendation on the Diabetic Foot: A guide for healthcare professionals." Diabetes research and clinical practice 127 (2017): 285-287.

5

Control

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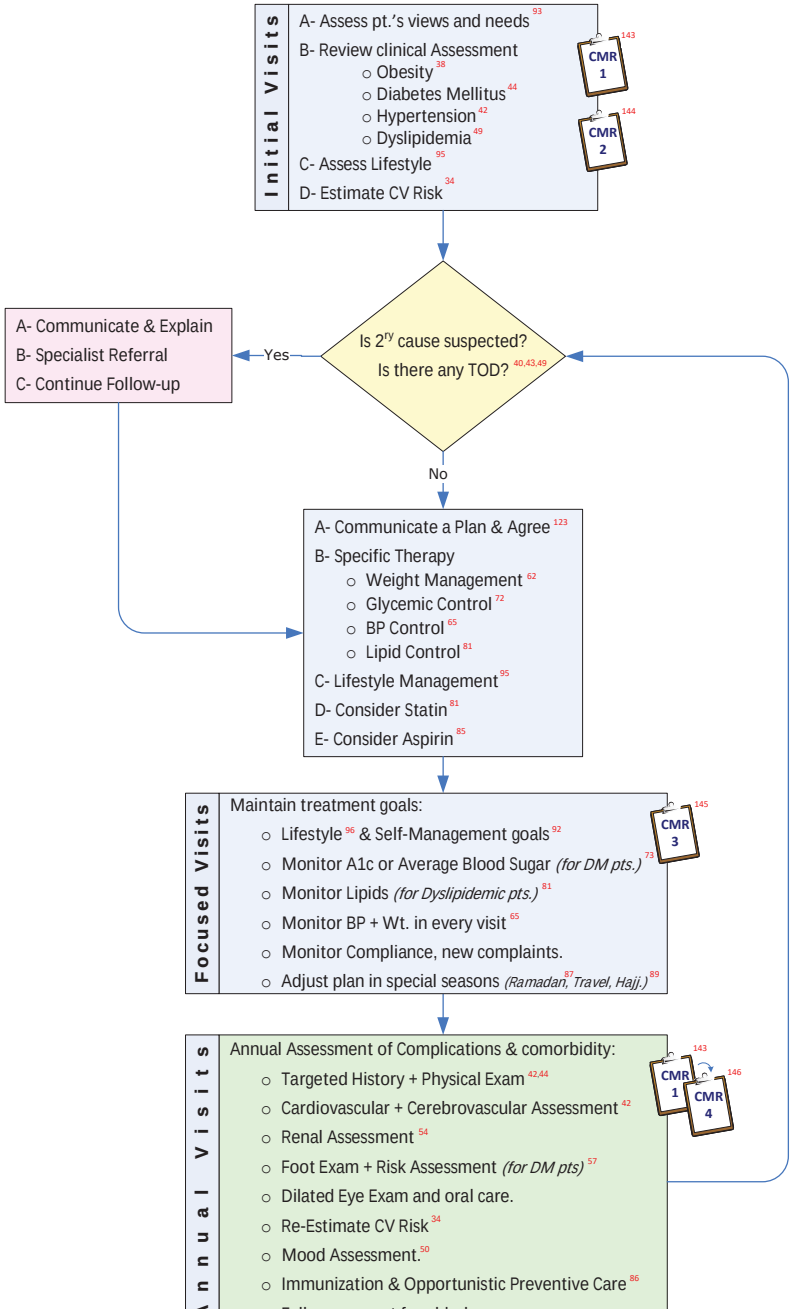
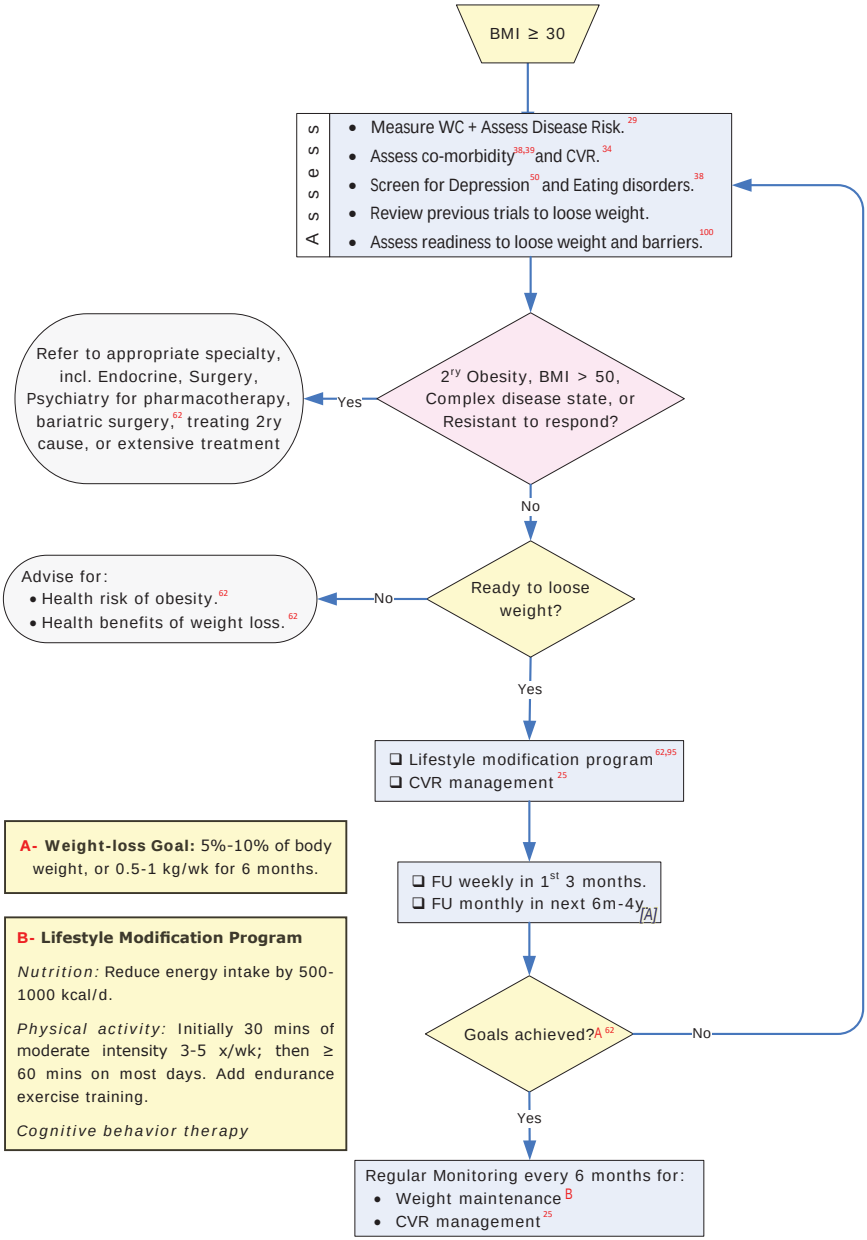
Chronic Management Algorithm



The encounter form that may be used at this step.

CVR, Cardiovascular Risk; RF, Risk Factor; TOD, Target Organ Damage

Obesity Management Algorithm



References

1. Schutz, Dominique Durrer, et al. European practical and patient-centred guidelines for adult obesity management in primary care. Obesity facts 12.1 (2019): 40-66.
2. Forgione, Nicholas, et al. Managing obesity in primary care: breaking down the barriers. Advances in therapy 35.2 (2018): 191-198.
3. Semlitsch, Thomas, et al. Management of overweight and obesity in primary care—A systematic overview of international evidence-based guidelines. Obesity Reviews 20.9 (2019): 1218-1230.
4. Al-Shehri, Fahad S., et al. Prevention and management of obesity: Saudi guideline update. Saudi Journal of obesity 4.1 (2016): 25.

Management of Obesity

Management aims to:

1. Improve pre-existing obesity-related comorbidities. (Table 5-9)
2. Reduce the future risk of obesity-related comorbidities.
3. Improve physical, mental and social wellbeing.

Health care providers need to collaborate with patients to develop eating habit, physical activities and life long skills to initiate and sustain weight reduction.

A realistic target should be emphasized aiming, initially, at 5-10% reduction of original weight with maximum weekly weight loss of 0.5-1 kg.

Table 5-9. Targets and benefits of obesity management.

Comorbidity	Weight Loss Target, %	Expected outcome
MetSy, PreDM	10	Prevention of DM2
Type 2 diabetes	5-15	↓ A1c; ↓ DM2 medication. Remission, if short duration.
Dyslipidemia	5-15	↓ Triglycerides; ↑ HDL, ↓ LDL
Hypertension	5-15	↓ BP; ↓ Medications
NAFLD	10-40	↓ Intrahepatocellular lipids, inflammation and fibrosis.
Polycystic ovary syndrome	5-15	Ovulation. Regulation of menses. ↓ Hirsutism. ↓ Androgen levels. ↑ Insulin sensitivity.
Female Infertility	≥10	Ovulation; Pregnancy.
Male Hypogonadism	5-10	↑ Serum testosterone.
Sleep apnoea	7-11	↓ Apnea/hypopnea index
Asthma	7-8	↑ FEV1 / PEFR
GERD	≥10	↓ Symptoms
Osteoarthritis	≥10	↓ Symptoms
Urinary Stress Incontinence	5-10	↓ Symptoms

MetSy: Metabolic Syndrome. NAFLD: Non-alcoholic fatty liver disease. GERD: Gastroesophageal reflux disease.

Pharmacological treatment

- Pharmacological treatment should be considered only after dietary [96], exercise [96] and behavioral [96] approaches have been started and evaluated.
- Patients considered for pharmacotherapy should have: *[A]*
  1. BMI ≥ 30, or BMI ≥ 28 with concomitant obesity-related risk factors or diseases (hypertension, dyslipidemia, CHD, DM-2 or sleep apnea).
  2. Therapy be continued beyond 3 months only if the person has lost at least 5% of their initial body weight since starting drug treatment.

Bariatric surgery

- Bariatric surgery should be considered on an individual case basis following assessment of risk and benefit in patients who fulfill the following criteria: *[C]*

1. Level of BMI:
   - BMI≥ 40 kg/m^2. *[A]* or
   - BMI≥ 35 kg/m^2 with severe comorbidities which are expected to improve

significantly with weight reduction (e.g., severe mobility problems, arthritis, DM-2).[A] or
- BMI≥ 30 kg/m^2 with poorly controlled DM-2 and high CVR.

2. Evidence of completion of a structured weight management programme involving diet, physical activity, behavioral and drug interventions, not resulting in significant and sustained improvement in the comorbidities.

Table 5-10. Types of Bariatric surgery procedures

Gastric bypass	Gastric band (adjustable)	Sleeve gastrectomy
Malabsorptive	Restrictive	Resective
Long technical experience	Three decades of experience	One decade of experience
Stomach and small intestine bypassed. Stomach reduced to a very small pouch size	Band placed around upper stomach (adjustable externally)	Stomach restricted vertically (80% removed)
Food intake volume ↓↓; absorption of nutrients ↓	Food volume ↓ (adjustable)	Food volume ↓
↓ 14–20 of BMI	↓ 8–12 of BMI	↓ 10–18 of BMI
Partly reversible	Fully reversible	Irreversible

Peri-Bariatric Care

- Health care professionals should undertake the following in all patients post bariatric surgery:
  1. Simple clinical assessments of micronutrient status (e.g., ask about hair loss, neuropathic symptoms, skin and oral lesions, muscle weakness).
  2. Simple blood tests (e.g., CBC, calcium, magnesium, phosphate and albumin).
  3. Review prior chronic medications and adjust their doses and indications.
- Calcium and vitamin D supplements (800 IU per day cholecalciferol) should be considered for all patients undergoing bariatric surgery. Baseline calcium and vitamin D should be measured to avoid iatrogenic hypercalcemia.
- Multivitamin supplements may be needed, including thiamin, vitamin B12 250 mcg, vitamin A 5000 iu, folic acid 1 mg, iron 150-300 mg, daily.
- Bariatric surgery should not be performed unless systematic follow-up is available and unless the patient has made a commitment to participate in such care. As in the preoperative evaluation, postoperative management requires a coordinated approach involving expertise in medicine, surgery, psychology, and nutrition.

References

1. Obesity management in adults. National Institute for Health and Clinical Excellence. London (UK) May 2020.
2. Al-Shehri FS, et al. Prevention and management of obesity: Saudi guideline update. Saudi Journal of Obesity. 2016 Jan 1;4(1):25.
3. Schutz, Dominique Durrer, et al. European practical and patient-centred guidelines for adult obesity management in primary care. Obesity facts 12.1 (2019): 40-66.
4. Forgione, Nicholas, et al. Managing obesity in primary care: breaking down the barriers. Advances in therapy 35.2 (2018): 191-198.
5. Semlitsch, Thomas, et al. Management of overweight and obesity in primary care: A systematic overview of international evidence-based guidelines. Obesity Reviews 20.9 (2019): 1218-1230.
6. S Wharton et al. Obesity in adults: a clinical practice guideline. CMAJ 2020 August 4;192:E875-91.

BP Control: Choice of a Plan

Choice of a plan for BP control depends on the level of the cardiovascular risk CVR:

1. Stratify the level of CVR using Table 11, below. For more details refer to page 34.
2. Match the level in Table 11 with its corresponding plan in Table 12.
3. Refer to page 95 for lifestyle change; page 66 for drug treatment; and page 72 for glycemic control.
4. Refer to appropriate specialist for the management of TOD and CVRD, and continue treatment.

Table 11. Stratification of CVR to quantify prognosis.

Other Risk Factors & Disease History	Blood Pressure (mmHg)				
	Normal: SBP 120–129 or DBP 80–84	**Pre-HTN: SBP 130–139 or DBP 85–89**	**Grade 1: SBP 140–159 or DBP 90–99**	**Grade 2: SBP 160–179 or DBP 100–109**	**Grade 3: SBP > 180 or DBP > 110**
No Other CVR Factors [A]	Average risk	Low added risk	Low added risk	Moderate added risk	High added risk
1-2 CVR Factors [A]	Low added risk	Low added risk	Moderate added risk	Moderate-High added risk	High added risk
≥3 CVR Factors [A], **or MetSyn** [D],	Low-Moderate added risk	Low-Moderate added risk	Moderate-High added risk	High added risk	High added risk
TOD [B] **or DM** [34]	Moderate-High added risk	Moderate-High added risk	High added risk	High added risk	High-Very High added risk
CVRD [C]	High added risk	Very High added risk	Very High added risk	Very High added risk	Very High added risk

Table 12. Match CVR with its corresponding plan

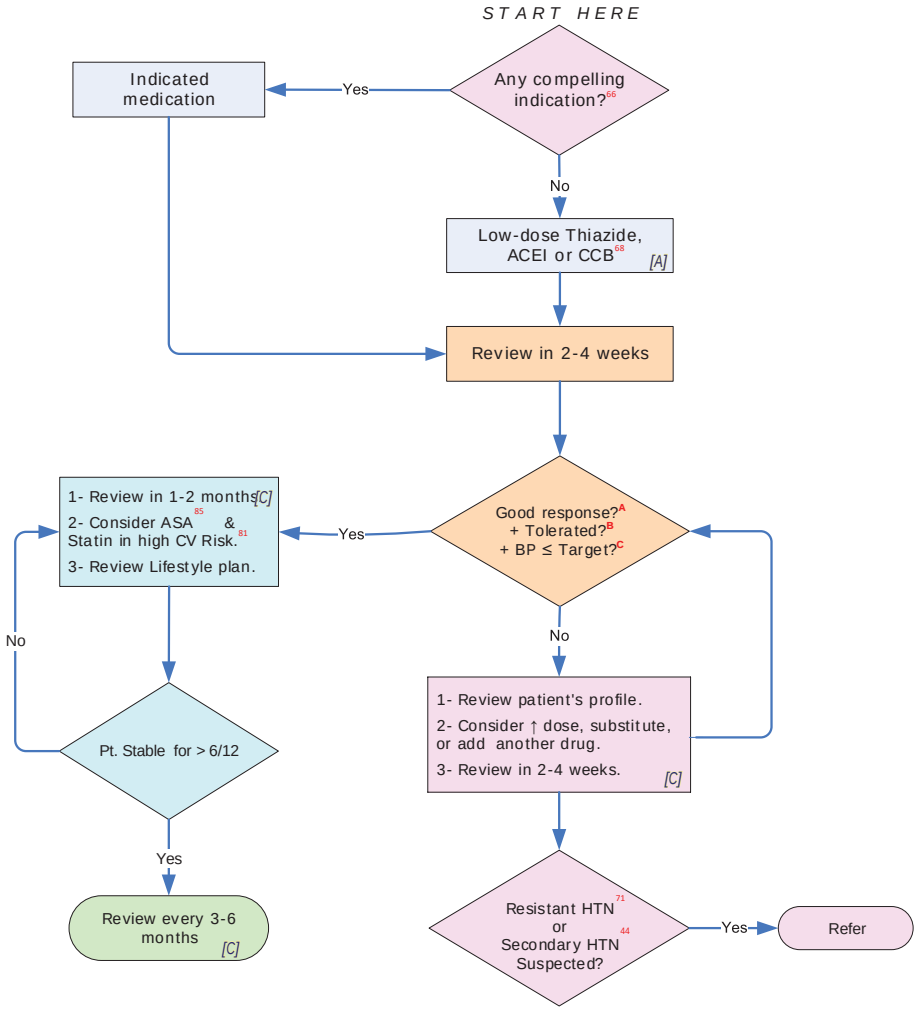
Other risk factors and disease history	Blood Pressure (mmHg)				
	Normal: SBP 120–129 or DBP 80–84	**Pre-HTN:** SBP 130–139 or DBP 85–89	**Grade 1:** SBP 140–159 or DBP 90–99	**Grade 2:** SBP 160–179 or DBP 100–109	**Grade 3:** SBP > 180 or DBP > 110
No Other CVR Factors [A]	No BP intervention	Lifestyle changes [95]	Lifestyle changes for several months [95], then drug Rx [65] if BP uncontrolled	Lifestyle changes for several weeks [95], then drug Rx [65] if BP uncontrolled [A]	Immediate drug Rx [65] + lifestyle [95] changes * [A]
1-2 CVR Factors [A]	Lifestyle changes [95]	Lifestyle changes [95]	Lifestyle changes for several weeks [95], then drug Rx [65] if BP uncontrolled [A]	Lifestyle changes for several weeks [95], then drug Rx [65] if BP uncontrolled [A]	Immediate drug Rx [65] + lifestyle [95] changes * [A]
≥3 CVR Factors [A], **or MetSyn** [D],	Lifestyle changes [95]	Lifestyle changes [95]	Lifestyle changes for several weeks [95], then drug Rx [65] if BP uncontrolled [A]	Drug Rx [65] + lifestyle [95] changes * [A]	Immediate drug Rx [65] + lifestyle [95] changes * [A]
TOD [B] **or DM** [34]	Lifestyle changes [95]	Consider drug [65] Rx [B] + lifestyle [95] changes *	Drug Rx [65] + lifestyle [95] changes * [A]	Drug Rx [65] + lifestyle [95] changes * [A]	Immediate drug Rx [65] + lifestyle [95] changes * [A]
CVRD [C]	Lifestyle [95] changes *	Consider drug [65] Rx [B] + lifestyle [95] changes *	Drug Rx [65] + lifestyle [95] changes * [A]	Drug Rx [65] + lifestyle [95] changes * [A]	Immediate drug Rx [65] + lifestyle [95] changes * [A]

* Consider the use of statin [71] and aspirin [73] in these risk groups.

References:

1. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
2. The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). 2018 ESH/ESC Guidelines for the management of arterial hypertension. European Heart Journal 2018;00:1–98.
3. Rabi, Doreen M., et al. "Hypertension Canada's 2020 comprehensive guidelines for the prevention, diagnosis, risk assessment, and treatment of hypertension in adults and children." Canadian Journal of Cardiology 36.5 (2020): 596-624.

Blood Pressure Control: Start of Medication and Chronic Management



A- Good response is judged by BP decrease of > 5 mm Hg in SBP and DBP. B- Patient has tolerated any adverse event of the drug.[68]

C- Target BP values:

Condition	SBP	DBP
HTN (No TOD; No CVRD) < 80 yrs	< 140 *[B]*	< 90 *[A]*
HTN (No TOD; No CVRD) ≥ 80 yrs	< 150 *[B]*	< 90
HTN w High CVR	< 130 *[C]*	< 80 *[C]*
Diabetic Hypertension	< 140 *[A]*	< 90 *[A]*
Non-DM Chronic Kidney Disease	< 140 *[B]*	< 90 *[B]*
Proteinuria > 1 g/day	< 130	< 80
Prior TIA, Stroke, PAD, CHF	< 140 *[A]*	< 90 *[A]*

References:

1. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
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Which Anti-Hypertensive Agent to use?

Risk factor / Disease	1st Choice	Second-line Choice	
Hypertension without compelling indications for specific agents	Thiazide and thaizide-like diuretics, ACEI, ARBs, or long-acting DHP-CCBs [68]	Combination of 1st choice drugs. Avoid combination of ACEIs and ARBs.	
Isolated systolic hypertension without compelling indications for specific agents	Thiazide diuretics, ARBs or long-acting DHP-CCBs [68]	Combination of 1st choice drugs	
Diabetes mellitus with nephropathy	ACEI or ARBs [68]	Addition of long-acting DHP-CCBs (preferably), thiazides, or cardio-selective β-blockers	
Diabetes mellitus without nephropathy	ACEI, ARBs, Long-acting DHP-CCB or thiazide diuretics [68]	Combination of 1st choice drugs or addition of cardio-selective β-blockers ± long-acting DHP-CCBs	
Metabolic syndrome	ACEI or Long-acting DHP-CCB [68]	ARB	
Atrial Fibrillation	Recurrent AF: ACEI or ARB [68]	Permanent AF: BB or non-DHP-CCB	
Angina	β-blockers and ACEI [68]	Long-acting DHP-CCBs, ARB	
Established atherosclerotic disease	ACEI added to other therapy [68]		
Previous myocardial infarction	β-blockers and ACEI [68]	Combination of additional agents	
Heart failure	ACEI, β-blockers and spironolactone [68]	ARBs; thiazide or loop diuretics as additive therapy in volume-overload	
Previous CVA or TIA	Thiazide, ACEI, or ARB [68]	Combination of thiazide and ACEI	
Chronic kidney Disease; Microalbuminuria	ACEI or ARB if not tolerated [68]	Add thiazide, long-acting DHP-CCB or β-blockers	
Left ventricular hypertrophy (LVH)	Thiazide diuretics, ACEI, ARB, or long acting DHP-CCBs [68]	Combination of 1st line, β-blockers	
Peripheral arterial disease	ACEI added to other therapy [68]	CCB	
Dyslipidemia	No special recommendation		
Elderly (isolated Syst HTN)	Diuretic; CCB [68]		
Lactating mothers	β-blockers, α/ β-blockers, DHP-CCB, Enalapril [68]	Thiazide diuretics is controversial	
Pregnancy	Methyldopa, labetolol, or nifedipine [68]	Thiazide diuretics is controversial	
Smokers			
Bronchospasm; 2nd / 3rd degree heart block			
Hyperthyroidism; Anxiety; S. Tachycardia	β-blockers [68]		
Gout, Hyperuricemia	Losartan, CCB	β-blockers, ACEIs and nonlosartan ARBs may ↑ risk of gout.	

Table 13. Which Anti-Hypertensive Agent to use? (cont.)

	Risk factor / Disease	Cautions/Notes
	Hypertension without compelling indications for specific agents	α-blockers are not recommended as initial therapy. β-blockers are not recommended as initial therapy in those >60 years of age. Hypokalemia is avoided by using K^+-sparing agents in those prescribed diuretic monotherapy. ACEI are not recommended as initial monotherapy in Blacks.
	Isolated systolic hypertension without compelling indications for specific agents	Hypokalemia should be avoided by using K^+-sparing agents in those prescribed diuretics
	Diabetes mellitus with nephropathy	If serum creatinine level is >2 mg/dL, or eGFR<30ml/min, a loop diuretic should be used as a replacement for low-dose thiazide diuretics if volume control is required.
	Diabetes mellitus without nephropathy	
	Metabolic syndrome	
	Atrial Fibrillation	
	Angina	Avoid short-acting nifidipine
	Established atherosclerotic disease	
	Previous myocardial infarction	
	Heart failure	Avoid non-DHP CCBs (diltiazem, verapamil)
	Previous CVA or TIA	Blood pressure reduction reduces recurrent cerebrovascular events
	Chronic kidney Disease; Microalbuminuria	Avoid ACEIs in bilateral renal artery stenosis. Avoid combination of ACEIs and ARBs.
	Left ventricular hypertrophy (LVH)	Avoid hydralazine and minoxidil
	Peripheral arterial disease	Avoid β-blockers with severe disease
	Dyslipidemia	
	Elderly (isolated Syst HTN)	No definite evidence of an increase in risk of aggressive treatment (a J-curve) unless DBP is lowered to <55 or 60 mmHg by treatment
	Lactating mothers	Diuretics may reduce milk volume. Propanolol and labetolol are preferred if a β-blockers is indicated. Avoid ARB. Avoid Methyldopa (Risk of postpartum depression).
	Pregnancy	ACEIs and ARBs should be avoided (associated with adverse fetal and neonatal renal effects.)
	Smokers	Interferes with the beneficial effects of β-blockers
	Bronchospasm; 2nd / 3rd degree heart block	β-blockers should generally be avoided
	Hyperthyroidism; Anxiety; S. Tachycardia	
	Gout, hyperuricemia	Avoid Thiazides and thiazide-like diuretics.

Anti-Hypertensive Agents

Class Of Drug	Drugs	Usual Dose (mg/Day)	Freq.	In-class Equivalent *	Compelling Indications	Possible Indications	
Thiazides or thiazide-like Diuretics	Chlorthalidone Indapamide Hydrochloro-thiazide (HCTh)	12.5-25 1.25–2.5 12.5-25	1 1 1		• Elderly patient, isolated systolic hypertension, • Heart failure, secondary stroke prevention	• Renal insufficiency (loop diuretics for S.Cr >2 or eGFR <30) • Edema states	
Angiotensin converting enzyme inhibitors (ACEI)	Captopril Enalapril Lisinopril Perinodpril	25-150 5-40 10-40 4-8	2-3 1-2 2 1	12.5x3 5x1 10x1 2x1	• Heart failure • LV dysfunction • Post-MI or established CHD. • Diabetic nephropathy • 2ry stroke prevention [B]	• Chronic kidney dis. [C] • DM nephropathy. • Proteinuric renal dis. • Unilateral Renovascular HTN.	
Angiotensin II receptor Blockers (ARB)	Valsartan Losartan Olmesartan Telmisartan Candesartan Irbesartan	80-320 25-100 20–40 20–80 8–32 150-300	1 1-2 1 1 1-2 1	80x1 50x1 20x1 40x1 8x1 150x1	• ACEI intolerance • Type 2 DM nephropathy • HTN with LVH • Heart failure	• Post-MI LV dysf. • Intolerance of other antihypertensives. • Proteinuric renal dis. • Chronic renal disease.	
Calcium channel blockers (DHP-CCB)	Amlodipine Nifedipine LA	2.5-10 30-60	1 1	5x1	• Elderly patient, isolated systolic hypertension • DM	• Angina • Esophageal spasm	
β blockers (BB)	Atenolol Metoprolol Bisoprolol ***BB and α-blockers:*** carvedilol	25-100 50-100 2.5-10 6.25–50	1 1 1 2	50x1 50x2 5x1 12.5x2	• Angina pectoris; • Post-MI; congestive heart failure • Pregnancy [66] • Tachyarrhythmias	• Heart failure [F]; PVC; Supraventricular arrhythmia • Anxiety; essential tremor; migraine • Glaucoma	
Centrally acting drugs	Methyldopa	250-1,000	2		Pregnancy		
α-blockers	Doxazosin Prazosin	1-16 2-20	1 2		Benign prostatic hypertrophy		
Diuretics (loop)	Furosemide	20-80	2		• Renal insufficiency; • Congestive heart failure		
Diuretics (anti-aldo)	Spironolactone	25-50	1		• Cong. heart failure; • Post-MI		
Rate limiting **NDHP-CCB**	Verapamil Diltiazem	80-320 80-360	2 1-2		• Angina pectoris; • Carotid atherosclerosis; • Supraventricular tachycardia	• Elderly patient • Migraine	

A Thiazides or thiazide-like diuretics may sometimes be necessary to control blood pressure in people with a history of gout, ideally used in combination with allopurinol.

B In combination with a thiazide or thiazide-like diuretic.

C ACEI or ARB may be beneficial in chronic renal impairment but should only be used with caution, close supervision, and specialist advice.

D Caution with ACEI and ARB in peripheral vascular disease because of association with renovascular disease.

Table 14. Anti-Hypertensive Agents (cont.)

