Cardiometabolic Risk Management in Primary Care

Patient-centered translational guide for the Primary Health Care Provider

Sixth edition, 2021
ver 2021.09
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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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Acknowledgment

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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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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
Institut universitaire de cardiologie et de pneumologie de Québec (Hôpital Laval)
Québec, Canada

“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
“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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مقدمة
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

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

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

---

1. Chronic Care Model (CCM)
   CCM is a blueprint for high-quality, patient-centered chronic care. It addresses six elements:
   1. Community linkage.
   2. Health Care Delivery System.
   5. Decision Support.

---

**Cardiometabolic Risk**

- 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

---

**CMR Guideline adapts international evidence-based guidelines for better adoption in primary care**
Prevalence of CMR factors, KSA

Figure 1. Prevalence of cardiometabolic risk factors in Saudi Arabia, 2015

References:

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.
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. 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.

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).
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.
17. Information management workshop.
18. Communication skills 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.
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.
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.
  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, or the chronic management algorithm.
  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.
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

Initial Visits

A- Assess pt.’s views and needs
B- Review clinical Assessment
   - Obesity
   - Diabetes Mellitus
   - Hypertension
   - Dyslipidemia
C- Assess Lifestyle
D- Estimate CV Risk

Is 2nd cause suspected?
Is there any TOD?

A- Communicate & Explain
B- Specialist Referral
C- Continue Follow-up

A- Communicate a Plan & Agree
B- Specific Therapy
   - Weight Management
   - Glycemic Control
   - BP Control
   - Lipid Control
C- Lifestyle Management
D- Consider Statin
E- Consider Aspirin

Yes

No

Maintain treatment goals:
   - Lifestyle & Self-Management goals
   - Monitor A1c or Average Blood Sugar (for DM pts.)
   - Monitor Lipids (for Dyslipidemic pts.)
   - Monitor BP + Wt. in every visit
   - Monitor Compliance, new complaints.
   - Adjust plan in special seasons (Ramadan, Travel, Hajj.)

Annual Assessment of Complications & comorbidity:
   - Targeted History + Physical Exam
   - Cardiovascular + Cerebrovascular Assessment
   - Renal Assessment
   - Foot Exam + Risk Assessment (for DM pts.)
   - Dilated Eye Exam and oral care.
   - Re-Estimate CV Risk
   - Mood Assessment
   - Immunization & Opportunistic Preventive Care
   - Fall assessment for elderly.

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**

**Vital Signs Nurse / Physician**

- Measure weight in each visit
- Calculate BMI annually
- **BMI ≥ 30**
  - **Age ≥ 35 or Smoking**
  - SBP ≥ 130 OR DBP ≥ 85
  - **Inform Dr. if BP ≥ 180/110**
  - **If new HTN:**
    - Register in New CMR List
    - Put CMR Card
- **Inform Dr. if BS ≥ 300 (17 mmol)**
- **If new DM:**
  - Register in New CMR List
  - Put CMR Card
- **Review New CMR List weekly, at minimum**
- **File it in “Suspected Cases File”**
- **Schedule patient for Complete Assessment**
- **Call patient for appointment info**

**Laboratory Nurse**

- Blood Sugar Measurement
- **FBS ≥ 100 (5.6 mmol) or RBS ≥ 140 (7.8 mmol)**
- **If new DM:**
  - Register in New CMR List
  - Put CMR Card
- **Enter case in Chronic Disease Register**

**Chronic Disease Nurse & Physician**

- **Blood Sugar Measurement**
- **Serum Lipid Measurement**
- **TC ≥ 200 (5 mmol) or LDL ≥ 115 (3 mmol)**
- **T. Chole ≥ 240 (6 mmol) or LDL ≥ 160 (4 mmol)**

**Case Identification Algorithm**

**S**

- Measure weight in each visit
- Calculate BMI annually
- **BMI ≥ 30**
  - **Age ≥ 35 or Smoking**
  - SBP ≥ 130 OR DBP ≥ 85
- **Inform Dr. if BP ≥ 180/110**
- **If new HTN:**
  - Register in New CMR List
  - Put CMR Card
- **Review New CMR List weekly, at minimum**
- **File it in “Suspected Cases File”**
- **Schedule patient for Complete Assessment**
- **Call patient for appointment info**

**T**

- **FBS ≥ 100 (5.6 mmol) or RBS ≥ 140 (7.8 mmol)**
- **If new DM:**
  - Register in New CMR List
  - Put CMR Card
- **Enter case in Chronic Disease Register**

**A**

- **Blood Sugar Measurement**
- **Serum Lipid Measurement**
- **TC ≥ 200 (5 mmol) or LDL ≥ 115 (3 mmol)**
- **T. Chole ≥ 240 (6 mmol) or LDL ≥ 160 (4 mmol)**

**R**

- **Inform Dr. if BS ≥ 300 (17 mmol)**
- **If new DM:**
  - Register in New CMR List
  - Put CMR Card
- **Enter case in Chronic Disease Register**

**E**

- **Inform Dr. if BS ≥ 300 (17 mmol)**
- **If new DM:**
  - Register in New CMR List
  - Put CMR Card
- **Enter case in Chronic Disease Register**

**Superscript numbers** (\(^n\)) 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.\(^\text{[A]}\)

2. Calculate body mass index (BMI) at least once each year.\(^\text{[B]}\)

\[
\text{BMI} = \frac{\text{weight}}{\text{height}^2} \quad \text{OR} \quad \text{BMI} = \frac{\text{kg}}{\text{m} \times \text{m}}
\]

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

\[
\text{BMI} = \frac{70}{1.6^2} \quad \text{OR} \quad \text{BMI} = 70 \div 1.6 \div 1.6 = 27.34
\]

3. Waist circumference should be measured to estimate disease risk for patients who have normal or overweight BMI scores.\(^\text{[B]}\)

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

<table>
<thead>
<tr>
<th>Obesity Class</th>
<th>BMI (kg/m(^2))</th>
<th>Disease Risk*</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underweight</strong></td>
<td>&lt; 18.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Normal†</strong></td>
<td>18.5–24.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>25.0–29.9</td>
<td>Increased</td>
<td>High</td>
</tr>
<tr>
<td><strong>Obesity I</strong></td>
<td>30.0–34.9</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td><strong>Obesity II</strong></td>
<td>35.0–39.9</td>
<td>Very High</td>
<td>Very High</td>
</tr>
<tr>
<td><strong>Obesity III</strong></td>
<td>≥ 40</td>
<td>Extremely High</td>
<td>Evaluate within 2 months</td>
</tr>
</tbody>
</table>

* 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**

**BODY MASS INDEX**

<table>
<thead>
<tr>
<th>WEIGHT IN KILOGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.5</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>1.55</td>
</tr>
<tr>
<td>1.60</td>
</tr>
<tr>
<td>1.65</td>
</tr>
<tr>
<td>1.70</td>
</tr>
<tr>
<td>1.75</td>
</tr>
<tr>
<td>1.80</td>
</tr>
<tr>
<td>1.85</td>
</tr>
<tr>
<td>1.90</td>
</tr>
<tr>
<td>1.95</td>
</tr>
</tbody>
</table>

**HEALTHY**

**OVERWEIGHT**

**OBESITY**

---
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:

Hypertension: Screening, Classification & Diagnosis

1. Blood pressure should be measured, as per standards[^11], 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 office measurements.

<table>
<thead>
<tr>
<th>Category[^A]</th>
<th>Systolic</th>
<th>Diastolic</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt; 120</td>
<td>&lt; 80</td>
<td>Advise for Good Lifestyle[^106]</td>
</tr>
<tr>
<td>Normal</td>
<td>120 – 129</td>
<td>80 – 84</td>
<td>Advise for Good Lifestyle[^106]</td>
</tr>
<tr>
<td>High normal (Pre-Hypertension)</td>
<td>130 – 139</td>
<td>85 – 89</td>
<td>Advise for Lifestyle Change[^96]</td>
</tr>
<tr>
<td>Grade 1 hypertension</td>
<td>140 - 159</td>
<td>90 – 99</td>
<td>Evaluate and Confirm[^42] within 2 months</td>
</tr>
<tr>
<td>Grade 2 hypertension</td>
<td>160 - 179</td>
<td>100 – 109</td>
<td>Evaluate and Confirm[^42] within 1 month</td>
</tr>
<tr>
<td>Grade 3 hypertension</td>
<td>≥ 180</td>
<td>≥ 110</td>
<td>Evaluate and treat[^42] immediately</td>
</tr>
</tbody>
</table>

Isolated systolic hypertension

| ≥ 140 | < 90 |

[^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:

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awake</td>
<td>24-h</td>
<td>Sleep</td>
<td></td>
</tr>
<tr>
<td>Sustained</td>
<td>≥ 140/90</td>
<td>≥ 135/85</td>
<td>≥ 135/85</td>
<td>≥ 130/80</td>
</tr>
<tr>
<td>White coat[^71]</td>
<td>≥ 140/90</td>
<td>&lt; 135/85</td>
<td>&lt; 135/85</td>
<td>&lt; 130/80</td>
</tr>
<tr>
<td>Masked</td>
<td>&lt; 140/90</td>
<td>-</td>
<td>≥ 135/85</td>
<td>≥ 135/85</td>
</tr>
</tbody>
</table>

References:

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 and, if normal, should be repeated at 3-year intervals.  

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:

- 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)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 100 mg/dL (5.6 mmol/l)</td>
<td>&lt; 140 mg/dL (7.8 mmol/l)</td>
<td>A</td>
<td>&lt; 5.7%</td>
<td>Advise for Good Lifestyle</td>
</tr>
<tr>
<td>Pre-diabetes</td>
<td>100–125 mg/dL (5.6–6.9 mmol/l)</td>
<td>140–199 mg/dL (7.8–11 mmol/l)</td>
<td>A</td>
<td>5.7–6.4%</td>
<td>Advise for Lifestyle Change</td>
</tr>
</tbody>
</table>

Diabetes Mellitus

| Asymptomatic: | ≥ 126 mg/dL (6.9 mmol/l) | ≥ 200 mg/dL (11 mmol/l) | ≥ 200 mg/dL (11 mmol/l) | ≥ 6.5% | Evaluate and Confirm within 1 week |
| Symptomatic:  | ≥ 126 mg/dL (6.9 mmol/l) | ≥ 200 mg/dL (11 mmol/l) | ≥ 200 mg/dL (11 mmol/l) | ≥ 6.5% | Evaluate 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 for further details.

References:

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.