	Class Of Drug	Caution	Compelling Contraindication	Potential Side Effects *(Monitor within 1-4 weeks of change)*	
	Thiazides	• Action blocked by NSAID [K] • Cardiac arrhythmia • Glucose intolerance; ↑Tg • Hypertrophic cardiomyopathy	• Gout [A] • Anuria	• Periodic Lytes, Uric acid, Ca^{+2}, FBS • **Hypokalemia** • **Hyperuricemia** • Hyponatremia • Hyperglycemia • Rash	• Fatigue • Impotence • Dry mouth • Nausea • Dizziness, Ortho Hypotension. • Constipation
	ACEI	• Child-bearing age. • Renal impairment [C], PVD [D] • Antacid & Food alter absorption. • NSAID ↓ effect of ACEI. [K] • Allopurinol; Digoxin; K^+ suppl; K^+-sparing diuretics.	• Pregnancy • Renovascular disease [E]	• Periodic Cr., Electrolyte, WBC [70] • Angioedema • **Cough** • Tachycardia • ↑ Cr.; ↑ K^+ [70]	• Hypotension • Diarrhea • Fatigue • Taste disorders • Agranulocytosis • Nausea
	ARB	• Child-bearing age. • Renal impairment [C] • Peripheral vascular disease. [D] • Fluconazole ↓ losartan level. • NSAID ↓ effect of ARB. [K]	• Pregnancy • Renovascular disease	• Periodic Cr., K^+ [70] • Tachycardia • Rare angioedema • Tachycardia	• ↑ Cr. + K^+ [70] • Hypotension • Fatigue
	DHP-CCB	Liver disease		• Dizziness • **Peripheral edema** • Headache • Flushing	• Rash • Abnormal LFT • Hypotension
	β blockers	• Heart failure [F] • Peripheral vascular dis, DM. • Rhinitis; Dyslipidemia; Depression; Mild Asthma; Pheochromocytoma • Nicotine ↓ bio-availability. • May ↑ warfarin activity.	• Asthma or COPD. • 2nd/3rd AV block • Sinus Bradycardia	• Impotence • Fatigue • Light-headedness • Dizziness • Dyspnea • Wheezing • Cold extremities	• Claudication • Confusion • Vivid dreams • Insomnia • Depression • Diarrhea • **Bradycardia**
	Central drugs	• Post-partum depression	• Liver disorders • Hemolytic anemia • Pheochromocytoma	• Diarrhea, H.ache, Dizziness, Sedation, Dry mouth, Rash, Hemolytic anemia, Thrombocytopenia	• Lupus-like, • Myocarditis • Pancreatitis • Hepatotoxicity • Leukopenia • CBC, LFT.
	α-blockers	• Postural hypotension • Heart failure [G]	Urinary incontinence		
	Loop Diuretics		• Renal failure • Hyperkalemia		
	anti-aldosterone				
	NDHP-CCB	• Combination with β blockade • Mild Heart failure HF*p*EF	• 2nd and 3rd AV block • Congestive HF*r*EF	• Constipation • Heart block	

E ACEI and ARB are sometimes used in patients with renovascular disease under specialist supervision.
F β-blockers are used increasingly to treat stable heart failure but may worsen heart failure.
G In heart failure when used as monotherapy.
DHP-CCB = dihydro-pyridine CCB. NDHP-CCB = Non-dihydro-pyridine CCB.
K NSAID may increase the chance of acute renal impairment in concomitant use of thiazide and ACEI or ARB.
***** Approximate equivalent dosages among medications of the same pharmaceutical class.

Change of Anti-HTN Medications

General Principles:

Changing therapy risks new side effects and it may take time to re-establish adequate control of blood pressure. A change of therapy is unlikely to be appropriate in patients on three or more antihypertensive drugs.

Once a hypertensive drug therapy is initiated, most patients should return for follow-up and medication adjustments at least at monthly intervals until BP goal is reached.

If blood pressure goals are not met the clinician has three options for subsequent therapy:

1. Increase the dose of the initial drug toward maximal levels
2. Substitute an agent from another class
3. Add a second drug from another class

Individualized drug selection is based on several principles:

4. If the initial response to one drug is:
   - **Adequate: continue the same drug.**
   - **Partial: increase the dose or add a second drug of a different class.**
   - **Little: substitute another single drug from a different class.**
5. Consider low-dose diuretic use early or as a first addition.
   - **Consider loop diuretic agents instead of thiazide or thiazide-like diuretics when creatinine is > 2.0 mg/dL or eGFR < 30.**
6. Do not combine two drugs of the same class.
7. Combine agents at medium doses. It can be more effective than a high-dose single agent. In addition, it can result in fewer side effects.
8. Combination is more effective if a medicine from column 1 is combined with another from column 2. *[B]*
9. CCB-induced pedal edema may be attenuated if combined with ACEI or ARB.

Column 1	Column 2
Diuretics CC Blockers	ACE inhibitors AR blockers ß-Blockers

Note on initiation or change of ACEI's and ARB's

Monitor RFT within 1 month and repeat as required thereafter. If $K^+ > 6.0$ mmol/L, stop ACEI/ARB therapy and other drugs known to ↑ K^+.

If eGFR< 25% or S. Cr. increases ≥ 30% from baseline, stop ACEI/ARB or reduce to a previously tolerated dose. Repeat tests within 1-2 weeks.

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Resistant Hypertension

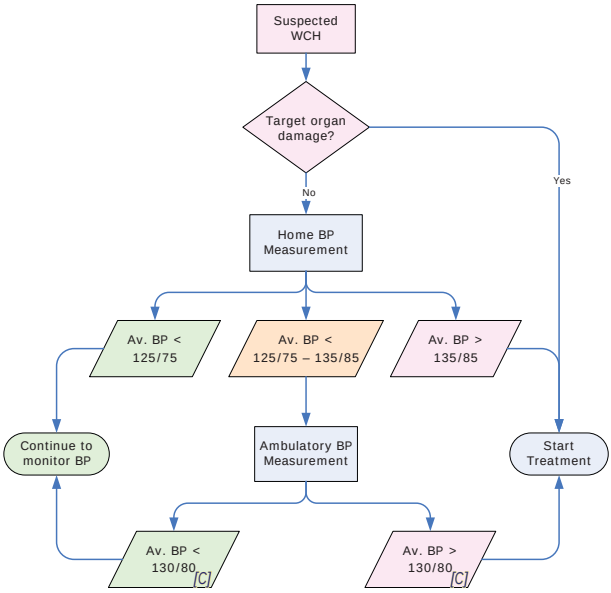
Hypertension may be termed resistant to treatment, or refractory, when a therapeutic plan that has included attention to lifestyle measures and the prescription of at least three drugs in adequate doses has failed to lower systolic and diastolic blood pressure sufficiently, after 6 months of follow-up. In these situations, referral to a specialist should be considered, as resistant hypertension is known to be often associated with target organ damage.

Causes of resistant hypertension

1. Improper Blood Pressure Measurement
2. Volume overload
   - Excess sodium intake
   - Volume retention from kidney disease
   - Inadequate diuretic therapy
3. Drug-induced [44]
4. Other causes
   - Non-adherence
   - Inadequate doses
   - Inappropriate combinations
5. Associated conditions
   - Obesity
   - Excess alcohol intake
6. White coat hypertension

White Coat Hypertension

White-coat HTN (WCH) or "isolated office HTN" is a persistent elevation of BP in the physician's office with normal BP at home or by ambulatory BP monitoring. Once suspected, BP must be evaluated using home or ambulatory measurement. The following chart summarizes the approach recommended for managing WCH.



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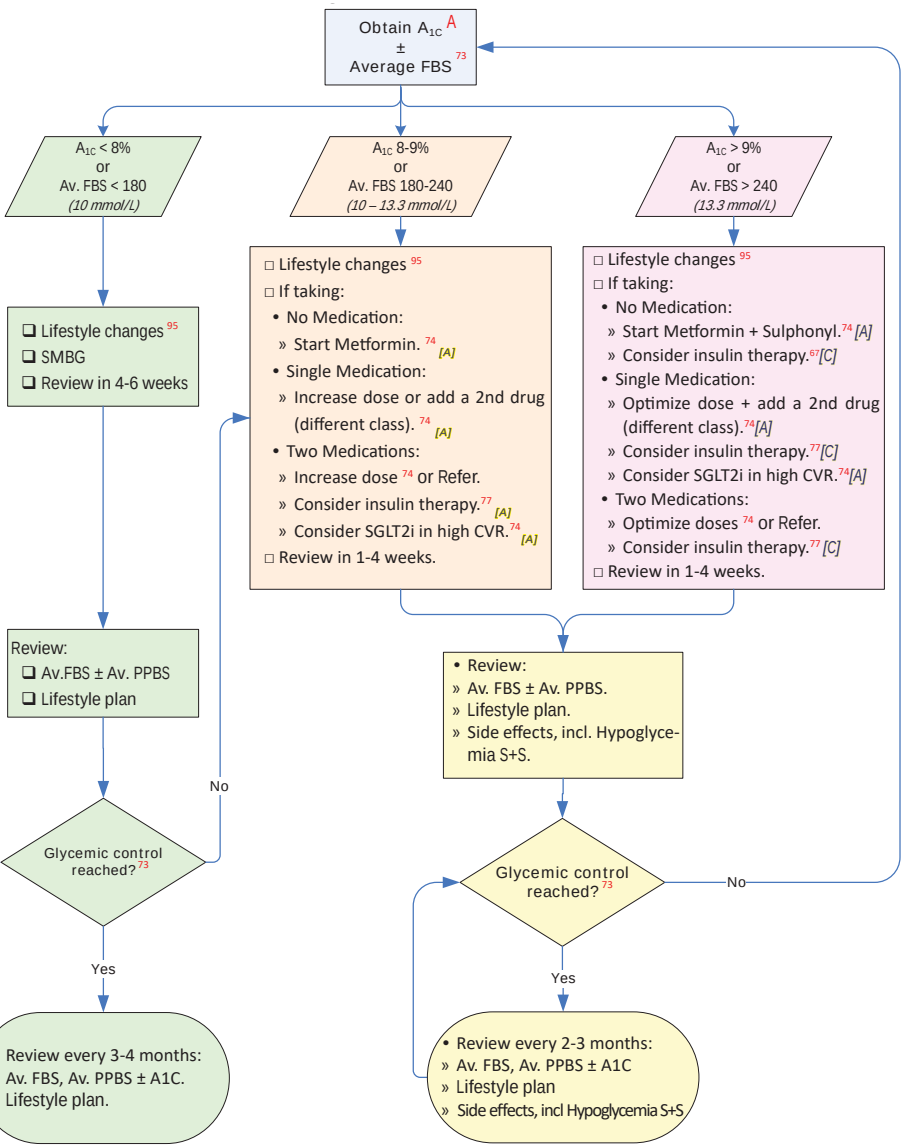
Glycemic Control: Chronic Management



At presentation, all patients should be instructed on blood glucose monitoring, hypoglycemia recognition and treatment, and when to seek medical help. Patients should check blood sugar frequently when insulin is initiated.

A: Not in hemoglobinopathies nor recent hemolysis or blood transfusion. They may interfere with A1c accuracy. [73]

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4. Scottish Intercollegiate Guidelines Network (SIGN). Pharmacological management of glycemic control in people with type 2 diabetes. Edinburgh: SIGN; 2017.
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Use of oral hypoglycemic agents

- Once an oral hypoglycemic (OHG) drug therapy is initiated, most patients should return for follow-up and medication every 1-2 weeks until glycemic goal is reached.
- If glycemic goals are not met, the clinician has three options for subsequent therapy:
  1. Increase the dose of the initial drug toward maximal levels
  2. Substitute an agent from another class
  3. Add a second drug from another class
- Start metformin early, or as a first addition, unless contraindicated. Begin with low dose and titrate weekly, to avoid gastrointestinal intolerance. if not tolerated, lower the dose or consider a trial of extended absorption metformin tablets.[A]
- Do not combine two drugs of the same class.
- Combine agents at medium doses. It can be more effective than a high-dose single agent. In addition, it can result in fewer side effects.

Assessment of glycemic control

- Glycemic control is best assessed by A1c. Please note that:
  1. Perform A1c test two times a year in controlled individuals, while quarterly in non-controlled.[C]
  2. Hemoglobinopathies, hemolysis and blood loss interfere with its accuracy.
  3. Average of multiple readings of FBS is a useful tool in achieving glycemic control (done daily or alternately). However, it reflects control over the measurement period, only.
  4. Postprandial glucose measurements (PPBS) should be made 1–2 h after the beginning of the meal.
  5. Less aggressive levels (such as A1c <8%) may be appropriate for patients with a history of severe hypoglycemia, limited life expectancy, advanced complications, extensive comorbidity, or long-standing diabetes with difficult-to-achieve goal.[B]

Levels of Glycemic Control:

Target test
A1c < 7%
Average FBS 80 - 130 mg/dL (4.4 - 7.2 mmol/L)
Average 1-2 hr-PPBS < 180 mg/dL (10 mmol/L)
Average bedtime < 120 mg/dL (6.7 mmol/L)
For Continuous glucose monitoring (10-14 days CGM): • Average Glucose. • Glucose Management Index (GMI). • Time in Range (TIR) > 70%. • Time in Hypoglycemia (TIHypo) < 4%. • Glucose Variability (GV).

Limitations on use of A1C in DM

- In People having Hb variants such as HbS (sickle cell trait), some A1C methods give falsely high or low readings that can lead to the over-treatment or under-treatment of diabetes. www.ngsp.org provides information about which assay methods are appropriate for these patients.
- **Shortened Erythrocyte Survival:** Any condition that shortens erythrocyte survival or decreases mean erythrocyte age (e.g., recovery from acute blood loss, hemolytic anemia, transfusion, HbSS, HbCC, HbSC) will falsely lower HbA1c test results regardless of the assay method used.
- **Prolonged Erythrocyte Survival:** Any condition that prolongs the life of the erythrocyte, or is associated with decreased red cell turnover, results in falsely elevated A1c. These include iron deficiency, vitamin B-12 deficiency and folate deficiency anemias, and asplenia.

Hypoglycemic Agents

Drug Class	Biguanides	Sulfonylureas (SU)	Meglitinides	α-glucosidase Inhibitors	
Medications	Metformin	Glipizide, Glyburide, Glibenclamide Gliclazide Glimepiride	Repaglinide Nateglinide	Acarbose	
Actions	Targets hepatic cells. ↓ hepatic glucose production. Does not stimulate insulin secretion.	Stimulates insulin secretion.	Augments glucose-induced insulin output More rapid onset of effect and shorter duration of action than SU	Slows absorption of carbohydrates Reduces post-prandial blood sugar	
Advantage	Extensive experience. Rare hypoglycemia. ↓ CVD events.	Extensive experience. ↓ Microvascular risk	↓Postprandial glucose excursions. Dosing flexibility.	No hypoglycemia. ↓Postprandial glucose excursions. Non systemic.	
Contra-indications & Precautions	eGFR<45: Don't start; Reduce dose to ≤ 1g/d. CI: Advanced hepatic insufficiency, eGFR<30. Caution: Unstable CHF, Excessive alcohol, Age> 80 years, Acetazolamide, COPD. ICM: Hold for few days.	Use with CAUTION in sulfa-allergic patients Use caution with hepatic insufficiency. eGFR<60: Stop Gliben. eGFR<45: Stop Glimep. eGFR<30: Stop Glicl.	Use caution with renal or hepatic insufficiency	Chronic intestinal disease Renal dysfunction (creatinine > 2.0) Cirrhosis	
Common Side Effects	GI upset, anorexia, metallic taste, Vit B12 ↓	Hypoglycemia and weight gain	Hypoglycemia and weight gain	Flatulence, diarrhea, abdominal pain	
Lab Monitoring	eGFR [54], LFTs Vit B12 (long-term SE) *[B]*	None	None	LFTs every 3 months in 1st year, then annually	
Usual Dose	500 mg od-1000 mg bid. XR may be prescribed once at night.	Glicl MR: 30 – 120 mg od with 1st meal. Glipiz: 5 od-20 mg bid ac. Gliben: 1.25 od- 10 mg bid ac. Glicl: 40 od–160 mg bd ac. Glimep: 1-8 mg od w/ meal.	Repa: 0.5-2 mg tid w/ each meal Nate: 60-120 mg tid w/ each meal	25 mg-100 mg tid	
Maximum Daily Dose	2500 mg	as above	as above	as above	
Dose Adjustment	2-4 weeks	1-2 weeks	1-2 weeks	2-4 weeks	
Cost (30 day)	$	$	$$	$	

ac= before meal ; pc= after meal ; SU= sulfonylurea ; SE= side effect; ICM= iodinated contrast media.

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Table 15. Anti-Glycemic Agents

	Drug Class	PPAR-γ Agonists (Thiazolidinediones TZD)	Dipeptidyl Peptidase-4 Inhibitors (DPP4i)	SGLT2 inhibitors	GLP-1 receptor agonists
	Medications	Pioglitazone Rosiglitazone	Sitagliptin, Vildagliptin Saxagliptin, Linagliptin, Alogliptin	Canagliflozin Dapagliflozin Empagliflozin	Exenatide Liraglutide Dulaglutide Semaglutide
	Actions	Regulates insulin responsive genes necessary for glucose and lipid metabolism. Improves sensitivity to insulin in skeletal and adipose tissue.	Glucose-dependent: ↑ Insulin release, ↓ Glucagon levels.	Blocks glucose re-absorption by the kidneys, increasing glucosuria.	Glucose-dependent: ↑ Insulin secretion, ↓ Glucagon secretion. Slows gastric emptying. ↑ Satiety
	Advantage	Rare hypoglycemia. ↑ HDL-C. ↓ Triglycerides.	Rare hypoglycemia. May be taken with or without food.	Rare hypoglycemia. ↓ Weight. ↓ Blood pressure. ↑ CV outcome in CVD. Improve CKD indices.	Rare hypoglycemia. ↓ Weight. ↓ Postprandial glucose excursions. ↓ Cardiovascular risk.
	Contra-indications & Precautions	CHF III & IV Abnormal LFTs CAUTION in ladies @ ↑ risk of fracture. May resume ovulation in anovulatory women.	H/o pancreatitis. May need ↓ SU dose to prevent hypoglycemia. Risk of Acute pancreatitis, Joint pain. eGFR<60: ↓ dose or shift to Linagliptin. Heart Failure.	Renal failure. Use with CAUTION in renal insufficiency and low-carb diets. Risk for Amputation & bone fracture (Cana). Risk of DKA.	History of pancreatitis. Severe hyper-triglyceridemia, renal failure, MEN-2, Hx or FHx of MTC. Take OCP & Abx 1 hr earlier.
	Common Side Effects	Weight gain, ↑ LDL, fluid retention, Bone fractures	Headache, URTI, nasopharyngitis, UTI, angioedema, urticaria,	GU infections, ↑ LDL, Polyuria, dehydration, hypotension, dizziness	GI upset. ↑ Heart rate, ? Acute pancreatitis, ? Tumors
	Lab Monitoring	LFTs every 2 months in 1st year, then PRN (ALT)	RFT	RFT, LDL	RFT
	Usual Dose	Pio: 15 od-45 mg od Rosi: 4 od-8 mg bid	Sitaglip: 25-100 mg od Vildaglip: 50 mg bid Saxaglip: 2.5-5 mg od Linaglip: 5 mg od Aloglip: 25 mg od	Cana: 100-300 mg od before first meal. Dapa: 5-10 md od w/ wo food. Empa: 10-25 mg od w/ wo food.	Exena: sc inj bd or ow Liraglu: sc inj od Dulaglu: sc inj ow Semaglu: sc inj ow, PO od
	Maximum Daily Dose	as above	as above	as above	as above
	Dose Adjustment	2-4 weeks	1-2 weeks	1-2 weeks	-
	Cost (30 day)	$$	$$$	$$$$	$$$$

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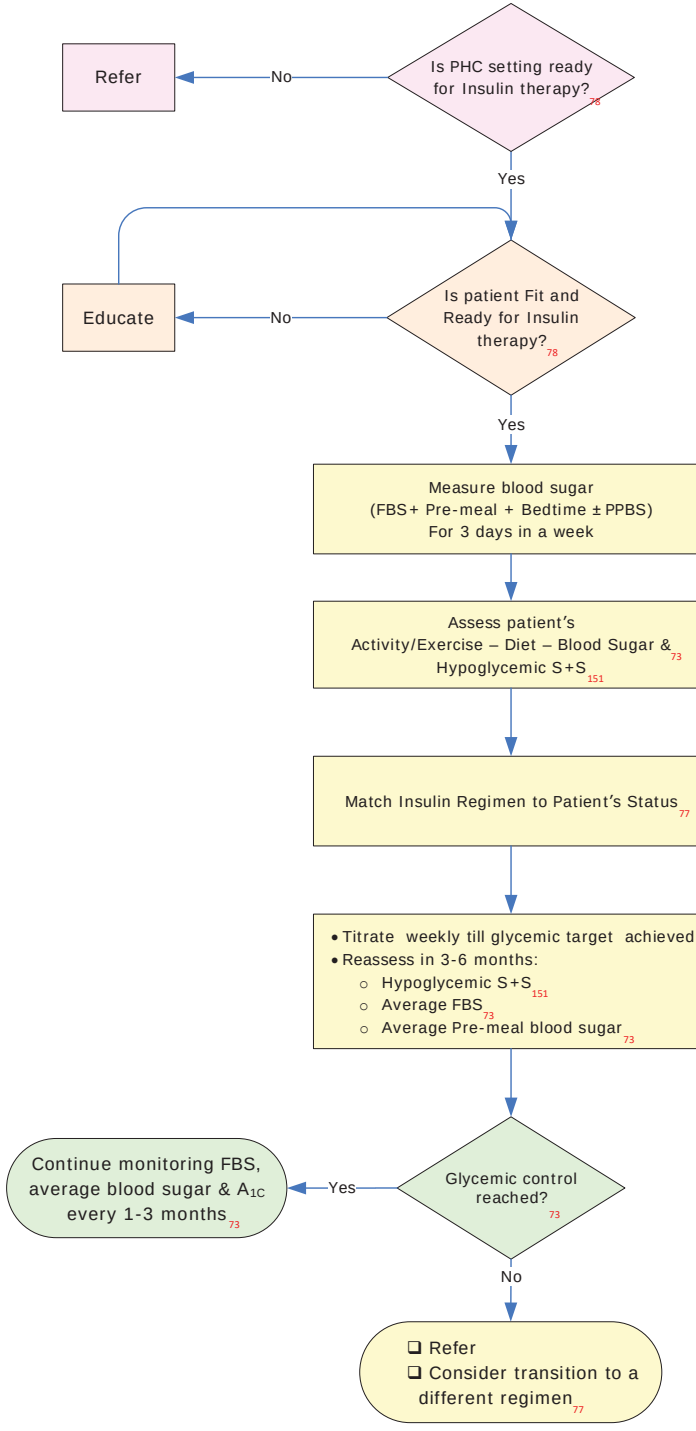
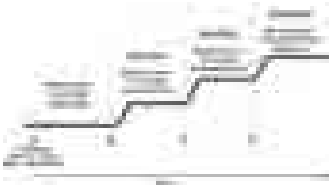
Insulin Therapy: General Algorithm



Insulin Therapy in T2DM: General Guideline

- Type 2 DM is a progressive disease in which ß-cell function deteriorates. Many patients will eventually need insulin.
- Early initiation of insulin would be a safer approach for individuals presenting with weight loss, severe symptoms and RBS > 250 mg/dl (14 mmol/L).
- Insulin might be added to the oral regimen if glycemic control is not achieved, after the use of two different classes.[A] This has to be done by an expert physician.



Types of insulin

	Insulin	Onset	Peak	Effective duration	Notes
Basal	Long-acting: Glargine 100	1–2 hrs	No peak	20–24 hrs	Once daily @ same time
	Long-acting: Detemir	1–2 hrs	No peak	6-24 hrs	1-2 times daily.
	Long-acting: Glargine 300	6 hrs	No peak	> 24 hrs	Once daily @ same time
	Long-acting: Degludec	30-90 Min	No peak	42 hrs	
	Intermediate: NPH	2–4 hrs	4–10 hrs	10–16 hrs	1-2 times daily.
Bolus	Short-acting: Regular	30–60 min	2–3 hrs	5–8 hrs	30 min pre-meal.
	Rapid-acting: Aspart	5–15 min	30–90 min	< 5 hrs	Immediate pre-, intra- or post-meal.
	Rapid-acting: Lispro	5–15 min	30–90 min	< 5 hrs	
	Rapid-acting: Glulisine	5–15 min	30–90 min	< 5 hrs	
Premixed	NPH / Regular	30–60 min	Dual	10–16 hrs	
	NPH / Lispro or Aspart	5-15 min	Dual	10–16 hrs	
	Aspart protamine / Aspart	5-15 min	Dual	12-24 hrs	
	Lispro protamine / Lispro	5-15 min	Dual	6-12 hrs	

Types of insulin regimen

Regimen / Characteristics	Basal-Only	Mixed	Basal-Bolus
Blood Sugar Pattern	↑ FBS + minimal ↑ PPBS	Any FBS + ↑ PPBS	Any blood sugar level
Diet Pattern	Small, regular meals	Isocaloric meals or larger lunches	Any diet pattern
Lifestyle	Reluctance to have MDI	Consistent daily routine, reluctance to do MDI	Erratic schedule, motivated to achieve tight glycemic control
Monitoring	Fasting	Fasting and pre-supper (if twice daily)	Before meals and bedtime
Insulin type	Intermediate or LA	Premixed	Long acting + Rapid

MDI: multi dose insulin; LA: long-acting

- Preferably, begin with long-acting insulin (Glargine or Detemir) because of lower risk of hypoglycemia and ease of use. If cost or availability is an issue, begin with insulin NPH while monitoring for hypoglycemia.

Is the PHC setting ready for insulin therapy?

When starting insulin therapy, use a structured programme employing active insulin dose titration that includes:[A]

1. Structured education by a Certified Diabetes Educator
2. Continuing easy-access support (including telephone).
3. Frequent self-monitoring.
4. Dietary understanding and review.
5. Management of hypoglycemia.
6. Management of acute changes in blood sugar control.
7. Support from an appropriately trained and experienced physician.

Is the patient fit and ready for insulin therapy?

1. New patients with extreme hyperglycemia (FBS > 250 mg/dl - 14 mmol/L).
2. Patients who are unable to achieve A1C goals using oral agents.
3. Patients educated by a certified diabetes educator to:
    - Ensure proper administration and understanding of the insulin regimen.
    - Discuss the benefits and risks of insulin therapy.
4. Patient and care giver agree on starting insulin therapy.

References:

5. M Abrahamson & A Peters. Intensification of insulin therapy in patients with type 2 diabetes mellitus: An algorithm for basal-bolus therapy. Annals of Medicine 2012;44:836–846.
6. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.Type 2 diabetes in adults: management. NICE guideline NG28. Published December 2015, last updated August 2019.
7. Irl B. Hirsch et al. A Real-World Approach to Insulin Therapy in Primary Care Practice. Clinical Diabetes 23(2):78-86, 2005.
8. Insulins pharmacokinetic properties. Epocrates Online. athenahealth, Inc. https://online.epocrates.com/tables/3201/Insulin-Comparisons. Accessed on 18 December 2017.
9. Prescribers' digital reference. PDR, LLC. http://www.pdr.net. Accessed on 18 December 2017.

Notes on the use of Insulin Therapy

Stepwise approach

Insulin therapy is commonly initiated, to increase the endogenous basal insulin level, with injected basal insulin, such as long-acting insulin analogue, or intermediate-acting human insulin.

The progressive nature of DM suggests that a stepwise intensification of therapy would be a logical approach to treatment.

The next step involves the introduction of bolus (regular or rapid) mealtime doses.

The simplest means of introducing bolus mealtime insulin is to begin with a single injection before the largest meal of the day.

Self-monitoring of blood glucose levels (SMBG) 2 hours after meals for a period of up to 1 week before adding bolus insulin doses will help the physician to target which meal has the largest impact on postprandial blood sugar.

The decision to escalate in the stepwise approach from one pre-meal bolus dose to two, and then possibly three doses, should be made on the basis of A1C levels.

When intensifying insulin therapy by adding bolus insulin, review and discontinue sulphonylurea therapy, specially if hypoglycemia occurs.

Titration & Intensification of Insulin Therapy

Dose titrations of 1–2 units increment, or decrement, or no change, can be made according to the next pre-meal SMBG results, or bedtime SMBG if bolus insulin is given before dinner.

- For basal insulin:
  - Asses 1 week FBS results. Goal is 90-150 mg/dl (5-8.3 mmol/L).
  - If 50% of FBS readings > goal, increase basal by 2 iu.
  - If 2 readings < 80 mg/dl (4.4 mmol/L), decrease basal by 2 iu.
- For bolus insulin:
  - Avoid at bedtime.
  - If premeal sugar > 250 mg/dl (13.9 mmol/L), add 1 iu for each 50 mg/dl > 150 mg/dl (correction factor 1:50).
  - If premeal sugar consistently needed a correction, adjust the prior insulin dose.