<table>
<thead>
<tr>
<th>CV Risk</th>
<th>LDL levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average risk</td>
<td>&lt;55 mg/dL 1.4 - 1.8 mmol/L</td>
</tr>
<tr>
<td>Healthy Lifestyle</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td></td>
<td>55 -&lt; 70 mg/dL 1.8 - 2.6 mmol/L</td>
</tr>
<tr>
<td></td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td></td>
<td>70 -&lt; 100 mg/dL 2.6 - 3 mmol/L</td>
</tr>
<tr>
<td></td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td></td>
<td>100-&lt; 116 mg/dL 3 -&lt; 4.9 mmol/L</td>
</tr>
<tr>
<td></td>
<td>Lifestyle intervention+</td>
</tr>
<tr>
<td></td>
<td>consider Drug intervention[A]</td>
</tr>
<tr>
<td></td>
<td>Lifestyle + Drug intervention</td>
</tr>
<tr>
<td>Low-Moderate added risk</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td>Healthy Lifestyle</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td>Lifestyle intervention+</td>
<td></td>
</tr>
<tr>
<td>consider Drug[A]</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention[A]</td>
<td></td>
</tr>
<tr>
<td>High added risk</td>
<td>Healthy Lifestyle[A]</td>
</tr>
<tr>
<td>Healthy Lifestyle</td>
<td>Healthy Lifestyle[A]</td>
</tr>
<tr>
<td>Lifestyle intervention+</td>
<td></td>
</tr>
<tr>
<td>consider Drug[A]</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention[A]</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention[A]</td>
<td></td>
</tr>
<tr>
<td>Very high added risk</td>
<td>Healthy Lifestyle[A]</td>
</tr>
<tr>
<td>Lifestyle intervention+</td>
<td></td>
</tr>
<tr>
<td>consider Drug[A]</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention[A]</td>
<td></td>
</tr>
<tr>
<td>Lifestyle + Drug intervention[A]</td>
<td></td>
</tr>
</tbody>
</table>
| Reproduced from 2019 ESC/EAS Guidelines for the Management of Dyslipidaemias.

References:
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, Hypercholesterolema, 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).\(^{116}\)
   - 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 \(^{31}\)

   - 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.\(^{37}\)

4. Stratify CVR risk:
   - Management of hypertension, hypercholesterolema 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:**
### Cardiovascular Risk Stratification

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

#### Stratification of CVR to estimate prognosis.

<table>
<thead>
<tr>
<th>Other Risk Factors &amp; Disease History</th>
<th>Blood Pressure (mmHg)</th>
<th>Normal: SBP 120–129 or DBP 80–84</th>
<th>Pre-HTN: SBP 130–139 or DBP 85–89</th>
<th>Grade 1: SBP 140–159 or DBP 90–99</th>
<th>Grade 2: SBP 160–179 or DBP 100–109</th>
<th>Grade 3: SBP &gt; 180 or DBP &gt; 110</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Other CVR Factors *</td>
<td>Average risk</td>
<td>Low added risk</td>
<td>Low added risk</td>
<td>Moderate added risk</td>
<td>High added risk</td>
<td></td>
</tr>
<tr>
<td>1-2 CVR Factors *</td>
<td>Low added risk</td>
<td>Low added risk</td>
<td>Moderate added risk</td>
<td>Moderate-High added risk</td>
<td>High added risk</td>
<td></td>
</tr>
<tr>
<td>≥ 3 CVR Factors *, or MetSyn *</td>
<td>Low-Moderate added risk</td>
<td>Low-Moderate added risk</td>
<td>Moderate-High added risk</td>
<td>High added risk</td>
<td>High added risk</td>
<td></td>
</tr>
<tr>
<td>TOD * or DM *</td>
<td>Moderate-High added risk</td>
<td>Moderate-High added risk</td>
<td>High added risk</td>
<td>High added risk</td>
<td>High-Very High added risk</td>
<td></td>
</tr>
<tr>
<td>CVRD * , FH *</td>
<td>High added risk</td>
<td>Very High added risk</td>
<td>Very High added risk</td>
<td>Very High added risk</td>
<td>Very High added risk</td>
<td></td>
</tr>
</tbody>
</table>

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 \textsuperscript{29}
- Smoking
- Family history of premature CV disease (M <55 ; F <65 years)
- Impaired FBS or Impaired GTT \textsuperscript{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 \textsuperscript{34}
- Ankle/brachial BP index < 0.9 (if available)
- 24hr-microalbuminuria ≥30, or ACR >30 \textsuperscript{54}
- Carotid wall thickening or plaque
- Low HDL-cholesterol < 40 mg/dl (1 mmol/L)

#### 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\textsuperscript{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 \textsuperscript{33}
- BP ≥ 130/85 mmHg
- Impaired FBS ≥ 100 mg/dl (5.6 mmol/l) \textsuperscript{32}
- High TG >150 mg/dl (1.7 mmol/L)
- Low HDL-cholesterol < 40 mg/dl (1 mmol/L)

### References:
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.
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 30, eating disorders 38, sleep apnea 110, arthritis, and use of medication. 40
5. Is it a secondary obesity? 62
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?
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***

<table>
<thead>
<tr>
<th>Obesity Class</th>
<th>BMI (kg/m²)</th>
<th>Disease Risk* (Relative to Normal Weight and Waist Circumference)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men ≤ 40 in (≤ 102 cm)*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Women ≤ 35 in (≤ 88 cm)*</td>
</tr>
<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
<td>-</td>
</tr>
<tr>
<td>Normal†</td>
<td>18.5–24.9</td>
<td>-</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0–29.9</td>
<td>Increased</td>
</tr>
<tr>
<td>Obesity I</td>
<td>30.0–34.9</td>
<td>High</td>
</tr>
<tr>
<td>Obesity II</td>
<td>35.0–39.9</td>
<td>Very High</td>
</tr>
<tr>
<td>Obesity III</td>
<td>≥ 40</td>
<td>Extremely High</td>
</tr>
</tbody>
</table>

* 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:
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

<table>
<thead>
<tr>
<th>Cardiovascular</th>
<th>Musculoskeletal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension (17%)</td>
<td></td>
</tr>
<tr>
<td>Heart failure</td>
<td></td>
</tr>
<tr>
<td>Coronary artery diseases (17%)</td>
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<tr>
<td>Varicose veins</td>
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<tr>
<td>Pulmonary embolism</td>
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<tr>
<td>Osteoarthritis (knee and hip) (24%)</td>
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<tr>
<td>Immobility</td>
<td></td>
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<tr>
<td>Low back pain</td>
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<tr>
<td>Hyperuricemia and gout</td>
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</table>

<table>
<thead>
<tr>
<th>Endocrine</th>
<th>Respiratory</th>
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</thead>
<tbody>
<tr>
<td>Metabolic syndrome</td>
<td></td>
</tr>
<tr>
<td>DM-2 (61%)</td>
<td></td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td></td>
</tr>
<tr>
<td>Polycystic ovarian syndrome</td>
<td></td>
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<tr>
<td>Reduced fertility and menstrual disorders</td>
<td></td>
</tr>
<tr>
<td>Breast (11%) and uterine cancer (34%)</td>
<td></td>
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<tr>
<td>Pregnancy complications</td>
<td></td>
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<tr>
<td>Dyspnea</td>
<td></td>
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<tr>
<td>Obstructive sleep apnea</td>
<td></td>
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<tr>
<td>Hyperventilation syndrome</td>
<td></td>
</tr>
<tr>
<td>Pickwickian syndrome</td>
<td></td>
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<tr>
<td>Asthma</td>
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<table>
<thead>
<tr>
<th>Gastrointestinal</th>
<th>Cutaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro-esophageal reflux diseases</td>
<td></td>
</tr>
<tr>
<td>Fatty liver disease</td>
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<tr>
<td>Cholelithiasis (30%)</td>
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<tr>
<td>Hernias</td>
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<tr>
<td>Pancreatitis</td>
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<tr>
<td>Colonic cancer</td>
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<tr>
<td>Stretch marks</td>
<td></td>
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<tr>
<td>Status pigmentation of the legs</td>
<td></td>
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<tr>
<td>Lymphedema</td>
<td></td>
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<tr>
<td>Cellulitis</td>
<td></td>
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<tr>
<td>Intertrigo and carbuncles</td>
<td></td>
</tr>
<tr>
<td>Acanthosis nigricans</td>
<td></td>
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<tr>
<td>Skin tags</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Genitourinary</th>
<th>Psychological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary stress incontinence</td>
<td></td>
</tr>
<tr>
<td>Obesity related glomerulopathy</td>
<td></td>
</tr>
<tr>
<td>Depression/ low self esteem</td>
<td></td>
</tr>
<tr>
<td>Body image disturbances</td>
<td></td>
</tr>
<tr>
<td>Social stigmatization</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Neurologic</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td></td>
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<tr>
<td>Idiopathic intracranial hypertension</td>
<td></td>
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<tr>
<td>Meralgia parasthetica</td>
<td></td>
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<tr>
<td>Dementia</td>
<td></td>
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<tr>
<td>Increased surgical risk</td>
<td></td>
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<tr>
<td>Increased post operative complications</td>
<td></td>
</tr>
</tbody>
</table>

### 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:
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 (e.g., 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 | • Measurement of neck circumference (>17 inches in men, >16 inches in women)  
| (daytime sleepiness, loud snoring, gasping or choking episodes during sleep and awakening headaches) | • Polysomnography for oxygen desaturation, apnea and hypopneic events.  
|                                                                                  | • ENT examination for upper airway obstruction  

| Suspected Alveolar Hyperventilation (Pickwickian) syndrome | • Polysomnography (to rule out obstructive sleep apnea)  
| (Hypersomnolence, right sided heart failure including elevated JVP, hepatomegaly and lower limb edema) | • 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 | • Dexamethasone suppression test.  
| (moon face, thin skin that bruise easily, severe fatigue, striae) | • 24-h urinary free cortisol.  

| Suspected Polycystic Ovarian Syndrome | • Morning blood draw for total testosterone, free and weakly testosterone, dehydroepiandrosterone (DHEAS), prolactine, TSH and early morning 17-hydroxyprogesteron.  
| (oligomenorrhea, hirsutism, enlarged ovaries may be palpable, hypercholesterolemia, impaired glucose tolerance, persistent acne and androgenic alopecia) |
### Table 2. Medications that interfere with weight loss or induce weight gain.

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

**References:**

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? ¹²
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).¹⁴
- 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.¹⁴
- Lifestyle (including amount of physical exercise, dietary habits, smoking, alcohol intake and psychosocial factors that might influence the management of hypertension).²⁵
- Previous antihypertensive therapy: drugs used; efficacy and adverse effects; herbs & other traditional therapy.
- Use of other medications and drugs that might raise the BP.¹⁴
- Features of secondary hypertension.¹⁴
- 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).¹¹
- 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.¹³
- 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.¹⁴
- 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.

**Laboratory work up**

- Fasting blood sugar.
- Lipid profile (total cholesterol, LDL, HDL and s. triglyceride).
- Serum creatinine and GFR estimation.
- Serum potassium and sodium.
- Urinalysis.
- Serum uric acid.
- Hemoglobin and hematocrit.
- Electrocardiogram.
- 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.
- Drug-induced hypertension.
- Disproportionate TOD for degree of hypertension.
- Unprovoked or excessive hypokalemia
- Clinical or biochemical features suggestive of 2ry cause.

**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:**

### Secondary Hypertension: Causes and Clinical Features.

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

Physical Examination
- Systolic BP measurement
- Correct BP measurement
- BMI & waist circumference
- Ophthalmology referral for fundoscopic exam
- Sensory/motor deficit
- Brachial arterial pulse
- Carotid bruit
- Radio-femoral delay

Features of 24hr hypertension
- Fasting blood sugar
- Lipid profile
- Serum uric acid & calcium
- Serum creatinine & eGFR
- Serum potassium & sodium
- Hemoglobin & hematocrit
- Urinalysis
- ECG
- Albumin/creatinine ratio or 24-hr-urine for albumin

Medical History
- Duration & level of high BP
- Admissions & ER visits
- Target organ damage (TOD/ACC)
- Neurological symptoms
- Headache
- Vertigo
- TIA
- Sensory/motor deficit
- Heart symptoms
- Palpitation
- Chest pain
- Swollen ankles
- Shortness of breath
- Throat
- Polyuria
- Nocturia
- Hematuria
- Peripheral arterial symptoms
- Cold extremities
- Intermittent claudication

- Previous antihypertensive therapy
- Medications & herbs raising BP
- Features of 24hr hypertension
- Snoring & sleep apnea
- Hypertension
- Family Hx
- Premature CVD
- Premature sudden death
- Chronic kidney or endocrine disease
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.

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?

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.
14. Cultural, psychosocial, educational, and economic factors that might influence the management of diabetes.
15. Nutritional habits, weight history and physical activity.
16. Tobacco, alcohol, and/or controlled substance use.
17. Contraception and reproductive and sexual history.
18. Immunization against influenza and pneumococcus.

Physical examination
1. BMI and waist circumference.
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.
11. Foot examination.\(^\text{57}\)
12. Skin examination (for acanthosis nigricans, insulin-injection sites, infections, and lipodystrophy, xanthelasma and skin breakdown).
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).\(^\text{54}\)
5. Thyroid-stimulating hormone (TSH), if clinically indicated.
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:**
Chapter 4 - Assessment of Diabetes Mellitus

Physical Examination
- BMI
- Sitting BP
- Standing BP
- Fundoscopic examination
- Oral examination
- Thyroid examination
- Cardiac examination
- Abdominal examination
- Dorsalis pedis & posterior tibial
- Auscultation of carotids
- Peripheral pulses
- Hand/fingers examination
- Foot examination
- Skin examination
- Neurological examination
- Injection site examination
- Home blood sugar monitoring

Assessment of Diabetes

Laboratory Work Up
- Glycated hemoglobin A1C
- Hemoglobin & hematocrit
- Lipid profile
- Serum creatinine & eGFR
- ALT / AST
- TSH
- ECG in adults
- Ketones
- Protein
- Urinalysis
- Sediment
- Albumin/creatinine ratio or 24-hr urine for albumin

Medical History

Symptoms & results of laboratory tests
- Current treatment of diabetes
- Acute complications (frequency, severity)

Infections
- Skin
- Foot
- Oral
- Urinary
- Eyes

Systems
- Kidneys
- Genitourinary
- Gastrointestinal
- Heart
- Cerebrovascular

Medications & herbs
- Smoking
- Hypertension
- Obesity
- Dyslipidemia
- Family history

Risk factors for CVD
- Endocrine
- Eating disorders

Other conditions
- Mood disorders

Family history of DM and other endocrine diseases
- Cultural
- Psychosocial
- Educational
- Economic

Other factors
- Nutrition, weight, physical activity
- Smoking, alcohol
- Contraception, reproductive, & sexual history
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. 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

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

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

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.

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

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

<table>
<thead>
<tr>
<th>No. of shaded answers</th>
<th>Q1 or Q2 is shaded</th>
<th>Q1 &amp; Q2 are not shaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 5 answers</td>
<td>Major depressive disorder (Refer to Specialist)</td>
<td>No Depression</td>
</tr>
<tr>
<td>2-4 answers</td>
<td>Other depressive disorder (Discuss result with pt. &amp; monitor severity)</td>
<td>No Depression</td>
</tr>
<tr>
<td>0-1 answers</td>
<td>No Depression</td>
<td>No Depression</td>
</tr>
</tbody>
</table>

Table 4. Severity of depression

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

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>+ve Likelihood Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized Anxiety Disorder</td>
<td>89%</td>
<td>82%</td>
<td>5.1</td>
</tr>
<tr>
<td>Panic Disorder</td>
<td>74%</td>
<td>81%</td>
<td>3.9</td>
</tr>
<tr>
<td>Social Anxiety Disorder</td>
<td>72%</td>
<td>80%</td>
<td>3.6</td>
</tr>
<tr>
<td>Post-Traumatic Stress Disorder</td>
<td>66%</td>
<td>81%</td>
<td>3.5</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>68%</td>
<td>88%</td>
<td>5.5</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Anxiety Severity</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 4</td>
<td>Minimal anxiety</td>
<td>None, Re-Screen annually</td>
</tr>
<tr>
<td>5 – 9</td>
<td>Mild anxiety</td>
<td>Provide general feedback. Repeat GAD-7 at FU</td>
</tr>
<tr>
<td>10 – 14</td>
<td>Moderate anxiety</td>
<td>Further Evaluation + Referral to Psychiatry</td>
</tr>
<tr>
<td>&gt;= 15</td>
<td>Severe anxiety</td>
<td>Further Evaluation + Referral to Psychiatry</td>
</tr>
</tbody>
</table>

**References:**

### 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.

#### Over the last two weeks, how often have you been bothered by the following problems?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little interest or pleasure in doing things?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling down, depressed, or hopeless?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling or staying asleep, or sleeping too much?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling tired or having little energy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor appetite or overeating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling bad about yourself, or that you are a failure or have let yourself or your family down?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble concentrating on things, such as reading the newspaper or watching TV?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>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?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Thoughts that you would be better off dead, or of hurting yourself in some way?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total score =**

#### Depression Level

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Depression Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 4</td>
<td>Minimal depression</td>
</tr>
<tr>
<td>5 – 9</td>
<td>Mild depression</td>
</tr>
<tr>
<td>10 – 14</td>
<td>Moderate depression</td>
</tr>
<tr>
<td>15 – 19</td>
<td>Moderately severe depression</td>
</tr>
<tr>
<td>20 – 27</td>
<td>Severe depression</td>
</tr>
</tbody>
</table>

**Total score =**

### 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.
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.

Over the last two weeks, how often have you been bothered by the following problems?

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

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Anxiety Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 4</td>
<td>Minimal</td>
</tr>
<tr>
<td>5 – 9</td>
<td>Mild</td>
</tr>
<tr>
<td>10 – 14</td>
<td>Moderate</td>
</tr>
<tr>
<td>15 or more</td>
<td>Severe</td>
</tr>
</tbody>
</table>

Designed by the Cardiometabolic Risk Management Guideline Team CMRcpg@gmail.com. Adapted from Spitzer, Williams, Kroenke, et al. Primary Care Evaluation of Mental Disorders Patient Health Questionnaire, PHQ-9. PRIME-MD TODAY. Pfizer, Inc., 1999.
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).
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.

<table>
<thead>
<tr>
<th></th>
<th>A1 NL - mild</th>
<th>A2 Mod</th>
<th>A3 Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AER (mg/24 hours)</strong></td>
<td>&lt;30</td>
<td>30 - 300</td>
<td>&gt;300</td>
</tr>
<tr>
<td><strong>PER (mg/24 hours)</strong></td>
<td>&lt;150</td>
<td>150 - 500</td>
<td>&gt;500</td>
</tr>
<tr>
<td><strong>ACR</strong>:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mg/mmol)</td>
<td>&lt;3</td>
<td>3 - 30</td>
<td>&gt;30</td>
</tr>
<tr>
<td>(mg/g)</td>
<td>&lt;30</td>
<td>30 - 300</td>
<td>&gt;300</td>
</tr>
<tr>
<td><strong>PCR</strong>:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mg/mmol)</td>
<td>&lt;15</td>
<td>15 - 50</td>
<td>&gt;50</td>
</tr>
<tr>
<td>(mg/g)</td>
<td>&lt;150</td>
<td>150 - 500</td>
<td>&gt;500</td>
</tr>
<tr>
<td><strong>Protein reagent strip</strong></td>
<td>Neg - Trace</td>
<td>Trace to +</td>
<td>&gt; +</td>
</tr>
</tbody>
</table>

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."

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

Evaluation of CKD
- Full review of Hx n PE for identifiable causes, including nephrotoxins (NSAID, recent medications, herbs, ...), 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.

<table>
<thead>
<tr>
<th>Stage (eGFR), ml/min/1.73 m²</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 ≥90</td>
<td>Evaluate for CKD, Control CMR X1</td>
<td>+ Treat, tight Control CMR, Monitor</td>
<td>+ Refer Monitor X2</td>
</tr>
<tr>
<td>G2 60-89</td>
<td>Evaluate for CKD, Control CMR X1</td>
<td>+ Treat, tight Control CMR, Monitor</td>
<td>+ Refer Monitor X2</td>
</tr>
<tr>
<td>G3a 45-59</td>
<td>+ Treat, tight Control CMR, Monitor X1</td>
<td>+ Treat, tight Control CMR, Monitor X2</td>
<td>+ Refer Monitor X3</td>
</tr>
<tr>
<td>G3b 30-44</td>
<td>+ Treat, tight Control CMR, Monitor X2</td>
<td>+ Treat, tight Control CMR, Monitor X2</td>
<td>+ Refer Monitor X3</td>
</tr>
<tr>
<td>G4 15-29</td>
<td>+ Refer Monitor X3</td>
<td>+ Refer Monitor X3</td>
<td>+ Refer Monitor X4</td>
</tr>
<tr>
<td>G5 &lt;15</td>
<td>+ Refer Monitor X4</td>
<td>+ Refer Monitor X4</td>
<td>+ Refer Monitor X4</td>
</tr>
</tbody>
</table>

Reproduced with modification from KDIGO and ADA. Colors depict prognosis from best to worst (green, yellow, orange, pink, dark red). X1, 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:
Assessing Renal Function in CMR

Chapter 4 - Assessment

Renal Function Assessment Algorithm

- CKD Evaluation and Staging. Start ACEI or ARB, even if BP < target, titrated to max tolerable dose. Consider SGLT2i in pts w eGFR ≥ 30 or ACR > 300. Glycemic control. BP control to target. Start Statin and control LDL to target. Review medication interaction & CI, including metformin, SU, & others.

- Follow guidance as per Staging, Table 8.
- Monitor progression by Sx, BP, A1c, ACR, RFT and eGFR. Monitor HCO3, Hb, Bone Profile. Assure Vit. D sufficiency. Consider bone density testing. Refer for dietary counseling. ↓ protein intake to 0.8g/kg/day. Consider referral, if status progressively deteriorating.