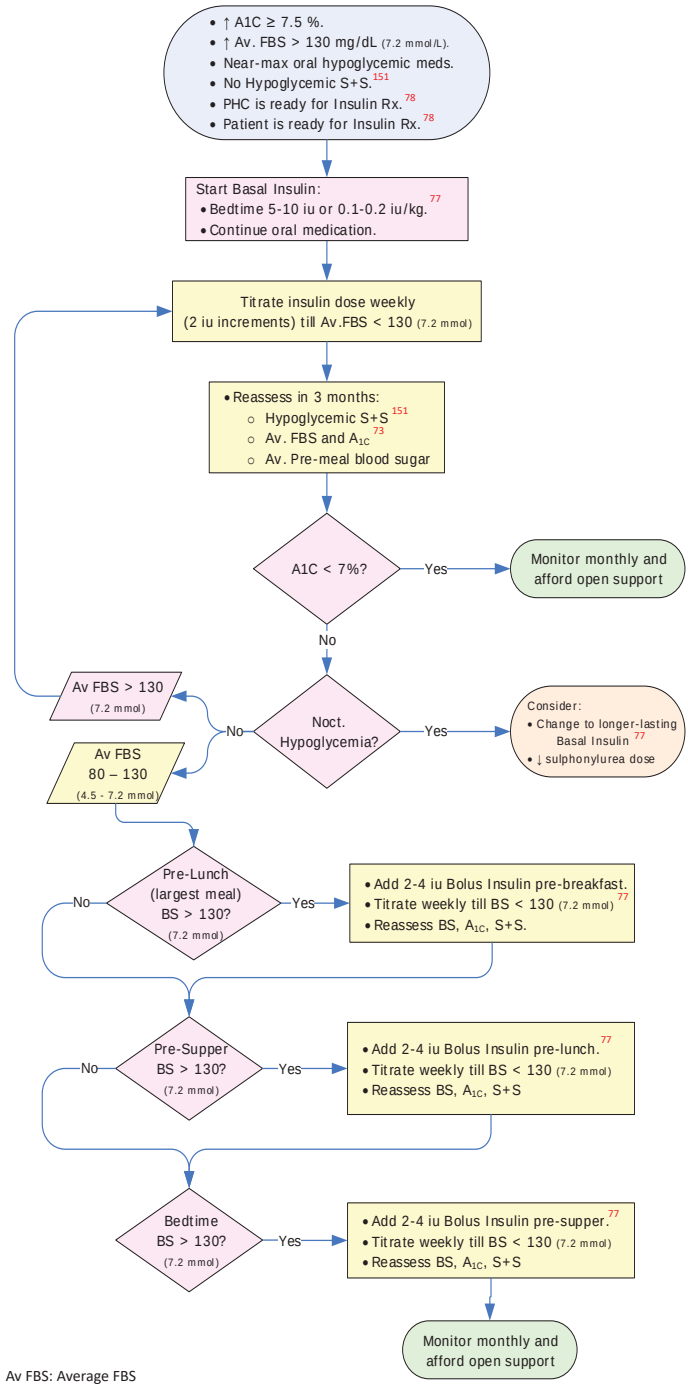
The following table guides this task.

Meal	Pre-meal Blood Sugar	Change either in	
		bolus dose in current meal	or if correction is consistently needed, consider change in prior insulin dose
Breakfast	< 90 mg/dL (5 mmol/L)	- 2 iu	Basal insulin
Lunch	90-130 mg/dL (5-7.2 mmol/L)	no change	Bolus insulin @ Breakfast
Supper	> 130 mg/dL (7.2 mmol/L)	+ 2 iu	Bolus insulin @ Lunch

References:

1. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
2. Type 2 diabetes in adults: management. NICE guideline NG28. Published December 2015, last updated August 2019.
3. Kovil, Rajiv, et al. "Consensus on insulin dose and titration algorithms in ambulatory care of type 2 diabetes in India." J Assoc Physicians India 65.2 (2017): 17-30.
4. Irl B. Hirsch et al. A Real-World Approach to Insulin Therapy in Primary Care Practice. Clinical Diabetes 23(2):78-86, 2005.
5. M Abrahamson & A Peters. Intensification of insulin therapy in patients with type 2 diabetes mellitus: An algorithm for basal-bolus therapy. Annals of Medicine 2012;44:836–846.

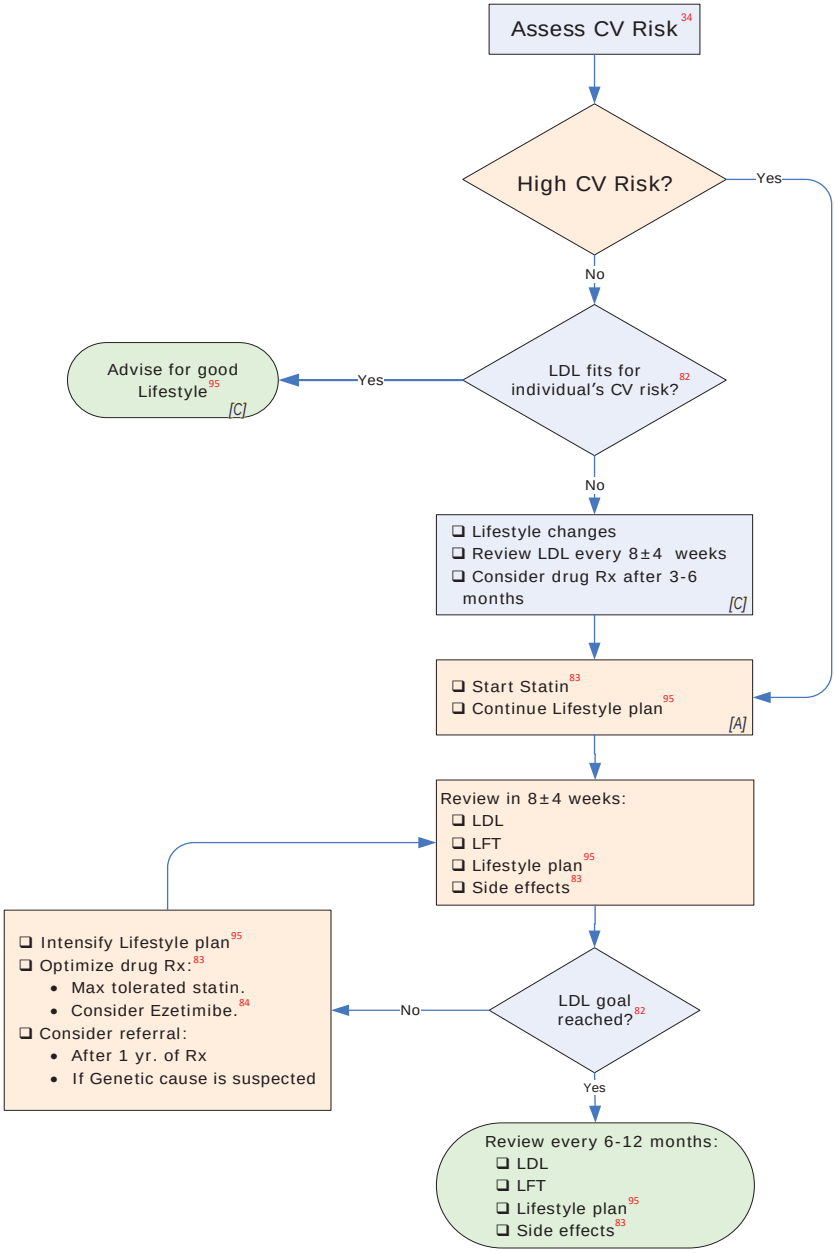
Insulin Therapy: Suggested Regimen



Av FBS: Average FBS

Lipid Control & Statin Therapy

1. LDL-C is recommended as target of treatment. *[A]*
2. No specific targets for HDL or Tg levels have been determined in clinical trials, though increases in HDL-C predict atherosclerosis regression, and low HDL is associated with excess events and mortality in CAD patients, even when LDL is lower than 70 mg/dL (1.8 mmol/L).



A: Primary CVD Prevention: Intervention to dyslipidemia as a function of CVR and baseline[a] LDL

CV Risk	LDL levels					
	<55 mg/dL < 1.4 mmol/L	55 -< 70 mg/dL 1.4 -< 1.8 mmol/L	70 - < 100 mg/dL 1.8-< 2.6 mmol/L	100-< 116 mg/dL 2.6-< 3 mmol/L	116-< 190 mg/dL 3-< 4.9 mmol/L	>=190 mg/dL >= 4.9 mmol/L
Average risk	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Lifestyle intervention+ consider Drug [A]	Lifestyle + Drug intervention [A]
Low-Moderate added risk	Healthy Lifestyle [C]	Healthy Lifestyle [C]	Healthy Lifestyle [A]	Lifestyle intervention + consider Drug [A]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]
High added risk	Healthy Lifestyle [A]	Healthy Lifestyle [A]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]
Very high added risk	Healthy Lifestyle [B]	Lifestyle intervention + consider Drug [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]	Lifestyle + Drug intervention [A]

Reproduced from 2019 ESC/EAS Guidelines for the Management of Dyslipidaemias.

[a] Refers to LDL-C level in a person not taking any lipid-lowering medication, or to the extrapolated baseline value for those who are on current treatment.

B: LDL Cholesterol Goals.[b]

Risk category [33, 34]	LDL goal
Low/ Moderate added CV Risk	<100-116 mg/dL (2.6-3 mmol/L) [A]
High CV Risk	<70 mg/dL (1.8 mmol/L) * [A]
Very High CV Risk	<55 mg/dL (1.4 mmol/L) * [A]

[b] Reduction of baseline LDL-C by >50% is recommended, as well.

References:

1. Mach, François, et al. "2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS)." European heart journal 41.1 (2020): 111-188.
2. Grundy, Scott M., et al. "2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines." Journal of the American College of Cardiology 73.24 (2019): e285-e350.
3. Al Sayed N, et al. Consensus clinical recommendations for the management of plasma lipid disorders in the Middle East. International journal of cardiology. 2016 Dec 15;225:268-83.

Lipid Lowering Agents

Drug Class	HMG CoA Inhibitors (Statins)	Fibrates
Medications	**Simvastatin; Atorvastatin; Pravastatin; Lovastatin; Fluvastatin; Rosuvastatin**	**Gemfibrozil (**600 mg bid**)** **Fenofibrate (**200 mg od**)**
Physiologic outcomes		
• LDL	↓ 20-50%	↓ 10-15%
• HDL	↑ 5-15%	↑ 10-15%
• Triglycerides	↓ 10-30%	↓ 20-50%
Indications	Lower LDL cholesterol in patients with: CHD, multiple risk factors, or very high LDL	TG > 400 mg/dL (5 mmol/L)
Contraindications		
• Absolute	Active or chronic liver disease	Pregnancy
• Relative	Concomitant use fibric acid derivatives, pregnancy	Severe Liver or Renal disease, cholelithiasis
Common Side Effects	Mild GI complaints, Not common: Myopathy Rare: Hepatotoxicity	Mild GI complaints, Not common: Gallstones Rare: Hepatotoxicity
Liver enzyme monitoring	0, 3, 6 months, then q 6 month	0, 3, 6 months, then annually
CPK monitoring	Complaints of muscle aches/pains/ cramps	Complaints of muscle aches/pains/ cramps

Notes on the use of Statins:

1. The clinical benefit is largely independent of the type of statin used, but depends on the extent of LDL lowering. *[A]*
2. Calculate the percentage reduction of LDL-C required to achieve that goal. Choose a statin that, on average, can provide this reduction.

LDL reduction, cost and usual doses of di□erent statins.

Statin	LDL Reduction		Cost	Usual Starting Dose (Dosage Range)
	~ 35%	~ 45%		
Atrovastatin	10 mg	20 mg	$$$	10 mg (10 - 80 mg) od
Simvastatin	20 mg	40 mg	$	20 mg (5 - 40 mg) od
Lovastatin	40 mg	80 mg	$$	20 mg (10 - 80 mg) od
Pravastatin	40 mg	80 mg	$	20 mg (10 - 80 mg) od
Fluvastatin	80 mg	-	$$$$$	40 mg (20 - 80 mg) od
Rosuvastatin	-	5 mg	$$$$$	10 mg (5 - 40 mg) od

3. The response to statin treatment is variable, up-titration to reach target is mandatory.
4. Bedtime or evening dose of statin is more effective (higher cholesterol synthesis).
5. Dosage adjustments should not be made more often than every 4 weeks after a fasting lipid profile.
6. If patients are intolerant to a statin, clinicians are encouraged to have the patient try the other statins in reduced doses before ruling out all statins.
7. If patients are unable to take a statin, then fibric acids and other lipid lowering agents may be used.
8. Safety Consideration:

DO

- Check baseline renal function and TSH prior to initiating statin therapy.
- Check ALT and AST levels prior to prescribing a statin and prior to any planned increase in statin dose.
- Consider the potential for drug-drug interactions when prescribing statins. Vitamin

E intake may reduce the benefit of statins.

- Counsel patients to discontinue statin therapy during a short course of a macrolide antibiotic (erythromycin, azithromycin, and clarithromycin).
- Be alert for patient characteristics that may increase the risk for myopathy during statin therapy, such as advanced age, renal or liver impairment, diabetes with evidence of hepatic fatty changes, hypothyroidism, surgery, trauma, ischemia-reperfusion, debilitated status, heavy exercise.
- Provide patient education regarding recognition and reporting of symptoms of myopathy during statin therapy.
- Suspect myopathy when a statin-treated patient complains of unexplained generalized muscle pain, tenderness, or weakness. Joint pain, nocturnal leg cramps, or localized pain are not symptoms of myopathy.
- Assess for signs of dehydration or renal compromise in patients with myopathy.
- Check CK levels when a patient reports symptoms of myopathy.
- If CK levels are less than 5 times upper limit of normal, repeat measurement in 1 week.
- If CK levels are elevated to 5 times upper limit of normal or greater, discontinue statin therapy and monitor serum CK levels.
- Consider referral, for patients requiring combination lipid-lowering therapy.

DON'T

- Prescribe high-dose statin for pregnant patients, elderly patients and patients with renal insufficiency, or in combination with fibrates.
- Do not exceed 20 mg simvastatin daily with amlodipine.
- Do not exceed 40 mg simvastatin daily.

Ezetimibe

It inhibits intestinal uptake of dietary and biliary cholesterol without affecting the absorption of fat-soluble nutrients.

Ezetimibe added to ongoing statin therapy reduces LDL-C by an additional 21-27% compared with placebo.

It may be considered for very-high risk patients, and basal LDL-C> 190 mg/dl (4.9 mmol/L), who have not achieved their LDL-C goals[82] on maximally tolerated dose of statin alone.

The recommended dose is 10 mg/day in the morning or evening irrespective of food intake.

References

1. Mach, François, et al. "2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and European Atherosclerosis Society (EAS)." European heart journal 41.1 (2020): 111-188.
2. Jellinger PS, et al. American association of clinical endocrinologists and American college of endocrinology guidelines for management of dyslipidemia and prevention of cardiovascular disease. Endocrine Practice. 2017 Apr;23(s2):1-87.
3. Al Sayed N, et al. Consensus clinical recommendations for the management of plasma lipid disorders in the Middle East. International journal of cardiology. 2016 Dec 15;225:268-83.
4. Piepoli MF, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European heart journal. 2016 May 23;37(29):2315-81.
5. Grundy, Scott M., et al. "2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines." Journal of the American College of Cardiology 73.24 (2019): e285-e350.
6. Characteristics of the Various Statins. Pharmacist's Letter/Prescriber's Letter. May 2012.

Aspirin Therapy

- Aspirin (ASA) reduces the risk of cardiovascular event by about 25% over 5 years, in both sexes.
- The decision to use ASA should be based on a balance of the risks and benefits for each person, taking into account their absolute risk of an event.

ASA Indications

1. Very High CV Risk:[34]
    - **Commence low-dose ASA (75-150 mg).** *[A]*
2. High CV Risk:[34]
    - **Commence low-dose ASA (75-150 mg) unless contraindicated, in patients aged ≥50 years.** *[C]*
3. Low-Medium CV Risk:[34]
    - **The risk of significant adverse effect (bleeding) outweighs the benefits of ASA for the prevention of CVD.**

ASA Contraindication

1. ASA allergy:
    - Patients with documented ASA allergy may consider clopidogrel (75mg/day) as an alternative. *[B]*
2. ASA intolerance.
3. Uncontrolled Blood Pressure.
4. Active peptic ulceration.
5. Any major bleeding risk.

Adverse Effects

- Bleeding is the most serious side effect:
    - Intracranial bleeding: absolute excess risk ≈ 2/1000 people treated/year.
    - Extracranial bleeding: absolute excess risk ≈ 1-2/1000 people treated/year. Most are not fatal.
    - Upper GI bleeding/perforation: regular ASA < 300 mg/day is associated with a two-fold increased risk.
- Notes on Monitoring Adverse Effects:
    - **Monitor stool for occult blood or change in color.**
    - **Monitor hemoglobin ± hematocrit for drop due to bleeding or hemolysis (esp. in G6PD deficiency).**
    - **Monitor bilirubin for rise due to hemolysis (in G6PD deficiency).**

References:

1. US Preventive Services Task Force. Aspirin Use for the Primary Prevention of Cardiovascular Disease and Colorectal Cancer: U.S. Preventive Services Task Force Recommendation Statement. Ann Intern Med. 2016;164(12):836-45.
2. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
3. Beutler E. Glucose-6-phosphate dehydrogenase deficiency: a historical perspective. Blood 2008;111(1):16-24.
4. H Brenner, U Haug. Low-Dose Aspirin Use and Performance of Immunochemical Fecal Occult Blood Tests. JAMA 2010;304(22):2513-2520.
5. Y Hirata, et al. Incidence of gastrointestinal bleeding in patients with cardiovascular disease: buffered aspirin versus enteric-coated aspirin. Scandinavian Journal of Gastroenterology 2011;46:803-809.
6. Williams, Bryan, et al. "2018 ESC/ESH Guidelines for the management of arterial hypertension" European heart journal 39.33 (2018): 3021-3104.

Immunization & Opportunistic Preventive Care

Influenza vaccine:[C]

- Annual vaccination is recommended for all adults without contraindications in the following groups and their household contacts:
  - Persons aged 50 years and older;
  - Women who will be pregnant during the influenza season;
  - Persons who have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, cognitive, neurologic/neuromuscular, hematological or metabolic disorders (including diabetes mellitus);
  - Persons who have immunosuppression.
- Annual vaccination is recommended for all health-care personnel.

Pneumococcal vaccine:[C]

- Vaccinate all adults age 65 years and older.
- Vaccinate all adults < 65 years, who smoke cigarettes, have chronic CVD, chronic pulmonary disease, diabetes mellitus, chronic renal failure or sickle cell disease.
- Vaccination includes PCV13 followed by PPSV23, after one year.
- Revaccinate PPSV23 after 5 years those above 65 years.

Oral & Dental Examination:

- Diabetic persons are more susceptible to oral infections such as periodontal disease, particularly if not controlled.
- The presence of active periodontitis can, in turn, impair glycemic control and increase the risk of developing systemic complications, including CVD and stroke.
- People with DM must have a routine visual inspection of their gums and teeth for signs of periodontal disease at diagnosis and during each diabetes-focused visit, by the PHC physician.
- A dental exam is recommended at diagnosis and then every 6 months if dentate or every 12 months if edentate.
- Refer a person who is suspected of having periodontal disease to a dentist to ensure early and prompt diagnosis and treatment.
- Signs of periodontal disease
  - Red, sore, swollen, receding, or bleeding gums;
  - Loose or sensitive teeth; separation of teeth;
  - Halitosis (bad breath);
  - Accumulation of food debris or plaque around teeth.

Mammogram:

- Evidence supports a modest association between type 2 diabetes and the risk of breast cancer, which appears to be more consistent among postmenopausal than among premenopausal women.
- Screening mammography is recommended for all women aged 50 to 74 years, every 2 years.[B] Consequently, it is wise to have mammogram done for all eligible population, and diabetic ladies in particular. Ladies with high risk for breast cancer may be screened at earlier age of 40 years.[C]

References:

1. Standards of Medical Care in Diabetes. American Diabetes Association. Diabetes Care 2021;44 (Suppl 1):S1-S244.
2. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2017–18 influenza season. MMWR 2017 Aug 25;66(2):1-24.
3. Kobayashi M, et al. Intervals between PCV13 and PPSV23 vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 2015 Sep 4;64(34):944-7.
4. Bhandari R, Kelley GA, Hartley TA, Rockett IR. Metabolic syndrome is associated with increased breast cancer risk: a systematic review with meta-analysis. International journal of breast cancer. 2014 Dec 29;2014.
5. US Preventive Services Task Force. Screening for breast cancer: US Preventive Task Force recommendation statement, September 2016.
6. Clinical Practice Guideline on the Use of Screening Strategies for the Detection of Breast Cancer. The Saudi Center for EBHC, Ministry of Health, Saudi Arabia, Riyadh 2014.

Cardiometabolic Management During Holy Ramadan

Rational: Ramadan fasting carries changes in the lifestyle of patients with chronic illnesses. These include, but not limited to:

- Food: type; timing; dehydration; and daytime fasting.
- Sleep pattern.
- Medications: patients may need to change medication timing and dosages.

Aim: Help CMR patients to fast safely.

Patients at higher risk of harm on fasting:

1. Recurrent or severe hypoglycemia within 3 months prior to Ramadan.
2. Severe Hyperglycemia (Hyperosmolar, DKA) within 3 months prior to Ramadan.
3. Uncontrolled type 1 diabetes.
4. Hypoglycemia unawareness.
5. Chronic kidney disease stage 3 or more.
6. Unstable cardiovascular disease.
7. Acute severe illness.

How to minimize risk?

1. Assess and educate the patient, 1 to 2 months before Ramadan.
2. Assess the patient's past experience with fasting.
3. Consider referral or liaise with the specialist doctor, including cardiologist and nephrologist, if needed.
4. Adjust lifestyle, including food intake and exercise (see below).
5. Adjust medication timing and possibly dosing (see below).
6. Encourage and adjust timing of HBSM to cover noon-time and pre/post meals.
7. Encourage HBPM on awakening and before sleep, in first few days of fasting.
8. Advise on conditions to break fasting.
9. Encourage a trial of few days of pre-Ramadan fasting.
10. Arrange a close FU.
11. Supply take-home written instructions.

Lifestyle Adjustment

a. Distribute calories evenly between Sunset (Iftar) and Pre-Dawn (Sahoor) meal.
b. Avoid or limit intake of sugary drinks, deserts, fatty and fried food.
c. Ensure adequate water intake (especially if on diuretics).
d. Delay the Sahoor meal.
e. Avoid or limit strenuous physical activity during fasting hours. It may be better to keep it 2 hours after Iftar.

Medication Adjustment

1. Stress on compliance to medications.
2. Replace multi-dose medications with once or twice dosing medications.
3. Shift AM medications to Sunset, while PM medications to Pre-Dawn.

Specific medication adjustment:

- *Sulphonylurea*
  1. Switch long acting drugs such as Glibenclamide to shorter acting drugs.[74]
  2. Consider decreasing Sahoor dose by 50%.
- *Basal insulin (Long / intermediate acting)*
  1. Shift it to Iftar.
  2. Consider decreasing dose by 15-30%.
- *Short acting / Premixed once daily*
  Shift it to Iftar.
- *Short acting / Premixed twice daily*
  1. Shift morning dose to Iftar.
  2. Consider decreasing evening dose by 25-50%; shift it to Sahoor meal.
- *Short acting / Premixed three times daily*
  1. Shift morning dose to Iftar; omit lunch dose.
  2. Consider decreasing evening dose by 25-50%; shift it to Sahoor meal.

When to consider Breaking the Fast:

1. Hypoglycemia < 70 mg/dL (3.9 mmol/L).
2. Symptomatic hyperglycemia > 300 mg/dL (16.7 mmol/L).
3. Blood pressure >180/110.
4. Acute severe illness.

References:

5. International Diabetes Federation and the DAR International Alliance. Diabetes and Ramadan: Practical Guidelines. Brussels, Belgium: International Diabetes Federation, 2016.
6. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.

Cardiometabolic Management During Hajj and Travel

Hajj and travel share common changes in the lifestyle of patients with chronic illnesses. These include, but not limited to:

- Food: type; timing; and skipping few meals.
- Physical activity: use of public transportation; and need for excessive walk.
- Sleep: environment; mattress; jet lag.
- Medications: patients may change or discontinue medications because they eat different types of food, walk more, loss or short of medication and etc.
- Weather.
- Stress.

Thus, CMR patients are at higher risk to develop complications and comorbidities, including infections and heat exhaustion, during their travel.

Recommendations to Travel and Perform Hajj Safely:

a. Assess and educate the traveling patient and her/his companion, 1 to 2 months before travel.

b. Assess the patient's past experience with travel, Hajj or Umra, including the changes above-mentioned.

c. Consider referral or liaise with the specialist doctor, including cardiologist and nephrologist, if needed.

d. Vaccinate patient according to destination.

e. Write a brief medical report, including patient's condition and medications.

f. Counsel CMR patients on:

1. Encourage patient to inform Hajj caravan about his/her condition and to carry a card that indicates health status.
2. Stress on compliance to medications, storage of medication especially insulin and hygiene on sharp needle disposal.
3. Carrying the medications on-flight, not in luggage; and have enough supply.
4. Encourage patients travelling on long flights or bus journeys (> 4 hours) to walk, every 1 hour, or to do calf and neck exercise, while seated.
5. Maintain a healthy diet, ensure adequate water intake (especially in hot weather and on diuretics). Avoid skipping meals (especially if diabetic).
6. Encourage diabetic and hypertensive patients to monitor their blood sugar and blood pressure, respectively, before each major step in hajj rituals.
7. Diabetic patients who intend to perform unusual physical activity may need to eat snacks. Advise them to carry sugary food or drink to be used in case of hypoglycemia.
8. Those with coronary artery disease should avoid strenuous physical activities, take multiple rest breaks, and seek medical advice when they experience symptoms.
9. Advise diabetic patients to have regular foot care.[128, 129]
10. Review hypoglycemia management.
11. Ask patient to seek medical advice promptly if he/she develop complications.
12. Supply take-home written instructions.[133]

References:

1. Ibrahim, Mahmoud, et al. "Recommendations for management of diabetes and its complications during Hajj (Muslim pilgrimage)." BMJ Open Diabetes Research and Care 6.1 (2018).
2. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
3. Plan ahead for Hajj pilgrimage, advises Diabetes UK. 2016. https://www.diabetes.org.uk/about_us/news/plan-ahead-for-hajj-pilgrimage-advises-diabetes-uk-. [cited 25 Aug 2020]

6

Non-Pharmacological Management

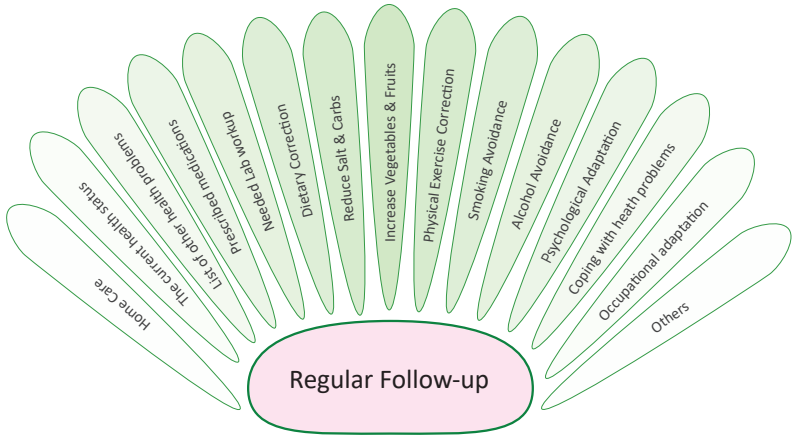
العلاج اللادوائي

Self-Management

The core of non-pharmacological management relies on setting a customized plan, that enhances active patient engagement (Self-Management Plan).

Self-Management Components

1. **The current health status**: Patient understands and is aware of his current condition, and its need of care.
2. **Ongoing health problems**: Patient understands and is aware about other ongoing chronic problems, including opportunistic findings, and their needs of health care.
3. **Regular Follow-up**: A cornerstone in self-management.
4. **Medication Awareness**: Patient is aware about prescribed medications, their indications, common and serious adverse events, cost, monitoring, storage, and how to deal with missed dosages and overdose.
5. **Lab workup**, needed to monitor health and medications.
6. **Home Care**: Patient is active in taking role in his care at home. This may include home measurement of blood sugar, blood pressure, weight, foot care, etc.
7. **Dietary Correction**, as guided by the dietary plan. [97]
8. **Salt & Carb reduction**, as guided by the dietary plan. [97]
9. Increase **Vegetable & Fruit** consumption.
10. **Physical Exercise Correction**, as guided by the dietary plan. [98]
11. **Smoking Avoidance**.
12. **Alcohol Avoidance**.
13. **Psychological Adaptation**, to accept the health problem.
14. **Coping** with the heath problem, positively at home, work, and travel.
15. **Occupational adaptation** with the health problem at work.
16. **Other** special circumstances that may be added, including daily rituals that are specific to the patient.



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Counselling and Coaching Self-Management: How-to

1. Build a good mutual relationship with your patient.
2. Assess patients views and interests (how far is the patient interested in change).
3. Explore the healthy habits needed, and bad habits, as well. Comment on their effects on health.
4. Develop and implement a plan for change (do not miss to explore patient's views and expectations towards the plan, to reach an agreement).
5. Arrange a planned follow-up visit during the implementation. Review achievement, reflect, solve problems and encourage.
6. Document the plan and its development. Good documentation facilitates follow-up, improve compliance and reminds all. CMR-10 encounter form may be used. [102]

Prioritizing Self-Management

The focus of self-management and its counselling and coaching must be prioritized, considering:

a. Acuteness of the clinical status, such as stage-3 BP, acute symptoms, severe hyper/hypo-glycemia, etc.
b. Response of the patient to the existing plan of management. If responding well, support it; if not, do not repeat it as it is.
c. The patient's trust and relationship with the care provider, in addition to his/her capability to comply.
d. The satisfaction of the patient, and his/her agreement to modify the current status or plan of management.

Self-Management Tools

1. Chronic Care Journey.[107]
2. Self-Management Puzzle [109] and Self-Management Stations.[108]
3. DASH Dietary Modification Plan.[118]
4. Dietary Diary. [119]
5. Dietary Pyramid and Plate. [126]
6. Salt in Diet.[125]
7. Types of Exercise.[116]
8. Foot Care.[128]
9. Choosing appropriate shoes and socks.[129]
10. Home Blood Pressure/Glucose Monitoring.[112]
11. Insulin Injection and Care.
12. Drug intake.
13. Smoking Cessation.