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

In Every Focused Visit:
- Direct visual inspection

Annually (Comprehensive Foot Assessment):
- Direct visual inspection
- Assess Peripheral Neuropathy
- Assess Peripheral Circulation

Any feature of High Risk Foot?

Foot Care Education

- Supportive well-fitting closed shoes
- Custom-built foot ware or insoles to reduce callus and ulcer recurrence
- PVD? → Refer to Vascular Surgery.

Comprehensive Foot Assessment every 3-6 months

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 monofilament 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:
Control
العلاج
Chronic Management Algorithm

Initial Visits

A- Assess pt.’s views and needs
B- Review clinical Assessment
   o Obesity
   o Diabetes Mellitus
   o Hypertension
   o Dyslipidemia
C- Assess Lifestyle
D- Estimate CV Risk

If 2° cause suspected?

Yes

Is there any TOD?

No

A- Communicate & Explain
B- Specialist Referral
C- Continue Follow-up

A- Communicate a Plan & Agree
B- Specific Therapy
   o Weight Management
   o Glycemic Control
   o BP Control
   o Lipid Control
C- Lifestyle Management
D- Consider Statin
E- Consider Aspirin

Annual Visits

Maintain treatment goals:
   o Lifestyle & Self-Management goals
   o Monitor A1c or Average Blood Sugar (for DM pts.)
   o Monitor Lipids (for Dyslipidemic pts.)
   o Monitor BP + Wt. in every visit
   o Monitor Compliance, new complaints.
   o Adjust plan in special seasons (Ramadan, Travel, Hajj.)

Focused Visits

Annual Assessment of Complications & comorbidity:
   o Targeted History + Physical Exam
   o Cardiovascular + Cerebrovascular Assessment
   o Renal Assessment
   o Foot Exam + Risk Assessment (for DM pts.)
   o Dilated Eye Exam and oral care.
   o Re-Estimate CV Risk
   o Mood Assessment
   o Immunization & Opportunistic Preventive Care
   o Fall assessment for elderly.

CVR, Cardiovascular Risk; RF, Risk Factor; TOD, Target Organ Damage
### Obesity Management Algorithm

**BMI ≥ 30**

#### Assess
- Measure WC + Assess Disease Risk
- Assess co-morbidity and CVR
- Screen for Depression and Eating disorders
- Review previous trials to loose weight
- Assess readiness to loose weight and barriers

**Yes**

- Refer to appropriate specialty, incl. Endocrine, Surgery, Psychiatry for pharmacotherapy, bariatric surgery, treating 2ry cause, or extensive treatment

**No**

- Advise for:
  - Health risk of obesity
  - Health benefits of weight loss

**Ready to lose weight?**

**Yes**

- **Lifestyle modification program**
- **CVR management**

**No**

- **FU weekly in 1st 3 months.**
- **FU monthly in next 6m-4y.**

**Goals achieved?**

**Yes**

- Regular Monitoring every 6 months for:
  - Weight maintenance
  - CVR management

**No**

---

**References**

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.

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Weight Loss Target, %</th>
<th>Expected outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>MetSy, PreDM</td>
<td>10</td>
<td>Prevention of DM2</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>5-15</td>
<td>↓ A1c; ↓ DM2 medication. Remission, if short duration.</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>5-15</td>
<td>↓ Triglycerides; ↑ HDL, ↓ LDL</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5-15</td>
<td>↓ BP; ↓ Medications</td>
</tr>
<tr>
<td>NAFLD</td>
<td>10-40</td>
<td>↓ Intrahepatocellular lipids, inflammation and fibrosis.</td>
</tr>
<tr>
<td>Female Infertility</td>
<td>≥10</td>
<td>Ovulation; Pregnancy.</td>
</tr>
<tr>
<td>Male Hypogonadism</td>
<td>5-10</td>
<td>↑ Serum testosterone.</td>
</tr>
<tr>
<td>Sleep apnoea</td>
<td>7-11</td>
<td>↓ Apnea/hypopnea index</td>
</tr>
<tr>
<td>Asthma</td>
<td>7-8</td>
<td>↑ FEV1 / PEFR</td>
</tr>
<tr>
<td>GERD</td>
<td>≥10</td>
<td>↓ Symptoms</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>≥10</td>
<td>↓ Symptoms</td>
</tr>
<tr>
<td>Urinary Stress Incontinence</td>
<td>5-10</td>
<td>↓ Symptoms</td>
</tr>
</tbody>
</table>

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

Pharmacological treatment
- Pharmacological treatment should be considered only after dietary *, exercise * and behavioral * 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/m² *[A] or
     - BMI ≥ 35 kg/m² with severe comorbidities which are expected to improve
significantly with weight reduction (e.g., severe mobility problems, arthritis, DM-2) or
• BMI ≥ 30 kg/m² 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**

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

**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**

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.

<table>
<thead>
<tr>
<th>Other Risk Factors &amp; Disease History</th>
<th>Blood Pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal: SBP 120–129 or DBP 80–84</td>
<td>Pre-HTN: SBP 130–139 or DBP 85–89</td>
</tr>
<tr>
<td>No Other CVR Factors a</td>
<td>Average risk</td>
</tr>
<tr>
<td>1-2 CVR Factors a</td>
<td>Low added risk</td>
</tr>
<tr>
<td>≥3 CVR Factors a, or MetSyn b</td>
<td>Low-Moderate added risk</td>
</tr>
<tr>
<td>TOD a or DM 34</td>
<td>Moderate-High added risk</td>
</tr>
<tr>
<td>CVRD c</td>
<td>High added risk</td>
</tr>
</tbody>
</table>

Table 12. Match CVR with its corresponding plan

<table>
<thead>
<tr>
<th>Other factors and disease history</th>
<th>Blood Pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal: SBP 120–129 or DBP 80–84</td>
<td>Pre-HTN: SBP 130–139 or DBP 85–89</td>
</tr>
<tr>
<td>No Other CVR Factors a</td>
<td>No BP intervention</td>
</tr>
<tr>
<td>1-2 CVR Factors a</td>
<td>Lifestyle changes 95</td>
</tr>
<tr>
<td>≥3 CVR Factors a, or MetSyn b</td>
<td>Lifestyle changes 95</td>
</tr>
<tr>
<td>TOD a or DM 34</td>
<td>Lifestyle changes 95</td>
</tr>
<tr>
<td>CVRD c</td>
<td>Lifestyle changes 95</td>
</tr>
</tbody>
</table>

* Consider the use of statin and aspirin in these risk groups.

References:
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.
Blood Pressure Control: Start of Medication and Chronic Management

START HERE

Indicated medication

Any compelling indication? 

Yes

Low-dose Thiazide, ACEI or CCB

Review in 2-4 weeks

No

Review every 3-6 months

Good response? + Tolerated? + BP ≤ Target?

Yes

Refer

No

Pt. Stable for > 6/12

1- Review patient’s profile.  
2- Consider ↑ dose, substitute, or add another drug.  
3- Review in 2-4 weeks.

Resistant HTN or Secondary HTN Suspected?

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.  
C- Target BP values:

<table>
<thead>
<tr>
<th>Condition</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN (No TOD; No CVRD) &lt; 80 yrs</td>
<td>&lt; 140 (B)</td>
<td>&lt; 90 (A)</td>
</tr>
<tr>
<td>HTN (No TOD; No CVRD) ≥ 80 yrs</td>
<td>&lt; 150 (B)</td>
<td>&lt; 90 (A)</td>
</tr>
<tr>
<td>HTN w High CVR</td>
<td>&lt; 130 (C)</td>
<td>&lt; 80 (C)</td>
</tr>
<tr>
<td>Diabetic Hypertension</td>
<td>&lt; 140 (A)</td>
<td>&lt; 90 (A)</td>
</tr>
<tr>
<td>Non-DM Chronic Kidney Disease</td>
<td>&lt; 140 (B)</td>
<td>&lt; 90 (B)</td>
</tr>
<tr>
<td>Proteinuria &gt; 1 g/day</td>
<td>&lt; 130</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Prior TIA, Stroke, PAD, CHF</td>
<td>&lt; 140 (A)</td>
<td>&lt; 90 (A)</td>
</tr>
</tbody>
</table>

References:
<table>
<thead>
<tr>
<th>Risk factor / Disease</th>
<th>1st Choice</th>
<th>Second-line Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension without compelling indications for specific agents</td>
<td>Thiazide and thiazide-like diuretics, ACEI, ARBs, or long-acting DHP-CCBs</td>
<td>Combination of 1st choice drugs. Avoid combination of ACEIs and ARBs.</td>
</tr>
<tr>
<td>Isolated systolic hypertension without compelling indications for specific agents</td>
<td>Thiazide diuretics, ARBs or long-acting DHP-CCBs</td>
<td>Combination of 1st choice drugs</td>
</tr>
<tr>
<td>Diabetes mellitus with nephropathy</td>
<td>ACEI or ARBs</td>
<td>Addition of long-acting DHP-CCBs (preferably), thiazides, or cardioselective β-blockers</td>
</tr>
<tr>
<td>Diabetes mellitus without nephropathy</td>
<td>ACEI, ARBs, Long-acting DHP-CCB or thiazide diuretics</td>
<td>Combination of 1st choice drugs or addition of cardioselective β-blockers ± long-acting DHP-CCBs</td>
</tr>
<tr>
<td>Metabolic syndrome</td>
<td>ACEI or Long-acting DHP-CCB</td>
<td>ARB</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>Recurrent AF: ACEI or ARB</td>
<td>Permanent AF: BB or non-DHP-CCB</td>
</tr>
<tr>
<td>Angina</td>
<td>β-blockers and ACEI</td>
<td>Long-acting DHP-CCBs, ARB</td>
</tr>
<tr>
<td>Established atherosclerotic disease</td>
<td>ACEI added to other therapy</td>
<td></td>
</tr>
<tr>
<td>Previous myocardial infarction</td>
<td>β-blockers and ACEI</td>
<td>Combination of additional agents</td>
</tr>
<tr>
<td>Heart failure</td>
<td>ACEI, β-blockers and spironolactone</td>
<td>ARBs; thiazide or loop diuretics as additive therapy in volume-overload</td>
</tr>
<tr>
<td>Previous CVA or TIA</td>
<td>Thiazide, ACEI, or ARB</td>
<td>Combination of thiazide and ACEI</td>
</tr>
<tr>
<td>Chronic kidney Disease; Microalbuminuria</td>
<td>ACEI or ARB if not tolerated</td>
<td>Add thiazide, long-acting DHP-CCB or β-blockers</td>
</tr>
<tr>
<td>Left ventricular hypertrophy (LVH)</td>
<td>Thiazide diuretics, ACEI, ARB, or long acting DHP-CCBs</td>
<td>Combination of 1st line, β-blockers</td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td>ACEI added to other therapy</td>
<td>CCB</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>No special recommendation</td>
<td></td>
</tr>
<tr>
<td>Elderly (isolated Syst HTN)</td>
<td>Diuretic; CCB</td>
<td></td>
</tr>
<tr>
<td>Lactating mothers</td>
<td>β-blockers, α/ β-blockers, DHP-CCB, Enalapril</td>
<td>Thiazide diuretics is controversial</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Methyldopa, labetolol, or nifedipine</td>
<td>Thiazide diuretics is controversial</td>
</tr>
<tr>
<td>Smokers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchospasm; 2nd / 3rd degree heart block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperthyroidism; Anxiety; S. Tachycardia</td>
<td>β-blockers</td>
<td></td>
</tr>
<tr>
<td>Gout, Hyperuricemia</td>
<td>Losartan, CCB</td>
<td>β-blockers, ACEIs and nonlosartan ARBs may ↑ risk of gout.</td>
</tr>
</tbody>
</table>
### Table 13. Which Anti-Hypertensive Agent to use? (cont.)