7. Powers, Margaret A., et al. "Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: A Consensus Report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association." The Diabetes Educator (2020): 0145721720930959.
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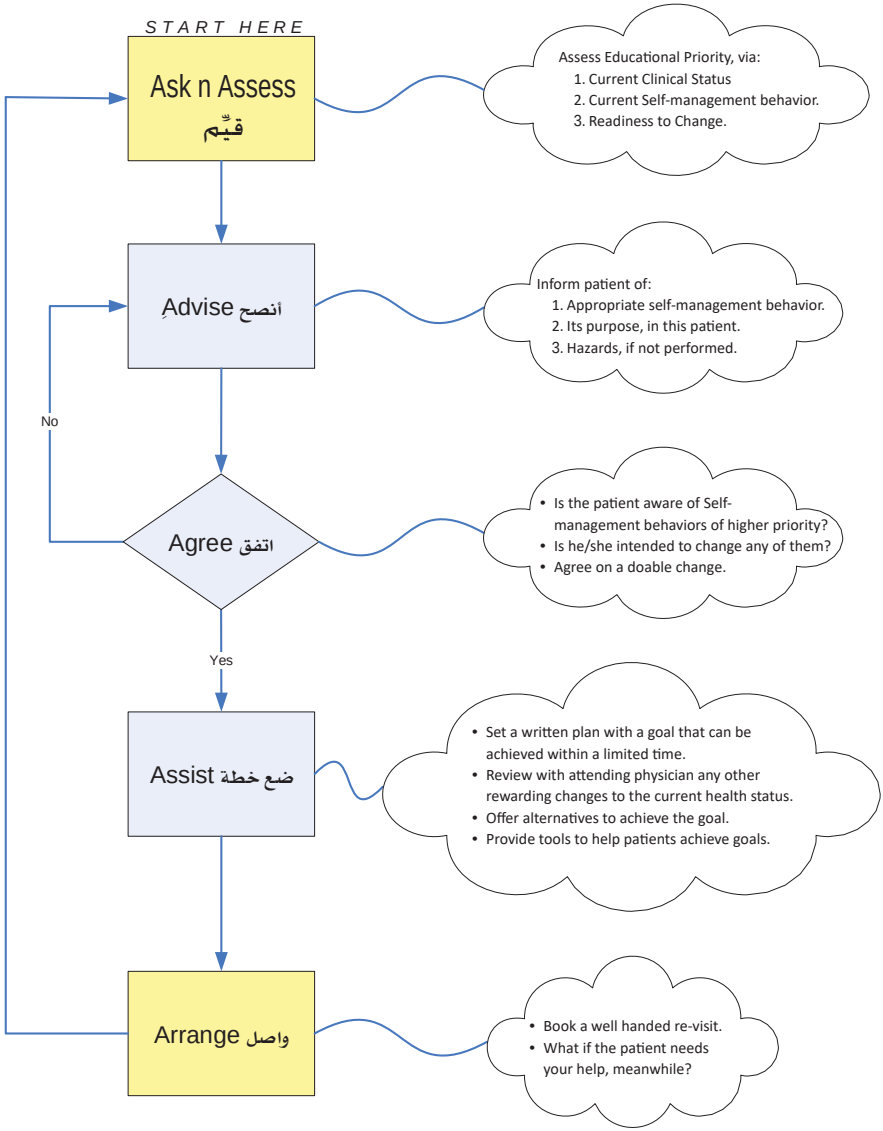
10. Coleman, Mary Thoesen, and Karen S. Newton. "Supporting self-management in patients with chronic illness." American family physician 72.8 (2005): 1503-1510.
11. Registered Nurses' Association of Ontario. Strategies to Support Self-Management in Chronic Conditions: Collaboration with Clients: Nursing Best Practice Guideline. Registered Nurses' Association of Ontario, 2010.

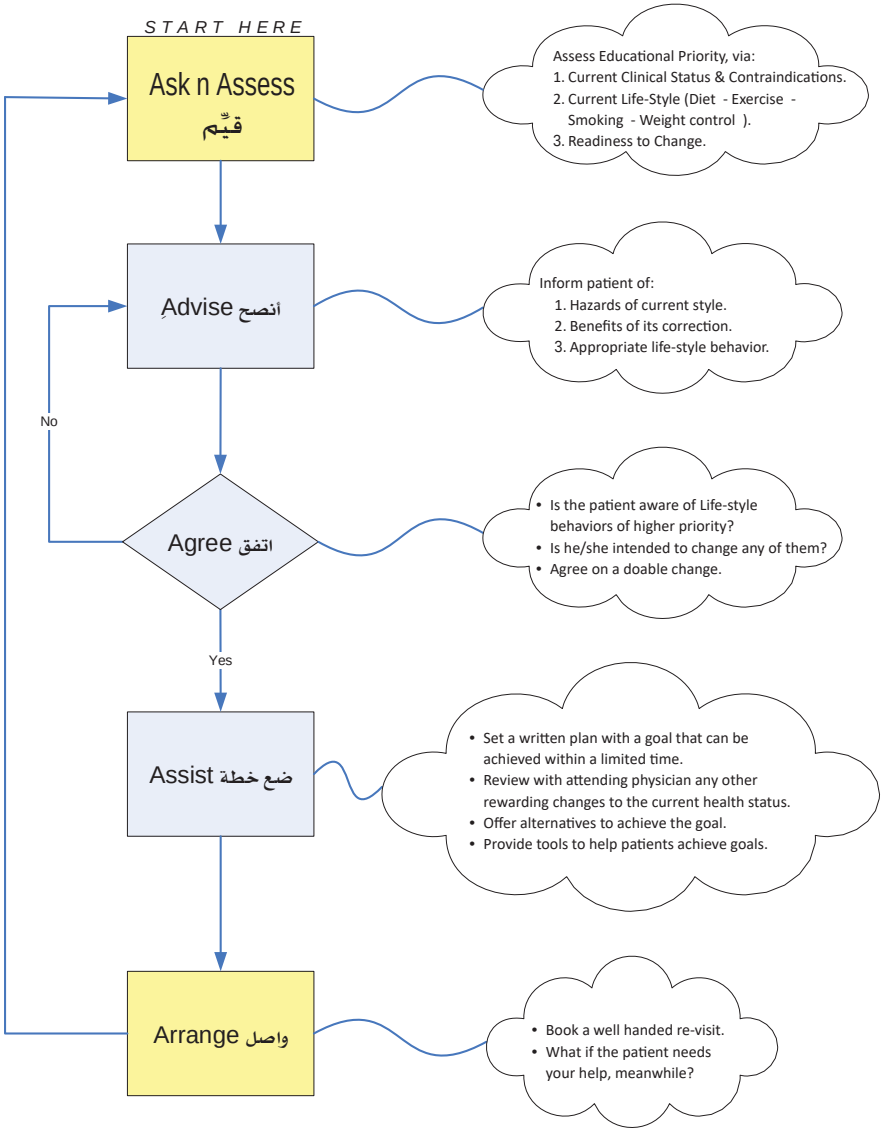
Chronic Care & Self-Management Counselling Algorithm

The 5-A's Algorithm



Lifestyle Management Algorithm

5-A's Algorithm Sample: Diet - Exercise - Smoking - Weight control



Lifestyle Change

Physical activity

- Physical activity refers to all types and intensities of body movement, including activities of daily living.
- Physical activity can be accumulated over the course of the day in multiple small sessions (of at least 10 minutes duration each) and does not need to be performed in a single session.
- Sedentary individuals should build up to their physical activity targets over several weeks, starting with 10-20 minutes of physical activity every other day during the first week or two of the programme, to minimise potential muscle soreness and fatigue.
- The recommended duration of activity for fitness effects is 30 minutes of moderate-intensity activity (e.g. brisk walking) on most days per week or 60 minutes a day of total physical activity time to control body weight.[B]

Markers of moderate intensity physical activity
• Increase the rate of breathing
• Increased body temperature
• Comfortable conversation
• Increased heart rate in the range of 55%-70% of age-predicted maximum (220-age)

Dietary advice

- Dietary interventions for weight loss should be calculated to produce a 600 kcal/day energy deficit. This result in a progressive weight loss of 0.5-1 Kg per week.[A]
- Dietary advice should be tailored to the preferences of individual patient.
- Emphasize eating breakfast daily and regulate mealtime.
- Encourage patient to read food labels when deciding to purchase food item.
- Provide lower calorie substitution to the patient usual diet.
- Encourage pre planning of food and snack.
- Avoid places and situation that encourage weight gain.

Behavioral modifications

Behavioral modifications are useful adjunct to diet and physical activity. They facilitate assessment of patient motivation and readiness to implement management plan and take steps to encourage patient for treatment.

- Goal setting: allows patients to develop realistic expectations and aim at practical individualized strategies for weight loss.
- Self–monitoring: regular self-weighing.
- Stimulus control: environmental modification to enhance behavior that support weight management.
- Slowing rate of eating, smaller bites, and good chewing (10-40 chews per bite).
- Problem solving: allows patients to identify the problem, propose options, devise a solution, implement it and evaluate its effectiveness.
- Cognitive restructuring: aiming at increase awareness of one's self and one's weight as well as replacing negative thinking with more positive and constructive self statements.

Dietary Assessment Questionnaire

To what extent do you agree with:		Agree totally 1	Agree 2	Do not Agree 3	Do not Agree at all 4
1	I eat my meals at restaurants.				
2	I am interested in meal flavor, not its content.				
3	Once hungry, I do not care what type is the food.				
4	I prefer fast foods.				
5	I get less than 3 pieces of vegetables, daily.				
6	I get less than 3 pieces of fruits, daily.				
7	I eat meat more than 2 hand-full size a day.				
8	I eat bread, more than 4 hand-sized pieces a day.				
9	I frequently miss one or more meal a day.				
10	In social events, I am encouraged to eat more.				
11	When I'm nervous, I eat more.				
12	I prefer Fried Foods in meals.				
13	I prefer to add salt to food.				
14	I don't prefer grilled foods.				
15	I drink a lot of coffee and tea.				

Total Points

Are you interested to change your eating behavior?	Not ready to change			Unsure		Ready to change			Trying to change	
	1	2	3	4	5	6	7	8	9	10
	Pre-contemplation			Contemplation			Action			

Result:

- ≥45 = Good dietary habits. Support it.
- 36-44 = Average dietary habits. There is a chance to optimize it.
- <35 = Inappropriate dietary habits. There is a need to correct it.

How to use this form:

1. Assessment to be done within few weeks from diagnosis or detection of a CMR.
2. It ma be self-administered or interviewed by the counsellor (care provider).
3. Results to be discussed with the patient; identifying areas of concern and possible corrections.
4. Upon the patient's readiness to change, agreement has to be reached. Stage-of-change table may be used, thereafter to encourage and support the lifestyle change.
5. Results to be documented in the Lifestyle Visit-to-visit encounter form (CMR-5).

Health Care Provider ..... Date ...../...../.....

CMR-06 Dietary Assessment Questionnaire

Physical Activity Assessment Questionnaire

To what extent do you agree with:		1	2	3	4
1	I feel hard to breathe when I climb the stairs.	Agree totally	Agree	Do not Agree	Do not Agree at all
2	Exercise in Human life	Not important	May be important	Important	Very important
3	I spend more than 3 hours watching TV, computer or mobile.	Agree totally	Agree	Do not Agree	Do not Agree at all
4	I exercise (walking, running, swimming, stairs, cycling...)	I don't practice any kind of sport	Few times	Sometimes	Most times
5	I spend time doing this exercise.	< ½ hour a week	½ to <2 hours a week	2-3 hour a week	>3 hour a week
6	I am committed to exercise ...	< Once a week	Once a week	2-3 times a week	>3 times a week

Total Points

Are you interested to change your physical activity?	Not ready to change			Unsure		Ready to change			Trying to change	
	1	2	3	4	5	6	7	8	9	10
	Pre-contemplation			Contemplation			Action			

Result:

- >20 = Good physical activity. Support it.
- 17-20 = Average physical activity. There is a chance to optimize it.
- <17 = Inappropriate dietary habits. There is a need to correct it.

How to use this form:

1. Assessment to be done within few weeks from diagnosis or detection of a CMR.
2. It ma be self-administered or interviewed by the counsellor (care provider).
3. Results to be discussed with the patient; identifying areas of concern and possible corrections.
4. Upon the patient's readiness to change, agreement has to be reached. Stage-of-change table may be used, thereafter to encourage and support the lifestyle change.
5. Results to be documented in the Lifestyle Visit-to-visit encounter form (CMR-5).

Health Care Provider ..... Date ...../...../.....

CMR-08 Physical Activity Assessment Questionnaire

Smoking Assessment Questionnaire

To what extent do you agree with:		1	2	3	4
1	I think smoking ...	Not bad	Not healthy Not harmful	Has some harm	So harmful
2	If your son or daughter wants to smoke, how do you feel?	Not a problem	I wouldn't stop them	I wouldn't encourage that	I will try to stop them
3	If there is a law prohibiting smoking in the country, what is your position?	Do not Agree at all	Do not Agree	Agree	Agree totally
4	Do you think setting with smokers while smoking is harmful?	Not harmful at all	Not Harmful	Harmful	So harmful
5	How often do you sit with smokers, in a week?	>3 times	3 times	1-2 times	Not at all
6	How often do you smoke (cigarette) per day	≥20 cigarettes	10-20 cigarettes	<10 cigarettes	Not at all
7	How often do you smoke (non-cigarettes)?	Daily	Few times a week	Once a week or less	Not at all
8	Do you smoke at any time during the day?	Most of the times	Many times per day	Specific time per day	Not at all

Total Points

Are you interested to quit smoking?	Not ready to change			Unsure		Ready to change			Trying to change	
	1	2	3	4	5	6	7	8	9	10
	Pre-contemplation			Contemplation			Action			

Result:

- >20 = Good smoking avoidance behavior. Support it.
- 17-20 = Average smoking avoidance behavior. There is a chance to optimize it.
- <17 = Inappropriate smoking habits. There is a need to correct it.

How to use this form:

1. Assessment to be done within few weeks from diagnosis or detection of a CMR.
2. It ma be self-administered or interviewed by the counsellor (care provider).
3. Results to be discussed with the patient; identifying areas of concern and possible corrections.
4. Upon the patient's readiness to change, agreement has to be reached. Stage-of-change table may be used, thereafter to encourage and support the lifestyle change.
5. Results to be documented in the Lifestyle Visit-to-visit encounter form (CMR-5).

Health Care Provider ..... Date ...../...../.....

CMR-07 Smoking Assessment Questionnaire

Assessment of patient readiness to change lifestyle

This tool is used whenever a lifestyle or behavior change is intended. Its use help the care provider to choose the appropriate change, based on the stage of change.[101] The following assessment is based to use for weight loss. The same may be used for other changes, as well, such as diet, exercise, smoking, non-healthy behaviors and other self-management components.

Assessment of patient readiness to lose weight

1. Determine patient's interest and confidence; tick the appropriate number:

A- How important is it for you to lose weight at this time?

Not important										Very important
0	1	2	4	3	5	6	7	8	9	10

B- How interested are you in losing weight at this time?

Not interested										Very interested
0	1	2	4	3	5	6	7	8	9	10

C- How confident are you to lose weight at this time?

Not confident										Very confident
0	1	2	4	3	5	6	7	8	9	10

2. Ask targeted questions:

Aiming to gain more information about your patient and to involve her/him in a self-reflection process that may facilitate readiness to change, e.g.:

- What is hard about managing your weight?
- How does being overweight affect you?
- What cannot you do, now, that you would like to do if you weigh less?

References

1. Scottish Intercollegiate Guidelines Network. Management of obesity: A national clinical guideline. Edinburgh (UK) Feb 2010.
2. Institute for Clinical Systems Improvement. Prevention and Management of Obesity for Adults. Sixth Edition May 2013.
3. Bridle C, et al. Systematic review of the effectiveness of health behavior interventions based on the Trans-theoretical Model. Psychol Health 2005;20(3):283-302.
4. Al-Shehri FS, et al. Prevention and management of obesity: Saudi guideline update. Saudi Journal of Obesity. 2016 Jan 1;4(1):25.
5. Miquel-Kergoat, Sophie, et al. "Effects of chewing on appetite, food intake and gut hormones: A systematic review and meta-analysis." Physiology & behavior 151 (2015): 88-96.
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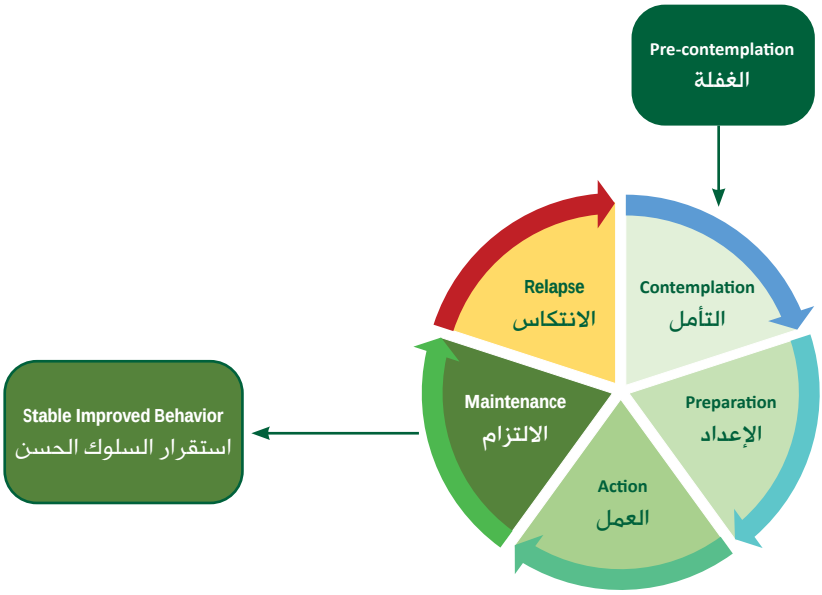
Stages of Change Model to assess Readiness to Lose Weight, *as an example*



Applying the stages of change model to assess readiness to lose weight.

Stage	Characteristics	Patient verbal cues	Appropriate intervention	Sample dialogue
Pre-contemplation الغفلة	Unaware of problem; No interest in change	I am not really interested in weight loss. It is not a problem.	Clarify complications of current behavior and benefits of weight reduction	Would you like to read some information about the health aspects of obesity?
Contemplation التأمل	Aware of problem, beginning to think of changing	I know I need to lose weight but with all that's going on my life right now, I am not sure I can.	Help resolve ambivalence, discuss barriers	Let's look at the benefit of weight loss, as well as what you may need to change
Preparation الإعداد	Realizes benefits of making changes and thinking about how to change.	I have to lose weight and I am planning to do that	Teach behavior modification; provide education	"Let's take a closer look at how you can reduce some of the calories you eat and how
Action العمل	Actively taking steps toward change	I am doing my best; this is harder than I thought.	Provide support and guidance, with a focus on the long term	"It is terrific that you are working so hard. What problems have you had so far? How have you solve them?
Maintenance الالتزام	Initial treatment goals reached	I've learned a lot through this process	Relapse control	What situations continue to tempt you to over eat? What can be helpful for the next time you face such a situation.

Self-Management Card

Description:

An encounter form that documents and supports the self-management plan, through active patient participation.

Who is in charge?

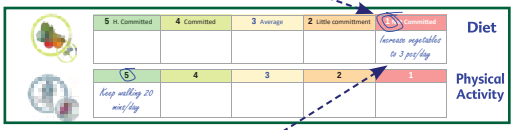
1. Chronic care provider.
2. The patient. He/She takes it with him as a reminder and a reference (especially those who have multiple difficulties, including attending appointments, correcting their lifestyle, adhering to medication, or reaching acceptable levels of control.

Benefits

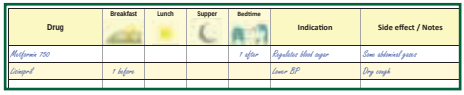
1. Raises patient's awareness towards his needs in following up his health problem.
2. Helps reminding the patient of current goals of treatment, and facilitates follow-up.

How to use?

1. In each visit, fill the card, once the patient's status has been reviewed.
2. Document the Current Self-Management Status (SMS):
   a. Document the level of self-care that the patient contributes to managing his health problem. Number 1 indicates a poor compliance with the said indicator, while number 5 indicates a persistent commitment.
   b. A circle is placed around the figure that states the current self-care status, for each behavior.
   c. On the next visit, another circle is placed around the figure that reflects the status. If there is no change from the last visit, the circle shall be placed around the prior one.



4. Write down the agreed goal to reach in the next visit. Write it in the box that reflects its current SMS.
5. A table of current drugs, dosages and purpose, as well as their possible side effects.



6. A table of target numbers to monitor and approach. They should be measured periodically, and controlled.
7. Table of clinic visits and whether attended or not.
8. Document all relevant informations in the appropriate encounter forms, including CMR-3, CMR-5 and appointment register.

Self-Management Card

CMR10

Self-Management Card

Important Steps to Reduce Cardiovascular Risk

Know Your Status & Fix it

Name ..... File No. ..... ID .....

5 H. Committed	4 Committed	3 Average	2 Little committment	1 Not Committed	
					Diet
5	4	3	2	1	Physical Activity
5	4	3	2	1	Smoking
5	4	3	2	1	Mood
5	4	3	2	1	Drug
5	4	3	2	1	Measure

Please, Commit to your clinic visits, periodic work-up and doctor's advises

Drug	Breakfast	Lunch	Supper	Bedtime	Indication	Side effect / Notes

Appointments

Date	Attended	Declined
/ /	☐	☐
/ /	☐	☐
/ /	☐	☐
/ /	☐	☐
/ /	☐	☐
/ /	☐	☐

Measures to be periodically reviewed, in addition to annual ECG, Kidney function, and eye and foot exam.

Date	BP	Weight	BMI	FBS	A1c	LDL
/ /	/					
/ /	/					
/ /	/					
/ /	/					
/ /	/					
Target <	130/85		25	110	7%	

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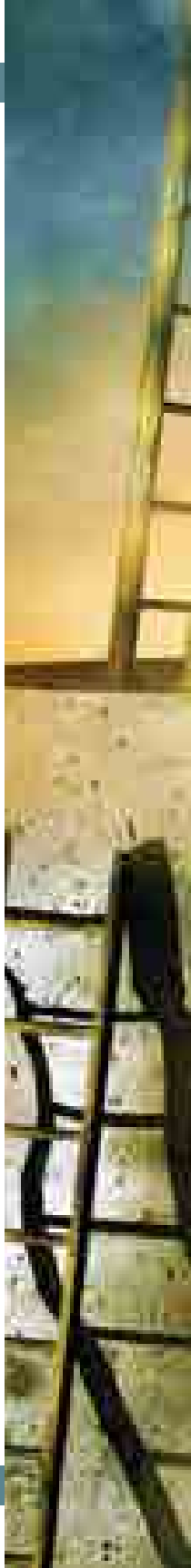
Extra Tools

أدوات إضافية



How to introduce CMR package?

تعريف البرنامج للمراجعين

A health care package, dedicated for the early detection of cardiovascular risk factors such as high blood pressure, dyslipidemia, diabetes mellitus, obesity and smoking.

In addition to cardiovascular health, the package assesses, as well, the general health status of each patient, including cancer risk, mental health and lifestyle.

This bulletin «Health Package for the Prevention of Cardiovascular Diseases» explains in more detail the package of concern. Please review. It contains useful information for you.

If you are interested, you may leave your contact number. The chronic care nurse will contact you to arrange a suitable timing for you to start the assessment process.

How to introduce CMR program on phone?

تعريف البرنامج للمراجعين من بعد

Salam/ Hello,

How are you doing? I hope that everything is fine.

This is Sara from the District Health Center.

Dear Ahmed, you may recall that you have done some Lab tests, few days ago, in the center. The results are fine. However, one of the tests that you did was a lipid test. Your lipids seem little high. This rise in lipids may lead to heart problems on the long run.

However, this can be remedied by a comprehensive assessment of your health. We do offer a dedicated package for people who are having their lipids abnormal. If you are interested, I will arrange an appointment for you, in the chronic care clinic, next Sunday.

How to deliver a quick life style advice?

رسالة توعية قصيرة

• After BP measurement:

Your blood pressure is 110/70. It is very normal. Please try your best to maintain it at this level, by reducing salt - more physical activity - more vegetables.

Your blood pressure is 130/85 which is slightly high, please reduce the salt in your food (stay away from canned foods and hidden salt). Re-measure your BP more frequently.

• After weight measurement:

You weigh 58 kg, while you are 157 cm tall. This means a body mass index of 23.5. It is a nice weight to maintain, as the normal score is less than 25.

You weigh 78 kg, while you are 160 cm tall. This means a body mass index of 30.5. It is little high and goes for Obesity Level-1. The normal BMI is less than 25. You need to lose 3-4 kg to reach normal level. Please reduce calories from fat, carbs and sugar - more physical exercise - more vegetables.

• After high blood sugar measurement:

Your blood sugar is 78. It is within the normal level. Please try to maintain it (more physical exercise - more vegetables - reduce sugars and carbs).

Your blood sugar is 102. It is higher than normal, though not to the level of diabetes. It may be called Pre-DM. You may need to lose weight (if it's too much) , to reduce calories from fat, carbs and sugars, get more exercise and vegetables.

Other Quick Life Style Advices:

رسائل توعية قصيرة متفرقة

1. Canned vegetables have a very large amount of salt. Use fresh vegetables.
2. Your weight is perfect.
3. Try to reduce the amount of salt in your food.
4. Reduce the intake of fried and fat food.
5. Try to reduce sweets and low fiber carbs.
6. Your weight is increasing, try to lose few kg, in order to protect yourself from diseases.
7. Exercise daily walking.

Ar

Chronic Care Journey

رحلة الرعاية المزمنة

1 Suspicion (pre-diagnosis)

- Many people have one or more risk factors for cardiovascular diseases (e.g. obesity, family history, unhealthy lifestyle, high blood pressure, sugar or lipids).
- A problem may be detected while measuring blood pressure and weight, or inquiring about smoking and family history of premature cardiovascular disease.
- Doctor may order some tests to assess general health.

2 Diagnosis

This may require several visits, including:

- Further lab tests,
- Measurements of blood sugar or blood pressure at home.

3 Assessment

- Includes full clinical exam and further lab workup. Some imaging tests may be requested.
- It aims to detect:
  1. Early complications of the disease
  2. Early detection of other chronic diseases (many are without early symptoms).
  3. A secondary cause of the current status.
- This may last multiple clinic visits.

4 Plan of Management

Developed in 3 main parts:

1. **Lifestyle change,** including healthy diet, increased physical activity, lose some weight, quit smoking and avoid alcohol.
2. **Drug therapy:** the prescribing of the appropriate medication to the patient according to the results of the evaluation phase.
3. **Get you engaged,** actively in the management by home measurement of blood pressure and sugar, foot examination and coping with your health problem in work, home, travel, and emergency.

5 Follow-up and control of the disease

- It is very crucial step in the Chronic Care Journey. Without it, no body know what is going on.
- It is more frequent in the beginning of the journey, but becoming less frequent, every 3 months, once control is achieved.
- In each visit:
  1. Quick review of health status, including new emerging symptoms, side effects of medications, control of the disease, compliance of patient to medication and self-management.
  2. Patient's queries are discussed.
  3. Focused care to improve self-management.

6 Hospital

- Most of the chronic care takes place in Primary Care.
- Hospital services may be needed for further investigations, second opinion, or liaison with other specialties, including eye examination.

7 Annual Full assessment

The health status is reassessed, annually, for:

1. General health checkup, including preventive measures such as vaccination, full clinical exam and workup.
2. Early detection of complications and other cardiovascular diseases.
3. Review of management plan, and set a new target goal.

Ar En

Stations in CMR Self-Management

محطات في الرعاية الذاتية لمنذرات القلب والسكر

Why to measure blood pressure and sugar @ home?

- Gives better view of the blood pressure and sugar levels.
- Shows the effect of food and physical activity and lifestyle.
- The absence of symptoms does not mean that the chronic disease is under control, many symptoms appear only when there are complications or elevated measurements.

Why physical activity?

- Helps reducing number and dosage of medications.
- Makes some medications more effective.
- Reduces weight.
- Helps to quit smoking.
- Improves sleep and mood.

Why Healthy Food?

- Helps reducing number and dosage of medications.
- Makes some medications more effective.
- Reduces weight.
- Protects from many diseases.
- Improves mood.

Medication Alerts

- Irregular intake makes some medications ineffective and possibly harmful.
- Medications have side effects. Recognize them; Know how to deal with.
- Recognize how to take and how to save them.
- What if short of medication or forgotten?
- What if a high dose taken?

Regular Clinic Visits

- The most important part of chronic care.
- Health status may worse without symptoms.
- Helps in early detection of complications and side effects.
- Management plan may change upon assessment.
- Increases patient's awareness towards his health status, even if not compliant.

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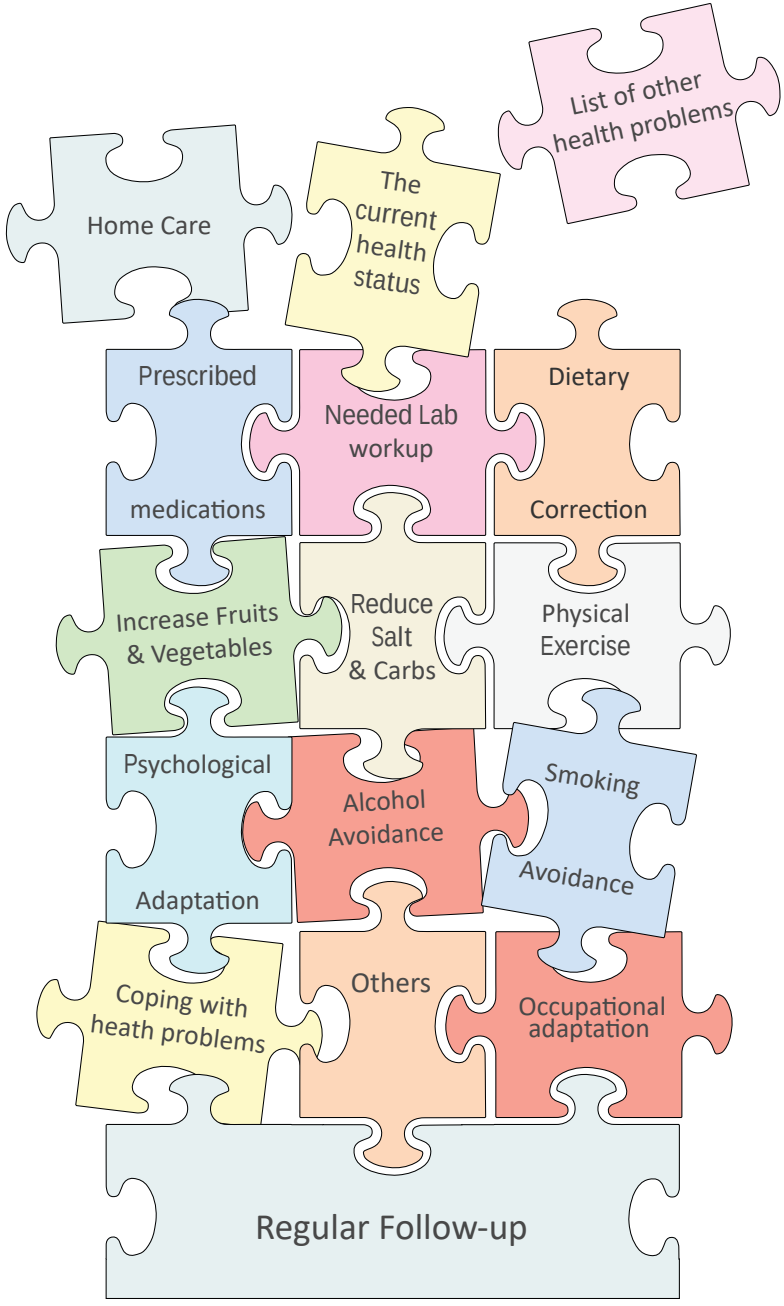
Self-Management Puzzle

- Uses: To visually counsel and motivate CMR patients towards self-managment. These components may be helpful as subjects for dedicated focused counseling visits.



Obstructive Sleep Apnea Questionnaire (STOP-BANG) استبيان توقف التنفس أثناء النوم

- Uses: It helps to screen for Obstructive Sleep Apnea (OSA), especially those at risk, including BMI>35, excessive snoring and daytime sleepiness.

CMR27

Obstructive Sleep Apnea Questionnaire (STOP-BANG) استبيان توقف التنفس أثناء النوم

It helps to screen for OSA, especially those at risk, including BMI>35, excessive snoring and daytime sleepiness.

Date:_____ التاريخ: Name: _____ الاسم:

خلال الفترة القريبة الماضية، استحضر التالي، وضع علامة " ✓ " عند إجابتك:

During the last few weeks/months, please recall the following:

الشخير العالى: هل تشخر/ين أثناء النوم بصوت عال (لدرجة أنه يمكن سماع صوت شخيرك خلف الأبواب المغلقة، أو لدرجة أن قرينك في الغرفة يعدل وضعيتك أثناء النوم لأن صوت شخيرك يزعجه)؟ Snoring? Do you Snore Loudly (loud enough to be heard through closed doors or your bed-partner elbows you for snoring at night)?	نعم 1	لا 0
الإرهاق؟ هل تشعر/ين أنك مرهق/ة، تعب/ة أو تشعر/ين بالنعاس خلال النهار (غفوة أثناء القيادة مثلا)؟ Tired? Do you often feel Tired, Fatigued, or Sleepy during the daytime (such as falling asleep during driving or talking to someone)?	نعم 1	لا 0
الملاحظة؟ هل لاحظ أحد أنك تتوقف/ين عن التنفس أو تختنق/ين أو تلهث/ين أثناء نومك؟ Observed? Has anyone Observed you Stop Breathing or Choking/Gasping during your sleep?	نعم 1	لا 0
ارتفاع ضغط الدم؟ هل لديك ارتفاع في ضغط الدم، أو تتناول/ ين حاليا علاجا لارتفاع ضغط الدم؟ Blood Pressure? Do you have or are being treated for High Blood Pressure?	نعم 1	لا 0
مؤشر (البدانة) كتلة الجسم > ٣٥؟ Body Mass Index > 35 kg/m^2?	نعم 1	لا 0
عمرك > ٥٠ عاما؟ Age > 50 years?	نعم 1	لا 0
مقاس رقبتك كبير؟ (يقاس حول تفاحة آدم) Neck size large? *(Measure around Adams apple; Male≥17"/43cm - Female≥16"/41cm)*	نعم 1	لا 0
هل أنت رجل؟ Are you Male Gender?	نعم 1	لا 0

المجموع

Interpretation for general population:

Low risk of OSA	Intermediate risk of OSA	High risk of OSA
0-2	3-4	5-8 or 2 of 4 STOP + Male or BMI>35 or Large Neck
Enforce healthy lifestyle	Adopt health lifestyle	Adopt health lifestyle + Refer for Sleep study

References:

1. Chung F et al. Anesthesiology 2008; 108:812-21; Chung F et al. Br J Anaesth 2012, 108:768–75; Chung F et al. J Clin Sleep Med 2014;10:951-8. www.stopbang.ca. Modified and reset by B Almustafa et al, CardioMetabolic Risk Management in Primary Care, Riyadh 2019.
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Standards for BP Measurement

Task	Rationale
Selecting Equipment	
• Use a validated automated device or mercury or a recently calibrated aneroid manometer. • Select appropriate cuff size. The width of the bladder should be 40% of the arm circumference and the length of the bladder should encircle at least 80% of the arm. • In auscultatory method, place the bell above the medial epicondyle and medial to the biceps tendon (brachial artery).	• If the meniscus of the Hg or aneroid gauge is not level with your vision, a reading may be read higher or lower. • A too small cuff will give falsely high readings. A too large cuff may give a false low reading but with less clinical significance. • The stethoscope bell is designed to listen to low-pitched sounds. • The early and late BP sounds are low-pitched.
Preparing The Patient	
• The patient should avoid eating, smoking, caffeine, exercise, and drinking alcohol ½-1 hour before BP measurement. • Have the patient sit quietly for a period at rest with both feet flat on the floor and back supported prior to measurement. • No clothing should be between the BP cuff and the arm. • The patient's arm should be supported or allowed to rest on a solid surface so the inner aspect of the bend of the elbow is level with the heart.	• Readings will vary after exercise, eating, smoking, drinking alcohol or having caffeine (e.g. differences of 5-15 mm Hg with cup of coffee or cola within 15 mins). • Any change in posture or activity causes BP to change. • Extra noise from the bell of the stethoscope rubbing against clothing could cause a false BP reading. • The difference between lower and higher positions of the arm can cause differences in measurements of as much as 10 mm Hg systolic and diastolic. If the patient's arm is tense, measurement can vary by up to 15 mm Hg (systolic more than diastolic.)
Taking An Initial Measurement	

• Secure the BP cuff evenly and snugly around the arm, 2-4 cm above the antecubital space (at the elbow). Center the bladder (inflatable bag) over the brachial artery.
• In Auscultatory method:
  • While inflating the bladder, palpate radial pulse to estimate systolic BP.
  • Inflate the cuff quickly to 30 mm Hg above the palpatory BP.
  • Deflate bladder at 2-3 mm Hg per second.
  • Record the first of at least two consecutive sounds as the systolic.
  • Diastolic is identified by the last sound heard.
  • Helpful hint: If the tones are difficult to hear, elevate arm while clenching and relaxing the fist, for 15 seconds to drain the veins. Then lower arm and repeat auscultation.
	• A loose BP cuff results in a falsely higher level of BP.
	• Failure to center the cuff can result in a falsely high BP.
	• An auscultatory gap (absence of sound for 20-40 mm Hg) occurs in 5% of hypertensives. Palpatory BP will help to avoid incorrectly recording the systolic below the gap.
	• Inflating the cuff too high can cause pain and result in a falsely high reading.
	• If the pressure is released too quickly, you could record SBP falsely low as the first systolic tap is missed and the diastolic falsely high. If you deflate too slowly, you could record the DBP falsely high.
	• The last sound heard is easier than muffling for observers to accurately record. In some patients, for example, children or pregnant women, sounds are heard to near 0. In these cases, record both muffling and 0, e.g. 150/80/0. The muffling value is then considered the diastolic BP.

Confirming Initial Elevation	
• If BP is elevated and the patient had initially waited quietly for 5 minutes, repeat BPM in 1-2 min. • Record both measurements. • If BP is elevated but the patient had not initially waited quietly for five minutes, allow for a 5-min rest. Re-measure BP and record it as 1st reading. • If this BP is still elevated, repeat BPM in 1-2 minutes, record it as the 2nd measurement.	• Because BP normally varies up to 10 mm Hg it is necessary to take two readings to obtain the most accurate present BP. The 2 readings must be < 10 mmHg variant, otherwise repeat till you obtain 2 successive readings < 10 mmHg variant. • A time interval of 1-2 minutes between cuff inflations is necessary to reduce forearm engorgement.

Adapted from:

1. Institute for Clinical Systems Improvement. Health Care Guideline: Hypertension Diagnosis and Treatment ; Thirteenth Edition, November 2010. www.icsi.org.
2. Muntner, Paul, et al. "Measurement of blood pressure in humans: a scientific statement from the American Heart Association." Hypertension 73.5 (2019): e35-e66.
3. Unger, Thomas, et al. "2020 International Society of Hypertension global hypertension practice guidelines." Hypertension 75.6 (2020): 1334-1357.

Home BP Measurement (HBPM)

The available evidence supports that the prognostic value of HBPM is equal to or higher than that of the clinic, which remains the point of reference for prognostic stratification and clinical decision making in hypertension.

Self-monitoring is usually performed by the patient with a digital (oscillometric) manometer. Home readings of 135/85 mm Hg correspond to clinic readings of 140/90 mm Hg. Multiple readings should be taken over a prolonged period of time.

Wrist sphygmomanometers are widely used by patients, but they are less reliable because minimal position changes can result in variable readings.

Advantages of HBPM

- Multiple measurements during day & night over several days.
- No alarm reaction to BP measurement.
- Good reproducibility.
- Good prognostic value.
- Relatively low cost.
- Patient-friendly.
- Involvement of patient in management.
- Digital storage, printout, PC download, tele-transmission of BP values.
- Improvement of patients' compliance
- Improvement of BP control rates.

How often to measure?

- Initial use: 12 readings in one week (AM + PM).
- On change of treatment: 12 readings in one week (AM + PM).
- On follow-up: 2 readings in one day per week (AM + PM).

Limitations

- Need patient training.
- Possible use of inaccurate devices.
- Measurement errors.
- Limited reliability of BP values.
- Induction of anxiety.
- Treatment changes made by patients.
- No doctor guidance.
- Definitions of ranges still debated.
- Lack of recordings during sleep.

Criteria for valid HBPM

- Certified, validated manometer using established protocols. This may be traced from https://www.stridebp.org or http://www.dableducational.org.
- Auscultatory devices not recommended.
- Arm devices are the recommended choice.
- Finger devices are not recommended.
- Wrist devices may be unreliable.
- Correct cuffs to be used.

Clinical Indications

- Suspected white-coat HTN (WCH).
- Suspected nocturnal HTN.

- Resistant hypertension.
- Elderly patient.
- Guides anti-HTN drug treatment.
- Hypertension of pregnancy.
- Evaluation of hypotension.
- Autonomic failure.

Un-Attended Automated Office BPM (AOBPM)

Multiple automated BPM taken while the patient remains alone in the clinic. It provides more standardized measurement. The resulted BP levels are lower than conventional office measurements with at least 6 mm Hg.

Confirmation with out-of-office BP (such as home BPM) is needed for most treatment decisions, however.

Ambulatory BP Monitoring (ABPM)

BP measurement and recording can be done by an automated device with a portable recorder over a period of 24 hours or more.

Thresholds for ambulatory hypertension are 135/85 mm Hg for awake average, 120/70 mmHg for asleep average and 130/80 mm Hg for 24-hour average blood pressure.[C]

Indications of ABPM

- Suspected white-coat hypertension.
- Suspected nocturnal hypertension.
- Suspected masked hypertension.
- To establish dipper status.
- Resistant hypertension.
- Hypertension of pregnancy.

References:

1. Muntner, Paul, et al. "Measurement of blood pressure in humans: a scientific statement from the American Heart Association." Hypertension 73.5 (2019): e35-e66.
2. Saudi Hypertension Management Society. Saudi Hypertension Management Guidelines; Fourth Edition, Riyadh 2018.
3. Stergiou, George S., et al. "Requirements for professional office blood pressure monitors." Journal of hypertension 30.3 (2012): 537-542.
4. Unger, Thomas, et al. "2020 International Society of Hypertension global hypertension practice guidelines." Hypertension 75.6 (2020): 1334-1357.

Home Blood Pressure Monitors (HBPM)

A medical device used to measure blood pressure (BP) at home or work place.

People with high blood pressure are advised to follow up regularly with their doctor, and make regular measurements of their BP at home, using such a device.

Instructions for purchasing HBPM

1. Many different types are available and with different specifications. Consult your doctor or health practitioner for the appropriate device.
2. Make sure that the device is licensed to be marketed by a public body such as the Saudi Food and Drug Administration, Stride BP and Medaval.
3. Make sure there is a warranty, after-sale support and service, such as maintenance.
4. Make sure you have a guide in your language to learn how to use and take care of the device.
5. There are several types of electronic HBPM, including those used for the wrist and those used for the arm. We recommend the arm devices. They are more accurate.
6. Make sure the size of the cuff is suitable for your arm, well-fit around the arm, and it should not be too large or small. Choosing the wrong size may give wrong readings. Consult your health care provider.
7. Make sure the results display is right for you and you can read it easily.
8. It is preferable to have a memory to save previous readings.

Please read the instruction manual of the device, and consult your physician on its use.

Reproduced from 2020 ISH Global Hypertension Practice Guidelines

HBPM Usage Instructions

1. Place the device around the top of the bare arm as instructed by the manufacturer, comfortably and consistently.
2. Make sure there is enough space between the cuff and the elbow (approx 2 cm).
3. Make sure that the machine tube is not twisted.
4. Do not move or talk while taking measurement.
5. Press the start button to start the device. After this is done the screen of the device will display a blood pressure reading; two numbers appear on the screen; the upper Systolic, and the lower Diastolic. Record them in your log diary.
6. Take 2-3 readings (1-min apart) and record them. Take the average of the last 2 readings, if they are less than 10 mm Hg different, otherwise continue re-measuring.

Validated HBPM

Home Blood Pressure & Sugar Log Diary

- Use these diaries (self-managemnt tools) to monitor home blood pressure and sugar, for 1-2 weeks.

Ar En

Ar En

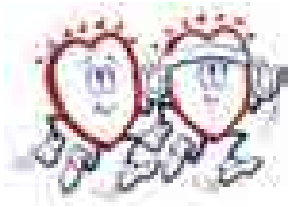
How to Prescribe Exercise?

وصفة تصحيح النشاط الحركي؟

Any physical activity is better than nothing, for CMR patients at all ages. It has cardiovascular, metabolic, psychological and functional benefits.[B] However, multiple precautions and safety measures must be considered in exercise prescription.

Optimal Exercise Prescription addresses:

1. Cardio-respiratory (aerobic) fitness.
2. Muscular strength and endurance.
3. Flexibility and body composition.
4. Neuromotor fitness.



Components of Exercise Prescription (FITT-VP)

1. **Frequency**: gradual increment of moderate aerobic exercise (up to 4-7 times/ week) ± moderate resistance exercise (2-3 times).
2. **Intensity**: Calculated by one of the following methods in the following table, depending on the type of exercise (aerobic or resistance):

Table 16. How to estimate Exercise Intensity?

	Cardio-respiratory Exercise				Resistance
	Relative			Absolute	Relative
Intensity	% HRR	% HRmax	Talk Test	METs	% 1-Rmax
Very light	<30	<57	Talk & Sing	<2.0	<30
Light	30-39	57-63	Comfortable	2-2.9	30-49
Moderate	40-59	64-76	Little challenge	3-5.9	50-69
Vigorous	60-89	77-95	Interrupted	6-8.7	70-84
Near Max	≥90	≥96	Difficult	≥8.8	≥85

HRR: Heart rate reserve.
HRmax: Maximal heart rate = 220 - age.
MET: Metabolic equivalent. 1-Rmax: 1-Repetition Max. Adapted from ACSM.

3. **Time**: 30-60 min per day; continuous or accumulated in bouts ≥10 min each.
4. **Type**:
   a. Aerobic: e.g. walking, swimming, sprinting.
   b. Resistance, e.g. lifting weights, hand weights, pulleys and other equipments.
   c. Flexibility, e.g. stretching.
   d. Neuromotor, e.g. yuga, balance, pilates, tai chi.
5. **Volume**: A target of ≥500-1000 MET-min/week (start pedometer counts from 2000 to ≥7000/day.
6. **Progression**: progress gradually by adjusting duration, frequency and intensity.

Steps to consider:

1. Have a written exercise prescription. CMR10[102], CMR19 and CMR20 may be used for this purpose.
1. Use light cotton clothing, when exercising, to keep body temperature stable.
2. Do warm-up exercises to stimulate circulation such as jumping or running in a fixed place.
3. Do Elongation exercises (such as stretching the butt tendons) before exercising. It softens muscles, decreases and avoids stiffness. Exercise them for 30 to 60 seconds then relax quietly (breathe calmly and deeply while exercising).
4. Post exercise, do relaxation exercises (cooling-down) such as taking a deep breath and locking it up and then trying to take it out and repeating it.

FITT

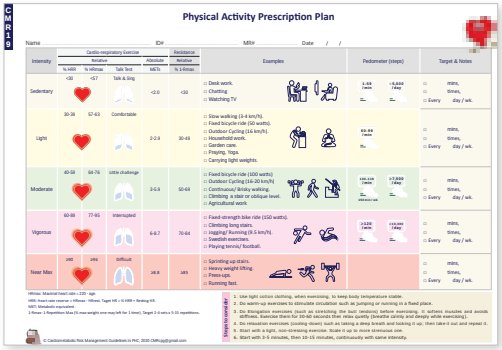
5. Start with a light, non-stressing exercise. Scale it up to more strenuous one.
6. Start with 3-5 minutes, then 10-15 minutes, continuously with same intensity.
7. Reach target activity as noted in "Components of Exercise Prescription (FITT-VP)".
    - Example-1: A 50-year-old lady who wants to exert *moderate* intensity. Her heart rate should not exceed 64-73% of the maximum. Maximum =220-50= 170 beats/min, i.e. moderate intensity not exceeding 109-124 beats/min.
    - Example-2: A 40-year-old man who wants to exert *light* intensity. His heart rate should not exceed 57-63% of the maximum. Maximum =220-40= 180 beats/min, i.e. light intensity not exceeding 103-113 beats/min.

Take precautions on counseling the following conditions:

- Uncontrolled high blood pressure at stage-2 or higher.
- Unstable hyperglycemia.
- Unexplained hypoglycemia.
- Severe proliferative retinopathy, and recent laser surgery.
- Heart Failure.
- Valvular Heart disease.
- Arrhythmias.
- A recently diagnosed cardiomyopathy for less than 6 weeks.
- Coronary Artery Disease.

For these cases, it is advisable to follow the following:

- More aerobic exercise (relaxation).
- A gradual increase in the level of the physical activity.
- Refrain from weight lifting.
- Reducing the activity level once the individual feels tired.
- Stop exercising if the individual feels chest pain or nausea.
- Consult the doctor if symptoms arise, including shortness of breath, dizziness or angina-like.



CMR19 En

CMR19 Ar

CMR20 Ar

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2. Pedersen, Bente Klarlund, and Bengt Saltin. "Exercise as medicine–evidence for prescribing exercise as therapy in 26 different chronic diseases." Scandinavian journal of medicine & science in sports 25 (2015): 1-72.
3. Pescatello, Linda S., et al. "Exercise for hypertension: a prescription update integrating existing recommendations with emerging research." Current hypertension reports 17.11 (2015): 87.
4. UK Chief Medical Officers' Physical Activity Guidelines. 7 Sep 2019.
5. The UK Chief Medical Officers physical activity guidelines report. 7 Sep 2019. https://www.gov.uk/government/publications/physical-activity-guidelines-uk-chief-medical-officers-report. (Accessed 2 Nov 2020)
6. Zaleski, A. "Exercise for the prevention and treatment of hypertension-Implication and Application [Internet]. American College of Sports medicine. 2019."
7. Mantovani, Alessandra Madia, et al. "Different amounts of physical activity measured by pedometer and the associations with health outcomes in adults." Journal of Physical Activity and Health 13.11 (2016): 1183-1191.

- Uses: Educating patient about proper choice of healthy diet for CMR.

نظام داش للوجبات الغذائية

الخطة الغذائية التالية معدة بموجب نظام داش للتحكم في ارتفاع ضغط الدم.
عدد الحصص اليومية يختلف باختلاف الاستهلاك اليومي للسعرات الحرارية (٢٠٠٠ أو ١٥٠٠ أو ١٢٠٠ سعرة حرارية في اليوم)

المجموعة الغذائية	فائدتها	أمثلة عليها	عدد الحصص الغذائية في اليوم الواحد	مقدار الحصة الغذائية (واحدة مما يلي)
الخبز والحبوب	مصدر رئيسي للطاقة والألياف	خبز بر، خبز أبيض، كورن فلكس، شوفان، كعك جاف، فشار غير مملح، مكرونة، شعيرية، رز	٢٠٠٠ = ٧- ٨ حصص ١٥٠٠ = ٥- ٦ حصص ١٢٠٠ = ٣- ٤ حصص	شريحة واحدة من البريد أو نصف كوب رقائق القمح المجفف أو نصف كوب أرز مطبوخ أو مكرونة.
الخضار (الأخضر-الأحمر-البرتقالي)	مصدر غني بالكالسيوم والمغنسيوم والألياف	بطاطس، طماطم، جزر، بازلاء خضراء، ملفوف، كوسة، فاصولياء خضراء، سبانخ، بطاطا حلوة	٢٠٠٠ = ٤ – ٥ حصص ١٥٠٠ = ٣- ٤ حصص ١٢٠٠ =٣ – ٤ حصص	نصف كوب خضار غير مطبوخة أو نصف كوب خضار مطبوخة أو ثلاث أرباع كوب عصير خضار.
الفواكه (بألوانها الأخضر، والأحمر والبرتقالي)	مصدر مهم للبوتاسيوم والمغنسيوم والألياف	مشمش، موز، تمر، برتقال، عنب، عصير برتقال، جريب فروت، مانجو، بطيخ، خوخ، أناناس، درّاق، زبيب، فراولة	٢٠٠٠ =٤- ٥ حصص ١٥٠٠ = ٣- ٤ حصص ١٢٠٠ = ٢- ٣ حصص	¾ كوب عصير فواكه، أو قطعة متوسطة الحجم، أو ¼ كوب فواكه جافة، أو ½ كوب فواكه طازجة أو معلبة أو مجففة.
الحليب ومشتقاته	المصدر الرئيسي للكالسيوم والبروتين	حليب أو لبن أو روب قليل أو خالي الدسم أو جبن قليل الدسم والملح	٢٠٠٠ =٢- ٣ حصص ١٥٠٠ =٢- ٣ حصص ١٢٠٠ = ٢ حصة	كوب حليب أو كوب روب أو حبة ونصف من الجبن المثلث
اللحوم والأسماك	مصدر غني بالبروتين والمغنسيوم	لحم منزوع منه الشحم، مطبوخ أو مشوي أو مسلوق أو دجاج منزوع الجلد	٢٠٠٠ = ٤ حصص ١٥٠٠ = ٣ حصص ١٢٠٠ = ٢ حصة	فخذ دجاج أو ٢سمك صغير أو سمكة واحدة متوسطة أو ٤ قطع لحم متوسطة
البقول والمكسرات	مصدر غني بالطاقة والمغنسيوم والبوتاسيوم والبروتين والألياف	لوز أو مكسرات مشكلة أو فول سوداني أو جوز أو بذور عباد الشمس أو عدس أو ماش	٢٠٠٠ = ٤- ٥ حصص/ أسبوع ١٥٠٠ = ٣- ٤ حصص/ أسبوع ١٢٠٠ = ٢- ٣ حصص/ أسبوع	ثلث كوب أو ٢ملعقة طعام مكسرات أو ٢ ملعقة طعام بذور أو نصف كوب مطبوخ فاصوليا جافة أو بازلاء.
الدهون والزيوت	تشكل الدهون ٢٧٪ من السعرات الحرارية في نظام DASH	زبدة ناعمة أو مايونيز قليل الدسم	٢٠٠٠ = ٢- ٣ حصص ١٥٠٠ = ٢ - ٣ حصص ١٢٠٠ = ١ - ٢ حصص	ملعقة صغيرة زبدة أو ملعقة كبيرة مايونيز قليل الدسم أو ٢ ملعقة كبيرة صلصة السلطة قليلة الدسم أو ملعقة صغيرة زيت نباتي.
السكريات	يجب أن تكون السكريات قليلة الدسم	سكر أو جلي أو مربى أو جلاتين نباتي أو عصير فواكه كوكتيل أو مثلجات أو شراب سكري	٢٠٠٠ = ٥ حصص/ أسبوع ١٥٠٠ = ٤ حصص/ أسبوع ١٢٠٠ = ٣ حصص/ أسبوع	ملعقة طعام سكر أو ملعقة شاي جيلي أو مربى أو ٢ ملعقة جيلي أو كوب ليمون محلى.

NHLBI

CMR12

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1. Your Guide to Lowering Your Blood Pressure with DASH. National Heart, Lung, and Blood Institute. https://www.nhlbi.nih.gov/files/docs/public/heart/dash_brief.pdf. [Accessed 8 Nov 2020]

Diet Diary

مذكرة غذائية

- Uses: To gather information about diet behavior in a full week. To be filled by the patient, and returned in the next appointment..

CMR12

مذكرة غذائية

يستخدم هذا النموذج لـ :

١. لمتابعة عادات الأكل، قبل البدء بنظام داش (DASH).

٢. لقياس أثر هذا النظام على الشخص، وعلى وجباته، بعد استخدامه بأسابيع قليلة.

طريقة استخدامه:

ينسخ هذا النموذج لتسجيل أكثر من يوم واحد، ويتم جمع كل من المجموعات الغذائية خلال كل يوم ومقارنتها بما تم تناوله بموجب نظام داش (DASH).

الوجبة الغذائية	حجم الوجبة	عدد الوجبات (الحصص في نظام داش)							
		حبوب	خضروات	فواكهه	مشتقات الحليب	لحم دجاج سمك	المكسرات والقوليات	دهون وزيوت	حلويات
الفطور									
الغداء									
العشاء									
وجبة خفيفة									
مجموع الأيام									
قارن وجبتك بالخطة الغذائية لنظام DASH		٧-٨ يومياً	٤-٥ يومياً	٤-٥ يومياً	٢-٣ يومياً	١٢ او اقل في الأسبوع	٤-٥ في الأسبوع	٢-٣ يوميا	٥ حصص في الاسبوع

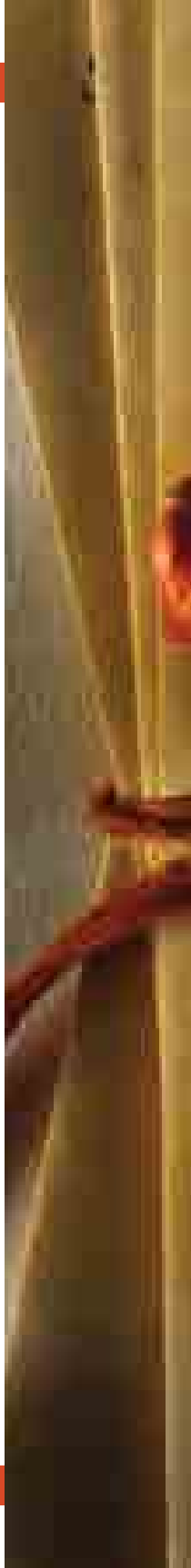
اقرأ محتويات الطعام على الأغذية المعلبة لتقارن كمية الصوديوم الموجودة في الطعام.

ستجد معلومات الصوديوم مسجلة على بطاقة محتويات الأغذية (ملح أو صوديوم).

8

Educational Tools

أدوات تعليمية



Cardiovascular Diseases Prevention Program

برنامج الوقاية من أمراض القلب والشرايين

- Uses: Advertisement and notification of the cardiovascular preventive services for the public and the staff.

برنامج الوقاية من أمراض القلب والشرايين

الهدف من البرنامج:

١. الاكتشاف المبكر لأمراض القلب والشرايين.
٢. الاكتشاف المبكر لمنذِرات الإصابة بهذه الأمراض، كارتفاع ضغط الدم والسكر والدهون والوزن والتدخين.
٣. معالجة هذه المنذِرات والتحكم فيها.

مميزات البرنامج وخدماته:

١. التقييم الشامل لكل حالة.
٢. تقيم لمستوى الخطر المحتمل للإصابة بأمراض القلب والشرايين.
٣. خطة علاج تشمل تصحيح نمط العيش، والعلاج الدوائي.
٤. متابعة منتظمة لمراقبة تطور الحالة.
٥. إعادة التقييم الشامل سنويا ويشمل فحوصات سريرية ومختبرية لوظائف القلب والكلى والكبد والأعصاب والدهون وأملاح الدم ومستوى التحكم في السكر.
٦. نظام مواعيد ومتابعة.
٧. يخضع البرنامج لمتابعة مستمرة لجودة الأداء، من قبل فريق مختص.