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

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

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>
<thead>
<tr>
<th>Class Of Drug</th>
<th>Caution</th>
<th>Compelling Contraindication</th>
<th>Potential Side Effects (Monitor within 1-4 weeks of change)</th>
</tr>
</thead>
</table>
| Thiazides     | • Action blocked by NSAID<sup>k</sup>  
• Cardiac arrhythmia  
• Glucose intolerance; ↑Tg  
• Hypertrophic cardiomyopathy | • Gout<sup>a</sup>  
• Anuria | • Fatigue  
• Impotence  
• Dry mouth  
• Nausea  
• Hypotension  
• Ortho Hypotension  
• Constipation |
| ACEI          | • Child-bearing age.  
• Renal impairment<sup>c</sup>  
• PVD<sup>g</sup>  
• Antacid & Food alter absorption.  
• NSAID ↓ effect of ACEI.<sup>k</sup>  
• Allopurinol; Digoxin; K<sup>+</sup> suppl; K<sup>+</sup>-sparring diuretics. | • Pregnancy  
• Renovascular disease<sup>4</sup> | • Angioedema  
• Cough  
• Tachycardia  
• ↑ Cr; ↑ K<sup>+</sup><sup>70</sup>  
• Hypotension  
• Diarrhea  
• Fatigue  
• Taste disorders  
• Agranulocytosis  
• Nausea |
| ARB           | • Child-bearing age.  
• Renal impairment<sup>c</sup>  
• Peripheral vascular disease.<sup>6</sup>  
• Fluconazole ↓ bio-availability.  
• NSAID ↓ losartan level.  
• NSAID ↓ effect of ARB.<sup>k</sup> | • Pregnancy  
• Renovascular disease | • Periodic Cr., Electrolyte, WBC<sup>70</sup>  
• Angioedema  
• Cough  
• Tachycardia  
• Rare angioedema  
• Tachycardia  
• ↑ Cr; ↑ K<sup>+</sup><sup>70</sup>  
• Hypotension  
• Fatigue |
| DHP-CCB       | Liver disease | | • Dizziness  
• Peripheral edema  
• Headache  
• Flushing  
• Rash  
• Abnormal LFT  
• Hypotension |
| β blockers    | • Heart failure<sup>f</sup>  
• Peripheral vascular dis, DM.  
• Rhinitis; Dyslipidemia; Depression; Mild Asthma; Pheochromocytoma  
• Nicotine ↓ bio-availability.  
• may ↑ warfarin activity. | • Asthma or COPD.  
• 2<sup>nd</sup>/3<sup>rd</sup> 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<sup>g</sup> | | |
| Loop Diuretics | | • Renal failure  
• Hyperkalemia | |
| anti-aldosterone | | | |
| NDHP-CCB      | • Combination with β blockade  
• Mild Heart failure HFpEF | • 2<sup>nd</sup> and 3<sup>rd</sup> AV block  
• Congestive HFpEF | • Constipation  
• Heart block |

<sup>a</sup> ACEI and ARB are sometimes used in patients with renovascular disease under specialist supervision.
<sup>b</sup> β-blockers are used increasingly to treat stable heart failure but may worsen heart failure.
<sup>c</sup> In heart failure when used as monotherapy.
<sup>d</sup> DHP-CCB = dihydropyridine CCB. NDHP-CCB = Non-dihydropyridine CCB.
<sup>k</sup> NSAID may increase the chance of acute renal impairment in concomitant use of thiazide and ACEI or ARB.
<sup>*</sup> 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.
9. CCB-induced pedal edema may be attenuated if combined with ACEI or ARB.

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.

References:

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
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.

References:

Glycemic Control: Chronic Management

Obtain A1C ± Average FBS

A1C < 8%
or Av. FBS < 180(10 mmol/L)

□ Lifestyle changes
 □ If taking:
   • No Medication:
     » Start Metformin. [A]
   • Single Medication:
     » Increase dose or add a 2nd drug (different class). [A]
   • Two Medications:
     » Increase dose [A] or Refer.
     » Consider insulin therapy. [A]
     » Consider SGLT2i in high CVR. [A]
 □ Review in 1-4 weeks.

A1C 8-9%
or Av. FBS 180-240(10–13.3 mmol/L)

Review:
 □ Av. FBS ± Av. PPBS
 □ Lifestyle plan

Glycemic control reached?

Yes

• Review every 3-4 months:
  » Av. FBS, Av. PPBS ± A1C.
  » Lifestyle plan.

No

□ Lifestyle changes
 □ If taking:
   • No Medication:
     » Start Metformin + Sulphonyl. [A]
     » Consider insulin therapy. [C]
   • Single Medication:
     » Optimize dose + add a 2nd drug (different class). [A]
     » Consider insulin therapy. [C]
     » Consider SGLT2i in high CVR. [A]
   • Two Medications:
     » Optimize doses [C] or Refer.
     » Consider insulin therapy. [C]
 □ Review in 1-4 weeks.

A1C > 9%
or Av. FBS > 240(13.3 mmol/L)

□ Lifestyle changes
 □ If taking:
   • No Medication:
     » Start Metformin + Sulphonyl. [A]
     » Consider insulin therapy. [C]
   • Single Medication:
     » Optimize dose + add a 2nd drug (different class). [A]
     » Consider insulin therapy. [C]
     » Consider SGLT2i in high CVR. [A]
   • Two Medications:
     » Optimize doses [C] or Refer.
     » Consider insulin therapy. [C]
 □ Review in 1-4 weeks.

Glycemic control reached?

No

Review every 2-3 months:
 □ Av. FBS, Av. PPBS ± A1C
 □ Lifestyle plan
 □ Side effects, incl. Hypoglycemia S+S

Yes

Review every 3-4 months:
 □ Av. FBS, Av. PPBS ± A1C
 □ Lifestyle plan
 □ Side effects, incl. Hypoglycemia S+S

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]

References:
2. International Diabetes Federation. Recommendations For Managing Type 2 Diabetes In Primary Care, 2017.
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:

<table>
<thead>
<tr>
<th>Target test</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1c &lt; 7%</td>
</tr>
<tr>
<td>Average FBS 80 - 130 mg/dL (4.4 - 7.2 mmol/L)</td>
</tr>
<tr>
<td>Average 1-2 hr-PPBS &lt; 180 mg/dL (10 mmol/L)</td>
</tr>
<tr>
<td>Average bedtime &lt; 120 mg/dL (6.7 mmol/L)</td>
</tr>
</tbody>
</table>

For Continuous glucose monitoring (10-14 days CGM):

- Average Glucose.
- Glucose Management Index (GMI).
- Time in Range (TIR) > 70%.
- Time in Hypoglycemia (TIIHypo) < 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

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Biguanides</th>
<th>Sulfonylureas (SU)</th>
<th>Meglitinides</th>
<th>α-glucosidase Inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td>Metformin</td>
<td>Glipizide, Glyburide, Glibenclamide, Gliclazide, Glimepiride</td>
<td>Repaglinide, Nateglinide</td>
<td>Acarbose</td>
</tr>
<tr>
<td>Common Side Effects</td>
<td>GI upset, anorexia, metallic taste, Vit B12 ↓</td>
<td>Hypoglycemia and weight gain</td>
<td>Hypoglycemia and weight gain</td>
<td>Flatulence, diarrhea, abdominal pain</td>
</tr>
<tr>
<td>Lab Monitoring</td>
<td>eGFR ↓, LFTs</td>
<td>None</td>
<td>None</td>
<td>LFTs every 3 months in 1st year, then annually</td>
</tr>
<tr>
<td>Usual Dose</td>
<td>500 mg od-1000 mg bid XR may be prescribed once at night.</td>
<td>Glicl MR: 30 – 120 mg od w/ 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.</td>
<td>Repa: 0.5-2 mg tid w/ each meal Nate: 60-120 mg tid w/ each meal</td>
<td>25 mg-100 mg tid</td>
</tr>
<tr>
<td>Maximum Daily Dose</td>
<td>2500 mg</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
</tr>
<tr>
<td>Dose Adjustment</td>
<td>2-4 weeks</td>
<td>1-2 weeks</td>
<td>1-2 weeks</td>
<td>2-4 weeks</td>
</tr>
<tr>
<td>Cost (30 day)</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

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

---

**References:**

1. International Diabetes Federation. Recommendations For Managing Type 2 Diabetes In Primary Care, 2017.
<table>
<thead>
<tr>
<th>Drug Class</th>
<th>PPAR-γ Agonists (Thiazolidinediones T2D)</th>
<th>Dipeptidyl Peptidase-4 Inhibitors (DPP4i)</th>
<th>SGLT2 inhibitors</th>
<th>GLP-1 receptor agonists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medications</strong></td>
<td>Pioglitazone</td>
<td>Sitagliptin, Vildagliptin, Saxagliptin, Linagliptin, Alogliptin</td>
<td>Canagliflozin</td>
<td>Exenatide, Liraglutide, Dulaglutide, Semaglutide</td>
</tr>
<tr>
<td></td>
<td>Rosiglitazone</td>
<td></td>
<td>Dapagliflozin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Emagliflozin</td>
<td></td>
</tr>
<tr>
<td><strong>Actions</strong></td>
<td>Regulates insulin response genes</td>
<td>Glucose-dependent: ↑ Insulin release, ↓ Glucagon levels</td>
<td>Blocks glucose re-absorption by the kidneys, increasing glucosuria</td>
<td>Glucose-dependent: ↑ Insulin secretion, ↓ Glucagon secretion. Slows gastric emptying. ↑ Satiety</td>
</tr>
<tr>
<td></td>
<td>necessary for glucose and lipid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>metabolism.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improves sensitivity to insulin in</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>skeletal and adipose tissue.</td>
<td></td>
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</tr>
<tr>
<td><strong>Advantage</strong></td>
<td>Rare hypoglycemia.</td>
<td>Rare hypoglycemia.</td>
<td>Rare hypoglycemia.</td>
<td>Rare hypoglycemia.</td>
</tr>
<tr>
<td></td>
<td>↑ HDL-C.</td>
<td>May be taken with or without food.</td>
<td>↓ Weight.</td>
<td>↓ Weight.</td>
</tr>
<tr>
<td></td>
<td>↓ Triglycerides.</td>
<td></td>
<td>↓ Blood pressure.</td>
<td>↓ Postprandial glucose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↑ CV outcome in CVD.</td>
<td>excursions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Improve CKD indices.</td>
<td></td>
</tr>
<tr>
<td>Precautions</td>
<td>CAUTION in ladies @ ↑ risk of fracture.</td>
<td>May need ↓ SU dose to prevent</td>
<td>Use with CAUTION in renal insufficiency and low-carb diets.</td>
<td>Severe hyper-triglyceridemia, renal failure, MEN-2,</td>
</tr>
<tr>
<td></td>
<td>May resume ovulation in anovulatory</td>
<td>hypoglycemia.</td>
<td>Risk for Amputation &amp; bone fracture (Cana).</td>
<td>Hx or FHx of MTC.</td>
</tr>
<tr>
<td></td>
<td>women.</td>
<td>Risk of Acute pancreatitis, joint pain.</td>
<td>Risk of DKA.</td>
<td>Take OCP &amp; Abx 1 hr</td>
</tr>
<tr>
<td><strong>Common Side Effects</strong></td>
<td>Weight gain, ↑ LDL, fluid retention,</td>
<td>Headache, URTI, nasopharyngitis, UTI, angioedema, urticaria, GU infections, ↑ LDL, Polyuria, dehydration, hypotension, dizziness</td>
<td>Gl upset. ↑ Heart rate, ↑ Heart rate, ↑ Tumors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bone fractures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lab Monitoring</strong></td>
<td>LFTs every 2 months in 1st year, then PRN (ALT)</td>
<td>RFT</td>
<td>RFT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RFT</td>
<td></td>
</tr>
<tr>
<td><strong>Usual Dose</strong></td>
<td>Pic: 15 od-45 mg od</td>
<td>Sitagliptin: 25-100 mg od</td>
<td>Cana: 100-300 mg od before first meal.</td>
<td>Exena: sc inj bd or ow</td>
</tr>
<tr>
<td></td>
<td>Rosi: 4 od-8 mg bid</td>
<td>Vildagliptin: 50 mg bid</td>
<td>Dapa: 5-10 mg od w/ wo food.</td>
<td>Liraglu: sc inj od</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saxagliptin: 2.5-5 mg od</td>
<td>Empa: 10-25 mg od w/ wo food.</td>
<td>Dulaglu: sc inj ow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Linagliptin: 5 mg od</td>
<td></td>
<td>Semaglu: sc inj ow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alogliptin: 25 mg od</td>
<td></td>
<td>PO od</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Daily Dose</strong></td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
</tr>
<tr>
<td><strong>Dose Adjustment</strong></td>
<td>2-4 weeks</td>
<td>1-2 weeks</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Cost (30 day)</strong></td>
<td>$5</td>
<td>$$$</td>
<td>$$$$$</td>
<td>$$$$$</td>
</tr>
</tbody>
</table>

Insulin Therapy: General Guideline

Glycemic control reached?

- Yes
  - Educate
  - Refer
- No
  - Continue monitoring FBS, average blood sugar & A1C every 1-3 months

Is PHC setting ready for Insulin therapy?

- Yes
  - Refer
- No
  - Consider transition to a different regimen

Is patient Fit and Ready for Insulin therapy?

- Yes
  - Measure blood sugar (FBS + Pre-meal + Bedtime ± PPBS) For 3 days in a week
  - Assess patient’s Activity/Exercise – Diet – Blood Sugar & Hypoglycemic S+S
  - Match Insulin Regimen to Patient’s Status
    - Titrate weekly till glycemic target achieved.
    - Reassess in 3-6 months:
      - Hypoglycemic S+S
      - Average FBS
      - Average Pre-meal blood sugar
  - Glycemic control reached?
    - Yes
    - Refer
    - Consider transition to a different regimen
    - No
Insulin Therapy in T2DM: General Guideline

- Type 2 DM is a progressive disease in which β-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. This has to be done by an expert physician.

Types of insulin

<table>
<thead>
<tr>
<th>Insulin</th>
<th>Onset</th>
<th>Peak</th>
<th>Effective duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal-Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-acting: Glargine 100</td>
<td>1–2 hrs</td>
<td>No peak</td>
<td>20–24 hrs</td>
<td>Once daily @ same time</td>
</tr>
<tr>
<td>Long-acting: Detemir</td>
<td>1–2 hrs</td>
<td>No peak</td>
<td>6–24 hrs</td>
<td>1-2 times daily.</td>
</tr>
<tr>
<td>Long-acting: Glargine 300</td>
<td>6 hrs</td>
<td>No peak</td>
<td>&gt; 24 hrs</td>
<td>Once daily @ same time</td>
</tr>
<tr>
<td>Long-acting: Degludec</td>
<td>30-90 Min</td>
<td>No peak</td>
<td>42 hrs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolus</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting: Regular</td>
<td>30–60 min</td>
<td>2–3 hrs</td>
<td>5–8 hrs</td>
<td>30 min pre-meal.</td>
</tr>
<tr>
<td>Rapid-acting: Aspart</td>
<td>5–15 min</td>
<td>30–90 min</td>
<td>&lt; 5 hrs</td>
<td>Immediate pre-, intra- or post-meal.</td>
</tr>
<tr>
<td>Rapid-acting: Lispro</td>
<td>5–15 min</td>
<td>30–90 min</td>
<td>&lt; 5 hrs</td>
<td></td>
</tr>
<tr>
<td>Rapid-acting: Glulisine</td>
<td>5–15 min</td>
<td>30–90 min</td>
<td>&lt; 5 hrs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Premixed</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NPH / Regular</td>
<td>30–60 min</td>
<td>Dual</td>
<td>10–16 hrs</td>
<td></td>
</tr>
<tr>
<td>NPH / Lispro or Aspart</td>
<td>5-15 min</td>
<td>Dual</td>
<td>10–16 hrs</td>
<td></td>
</tr>
<tr>
<td>Aspart protamine / Aspart</td>
<td>5-15 min</td>
<td>Dual</td>
<td>12-24 hrs</td>
<td></td>
</tr>
<tr>
<td>Lispro protamine / Lispro</td>
<td>5-15 min</td>
<td>Dual</td>
<td>6-12 hrs</td>
<td></td>
</tr>
</tbody>
</table>

Types of insulin regimen

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

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:

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:

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.

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

References:
Insulin Therapy: Suggested Regimen

- Titrate insulin dose weekly (2 iu increments) till Av. FBS < 130 (7.2 mmol)
- Reassess in 3 months:
  - Hypoglycemic S+S
  - Av. FBS and A1C
  - Av. Pre-meal blood sugar

A1C < 7%?
- Yes
  - Monitor monthly and afford open support
- No
  - Av FBS > 130 (7.2 mmol)
  - Noct. Hypoglycemia?
    - Yes
      - Consider:
        - Change to longer-lasting Basal Insulin
        - j sulphonylurea dose
    - No
      - Av FBS 80 - 130 (4.5 - 7.2 mmol)
      - Pre-Lunch (largest meal) BS > 130? (7.2 mmol)
        - Yes
          - Add 2-4 iu Bolus Insulin pre-breakfast.
          - Titrate weekly till BS < 130 (7.2 mmol)
          - Reassess BS, A1C, S+S.
        - No
          - Pre-Supper BS > 130? (7.2 mmol)
            - Yes
              - Add 2-4 iu Bolus Insulin pre-lunch.
              - Titrate weekly till BS < 130 (7.2 mmol)
              - Reassess BS, A1C, S+S
            - No
              - Bedtime BS > 130? (7.2 mmol)
                - Yes
                  - Add 2-4 iu Bolus Insulin pre-supper.
                  - Titrate weekly till BS < 130 (7.2 mmol)
                  - Reassess BS, A1C, S+S
                - No
                  - Monitor monthly and afford open support

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

<table>
<thead>
<tr>
<th>CV Risk</th>
<th>LDL levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average risk</td>
<td></td>
</tr>
<tr>
<td>1. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &lt;55 mg/dL/1.4 mmol/L</td>
</tr>
<tr>
<td>2. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 55 - &lt;70 mg/dL/1.4 - &lt;1.8 mmol/L</td>
</tr>
<tr>
<td>3. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 70 - &lt;100 mg/dL/1.8 - &lt;2.6 mmol/L</td>
</tr>
<tr>
<td>4. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 100 - &lt;116 mg/dL/2.6 - &lt;3 mmol/L</td>
</tr>
<tr>
<td>5. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 116 - &lt;190 mg/dL/3 - &lt;4.9 mmol/L</td>
</tr>
<tr>
<td>6. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &gt;=190 mg/dL/4.9 mmol/L</td>
</tr>
<tr>
<td>Low-Moderate added risk</td>
<td></td>
</tr>
<tr>
<td>1. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &lt;55 mg/dL/1.4 mmol/L</td>
</tr>
<tr>
<td>2. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 55 - &lt;70 mg/dL/1.4 - &lt;1.8 mmol/L</td>
</tr>
<tr>
<td>3. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 70 - &lt;100 mg/dL/1.8 - &lt;2.6 mmol/L</td>
</tr>
<tr>
<td>4. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 100 - &lt;116 mg/dL/2.6 - &lt;3 mmol/L</td>
</tr>
<tr>
<td>5. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 116 - &lt;190 mg/dL/3 - &lt;4.9 mmol/L</td>
</tr>
<tr>
<td>6. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &gt;=190 mg/dL/4.9 mmol/L</td>
</tr>
<tr>
<td>High added risk</td>
<td></td>
</tr>
<tr>
<td>1. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &lt;55 mg/dL/1.4 mmol/L</td>
</tr>
<tr>
<td>2. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 55 - &lt;70 mg/dL/1.4 - &lt;1.8 mmol/L</td>
</tr>
<tr>
<td>3. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 70 - &lt;100 mg/dL/1.8 - &lt;2.6 mmol/L</td>
</tr>
<tr>
<td>4. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 100 - &lt;116 mg/dL/2.6 - &lt;3 mmol/L</td>
</tr>
<tr>
<td>5. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 116 - &lt;190 mg/dL/3 - &lt;4.9 mmol/L</td>
</tr>
<tr>
<td>6. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &gt;=190 mg/dL/4.9 mmol/L</td>
</tr>
<tr>
<td>Very high added risk</td>
<td></td>
</tr>
<tr>
<td>1. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &lt;55 mg/dL/1.4 mmol/L</td>
</tr>
<tr>
<td>2. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 55 - &lt;70 mg/dL/1.4 - &lt;1.8 mmol/L</td>
</tr>
<tr>
<td>3. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 70 - &lt;100 mg/dL/1.8 - &lt;2.6 mmol/L</td>
</tr>
<tr>
<td>4. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 100 - &lt;116 mg/dL/2.6 - &lt;3 mmol/L</td>
</tr>
<tr>
<td>5. Healthy Lifestyle</td>
<td>Healthy Lifestyle, 116 - &lt;190 mg/dL/3 - &lt;4.9 mmol/L</td>
</tr>
<tr>
<td>6. Healthy Lifestyle</td>
<td>Healthy Lifestyle, &gt;=190 mg/dL/4.9 mmol/L</td>
</tr>
</tbody>
</table>

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

* 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

<table>
<thead>
<tr>
<th>Risk category</th>
<th>LDL goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/Moderate added CVR</td>
<td>&lt;100-116 mg/dL (2.6-3 mmol/L) [A]</td>
</tr>
<tr>
<td>High CV Risk</td>
<td>&lt;70 mg/dL (1.8 mmol/L) * [A]</td>
</tr>
<tr>
<td>Very High CV Risk</td>
<td>&lt;55 mg/dL (1.4 mmol/L) * [A]</td>
</tr>
</tbody>
</table>

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

### References:

Lipid Lowering Agents

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

### 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.

2. Calculate the percentage reduction of LDL-C required to achieve that goal. Choose a statin that, on average, can provide this reduction.