Chronic Care Journey

رحلة الرعاية المزمنة

- Uses: Description of the journey of the cardiovascular preventive care for the newly diagnosed individuals.

١ ما قبل التشخيص

- كثير من الناس لديه واحد أو أكثر من منذرات أمراض القلب والسّرايين والسكر كالسمنة وقلة الحركة والعامل الوراثي.
- يمكن اكتشاف هذه المنذرات من خلال قياس ضغط الدم والوزن وتحاليل الدم العامة الشاملة للدهون والسكر ووظائف الكلى.
- قد يطلب الطبيب فحوصات إضافية لتأكيد التشخيص، واستكمال تقييم الحالة.

٢ التشخيص

قد يستدعي ذلك عدة زيارات لإجراء:
- فحوصات مخبرية إضافية.
- قياس ضغط الدم والسكر في المنزل.

٣ التقييم

- يتم فيها عمل المزيد من الفحوصات المخبرية والسريرية، للكشف عن:
  ١. منذرات القلب والسّرايين الأخرى.
  ٢. أسباب عضوية لنشوئها.
  ٣. مضاعفات المشكلة الصحية.
- قد يتطلب ذلك عدة زيارات، وفحوصات.

٤ خطة العلاج

تشمل ٣ جوانب رئيسية:
١. تصحيح نمط العيش، بما فيه الغذاء الصحي، وزيادة النشاط الحركي، وتصحيح الوزن، والامتناع عن التدخين وتجنب الكحول.
٢. العلاج الدوائي: بوصف الدواء الأنسب حسب نتائج التقييم.
٣. الرعاية الذاتية، حيث يساهم المريض بفعالية في معالجة المشكلة الصحية، بما فيها القياس المنزلي للضغط والسكر، فحص القدمين، التأقلم مع مشكلته الصحية في المنزل والعمل وحسن التصرف في السفر والطوارئ.

٥ المتابعة والتحكم

- مرحلة حساسة في رحلة المعالجة المزمنة، إذ بدونها، لا يعلم أحد ماذا يجري. معظم منذرات القلب، بلا أعراض واضحة، حتى تحدث المضاعفات.
- قد تستدعي عدة زيارات في بداية الخطة العلاجية. ولكنها قد تنتهي بمعدل مرة كل ثلاثة شهور عند بلوغ التحكم.
- في كل زيارة، يتم:
  ١. مراجعة سريعة للوضع الصحي، شاملة الأعراض الناشئة، التحكم، الالتزام بالخطة العلاجية، وآثارها الجانبية، إضافة إلى مستوى الرعاية الذاتية.
  ٢. مراجعة هواجس المريض وتساؤلاته.
  ٣. تدريب المريض ليتمكن من التعامل مع المرض بشكل أفضل، إلى أن يتم التحكم في المرض.

٦ المستشفى

- تقدم الرعاية المزمنة بشكل رئيسي في مراكز الرعاية الصحية الأولية.
- يحتاج بعض المرضى رعاية إضافية في المستشفى، لفحوصات إضافية، أو مشورة طبية، أو فحص متخصص، كفحص قاع العين.

٧ التقييم السنوي الكامل

يلزم إعادة التقييم الكامل للحالة الصحية، لغرض:
١. الفحص الصحي العام، بما فيها الإجراءات الوقائية من لقاحات وفحوصات.
٢. الكشف المبكر عن المضاعفات ومنذرات القلب والسرايين الأخرى.
٣. مراجعة الخطة العلاجية وإعادة توجيهها.

CMR-29 Chronic Care Journey Aabic

Read the Dietary Card while shopping

إقرأ ملصق المحتوى الغذائي عند تسوقك

- Uses: Education of patient about the proper choice of low-salt diet while shopping.

CMR13

أين الملح في الطعام ٢/١ (إقرأ ملصق المحتوى الغذائي عند تسوقك)

قلّلْ من الملح لأن:

الذين يتناولون ملح طعام كثير معرضون بشكل أكبر للإصابة بارتفاع ضغط الدم وأمراض القلب والشرايين.

كيف تقلّل من الملح في طعامك؟

انظر إلى ملصق المحتوى الغذائي Nutrition Facts وتعرَّف على كمية الصوديوم .واختر الأطعمة التي فيها أقل من ٥٪ من الاحتياج اليومي.

كم يحتاج الإنسان من الملح يوميًا؟

يجب أن لا يتناول أكثر من ٢٣٠٠ملغم لكل يوم (ملعقة تقريبًا من الملاعق العادية المستخدمة).

من هم الناس الأكثر تأثراً بملح الطعام؟

١. المصابين بارتفاع ضغط الدم.
٢. ذوو البشرة الداكنة جداً.
٣. من تجاوز عمره الستين عامًا.

كل هؤلاء لابد أن يتناولون ملحًا أقل ولا يزيد عن ١٥٠٠ملغم في اليوم.

أي الوجبات تحتوى على ملح طعام أكثر ؟

- وجبات المطاعم وخاصة الوجبات السريعة.
- الأطعمة المغلفة والمعالجة والمعلبة.

إقرأ ملصق (المحتوى الغذائي) قبل أن تشترى ؟

- في العادة، تحتوي المعلبات على ملصق المحتوى الغذائي ويشمل ذلك كمية الصوديوم.
- إحرص على أن تتعرف على النسبة المئوية من الاحتياج اليومي للصوديوم.

حاول أن تعرف ماذا تعني هذه المعلومة (إذا قرأتها على علب الأغذية):

- خالي من الصوديوم = أقل من ٥ ملغم من الصوديوم.
- ملح قليل جدا = أقل من ٣٥ ملغم من الصوديوم.
- ملح قليل = أقل من ١٤٠ملغم من الصوديوم .

نقاط مهمة عن الأكل من خارج المنزل:

توجد لدى مطاعم الوجبات السريعة الكبيرة نشرة غذائية عن المحتوى الغذائي للوجبات التي يقدمونها.

نقاط مهمة عن الأكل في داخل المنزل :

- لا تضع ملح الطعام على الطاولة (على الأقل تذوق الأكل أولاً).
- استخدم الملح باقتصاد (مثلا نصف ملعقة عند التحضير).
- كثير من الأطعمة يمكن تجهيزها بدون إضافة ملح.
- استخدم الليمون والأعشاب والتوابل بدلاً عن الملح.
- امتنع عن الملح بالتدريج لفترة أسابيع أو لشهر وبعدها سوف تلاحظ الفرق.
- تناول وجبات خفيفة أو فاكهة طازجة أو خضروات بدلاً من البطاطس المملحة أو الذرة.

الحصة = المقدار المعتاد تناوله في الوجبة الواحدة

هذه النشرة مقتبسة من "دليل معالجة منذرات أمراض القلب والسكر ٢٠٢٠"

CMR-13 Salt in Diet

Salt in Your Diet

أين الملح في الطعام

- Uses: Education of patient about the proper choice of low-salt diet.

CMR13

أين الملح في الطعام ٢/٢

- العطام الطبيعي يحتوي على كمية قليلة من ملح الصوديوم.
- معظم ملح الصوديوم المستهلك يُضاف خلال عملية الطبخ.
- يجب الا نتناول اكثر من ٢٣٠٠ ملغم (٢ جم) من الملح في اليوم.

الطعام	الكمية	الصوديوم (ملغم في الحصة)	نسبته من الاحتياج اليومي للصوديوم
الوجبات السريعة			
بيتزا جبن	قطعة واحدة	٣٨٥ ملغم	٪ ١٧
بيض ساندويتش جبن	٥ أونس	١٣٥٠ ملغم	٪٥٤
خبز برجر	ربع رطل	١١٥٠ ملغم	٪ ٥٠
دجاج مقلي	قطعة	١١٥٠ ملغم	٪ ٥٠
بطاطس مقلي ومملح	٦ أونس (حجم كبير)	٢٣٠ ملغم	٪١٠
الوجبات الخفيفة			
ذرة	٣ وربع كوب	٢٩٠ ملغم	٪ ١٣
بطاطس شيبي	١ أونس (٣٠جم)	١٨٠ ملغم	٪ ٨

CMR13

أين الملح في الطعام ٢/٢

- العطام الطبيعي يحتوي على كمية قليلة من ملح الصوديوم.
- معظم ملح الصوديوم المستهلك يُضاف خلال عملية الطبخ.
- يجب الا نتناول اكثر من ٢٣٠٠ ملغم (٢ جم) من الملح في اليوم.

الطعام	الكمية	الصوديوم (ملغم في الحصة)	نسبته من الاحتياج اليومي للصوديوم
العجائن			
فاصوليا	نصف كوب (٤ أونس)	٣٤٠ ملغم	٪ ١٥
باستا حارة	١ كوب (٨ أونس)	١٠٢٠ملغم	٪٤٤
باستا (معلبة باللحم والصلصة)	١ كوب (٨ أونس)	٨٥٠ ملغم	٪٣٧
شوربة خضروات	١ كوب (٨ أونس)	٧٩٠ ملغم	٪٣٤
صلصة الطماطم	نصف كوب (٤ أونس)	٥٦٠ ملغم	٪٢٤
الخوخ المعلب	١٢٥جم	٤ملغم	٪١.٧
الكمثرى المحلى	١٢٥جم	١ملغم	٪٤.٣
علبة بازلاء	١٠٠جم	٢٢٠ملغم	٪٩
علبة فول مقشور	١٥٠جم	٧٧٦ملغم	٪١٦
فاصوليا الحمراء	١٥٠جم	٥٠٧ملغم	٪٢٠
الأنا ناس المعلب	١٤٠جم	صفر	صفر
مخلل خيار	١٠٠جم	٩٦٠ملغم	٪٣٠
مخلل خضار مشكل	١٠٠جم	٢٣٠ملغم	٪١٤
سبانخ	١٠٠جم	٢٥ملغم	٪١
بازلاء مثلجة	١٥٠جم	٨ملغم	٪٠٣
زيتون اسود	١٥جم	٢١٠ملجم	٪٦.٥
زيتون اخضر	١٥جم	١٩٠ملجم	٪٦.٥
العجينات			
بسكويت	١علبة (٢ أونس)	٥٥٠ ملغم	٪٢٣
بسكويت مالح	٢٥٠ جم		٪١٠
بسكويت البودنغ بالزبيب	١١٥ جم		٪٥
عجينة الف باستري	١٨ ملغم		٪ ١٥
بريد (ابيض أو اسمر)	شريحة واحدة (١أونس)	١٣٠ ملغم	٪ ٦
عجينة الكرواسان	٤٠ جم	٢٥٠ملغم	٪١٠
عجينة البقلاوة	٢٥٠ جم		٪ ١٠
عجينة فطائر جاهزة	٨٠ جم		٪١٦
كورن فلكس	١٠٠ جم	٨٦٦ملغم	٪٣٠
شابورة بر	٨٠ جم		٪٣
شابورة عادية	١٧٠ جم		٪٧
شابورة بالحبوب	٥٠ جم	٢٨٠ملغم	٪١٢
معكرونة بالسبانخ	٢٤٠ جم		٪٢
المشروبات			
الماء	١ كوب (٨ أونس)	صفر	صفر
عصير الطماطم	١ كوب (٨ أونس)	٣٨٠ ملغم	٪ ٢٠
صودا	١ كوب (١٢ أونس)	١٠٠ ملغم	٪ ٤
كولا	١ كوب (١٢ أونس)	٥٠ ملغم	٪ ٢
عصير برتقال	١ كوب (٨ أونس)	١٥	٪ ١
الفواكه والخضروات			
حشائش	١ صرة (٢٥ أونس)	٥٠ ملغم	٪ ٢
جزر	١ حبة متوسطة	٢٠ ملغم	٪ ١
تفاح	١ حبة متوسطة	صفر	صفر ٪
برتقال	١ حبة متوسطة	صفر	صفر ٪
موز	١ حبة متوسطة	صفر	صفر ٪

المصادر:
١- مسح بيد اني للمنتجات الغذائية. طريق تطوير الرعاية المزمنة بالتركيز الصحيح بالتغذية. وزارة الصحة ٢٠٠٧
Health Bulletin 5:2. New York City Department of Health and Mental Hygiene -2

هذه النشرة مقتبسة من "دليل معالجة منذرات أمراض القلب والسكر ٢٠٢٠"

Diet Pyramid & Plate

الهرم الغذائي

- Uses: Education of patient about proper, healthy choice of diet portions.

CMR-24 Food Plate

How to suspect early ischemia in the heart and the brain?

هل أنت بعيد عن الإصابة بقصور التروية في القلب أو الدماغ؟

- Uses: Education of patient about early symptoms of heart attack and pre-stroke.

CMR14

هل أنت بعيد عن الإصابة بقصور التروية (الجلطة) في القلب أو الدماغ؟

لتعرف الإجابة تابع القراءة، وأجب على الأسئلة التالية:

أ. قصور تروية القلب:

هل شعرت في أي وقت سابق بألم أو عدم ارتياح، أو ضغط أو ثقل في الصدر؟ ☐ نعم ☐ لا

❖ إذا أجبت بلا انتقل إلى السؤال ٨ . وان أجبت بنعم تابع:

هل كان الألم في منتصف الصدر، أم في يساره، أم في الذراع الأيسر؟ ☐ نعم ☐ لا

❖ إذا أجبت بلا انتقل إلى السؤال ٨ . وان أجبت بنعم تابع:

هل شعرت بالألم عندما كنت تمشي؟ ☐ نعم ☐ لا

هل قللت من الجهد المبذول عندما شعرت بالألم خلال المشي؟ ☐ نعم ☐ لا

هل زال الألم عندما توقفت عن المشي، (أو عندما تناولت حبة تحت اللسان)؟ ☐ نعم ☐ لا

هل زال الألم في غضون ١٠ دقائق؟ ☐ نعم ☐ لا

هل شعرت في وقت سابق بألم شديد في الصدر استمر نصف ساعة أو مايزيد على ذلك؟ ☐ نعم ☐ لا

❖ إذا أجبت بنعم على أي من الأسئلة ٣،٤،٥،٦،٧ فربما تكون قد أصبت بقصور تروية القلب
وتحتاج إلى استشارة الطبيب

ب. قصور تروية الدماغ:

هل شعرت في وقت سابق بأي من الأعراض التالية:

- ☐ صعوبة في النطق
- ☐ ضعف بأحد ذراعيك أو ساقيك
- ☐ تنمل في أحد أجزاء جسدك؟

☐ نعم ☐ لا

❖ إذا أجبت بنعم على السؤال ٨ ، فربما تكون قد أصبت بقصور تروية الدماغ
وتحتاج إلى استشارة الطبيب

CMR-14 When to suspect Cardiovascular attack

Foot Care for Diabetic Patients

العناية بقدمي المصاب بالسكر

- Uses: Education of patient about proper home-care of foot for diabetic patients.

CMR-15 Foot Care

How to choose Your Shoes & Socks

كيف تختار الحذاء والجورب المناسبين؟

- Uses: Education of patient about the proper choice of shoes and socks.

CMR16

كيف تختار الحذاء والجوارب المناسبة؟

إختيار الحذاء المناسب

يجب أن يكون مقاس الحذاء مناسبا للقدم بحيث لايكون ضاغطا على أطراف الأصابع ونهاية القدم.

احرص على اختيار الحذاء الطري والناعم من الداخل.

تجنب الصندل المكشوف والكعب العالي وكذا الأحذية ذات الأساور الضيقة.

عند شرائك حذاء جديد اتبع مايلى:

١. قم بقياس الحذاء في المساء، فعادة تتورم الأقدام في نهاية اليوم.
٢. جرب الحذاء الجديد لمدة نصف ساعة في المنزل ثم قم بفحص القدم لمعرفة وجود اى جروح سطحية، فإذا كانت موجودة عليك باستخدام مقاس أكبر للحذاء.
٣. يجب زيادة مدة الاستخدام بالتدريج، ساعتين ثم ثلاث ساعات.

إختيار الجوارب المناسبة

١. استخدم الجوارب القطنية لأنها تمتص العرق.
٢. ابتعد عن الجوارب المصنوعة من النايلون.
٣. ابتعد عن الجوارب الضيقة فإنها تقلل وصول الدم للقدم.
٤. ابتعد عن الجوارب الواسعة فإنها تنزلق من القدم.
٥. اختر الجوارب الفاتحة اللون، فهي تظهر وجود نقط الدم والإفرازات..
٦. يجب أن تكون الجوارب نظيفة.

نصائح عامة

- لا تستخدم الحذاء بدون جوارب
- تأكد من خلو الحذاء من الأجسام الحادة أو الحصى
- إذا كنت تعمل على فترتين، صباحية ومسائية. فليكن هناك حذاءً تستعمله لكل فترة، حتى تغير من نقاط الضغط على القدمين، ولتعطيه فرصة ليجف.

- لا تستخدم نفس الجورب أكثر من مرة قبل غسله.
- يفضل استخدام الجوارب الصوفية في الشتاء والقطنية في الصيف، دون الجوارب المصنوعة من النايلون.
- لا تمشي حافي القدمين في أي مكان، وخصوصا في المنزل أو أثناء الرحلات، فهناك أحذية خاصة لكلٍ من البيت والبحر.
- يمكنك استخدام التلبيسات Insoles الإضافية عند الحاجة، لزيادة نعومة الحذاء.

Edited by the Chronic Care Quality Improvement Team, KSA 2020. CMRcpg@gmail.com
Reference: https://www.knowdiabetes.org.uk/resources/translations/arabic-footwear-advice/ [cited 26 Aug 2020]

Change Your LifeStyle: Diet & Weight

غير أسلوب عيشك وحياتك: راقب وزنك وأكلك

- Uses: Education of patient about healthier alternatives in lifestyle.

CMR22

غيِّر أسلوب عيشك وحياتك
من أجل قلبٍ أكثر حيوية ونشاط

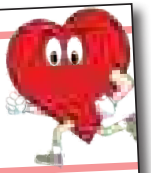
☒ إذا كنت	☑ فجرِّب أن .....
☒ بديناً أو زائد الوزن	☑ تأكل كمية أقل من المعتاد، وأن تزيد نشاطك الحركي "تقليل الوزن وزيادة النشاط البدني يساعدان على تخفيض ضغط الدم والسكر والكولسترول"
☒ تأكل أطعمة مالحة	☑ تختار أطعمة قليلة الملح أو بدون ملح مضاف "اقرأ محتويات الأغذية المعلبة من الملح والصوديوم، واختر الأغذية التي تحتوي على أقل من ٥٪ من الملح"
☒ تضيف الملح أثناء الأكل	☑ تبعد الملاَّحة عن السفرة "يمكنك استخدام بدائل أخرى كالليمون أو البهارات"
☒ تشرب المشروبات الغازية	☑ تستبدلها بالماء أو الحليب قليل الدسم أو اللبن قليل الملح أو الروب
☒ لا تتناول الخضار والفاكهة بانتظام	☑ تتناول الخضروات والفاكهة الطازجة في كل وجبة
☒ تتناول أغذية غير صحية بين الوجبات كالبطاطس المعلب والحلويات	☑ تستبدلها بالفاكهة والخضار، أو الفشار والمكسرات الغير مملحة
☒ تضيف الملح إلى الطعام المطبوخ	☑ تقلل الملح إلى الحد الأدنى أو تتركه، وتستبدله بالبهارات والبصل والثوم (إن كان مناسباً)
☒ تتناول اللحم الأحمر (البقر والغنم) يومياً	☑ تستبدله، بعض الأيام، باللحم الأبيض كالسمك والدواجن
☒ تتناول منتجات الألبان كاملة الدسم	☑ تستبدلها بقليلة الدسم أو المقشود دسمها
☒ تأكل الأطعمة السريعة كالبيتزا والفطاير والهمبرجر والبطاطس المقلية	☑ تقللها إلى الحد الأدنى (ليس أكثر من مرة في الأسبوع)
☒ تأكل الأطعمة الجاهزة كالشوربة والنودلز	☑ تتفادى ذلك، وإن لزم، فتأكد من محتوى الملح والصوديوم فيها

CMR-22 Change your Lifestyle

Change Your LifeStyle: Be Active

غير أسلوب عيشك وحياتك: كن نشطا

- Uses: Education of patient about the benefits of regular exercise, and how to start.



"من أجل قلبٍ أكثر حيوية ونشاط" ...

... غيِّر أسلوب عيشك وحياتك

- ابدأ بزيادة قليلة في نشاطك اليومي.
- واصل بزيادة عدة دقائق من النشاط كل أسبوع، حتى تصل إلى هدفك.
- إنَّ نصف ساعة من النشاط الحركي يُساعد على:
  - تقليل فرصة الإصابة بأمراض القلب وجلطات الدماغ.
  - زيادة نشاطك وحيويتك وإنتاجك.
  - تقليل الإجهاد النفسي وتحسين المزاج.
  - التحكم بالوزن.
  - تخفيض ضغط الدم.
  - تخفيض الكولسترول.
  - التحكم في السكر والوقاية منه.

فوائد المشي الرياضي

Few Tips to Lose Weight

تغييرات بسيطة للتخلص من بعض الوزن

- Uses: Education of patient about loosing weight for overweight CMR patients.

CMR23

تغييرات بسيطة
تساعدك في التخلص من بعض الوزن

أذا كنت معتادا أن	فيمكنك التغير بأن	أذا أمكنك ذلك	تستطيع أن تتخلص من ..... (كغم) خلال السنة
تستخدم المصعد أو السلم المتحرك	تستخدم الدرج لدقيقتين	كل يوم	١
تستخدم ملعقة من المايونيز أو كريمة الجبن في السندوتش	تستخدم خردل	٣ مرات في الأسبوع	٢
تأكل كمية كبيرة من الوجبات السريعة المقلية	تستبدلها بمشويات أو أخرى غير مقلية	مرة أسبوعيا	٢
تشاهد التلفزيون بكثرة	تعمل عمل منزلي قليل	نصف ساعة يوميا	٢
تشرب كأس من الحليب كامل الدسم	تشرب كأس من الحليب منزوع الدسم	مرة كل يوم	٣
تتنقل بالسيارة	تمشي مشيا سريعا لمدة ٢٠ دقيقة	كل يوم	٣
تأكل بين الوجبات قطعة شوكولا (٦٠ جم)	تأخذ قطعة من الفواكه	مرتين في الأسبوع	٣
تأكل ٣ بيضات مع الجبن (اوملت) مع الخبز أو البريد	تأخذ حبوب سيريال مع حليب منزوع الدسم	مرة في الأسبوع	٥
تأكل كأس آيسكريم كل أسبوع	تقلل إلى نصف كأس	كل أسبوع	٦
تشرب علبة من الصودا أو المشروبات الغازية	تشرب كأس من الماء	كل يوم	٧

CMR-23 Few Tips to Lose Weight

ي غ ط الحياة (الغذاء، النشاط البدني، النوم) عند الذهاب للحج أو السفر، لذا نورد في كل مما يلي أهم النصائح للحاج أثناء أدائه مناسكه:

١. قبل الرحلة:
   أ- قم بزيارة الطبيب قبل موعد الرحلة بوقت كاف لعمل الفحوصات الضرورية.
   ب- احرص على تناول الأدوية المزمنة بانتظام وأخبر الطبيب عن أي أعراض جديدة.
   ت- أحضر معك كمية كافية من الأدوية تكفي لمدة تزيد عن مدة الرحلة بأسبوع.
   ث- احمل معك نسخة من وصفاتك الطبية وقائمة بالأدوية التي تتناولها.

٢. الغذاء:
   أ- تناول وجبات غذاء متوازنة وصحية.
   ب- تجنب الأطعمة الدسمة والمقلية.
   ت- تجنب الأطعمة الغنية بالكربوهيدرات البسيطة مثل السكريات والحلويات.

٣. خذ قسطًا من الراحة عند الشعور بالتعب، وتأكد من أخذ حاجتك من النوم.

٤. الالتزام بالإرشادات الصحية:
   أ- احرص على تناول وجبة السحور التي تساعدك على الصيام لفترة طويلة.
   ب- احرص على شرب كميات كافية من الماء للوقاية من الجفاف، خاصة مع ارتفاع درجة الحرارة والرطوبة.
   ت- إذا كان لديك أي من الأمراض المزمنة، فاستشر طبيبك قبل الصيام.
   ث- تأكد من حصولك على التطعيمات اللازمة قبل السفر، وأخبر الطبيب إذا كنت تتناول أي أدوية.
   ج- يجب أن يتم التطعيم ضد الالتهاب السحائي قبل السفر بأسبوع على الأقل.
   ح- إذا كانت مدة الرحلة أكثر من أسبوعين، فيجب أخذ التطعيمات اللازمة.

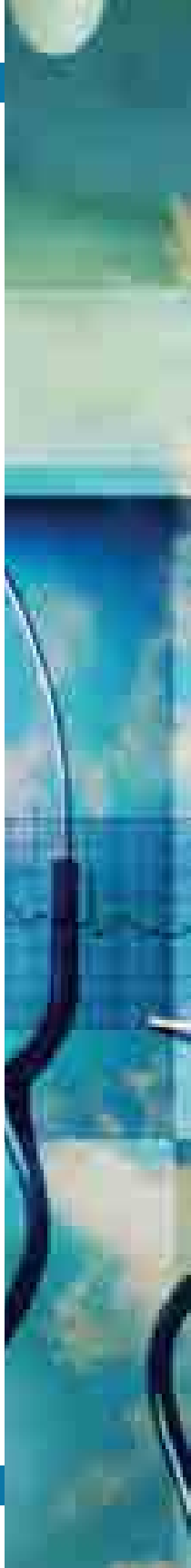
٥. النصائح الإضافية للحاج:
   أ- قم بتقسيم السكر، خصوصًا قبل الصلوات الخمس.
   ب- تناول وجبات خفيفة أو متوسطة الحجم قبل السكر بساعة على الأقل.
   ت- تأكد من حملك لبعض الطعام أو الوجبات الخفيفة لجميع السكر.
   ث- اتبع إرشادات العناية بالقدم[١٢٨] واختيار الحذاء والجوارب المناسبة[١٢٩].
   ج- راجع الطبيب فورًا عند حدوث أي من الأعراض التالية:

٦. النصائح الإضافية للحاج بعد العودة:
   أ- تأكد من حصولك على تطعيم الأنفلونزا قبل مدة السفر.
   ب- قم بزيارة الطبيب عند حدوث أي من الأعراض التالية:

9

Information & Quality Management

إدارة المعلومات والجودة



Quality Measures

The purpose of the guideline is to control CMR. Every effort has been put to meet the requirements of the Chronic Care Model. However, producing the guideline alone is insufficient to address this goal. There must be a continuous process of implementation involving education, training and audit, which includes many quality measures that are used nationally and worldwide. For this purpose a dedicated team has to be assigned for this task. The following measures have been appraised and selected based on the following criteria:

1. The measure is common among multiple guidelines and quality bodies.
2. The measure is recommended in the Saudi Quality references.
3. The measure is applicable in practice (convenient to measure and follow).

The measures were grouped in three categories (short-, intermediate- and long-term measures).

Measures selected:

Measures that cover process, and outcome of care, are covered here. Once these measures are highly affected, every effort has to be made to review measures of structure and resources, as well.

The measures had been labeled as ST, IT and LT standing for short, intermediate and long-term, respectively. They are supposed to be measured annually, unless stated otherwise.

Screening:

1. Percentage of all patient visits with blood pressure (BP) measurement recorded. (ST)
2. Percentage of adult patients who have their weight ± BMI documented in the medical record, at least once a year. (ST)
3. Percentage of paramedical staff with documented initial and annual training in the correct technique for BP measurement. (ST)
4. Percentage of patients who have been categorized as tobacco users or nonusers. (ST)
5. Percentage of adults≥45 years of age or BMI≥30 attending the clinics and having their CVR been estimated. (ST)
6. Percentage of CVR-screened adults with low, intermediate and high CVR. (ST)

Obese Individuals:

1. Percentage of obese patients who have maintained stable BMI or achieved a reduction in BMI within a 12-month period. (IT)
2. Percentage of obese patients who self-report they are physically active. (IT)

Diabetic Individuals:

1. Percentage of patients with diabetes mellitus (DM), heart failure, coronary artery disease or renal disease and have BP < 140/90 mm Hg in their last clinic visit. (IT)
2. Percentage of DM patients with A1c ≤ 7%. (IT)
3. Percentage of DM patients who have proteniuria measured, once or more. (ST)
4. Percentage of DM patients with last readings of A1c > 8%, LDL > 130 mg/dl, or BP > 140/90 mm hg. (IT)
5. Percentage of DM patients who have visual foot inspection in last 3 months. (ST)
6. Percentage of DM or HTN patients who have dilated eye exam in past 1 year. (ST)
7. Percentage of DM patients who have A1c measured once or more in past 1 year. (ST)
8. Percentage of DM patients with A1C test in the last year greater than 8%. (IT)
9. Percentage of DM patients with microalbuminuria or proteinuria who have ACEI or ARB prescribed. (ST)
10. Percentage of DM patients with hypertension who have ACEI/ARB prescribed. (ST)

11. Hospital admission rate for uncontrolled blood sugar. (IT)
12. Emergency visit rate for uncontrolled blood sugar. (IT)

Hypertensive Individuals:

1. Percentage of hypertensive patients whose most recent BP recording ≤ 140/90. (IT)
2. Percentage of non-CMR (not diagnosed and labeled to have CMR) patient visits with BP ≥ 140/90 with documented plan of care for hypertension. (ST)
3. Hospital admission rate for uncontrolled blood pressure. (IT)
4. Emergency visit rate for uncontrolled blood pressure. (IT)

Smoking Individuals:

1. Percentage of Chronic Care tobacco users counseled to quit in last one year. (ST)

ALL CMR Individuals:

2. Percentage of CMR patient with < target LDL. (IT)
3. Percentage of CMR patients who have LDL measured once or more in past 1 year. (ST)
4. Percentage of CMR patients who have eGFR measured once or more in past 1 year. (ST)
5. Percentage of high-CV risk patients, at age of 50 to 65 years, who were prescribed Aspirin. (ST)
6. Percentage of high-CV risk patients who were prescribed Statin. (ST)
7. Hospital admission rate for long and short complication. (LT)
8. Percentage of CMR complication: (LT)
    a. **Myocardial infarction (MI)**
    b. **Stroke (CVA)**
    c. **Cardiovascular events.**
    d. **Nephropathy**
    e. **End-stage renal disease.**
    f. **Sexual Dysfunction**
    g. **Proliferative or Stage III hypertensive retinopathy**
    h. **Blindness (DM only)**
    i. **Lower extremity amputations. (DM only)**
10. Percentage of CMR patients who have comprehensive foot assessment in the past 1 year. (ST)
11. Level of satisfaction in CMR patients. (LT)
12. Level of quality-of-life (QoL) in CMR patients. (LT)
13. Percentage of CMR patients who lost to follow up (> 6 months or missed 3 successive visits). (ST)
14. Percentage of composite CMR control, including to-target BP, A1c, LDL, non-smoking and BMI.