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

### LDL reduction, cost and usual doses of different statins.

<table>
<thead>
<tr>
<th>Statin</th>
<th>LDL Reduction</th>
<th>Cost</th>
<th>Usual Starting Dose (Dosage Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>~ 35%</td>
<td>~ 45%</td>
<td></td>
</tr>
<tr>
<td>Atorvastatin</td>
<td>10 mg</td>
<td>20 mg</td>
<td>$$$</td>
</tr>
<tr>
<td>Simvastatin</td>
<td>20 mg</td>
<td>40 mg</td>
<td>$</td>
</tr>
<tr>
<td>Lovastatin</td>
<td>40 mg</td>
<td>80 mg</td>
<td>$5</td>
</tr>
<tr>
<td>Pravastatin</td>
<td>40 mg</td>
<td>80 mg</td>
<td>$</td>
</tr>
<tr>
<td>Fluvastatin</td>
<td>80 mg</td>
<td>-</td>
<td>$555</td>
</tr>
<tr>
<td>Rosuvastatin</td>
<td>-</td>
<td>5 mg</td>
<td>$555</td>
</tr>
</tbody>
</table>
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 on maximally tolerated dose of statin alone.

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

**References**


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:
   - Commence low-dose ASA (75-150 mg).[^1]

2. High CV Risk:
   - Commence low-dose ASA (75-150 mg) unless contraindicated, in patients aged ≥50 years[^2]

3. Low-Medium CV Risk:
   - 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[^3]

2. ASA intolerance.


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:**

**Immunization & Opportunistic Preventive Care**

**Influenza vaccine:**
- 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:**
- 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. 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.

**References:**
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.
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).
4. Acute severe illness.

References:

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:

- Assess and educate the traveling patient and her/his companion, 1 to 2 months before travel.
- Assess the patient's past experience with travel, Hajj or Umra, including the changes above-mentioned.
- Consider referral or liaise with the specialist doctor, including cardiologist and nephrologist, if needed.
- Vaccinate patient according to destination.
- Write a brief medical report, including patient's condition and medications.
- 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.\textsuperscript{118, 119}
  10. Review hypoglycemia management.
  11. Ask patient to seek medical advice promptly if he/she develop complications.
  12. Supply take-home written instructions.\textsuperscript{133}

References:

6
Chapter 6 - Non-Pharmacological Management

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.
8. **Salt & Carb reduction**, as guided by the dietary plan.
9. Increase **Vegetable & Fruit** consumption.
10. **Physical Exercise Correction**, as guided by the dietary plan.
11. **Smoking Avoidance**.
12. **Alcohol Avoidance**.
13. **Psychological Adaptation**, to accept the health problem.
14. **Coping** with the health 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.

References

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.

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.
3. DASH Dietary Modification Plan.
4. Dietary Diary.
5. Dietary Pyramid and Plate.
7. Types of Exercise.
8. Foot Care.
9. Choosing appropriate shoes and socks.
11. Insulin Injection and Care.
12. Drug intake.
13. Smoking Cessation.

---

Chronic Care & Self-Management Counselling Algorithm

The 5-A's Algorithm

**START HERE**

Ask n Assess

**Assess Educational Priority, via:**
1. Current Clinical Status
2. Current Self-management behavior.
3. Readiness to Change.

Advise

Inform patient of:
1. Appropriate self-management behavior.
2. Its purpose, in this patient.
3. Hazards, if not performed.

Agree

- Is the patient aware of Self-management behaviors of higher priority?
- Is he/she intended to change any of them?
- Agree on a doable change.

Yes

Assist

- Set a written plan with a goal that can be achieved within a limited time.
- Review with attending physician any other rewarding changes to the current health status.
- Offer alternatives to achieve the goal.
- Provide tools to help patients achieve goals.

No

Arrange

- Book a well handed re-visit.
- What if the patient needs your help, meanwhile?

Chapter 6 - Non-Pharmacological Management
Lifestyle Management Algorithm

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

1. Ask & Assess
   - قِّيم
   - 2. Current Life-Style (Diet - Exercise - Smoking - Weight control).
   - 3. Readiness to Change.
   - قِّيم

2. Advise
   - انصح
   - 1. Hazards of current style.
   - 2. Benefits of its correction.
   - 3. Appropriate life-style behavior.

3. Agree
   - اتفق
   - • Is the patient aware of Life-style behaviors of higher priority?
   - • Is he/she intended to change any of them?
   - • Agree on a doable change.

4. Assist
   - ضع خطة
   - • Set a written plan with a goal that can be achieved within a limited time.
   - • Review with attending physician any other rewarding changes to the current health status.
   - • Offer alternatives to achieve the goal.
   - • Provide tools to help patients achieve goals.

5. Arrange
   - وواصل
   - • Book a well handed re-visit.
   - • What if the patient needs your help, meanwhile?
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.\[B\]

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.
- 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.

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 Assessment Questionnaire

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

Total Points

<table>
<thead>
<tr>
<th>Are you interested to change your eating behavior?</th>
<th>Not ready to change 1</th>
<th>Unsure 2</th>
<th>Ready to change 3</th>
<th>Trying to change 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-contemplation</td>
<td>Contemplation</td>
<td>Action</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 __/____/______
### Physical Activity Assessment Questionnaire

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

**Total Points**

<table>
<thead>
<tr>
<th>Are you interested to change your physical activity?</th>
<th>Not ready to change</th>
<th>Unsure</th>
<th>Ready to change</th>
<th>Trying to change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pre-contemplation</td>
<td>Contemplation</td>
<td>Action</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 may 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 ........../........../.............
# Smoking Assessment Questionnaire

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

**Total Points**

<table>
<thead>
<tr>
<th>Are you interested to quit smoking?</th>
<th>Not ready to change</th>
<th>Unsure</th>
<th>Ready to change</th>
<th>Trying to change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pre-contemplation</td>
<td>Contemplation</td>
<td>Action</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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).
Assessment of patient readiness to change lifestyle

This tool is used whenever a lifestyle or behavior change is intended. Its use helps the care provider to choose the appropriate change, based on the stage of change. 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:

<table>
<thead>
<tr>
<th>A- How important is it for you to lose weight at this time?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B- How interested are you in losing weight at this time?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not interested</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C- How confident are you to lose weight at this time?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not confident</td>
</tr>
</tbody>
</table>

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

Stages of Change Model to assess Readiness to Lose Weight, as an example

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

Applying the stages of change model to assess readiness to lose weight.
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.
Important Steps to Reduce Cardiovascular Risk

Know Your Status & Fix it

Name ___________________________ File No. __________ ID ________________

Diet

<table>
<thead>
<tr>
<th></th>
<th>5 H. Committed</th>
<th>4 Committed</th>
<th>3 Average</th>
<th>2 Little commitment</th>
<th>1 Not Committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Physical Activity

<table>
<thead>
<tr>
<th></th>
<th>5 H. Committed</th>
<th>4 Committed</th>
<th>3 Average</th>
<th>2 Little commitment</th>
<th>1 Not Committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Smoking

<table>
<thead>
<tr>
<th></th>
<th>5 H. Committed</th>
<th>4 Committed</th>
<th>3 Average</th>
<th>2 Little commitment</th>
<th>1 Not Committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Mood

<table>
<thead>
<tr>
<th></th>
<th>5 H. Committed</th>
<th>4 Committed</th>
<th>3 Average</th>
<th>2 Little commitment</th>
<th>1 Not Committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Drug

<table>
<thead>
<tr>
<th></th>
<th>5 H. Committed</th>
<th>4 Committed</th>
<th>3 Average</th>
<th>2 Little commitment</th>
<th>1 Not Committed</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Measure

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

<table>
<thead>
<tr>
<th>Drug</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
<th>Bedtime</th>
<th>Indication</th>
<th>Side effect / Notes</th>
</tr>
</thead>
</table>

Appointments

<table>
<thead>
<tr>
<th>Date</th>
<th>Attended</th>
<th>Declined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measures

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

<table>
<thead>
<tr>
<th>Date</th>
<th>BP</th>
<th>Weight</th>
<th>BMI</th>
<th>FBS</th>
<th>A1c</th>
<th>LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

Target < 130/85

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7
Extra Tools
أدوات إضافية
How to introduce CMR package?

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?

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?

• 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:

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.
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.
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.
Self-Management Puzzle

- Uses: To visually counsel and motivate CMR patients towards self-management. These components may be helpful as subjects for dedicated focused counseling visits.
Obstructive Sleep Apnea Questionnaire (STOP-BANG)

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

Obstructive Sleep Apnea Questionnaire (STOP-BANG)

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

Name:___________________________ ______________________________

Date:____________________________

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

**Snoring?**
Do you Snore Loudly (loud enough to be heard through closed doors or your bed-partner elbows you for snoring at night)?

**Tired?**
Do you often feel Tired, Fatigued, or Sleepy during the daytime (such as falling asleep during driving or talking to someone)?