References:

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CMR Patient Recall Algorithm

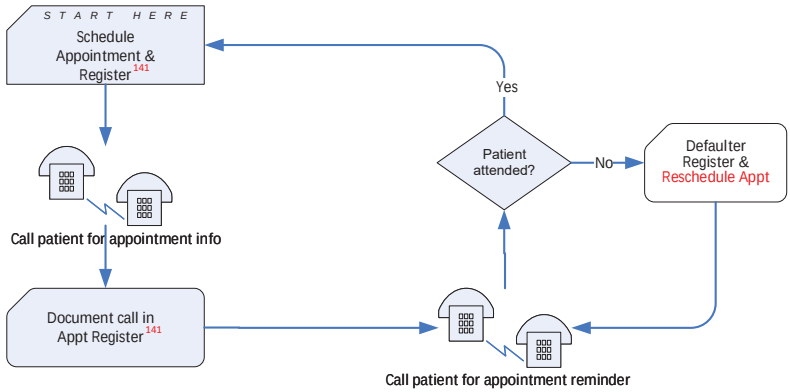
نظام جدولة مواعيد الرعاية المزمنة

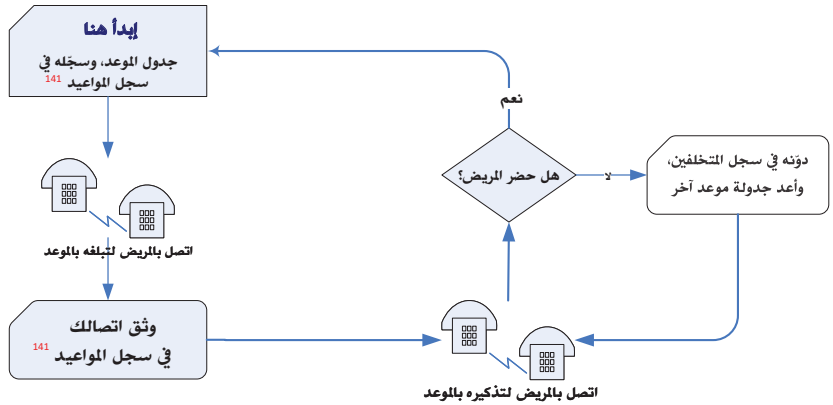
Keeping a good appointment system is a key pillar in Chronic Care, without which quality services are hard to achieve. In addition, it saves cost and complications.

Automated Electronic appointment systems follow similar principles. They adds a powerful tool for recall and show-up.

إن ا ح ا ظ ة ظ ع ن ظ ا م م و ا ع ي د ف ا ع ا ل ر ك ي ز ة، أ س ا س ي ة و ع ا ل ي ة ا م م ي ة، ع ا ي ة ا م ر ا ض ا ز م ن ة. ف ض ع ن ا ل ق ي ل ا ه ل ي ل ا ك ن ل ل ف ي و ا ض ا ع ا ف ا ت.

ن ة أ ف ي ض ن ظ ا م ا و ا ع ي د ي ة م ي ة ل ب ة إ ن ظ ا م ا س ع د ن ا ء ا ر ا ج ع ، و ر ف ي ع ى و ن س م ا ل ز ا م.





CMR Screening Register

استمارة حصر الحالات المكتشفة

الهدف:

- رصد وتوثيق حالات منذرات أمراض القلب والشرايين المكتشفة يومياً.

الفائدة:

- ربط الحالات المكتشفة لدى العلامات الحيوية والمختبر بمسار الرعاية المزمنة في المركز الصحي.
- خلق قناة اتصال بين الجهة المكتشفة للحالة(ممرضة العلامات الحيوية او ممرضة المختبر) وجهة تقيم ومتابعة الحالة (ممرضة الرعاية المزمنة). وذلك لغرض تقليل الحالات اللاتى لم تتلقى الرعاية الصحية المناسبة .

المعنيون بتسجيل الحالات في النموذج وقراءتها:

- ممرضة العلامات الحيوية.
- ممرضة المختبر.
- ممرضة الرعاية المزمنة.

كيفية التسجيل:

- توضع علامة (✓) عند اكتشاف أحد عوامل الخطورة من قبل ممرضة العلامات الحيوية أو ممرضة المختبر حسب ما هو مدون في صفحة ٢٤.
- يتم تسليم الاستمارة لممرضة الأمراض المزمنة بشكل دوري (لا يزيد عن أسبوع) لتستكمل إجراءات الخدمة كما هو مبين في صفحة ٢٤.
- تستكمل ممرضة الأمراض المزمنة تسجيل الحالات في السجل الدائم [١٤١] وتوثق ذلك في أسفل هذه الاستمارة.
- تحفظ الاستمارة في ملف خاص(مرتبة حسب التاريخ بحيث يكون التاريخ الأحدث هو الأعلى)لغرض التوثيق ومراجعة الأداء.
- تستكمل ممرضة الأمراض المزمنة الإجراءات اللازمة (ص ٢٤ المربع الأزرق).

CMR 17

مركز الرعاية الصحية الأولية بـ..
الرعاية المزمنة

استمارة حصر الحالات المكتشفة لمنذرات أمراض القلب والشرايين

التدخين – الضغط – الدهون – البدانة

ت SN	رقم الملف File no.	الاسم Name	علامات حيوية Vital Signs			مختبر Lab		هاتف Tel no.	الممرضة Nurse	التاريخ Date
			BP ≥ 140/90	Age ≥ 45	BMI ≥ 30	FBS ≥ 126 RBS ≥ 200	Chol ≥ 240 LDL ≥ 160			
١										/ /
٢										/ /
٣										/ /
٤										/ /
٥										/ /
٦										/ /
٧										/ /
٨										/ /
٩										/ /
٠										/ /

ملاحظة: الرجاء التأكد من صحة رقم الهاتف

Be sure that the telephone number is correct

CMR-17 CMR Screening Register

CMR Case Register

السجل الدائم لمنذرات أمراض القلب والأوعية الدموية

الهدف:

- ح ومنابعة حا ت منذرات أمراض القلب وا وعية الدموية ا كتشفة داخل نطاق عمل ا ركز الصحي.

الفائدة:

- يريًا:
  تحديد الحا ت التي بحاجة لرعاية أك ا كا خلف وعا الخطورة ومن فيهم مضاعفات.
- إحصائيًا:
  ١. ح الحا ت.
  ٢. عدد ا تابع داخل وخارج ا ركز الصحي، ونسبتهم إ العدد ا توقع.
  ٣. نسبة ا صابة لدى الذكور وا ناث لعوامل الخطورة ومضاعفاتها.

يقوم بتسجيل الحالات في السجل:

ممرضة الرعاية ا زمنة.

كيفية التسجيل:

٤. يُسجل الرقم التسلسل للمراجع مع بيانات ا ريض.
٥. يُسجل تاريخ التشخيص خانة (✓) أو ا شتباه خانة (؟).
٦. خانات ا جموع يتم جمع جميع الحا ت ا سجلة تلك الصفحة بالقلم الرصاص حتى كن تحديثها عند تغ ا علومات التي تحتويها.
٧. حال تلقي ا ريض للرعاية خارج ا ركز الصحي، يُسجل ذلك خانة م حظات.
٨. تحسب وتسجل درجة الخطورة بالقلم الرصاص حتى كن تحديثها دوريًا.
٩. يسجل خانة ا ضاعفات الرقم الخاص بنوع ا ضاعفات حسب ما هو موجود نهاية السجل.

إدارة الرعاية الصحية الأولية بـ

مركز صحي ....

CMR21

الســـجل الدائم لمنذرات أمراض القلب والشرايين

☐ السكر ☐ الضغط ☐ الدهون ☐ البدانة

ملاحظات Remarks[D]	درجة الخطورة Risk Degree[C]			المضاعفات Complications[B]	عوامل الخطورة CVD Risk Factor[A]							الجنس sex		الجنسية Nat		تاريخ الميلاد Birth Date	رقم التلفون Tel. no	الإسم Name	رقم الملف File no	الرقم S
	Low	Med	High		Obese	Lipids ؟	Lipids ✓	DM ؟	DM ✓	HTN ؟	HTN ✓	F	M	NS	S					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
	○	○	○									○	○	○	○					
																مجموع الحالات في هذه الصفحة[C]				

A يدون تاريخ التشخيص في خانة ✓، وفي حال كون الحالة إشتباه فقط فيدون تاريخ الإشتباه في خانة ؟

B يدون كود المضاعفات: (دماغ=١، شبكية=٢، قلب=٣، كلى=٤، أعصاب=٥، شرايين قلب=٦)

C تدون درجة الخطورة والمجاميع بالقلم الرصاص، لتحديثها دورياً.

D غادر للمتابعة في مكان آخر أو توفي.

CMR Appointment Register

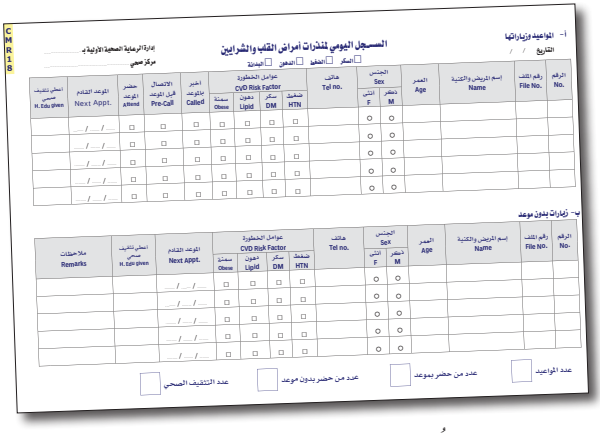
السجل اليومي لمنذرات أمراض القلب والشرايين

الغرض:

حصر ومتابعة زيارات المراجعين لعيادة الأمراض المزمنة ومواعيدها.

الفائدة:

١. توثيق ومتابعة مواعيد العيادة، والتذكير بها.
٢. توثيق الزيارات الخاصة بالعيادة.
٣. حصر المتخلفين ومتابعتهم وتجديد المواعيد لهم.
٤. توثيق عدد الحالات التي يتم تثقيفها.
٥. استخراج الإحصائيات:
   أ- عدد زوار العيادة بموعد وبدون موعد.
   ب- عدد ونسبة المنتظمين والمتخلفين.


CMR18

السجل اليومي لمنذرات أمراض القلب والشرايين

إدارة الرعاية الصحية الأولية بـ .....

مركز صحي .....

أ- المواعيد وزيارتها

التاريخ / /

أسكر ☐ الضغط ☐ الدهون ☐ السمنة

الرقم No.	رقم الملف File No.	إسم المريض والكنية Name	العمر Age	الجنس Sex ذكر M	الجنس Sex أنثى F	هاتف Tel no.	عوامل الخطورة CVD Risk Factor ضغط HTN	عوامل الخطورة CVD Risk Factor سكر DM	عوامل الخطورة CVD Risk Factor دهون Lipid	عوامل الخطورة CVD Risk Factor سمنة Obese	أخبر بالموعد Called	الاتصال قبل الموعد Pre-Call	حضر الموعد Attend	الموعد القادم Next Appt.	أعطى تثقيف صحي H. Edu given
														__/__/__	
														__/__/__	
														__/__/__	
														__/__/__	
														__/__/__	

ب- زيارات بدون موعد

الرقم No.	رقم الملف File No.	إسم المريض والكنية Name	العمر Age	الجنس Sex ذكر M	الجنس Sex أنثى F	هاتف Tel no.	عوامل الخطورة CVD Risk Factor ضغط HTN	عوامل الخطورة CVD Risk Factor سكر DM	عوامل الخطورة CVD Risk Factor دهون Lipid	عوامل الخطورة CVD Risk Factor سمنة Obese	الموعد القادم Next Appt.	أعطى تثقيف صحي H. Edu given	ملاحظات Remarks
											__/__/__		
											__/__/__		
											__/__/__		
											__/__/__		
											__/__/__		

عدد المواعيد ☐ عدد من حضر بموعد ☐ عدد من حضر بدون موعد ☐ عدد التثقيف الصحي ☐

من الذي يسجل في السجل؟

ممرضة الرعاية المزمنة.

كيف يتم التسجيل فيه؟

أ. الزيارات بموعد:

١. دون بيانات المراجع.
٢. ضع علامة (✓) عند عامل الخطورة المصاب به ودون الموعد القادم.
٣. أخبر المراجع بالموعد سواء بالهاتف أو شخصياً، ووثق ذلك بعلامة (✓) في خانة (أُخبر بالموعد).
٤. اتصل بالمريض قبل الموعد بيوم واحد ووثق ذلك بعلامة (✓) في خانة الاتصال قبل الموعد بيوم.
٥. عند حضور الموعد ضع علامة (✓) في خانة "حضر الموعد"، أو علامة (×) في حال تخلفه.
٦. أعطي المراجع موعدًا قادمًا وسجله في خانة الموعد القادم, وكذلك في صفحة يوم الموعد.
٧. ضع علامة (✓) في خانة التثقيف الصحي إذا أُعطي، أو علامة (×) إذا لم يُعطى.

ب. الزيارات بدون موعد:

١. دون بيانات المراجع.
٢. ضع علامة (✓) عند عامل الخطورة المصاب به ودون الموعد القادم.
٣. أعطي المراجع موعدًا قادمًا وسجله في صفحة يوم الموعد.
٤. ضع علامة (✓) في خانة التثقيف الصحي إذا أُعطي، أو علامة (×) إذا لم يُعطى.

Digital Health Information System (HiS) in CMR

Good health information management is a cornerstone in improving the care for chronically diseased patients. It helps in:

1. Better assessment of CMR patients in their initial and follow-up visits. Simulation of encounter forms CMR-2[144], CMR-3[145] and CMR-4[146] is highly advised.
2. Clinical decision support, through the use of alerts, reminders, interpreters, clinical documentation and many others. Good HiS provide panoramic, multi-dimensional views of clinical status such as those in CMR-3[145] and CMR-4[146].
3. Health information exchange, between care givers in different services.
4. Disease registries tracking clinical and epidemiological data and lists that help in managing patients proactively.
5. Prescribing and refill of medications.
6. Patient-centered portals and applications that help in communication, patient recall, education, coach, tele-monitoring, self management and tele-medicine.

An example of the HiS solutions is "Cardiovascular & Chronic Disease Electronic Management System" (CVDEMS). It is a quality-improvement software that has been designed to assist chronic care providers in following up their patients and generating previews, flow charts, graphs and quality-based reports.

Taking into account the pivotal role of clinical information in chronic care, the authors highly recommend the early introduction of HiS in the services provided for CMR patients.

The DMRS must collect information (input) needed in chronic care, including demographic information, health profile, referrals, procedures, laboratory requesting and results. In addition, services provided such as education, medications and vaccinations must be integrated.

The information entered and stored via DMRS may be used to generate different types of reports and views (output) such as:

1. Comprehensive views of chronic care over last few months or years.
2. Summary reports of appointments & defaulters.
3. Flow charts for vitals signs, lab results, medications and self-management.
4. Quality indicators of services and outcome.
5. List of clinically relevant information, such as:
    - Patients at higher CVR, specific medication, abnormal laboratory value, blood pressure and etc.
    - Had documented self-management goal.
    - Took specific medication or vaccination.
    - Had smoking status and self-management documented.
    - Had BP, A1c or other parameters to target.
    - Had a foot or eye exam.
6. Visit notes (medical report) for latest investigations, treatment and complications.

CMR-1: CVD Risk Screening Encounter Form

نموذج حساب نُذُر أمراض القلب والشرايين

Description

A clerking form for the qualitative stratification of cardiovascular risk. It covers many CVR that are lacking in quantitative CVR calculators.

Who is in charge?

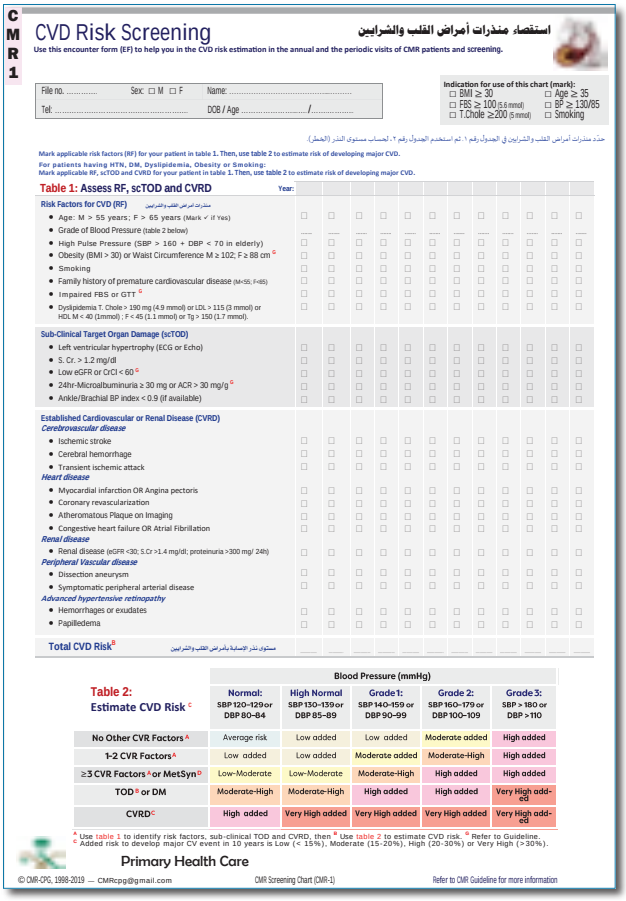
Chronic Care manager (nurse) or if not affordable, the attending physician.

When to use?

1. Part of the full assessment of the CMR.
2. Annually, to monitor progress.
3. Emergence of new CVR or TOD.

Benefits

1. Draw the attention of the PCP to the level of CVR.
2. Helps in better tailor of plan of management.
3. Aid for patient's counselling.



CMR 1

CVD Risk Screening

استقصاء منذرات أمراض القلب والشرايين

Use this encounter form (EF) to help you in the CVD risk estimation in the annual and the periodic visits of CMR patients and screening.

File no. ..... Sex: ☐ M ☐ F Name: .....

Tel: ..... DOB / Age ...../.....

Indication for use of this chart (mark):
☐ BMI ≥ 30 ☐ Age ≥ 35
☐ FBS ≥ 100 (5.6 mmol) ☐ BP ≥ 130/85
☐ T.Chole ≥200 (5 mmol) ☐ Smoking

حدّد منذرات أمراض القلب والشرايين في الجدول رقم ١. ثم استخدم الجدول رقم ٢. لحساب مستوى النذر (الخطر).

Mark applicable risk factors (RF) for your patient in table 1. Then, use table 2 to estimate risk of developing major CVD.
For patients having HTN, DM, Dyslipidemia, Obesity or Smoking:
Mark applicable RF, scTOD and CVRD for your patient in table 1. Then, use table 2 to estimate risk of developing major CVD.

Table 1: Assess RF, scTOD and CVRD Year:

Risk Factors for CVD (RF) منذرات أمراض القلب والشرايين												
• Age: M > 55 years; F > 65 years (Mark ✓ if Yes)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Grade of Blood Pressure (table 2 below)	____	____	____	____	____	____	____	____	____	____	____	____
• High Pulse Pressure (SBP > 160 + DBP < 70 in elderly)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Obesity (BMI > 30) or Waist Circumference M ≥ 102; F ≥ 88 cm [C]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Smoking	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Family history of premature cardiovascular disease (M<55, F<65)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Impaired FBS or GTT [G]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Dyslipidemia T. Chole > 190 mg (4.9 mmol) or LDL > 115 (3 mmol) or HDL M < 40 (1mmol) ; F < 45 (1.1 mmol) or Tg > 150 (1.7 mmol).	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sub-Clinical Target Organ Damage (scTOD)												
• Left ventricular hypertrophy (ECG or Echo)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• S. Cr. > 1.2 mg/dl	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Low eGFR or CrCl < 60 [G]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• 24hr-Microalbuminuria ≥ 30 mg or ACR > 30 mg/g [C]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Ankle/Brachial BP index < 0.9 (if available)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Established Cardiovascular or Renal Disease (CVRD)												
Cerebrovascular disease												
• Ischemic stroke	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Cerebral hemorrhage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Transient ischemic attack	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Heart disease												
• Myocardial infarction OR Angina pectoris	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Coronary revascularization	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Atheromatous Plaque on Imaging	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Congestive heart failure OR Atrial Fibrillation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Renal disease												
• Renal disease (eGFR <30; S.Cr >1.4 mg/dl; proteinuria >300 mg/ 24h)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Peripheral Vascular disease												
• Dissection aneurysm	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Symptomatic peripheral arterial disease	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Advanced hypertensive retinopathy												
• Hemorrhages or exudates	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• Papilledema	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Total CVD Risk [E] مستوى نذر الإصابة بأمراض القلب والشرايين	____	____	____	____	____	____	____	____	____	____	____	____

Table 2: Estimate CVD Risk [C]

	Blood Pressure (mmHg)				
	Normal: SBP 120–129 or DBP 80–84	High Normal SBP 130–139 or DBP 85–89	Grade 1: SBP 140–159 or DBP 90–99	Grade 2: SBP 160–179 or DBP 100–109	Grade 3: SBP > 180 or DBP > 110
No Other CVR Factors [A]	Average risk	Low added	Low added	Moderate added	High added
1-2 CVR Factors [A]	Low added	Low added	Moderate added	Moderate-High	High added
≥ 3 CVR Factors [A] or MetSyn [D]	Low-Moderate	Low-Moderate	Moderate-High	High added	High added
TOD [B] or DM	Moderate-High	Moderate-High	High added	High added	Very High added
CVRD [C]	High added	Very High added	Very High added	Very High added	Very High added

[A] Use table 1 to identify risk factors, sub-clinical TOD and CVRD, then [#] Use table 2 to estimate CVD risk. [*] Refer to Guideline.
[C] Added risk to develop major CV event in 10 years is Low (< 15%), Moderate (15-20%), High (20-30%) or Very High (>30%).

Primary Health Care

 CMR Screening Chart (CMR-1) Refer to CMR Guideline for more information

Al-Mustafa BA. Encounter Forms for Cardiovascular Disease Risk Management. Middle East Journal of Family Medicine 2006;4(6). http://www.mejfm.com/journal/Nov2006/CVD_Risk_Management.htm.

CMR-01 CVR Screening

CMR-2: Initial-Assessment Encounter Form

نموذج التقييم الشامل

Description

A clerking form for the full assessment of CMR.

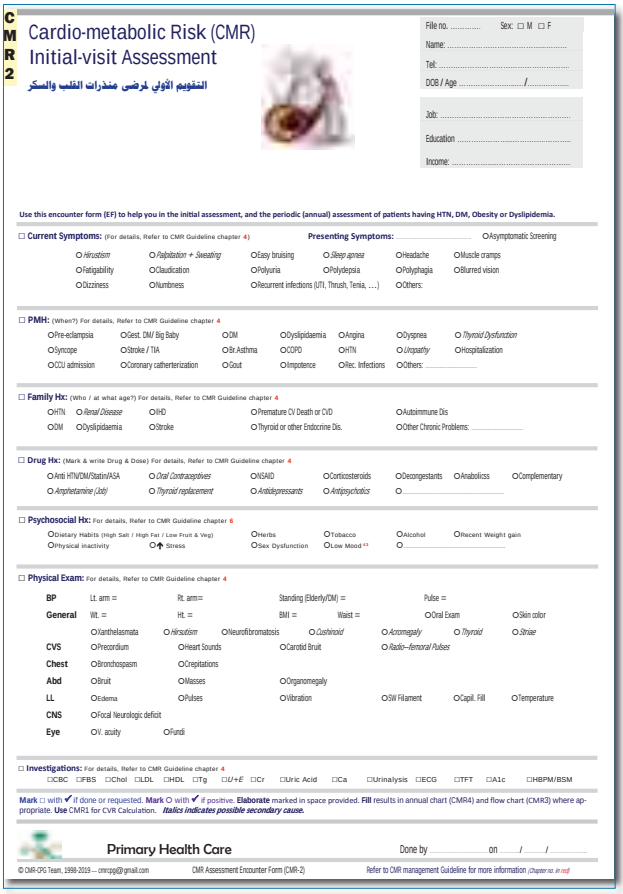
Who is in charge?

Doctor and Chronic Care manager (nurse).

When to use?

1. Initial suspicion or diagnosis of any CMR, including HTN, DM, Dyslipidemia, obesity and family history of premature CVD.
2. Instances that require full assessment revisit, including:
   a. Resistant to treatment,
   b. Suspicion of a secondary cause
   c. Development of premature TOD.

Secondary signs and symptoms are typed in *italics* to draw the attention of the primary care provider.



CMR 2

Cardio-metabolic Risk (CMR)
Initial-visit Assessment

التقييم الأولي لمرضى مخدرات القلب والسكر

File no. ..... Sex: ☐ M ☐ F
Name: .....
Tel: .....
DOB / Age ..... / .....
Job: .....
Education .....
Income: .....

Use this encounter form (EF) to help you in the initial assessment, and the periodic (annual) assessment of patients having HTN, DM, Obesity or Dyslipidemia.

☐ **Current Symptoms:** (For details, Refer to CMR Guideline chapter 4) **Presenting Symptoms:** ..... ○Asymptomatic Screening

○ *Hirsutism* ○ *Palpitation + Sweating* ○Easy bruising ○ *Sleep apnea* ○Headache ○Muscle cramps
○Fatigability ○Claudication ○Polyuria ○Polydepsia ○Polyphagia ○Blurred vision
○Dizziness ○Numbness ○Recurrent infections (UTI, Thrush, Tenia, …) ○Others:

☐ **PMH:** (When?) For details, Refer to CMR Guideline chapter 4

○Pre-eclampsia ○Gest. DM/ Big Baby ○DM ○Dyslipidaemia ○Angina ○Dyspnea ○ *Thyroid Dysfunction*
○Syncope ○Stroke / TIA ○Br.Asthma ○COPD ○HTN ○ *Uropathy* ○Hospitalization
○CCU admission ○Coronary catherterization ○Gout ○Impotence ○Rec. Infections ○Others: .....

☐ **Family Hx:** (Who / at what age?) For details, Refer to CMR Guideline chapter 4

○HTN ○ *Renal Disease* ○IHD ○Premature CV Death or CVD ○Autoimmune Dis
○DM ○Dyslipidaemia ○Stroke ○Thyroid or other Endocrine Dis. ○Other Chronic Problems: .....

☐ **Drug Hx:** (Mark & write Drug & Dose) For details, Refer to CMR Guideline chapter 4

○Anti HTN/DM/Statin/ASA ○ *Oral Contraceptives* ○NSAID ○Corticosteroids ○Decongestants ○Anabolisss ○Complementary
○ *Amphetamine (Job)* ○ *Thyroid replacement* ○ *Antidepressants* ○ *Antipsychotics* ○.....

☐ **Psychosocial Hx:** For details, Refer to CMR Guideline chapter 6

○Dietary Habits (High Salt / High Fat / Low Fruit & Veg) ○Herbs ○Tobacco ○Alcohol ○Recent Weight gain
○Physical inactivity ○↑ Stress ○Sex Dysfunction ○Low Mood [4,5] ○.....

☐ **Physical Exam:** For details, Refer to CMR Guideline chapter 4

BP Lt. arm = Rt. arm= Standing (Elderly/DM) = Pulse =
General Wt. = Ht. = BMI = Waist = ○Oral Exam ○Skin color
○Xanthelasmata ○ *Hirsutism* ○Neurofibromatosis ○ *Cushinoid* ○ *Acromegaly* ○ *Thyroid* ○ *Striae*
CVS ○Precordium ○Heart Sounds ○Carotid Bruit ○ *Radio–femoral Pulses*
Chest ○Bronchospasm ○Crepitations
Abd ○Bruit ○Masses ○Organomegaly
LL ○Edema ○Pulses ○Vibration ○SW Filament ○Capil. Fill ○Temperature
CNS ○Focal Neurologic deficit
Eye ○V. acuity ○Fundi

☐ **Investigations:** For details, Refer to CMR Guideline chapter 4

☐CBC ☐FBS ☐Chol ☐LDL ☐HDL ☐Tg ☐*U+E* ☐Cr ☐Uric Acid ☐Ca ☐Urinalysis ☐ECG ☐TFT ☐A1c ☐HBPM/BSM

Mark ☐ with ✔ if done or requested. **Mark** ○ with ✔ if positive. **Elaborate** marked in space provided. **Fill** results in annual chart (CMR4) and flow chart (CMR3) where appropriate. **Use** CMR1 for CVR Calculation. ***Italics indicates possible secondary cause.***

Primary Health Care Done by ..... on ...../...../.....

 CMR Assessment Encounter Form (CMR-2) Refer to CMR management Guideline for more information *(Chapter no. in red)*

Al-Mustafa BA. Encounter Forms for Cardiovascular Disease Risk Management. Middle East Journal of Family Medicine 2006;4(6). http://www.mejfm.com/journal/Nov2006/CVD_Risk_Management.htm.

CMR-02 Initial Assessment Form

CMR-3: Focused Visits Encounter Form

نموذج الزيارات الترددية

Description

An encounter form (EF) that documents and track visit-to-visit data. It replaces or augment the usual free-writing progress notes.

The data include clinical indicators, lab results-of-concern, medications, compliance, education and counselling offered, next appointment, procedures and referrals afforded.

In electronic health systems, every effort must be paid to simulate it.

Who is in charge?

Attending doctor and Chronic Care manager (nurse).

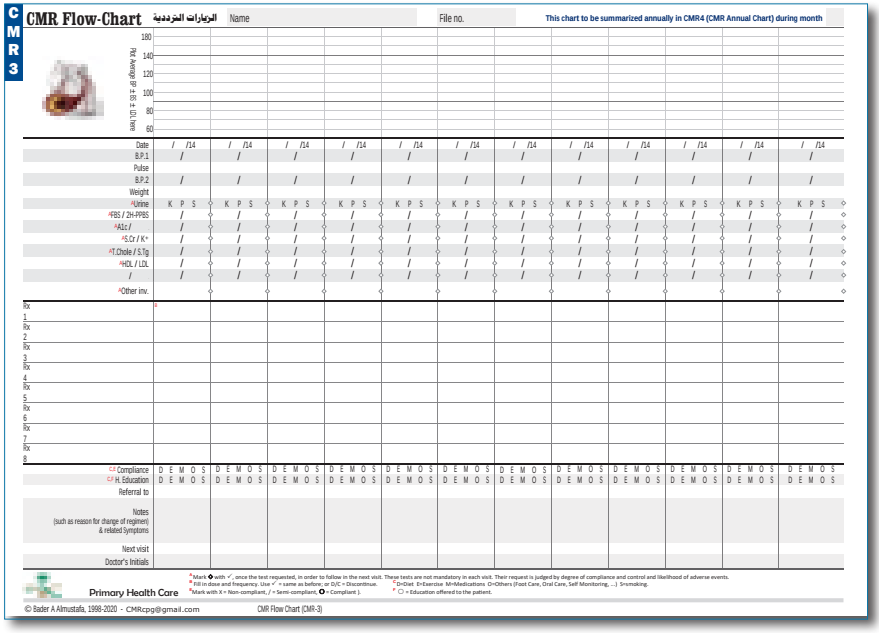
When to use?

All CMR focused visits.

It may be filled, in-part, before the consultation by the chronic care manager.

Benefits

1. Comprehensive, easy and quick to fill.
2. Easily read years of care. Thus, it saves a lot of time, effort and cost.
3. An aid to avoid hazards and minimize adverse events.
4. Reminds PCP for the missing procedures, in focused visits.
5. An Educational aid in patient counseling.
6. High PCP satisfaction, after its implementation in more than hundred clinics.
7. Simplifies audit process.


CMR Flow-Chart الزيارات الترددية

Name

File no.

This chart to be summarized annually in CMR4 (CMR Annual Chart) during month

CMR3

Primary Health Care

© Bader A Almustafa, 1998-2020 - CMRcpg@gmail.com

CMR Flow Chart (CMR-3)

Al-Mustafa BA. Encounter Forms for Cardiovascular Disease Risk Management. Middle East Journal of Family Medicine 2006;4(6). http://www.mejfm.com/journal/Nov2006/CVD_Risk_Management.htm.

CMR-03 Visit-to-Visit Encounter Form

CMR-4: Annual Assessment Encounter Form

نموذج التقييم السنوي

Description

An encounter form (EF) that documents, tracks and reminds for the periodic workup needed for every CMR patient.

In electronic health systems, every effort must be paid to simulate it.

Who is in charge?

Attending doctor and Chronic Care manager (nurse).

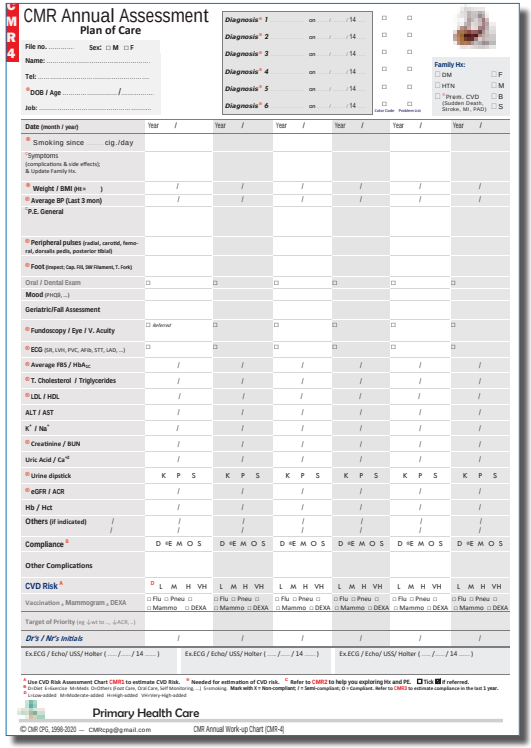
When to use?

- Annually for low-intermediate risk patients.
- Biannually for high-very high risk individuals.

A reminder must be set for every patient, as part of the internal duties of the attending PCP.

Benefits

1. Comprehensive, easy and quick to fill and collate.
2. Easily read years of care and progress of patient's health. Thus, it saves a lot of time, effort and cost.
3. Reminds PCP for the missing procedures, in assessment visits, including preventive measure, such as vaccinations and mammogram.
4. An Educational aid in patient counseling.
5. High PCP satisfaction, after its implementation in more than hundred clinics.
6. Simplifies audit process.



CMR Annual Assessment
Plan of Care

File no. ..... Sex: □ M □ F
Name: .....
Tel: .....
*DOB / Age ...../.....
Job: .....

*Diagnosis 1 ..... on ...../...../14 □ □
*Diagnosis 2 ..... on ...../...../14 □ □
*Diagnosis 3 ..... on ...../...../14 □ □
*Diagnosis 4 ..... on ...../...../14 □ □
*Diagnosis 5 ..... on ...../...../14 □ □
*Diagnosis 6 ..... on ...../...../14 □ □
Color Code Problems List

Family Hx:
□ DM □ F
□ HTN □ M
□ *Prem. CVD (Sudden Death, Stroke, MI, PAD) □ S

Date (month / year)	Year /	Year /	Year /	Year /	Year /	Year /
*Smoking since ..... cig./day						
*Symptoms (complications & side effects); & Update Family Hx.						
*Weight / BMI (Ht=)	/	/	/	/	/	/
*Average BP (Last 3 mon)	/	/	/	/	/	/
*P.E. General						
*Peripheral pulses (radial, carotid, femoral, dorsalis pedis, posterior tibial)						
*Foot (Inspect: Cap. Fill, SW Filament, T. Fork)						
Oral / Dental Exam	□	□	□	□	□	□
Mood (PHQ9, ...)						
Geriatric/Fall Assessment						
*Fundoscopy / Eye / V. Acuity	□ Referral	□	□	□	□	□
*ECG (SR, LVH, PVC, AFib, STT, LAD, ...)	□	□	□	□	□	□
*Average FBS / HbA_{1C}	/	/	/	/	/	/
*T. Cholesterol / Triglycerides	/	/	/	/	/	/
*LDL / HDL	/	/	/	/	/	/
ALT / AST	/	/	/	/	/	/
K^+ / Na^+	/	/	/	/	/	/
*Creatinine / BUN	/	/	/	/	/	/
Uric Acid / Ca^{++}	/	/	/	/	/	/
*Urine dipstick	K P S	K P S	K P S	K P S	K P S	K P S
*eGFR / ACR	/	/	/	/	/	/
Hb / Hct	/	/	/	/	/	/
Others (if indicated)	/ /	/ /	/ /	/ /	/ /	/ /
Compliance *	D ✳E M O S	D ✳E M O S	D ✳E M O S	D ✳E M O S	D ✳E M O S	D ✳E M O S
Other Complications						
CVD Risk ^	D L M H VH	L M H VH	L M H VH	L M H VH	L M H VH	L M H VH
Vaccination , Mammogram , DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA	□ Flu □ Pneu □ □ Mammo □ DEXA
Target of Priority (eg. ↓ wt to ..., ↓ ACR, ...)						
Dr's / Nr's Initials	/	/	/	/	/	/
Ex.ECG / Echo/ USS/ Holter (...../...../ 14 .....)	Ex.ECG / Echo/ USS/ Holter (...../...../ 14 .....)		Ex.ECG / Echo/ USS/ Holter (...../...../ 14 .....)			

^ Use CVD Risk Assessment Chart CMR1 to estimate CVD Risk. * Needed for estimation of CVD risk. * Refer to CMR2 to help you exploring Hx and PE. ☐ Tick ☑ if referred.
Nr=Diet- E=Exercise- M=Meds- Dr=Others (Foot Care, Oral Care, Self Monitoring, ...) S=smoking. Mark with X = Non-compliant; / = Semi-compliant; O = Compliant. Refer to CMR3 to estimate compliance in the last 1 year.
L=Low-added M=Moderate-added H=High-added VH=Very-High-added

Primary Health Care

 CMR Annual Work-up Chart (CMR-4)

Al-Mustafa BA. Encounter Forms for Cardiovascular Disease Risk Management. Middle East Journal of Family Medicine 2006;4(6). http://www.mejfm.com/journal/Nov2006/CVD_Risk_Management.htm.

CMR-04 CMR Annual Form

CMR-5: Non-pharmacological Follow-up Card

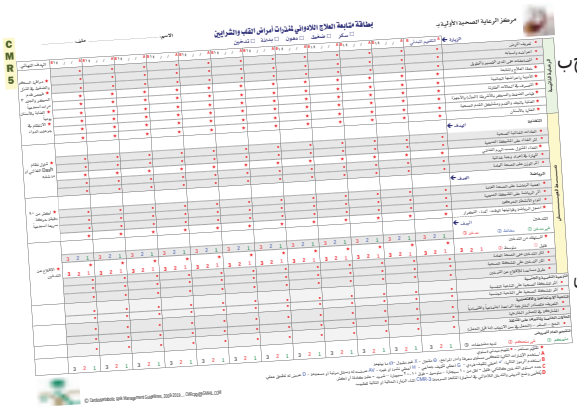
بطاقة متابعة العلاج اللادوائي

الغرض:

- توثيق العلاج الدوائي وغير الدوائي المقدم لمرضى أمراض القلب والأوعية الدموية، ومتابعة ذلك خلال زيارة المريض إلى العيادة الخارجية أو المنزل.

الفائدة:

- يساعد مقدم الخدمة على معرفة ما يجب أن يقدمه للمريض خلال زيارته.



المعنيون بالبطاقة:

- ممرضة العيادة الخارجية أو المنزل.

كيفية التسجيل:

١. تم تقييم المريض حسب أحد العوامل التي تؤثر على قدرته على الصيام أثناء الخدمة إذا لم يصرح له.

٢. خلال كل عمود، دوّن تقييم الحالة الحيوية المهمة، ونوع التدخل المعطى الحيوية التي تم التدخل.

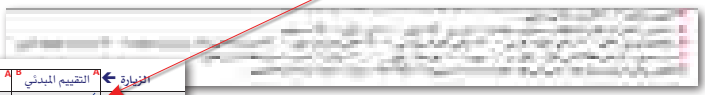
٣. ضع علامة ✓ أو ✗ في الخلية المناسبة.

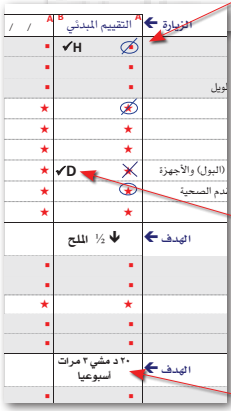
٤. التقييم:

١. دوّن ذلك في الطرف العلوي من كل خانة.

٢. استخدم الرموز المدونة أسفل البطاقة.[A]

٣. استعن بتقييم العناية الذاتية بالعادة المريض.





٤. استعن بتقييم حالة المريض بالاستجابات الخاصة بها ص ٩٧ النغذية،٩٦ الرياضة، ٩٩ التدخين.

٥. استعن بتقييم الحالة النفسية بالاستبيان الاكتئاب ص ٥٢.

٦. استعن بتقييم الحالة الاجتماعية المالية المريض.

٥. التدخل العلاجي:

١. دوّن ذلك في الطرف العلوي من كل خانة.

٢. استخدم الرموز المدونة أسفل البطاقة.[B]

٦. التقييم العام:

- دوّن ذلك من واقع بطاقة التقييم الرئيسي CMR-4.[١٤٦]

٧. دوّن الهدف المتفق عليه مع المريض خلال الهدف، متابعته الزيارة القادمة، سواء الهدف السابق أم هدفا آخر تماما.

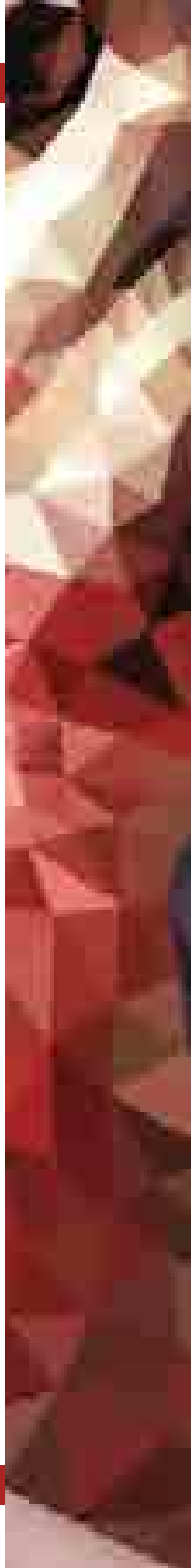
٨. تحديد متابعة العلاج الدوائي كلما دعت الحاجة وحدد أحد مرين رئيسيين، وذلك عند اتخاذ القرار الحالة.

٩. فحص وضع المريض والتدخل العلاجي على بطاقة المتابعة الدورية CMR-3.[١٤٥]

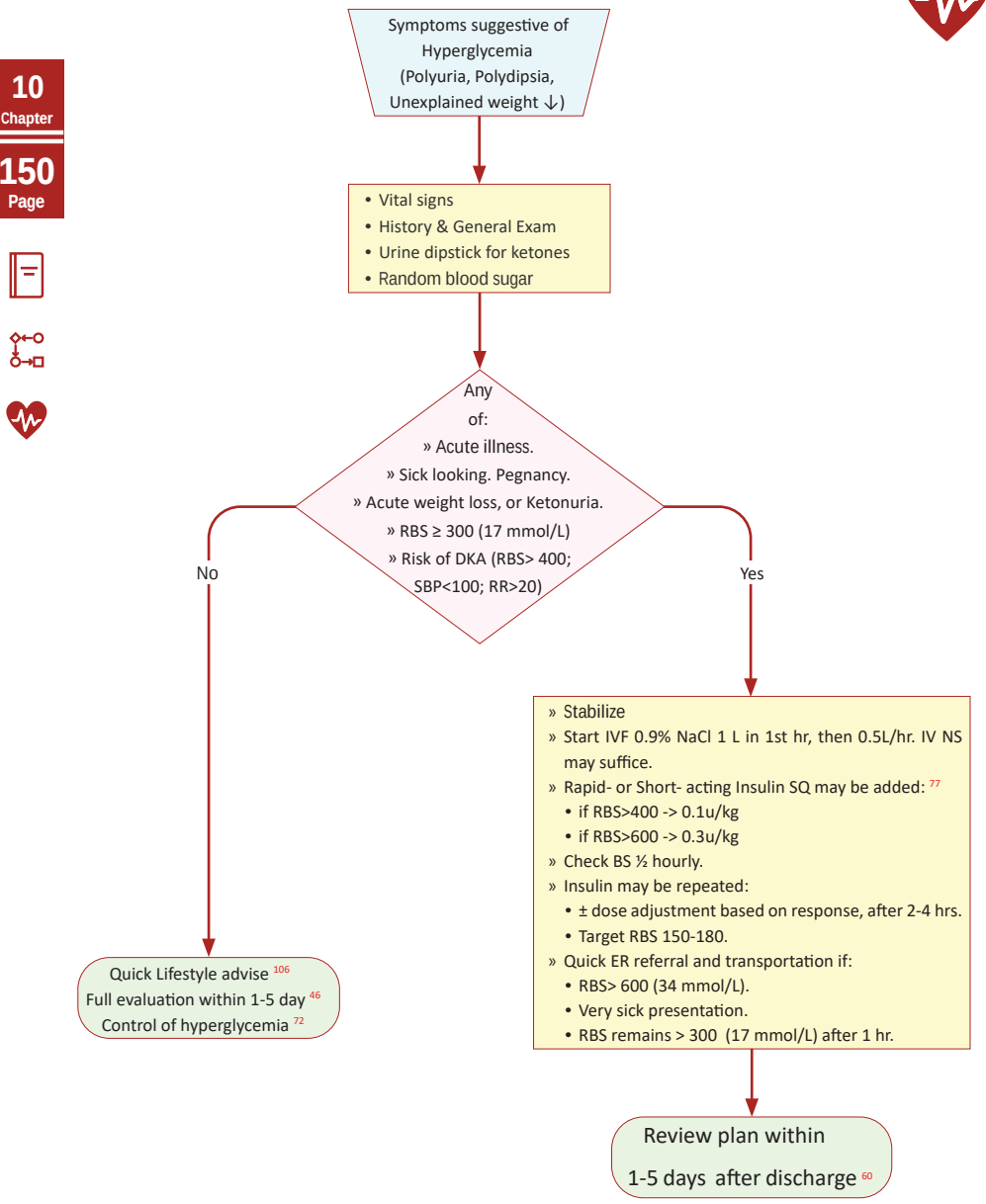
10

Urgency

الحالات العاجلة



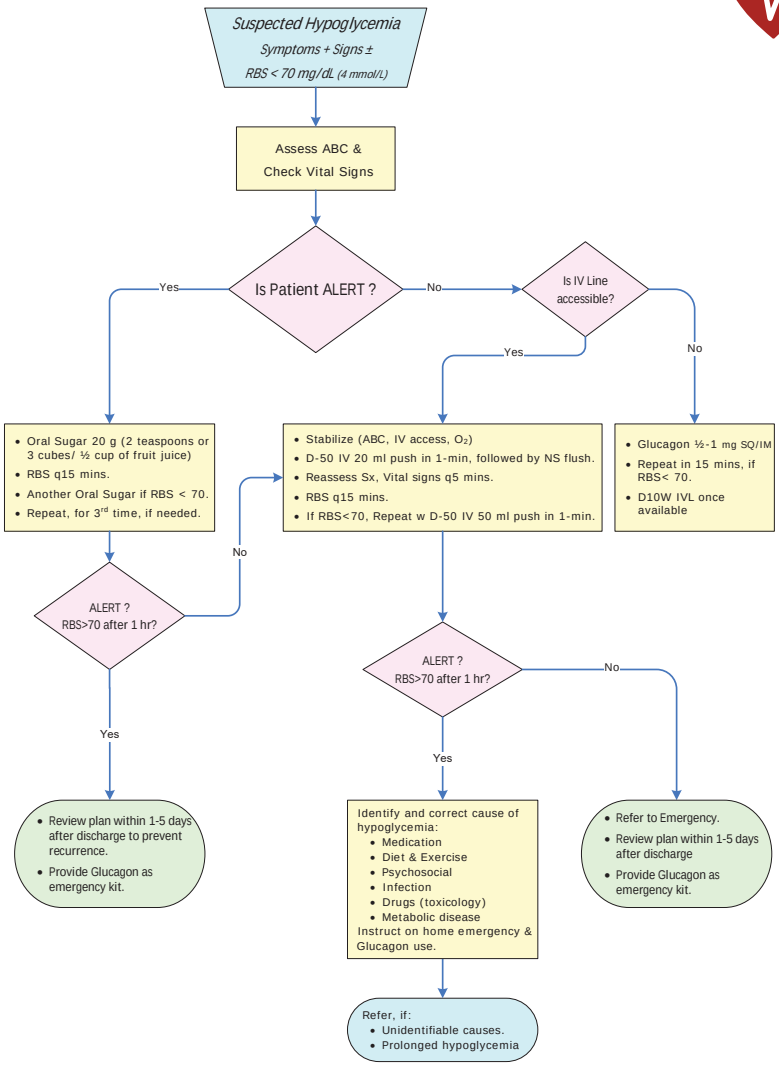
Initial Management of Symptomatic Hyperglycemia



References:

1. Abbas EK, et al. Hyperglycemic Crises in Adult Patients With Diabetes. DIABETES CARE 2009;32:1335-43.
2. David MN et al. Medical Management of Hyperglycemia in Type 2 Diabetes: A Consensus Algorithm for the Initiation and Adjustment of Therapy. Diabetes Care 2009;32:193–203.
3. PICK, ANTHONY J., and LOWELL R. SCHMELTZ. "Management of Acute Hyperglycemia in Urgent Care (Part 1). " https://www.jucm.com/management-acute-hyperglycemia-urgent-care-part-1. Accessed 4 Dec 2020.
4. Guidelines and Protocols of Diabetes Emergencies. Saudi Ministry of health, Riyadh 2015. https://www.moh.gov.sa/Documents/Diabetes-Emergencies.pdf. Accessed 4 Dec 2020.

Management of Hypoglycemia



Hypoglycemia Signs & Symptoms:

- *Mild (Autonomic)*: tremors, palpitations, sweating, excessive hunger.
- *Moderate (Neuroglycopenic)*: headache, mood changes, irritability, parasthesia, visual disturbances, confusion, difficulty speaking.
- *Severe*: unconsciousness, seizures or coma.

Severe hypoglycemia, particularly that caused by a sulfonylurea, is often prolonged. Subsequent glucose infusion and frequent feeding are often required.

References:

1. American Diabetes Association. "Standards of Medical Care in Diabetes—2020 abridged for primary care providers." Clinical Diabetes 38.1 (2020): 10-38.
2. Cryer, Philip E. "Hypoglycemia in adults with diabetes mellitus." UpToDate. Waltham (MA): UpToDate Inc. Available at: https://www. uptodate. com. Accessed February 12 (2019).

Initial Approach to Very High Blood Pressure in PHC

SBP ≥ 180
or
DBP ≥ 110

-Recheck BP manually using appropriate cuff size
-Call Doctor
-Measure BP in both arms

- Review current Symptoms & Signs[A]
- Evaluate Heart, Lungs, neck veins, and Lower Limbs for Heart Failure; Fundi; Pulses for Aortic Dissection; Brief mental status; Gross motor exam

Any Acute TOD?[A]
Or
BP ≥ 220/120

Yes →

Hypertensive Emergency

- ❑ Relax in quite dim room
- ❑ Stabilize the pt.
- ❑ Refer to ER for inpatient Mgx
- ❑ Review plan after discharge from the hospital

No →

Hypertensive Urgency

- ❑ Relax in quite dim room.
- ❑ Resume dose, if missing, or initiate Oral Long-acting Anti-HTN , or Immediate-acting Anti-HTN.[B]
- ❑ Monitor vital signs Q 15-30 mins for 1-3 hrs.
- ❑ Re-evaluate for BP level & Acute TOD before discharge.
- ❑ Start/ Review CMR work-up within 1 week.
- ❑ Advise for low salt diet& Stress avoidance.
- ❑ F/U daily & Adjust dose till initial target BP < 180/110 within 24-72 hrs.

A: Symptoms & Signs of Acute TOD

Neurologic: Unusual headache, Confusion, Somnolence, Stupor, Visual loss, Seizure, Dysarthria, Focal Neurologic deficit, Coma

Cardiac: SOB, Chest pain/ Inter-scapular/ epigastric, Nocturia, Pulmonary Edema

Renal: Oliguria, Azotemia, Proteinuria, Hematuria

GI: Nausea, Vomiting

Fundoscopic: Wide cup, Papilloedema

B: Drugs for hypertensive urgencies

Drug	Dose	Time to peak	Half life	Side effects
Captopril	12.5-25 mg PO	15-60 min	1.9 h	Renal failure in patients with renal artery stenosis
Labetalol	200-400 mg PO	20 –120 min	2.5-8 h	Bronchospasm, depression of myocardial contractility, A-V block, nausea, elevation of liver enzymes
Furosemide	20-40 mg PO	1-2 h	0.5-1.1 h	Volume depletion
Amlodipine	5-10 mg PO	1-6 h	30–50 h	Headache, tachycardia, flushing, peripheral edema

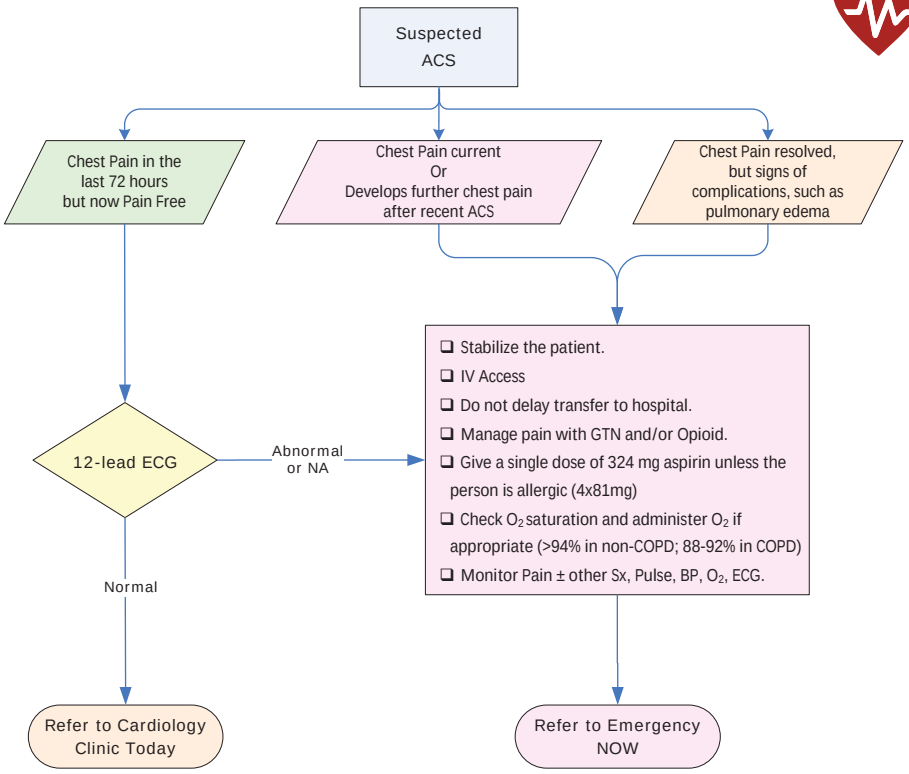
Notes:

1. Take average of 2 successive measurements, 1-3 mins apart. If the successive measurement is > 10 mmHg different, then repeat.[B9]
2. Aggressive lowering of BP (>25%) may induce cerebral, myocardial or renal ischemia.
3. Avoid short-acting Nifidipine (oral and sublingual).

References:

1. MA Rodriguez, SK Kumar, M De Caro. Hypertensive Crisis. Cardiology in Review 2010;18(2):102-107.
2. J Varon. Treatment of acute severe hypertension: current and newer agents. Drugs 2008;68(3):283-97.
3. CJ Hebert, DG Vidt. Hypertensive Crises. Primary Care: Clinics in Office Practice 2008:35(3):475-487.
4. TJ Burton and IB Wilkinson. The dangers of immediate-release nifedipine in the emergency treatment of hypertension. J Human Hypertension 2008;22:301-2.

Acute Coronary Syndrome in Primary Care



Symptoms and Signs which may indicate An Acute Coronary Syndrome (ACS)

- Pain in the chest and/or other areas (e.g. arms, back or jaw) lasting > 15 minutes.
- Chest pain associated with nausea and vomiting, marked sweating, breathlessness, or particularly a combination of these.
- Chest pain associated with hemodynamic instability.
- New onset chest pain, or abrupt deterioration in previously stable angina, with recurrent chest pain occurring frequently and with little or no exertion, with episodes often lasting > 15 minutes.

Definition of Angina

- **Typical angina** – Pain or discomfort that is 1) substernal, 2) provoked by exercise and/or emotion, and 3) relieved by rest and/or nitroglycerin.
- **Atypical angina** – Pain or discomfort that has 2 of 3 features listed for typical angina.
- **Non-anginal chest pain** – Pain or discomfort that has one or none of the three features listed for typical angina.

ECG changes indicative of new ischaemia

- new ST-T changes, or
- new left bundle branch block (LBBB), or
- Development of pathological Q waves in the ECG

References

1. NICE Guidelines. Chest pain of recent onset: Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin. National Clinical Guideline Centre for Acute and Chronic Conditions, London 2010. Updated Nov 2016.
2. ICSI Health Care Guideline: Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome. Institute for clinical systems improvement. 8th Edition, Nov 2012.

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الحمد لله