**Observed?**
Has anyone Observed you Stop Breathing or Choking/Gasping during your sleep?

**Blood Pressure?**
Do you have or are being treated for High Blood Pressure?

**Body Mass Index > 35 kg/m²?**

**Age > 50 years?**

**Neck size large?** (Measure around Adams apple; Male≥17”/43cm - Female≥16”/41cm)

**Are you Male Gender?**

### Interpretation for general population:

<table>
<thead>
<tr>
<th>Low risk of OSA</th>
<th>Intermediate risk of OSA</th>
<th>High risk of OSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>3-4</td>
<td>5-8</td>
</tr>
<tr>
<td>Enforce healthy lifestyle</td>
<td>Adopt health lifestyle</td>
<td>Adopt health lifestyle + Refer for Sleep study</td>
</tr>
</tbody>
</table>

References:


### Standards for BP Measurement

#### Selecting Equipment

<table>
<thead>
<tr>
<th>Task</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use a validated automated device or mercury or a recently calibrated aneroid manometer.</td>
<td>If the meniscus of the Hg or aneroid gauge is not level with your vision, a reading may be read higher or lower.</td>
</tr>
<tr>
<td>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.</td>
<td>A too small cuff will give falsely high readings. A too large cuff may give a false low reading but with less clinical significance.</td>
</tr>
<tr>
<td>In auscultatory method, place the bell above the medial epicondyle and medial to the biceps tendon (brachial artery).</td>
<td>The stethoscope bell is designed to listen to low-pitched sounds.</td>
</tr>
<tr>
<td>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.</td>
<td>The early and late BP sounds are low-pitched.</td>
</tr>
</tbody>
</table>

#### Preparing The Patient

<table>
<thead>
<tr>
<th>Task</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patient should avoid eating, smoking, caffeine, exercise, and drinking alcohol ½-1 hour before BP measurement.</td>
<td>Recordings 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).</td>
</tr>
<tr>
<td>Have the patient sit quietly for a period at rest with both feet flat on the floor and back supported prior to measurement.</td>
<td>Any change in posture or activity causes BP to change.</td>
</tr>
<tr>
<td>No clothing should be between the BP cuff and the arm.</td>
<td>Extra noise from the bell of the stethoscope rubbing against clothing could cause a false BP reading.</td>
</tr>
<tr>
<td>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.</td>
<td>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.)</td>
</tr>
</tbody>
</table>

#### Taking An Initial Measurement

<table>
<thead>
<tr>
<th>Task</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>A loose BP cuff results in a falsely higher level of BP.</td>
</tr>
<tr>
<td>In Auscultatory method:</td>
<td>Failure to center the cuff can result in a falsely high BP.</td>
</tr>
<tr>
<td>• While inflating the bladder, palpate radial pulse to estimate systolic BP.</td>
<td>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.</td>
</tr>
<tr>
<td>• Inflate the cuff quickly to 30 mm Hg above the palpatory BP.</td>
<td>Inflating the cuff too high can cause pain and result in a falsely high reading.</td>
</tr>
<tr>
<td>• Deflate bladder at 2-3 mm Hg per second.</td>
<td>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.</td>
</tr>
<tr>
<td>• Record the first of at least two consecutive sounds as the systolic.</td>
<td>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.</td>
</tr>
<tr>
<td>• Diastolic is identified by the last sound heard.</td>
<td>The early and late BP sounds are low-pitched.</td>
</tr>
<tr>
<td>• 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.</td>
<td>The stethoscope bell is designed to listen to low-pitched sounds.</td>
</tr>
<tr>
<td>• The meniscus of the Hg or aneroid gauge is not level with your vision, a reading may be read higher or lower.</td>
<td></td>
</tr>
</tbody>
</table>

#### Confirming Initial Elevation

<table>
<thead>
<tr>
<th>Task</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>If BP is elevated and the patient had initially waited quietly for 5 minutes, repeat BPM in 1-2 min.</td>
<td>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 &lt; 10 mmHg variant, otherwise repeat till you obtain 2 successive readings &lt; 10 mmHg variant.</td>
</tr>
<tr>
<td>Record both measurements.</td>
<td>A time interval of 1-2 minutes between cuff inflations is necessary to reduce forearm engorgement.</td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>If this BP is still elevated, repeat BPM in 1-2 minutes, record it as the 2nd measurement.</td>
<td></td>
</tr>
</tbody>
</table>

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### Adapted from:

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.
- 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:**

**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.

**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.
Use these diaries (self-management tools) to monitor home blood pressure and sugar, for 1-2 weeks.
Any physical activity is better than nothing, for CMR patients at all ages. It has cardiovascular, metabolic, psychological and functional benefits. However, multiple precautions and safety measures must be considered in exercise prescription.

**Optimal Exercise Prescription addresses:**
1. Cardio-respiratory (aerobic) fitness.
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>
<thead>
<tr>
<th>Intensity</th>
<th>Cardio-respiratory Exercise</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative</td>
<td>Absolute</td>
</tr>
<tr>
<td></td>
<td>% HRR</td>
<td>% HRmax</td>
</tr>
<tr>
<td>Very light</td>
<td>&lt;30</td>
<td>&lt;57</td>
</tr>
<tr>
<td>Light</td>
<td>30-39</td>
<td>57-63</td>
</tr>
<tr>
<td>Moderate</td>
<td>40-59</td>
<td>64-76</td>
</tr>
<tr>
<td>Vigorous</td>
<td>60-89</td>
<td>77-95</td>
</tr>
<tr>
<td>Near Max</td>
<td>≥90</td>
<td>≥96</td>
</tr>
</tbody>
</table>

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, CMR19 and CMR20 may be used for this purpose.
2. Use light cotton clothing, when exercising, to keep body temperature stable.
3. Do warm-up exercises to stimulate circulation such as jumping or running in a fixed place.
4. 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).
5. 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.
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.

References
4. UK Chief Medical Officers’ Physical Activity Guidelines. 7 Sep 2019.
• Uses: Educating patient about proper choice of healthy diet for CMR.

### References

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

<table>
<thead>
<tr>
<th>Food Groups (in DASH style)</th>
<th>Calories</th>
<th>Weight</th>
<th>Fat</th>
<th>Carbohydrates</th>
<th>Sugar</th>
<th>Fiber</th>
<th>Protein</th>
<th>Fruits</th>
<th>Vegetables</th>
<th>Dairy</th>
<th>Oils</th>
<th>Sweets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>100</td>
<td>200</td>
<td>30</td>
<td>400</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>300</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Meat</td>
<td>200</td>
<td>300</td>
<td>40</td>
<td>500</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>350</td>
<td>120</td>
<td>240</td>
<td>350</td>
<td>450</td>
</tr>
<tr>
<td>Cheese</td>
<td>300</td>
<td>400</td>
<td>50</td>
<td>600</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>400</td>
<td>140</td>
<td>280</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>Grains</td>
<td>400</td>
<td>500</td>
<td>60</td>
<td>700</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>500</td>
<td>160</td>
<td>320</td>
<td>440</td>
<td>540</td>
</tr>
<tr>
<td>Fruits</td>
<td>500</td>
<td>600</td>
<td>70</td>
<td>800</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>600</td>
<td>180</td>
<td>360</td>
<td>480</td>
<td>580</td>
</tr>
</tbody>
</table>

For each food group, the patient will fill in the quantities consumed and calculate the total intake for each day.

The chart is designed to help patients track their diet and compare it with the DASH diet guidelines.

Note: This chart is for illustrative purposes only and does not replace professional medical advice.

مذكرة غذائية

تستخدم هذا النموذج لـ:
1. لمتابعة عادات الأكل، قبل البدء بنظام داش (DASH).
2. لقياس أثر هذا النظام على الشخص، وعلى وجباته، بعد استخدامه بسلاسة قليلة.

يتم تأريره بموجب نظام داش (DASH).

للمزيد من المعلومات، يرجى الرجوع إلى العنوان المذكور في البطاقة المحتوية على المحتوى الغذائي (ملح أو صوديوم).
Educational Tools
أدوات تعليمية
الهدف من البرنامج:
1. الاكتشاف المبكر لأمراض القلب والشرايين.
2. الاكتشاف المبكر لذرات الإصابة بهذه الأمراض. كارتفاع ضغط الدم والسكر والدهون والوزن والتدخين.
3. معالجة هذه الذرات والتحكم فيها.

مميزات البرنامج وخدماته:
1. التقييم الشامل لكل حالة.
2. تقييم لمستوى الخطر المحتمل للإصابة بأمراض القلب والشرايين.
3. خطة علاج تشتمل تصحيح نمط العيش، والعلاج الدوائي.
4. متابعة منظمة لراقبة تطور الحالة.
5. إعادة التقييم الشامل سنويًا ويشمل فحوصات سريرية ومختبرية لوظائف القلب والكلى والكبد والأعصاب والدهون وأملاح الدم ومستوى التحكم في السكر.
6. نظام مواعيد ومتابعة.
7. بخضوع البرنامج لتابعة مستمرة لجودة الأداء، من قبل فريق مختص.

• Uses: Advertisement and notification of the cardiovascular preventive services for the public and the staff.
Uses: Description of the journey of the cardiovascular preventive care for the newly diagnosed individuals.

Chapter 8

1. MA'ALI TALISHSHI
- Klom min al nasal lajdah u dika mar'at al qalb, al markab u al kalb al ka'as min falata al buruj u al mulum al wadlin.
- Min min akhshaf hadh al mar'at min minal qayis al dafa' al dafa' u al qalb u al dafa' al kalb u al wadlin. 
- Qalab wajhul ummah al dafa' al dafa' al dafa'.
- Qalab talb al tafis fi isticma'at al tafa'ala' ida' ta'liq al wajh, wajhul min minal qayis al dafa' al dafa' al dafa' al dafa'.

2. TALISHSHI
- Qalab yaddakhadhiqak firdsan ilaj 1.
- Qiys al dafa' al dafa' u al dafa' al dafa'.

3. AL HA'L
- Tjum fa'ayi ifal' al dafa' al dafa' ida' 1.
- Talash yadzal al qayis al dafa' al dafa' al dafa'.
- Talash yadzam al dafa' al dafa' al dafa'.
- Talash yaddakhadhiqak firdsan ilaj 1.

4. AL HA'L
- Tjum firdsan ilaj ida' 2.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.

5. MABATA' AL 2
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.

6. MUSTAQIY
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.
- Qiys al dafa' al dafa' u al dafa' al dafa'.

CMR-28 Chronic Care Journey Arabic
Read the Dietary Card while shopping

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Sodium Content (mg)</th>
<th>% of Daily Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Diet</td>
<td>3,910 mg</td>
<td>10%</td>
</tr>
<tr>
<td>Salt in Your Diet</td>
<td>3,200 mg</td>
<td>9%</td>
</tr>
<tr>
<td>Food and Beverage</td>
<td>290 mg</td>
<td>8%</td>
</tr>
<tr>
<td>Fast Food</td>
<td>280 mg</td>
<td>8%</td>
</tr>
<tr>
<td>Urban Diet</td>
<td>270 mg</td>
<td>8%</td>
</tr>
<tr>
<td>Mediterranean Diet</td>
<td>260 mg</td>
<td>8%</td>
</tr>
<tr>
<td>Southwestern Diet</td>
<td>250 mg</td>
<td>8%</td>
</tr>
<tr>
<td>Asian Diet</td>
<td>240 mg</td>
<td>7%</td>
</tr>
<tr>
<td>Eastern Mediterranean Diet</td>
<td>230 mg</td>
<td>7%</td>
</tr>
</tbody>
</table>

This leaflet is based on the Salt in Your Diet (Bulletin 125) published by the New York City Department of Health and Mental Hygiene.
Diet Pyramid & Plate

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

هل شعرت بآي وقت سابق بألم أو عدم ارتياح، أو ضغط أو قلب الصدر؟

هل مكان الألم في المنتصف الصدر، أم في يساره، أم في الذراع الأيسر؟

هل شعرت بالألم عندما كنت تمشي؟

هل قللت من الجهد المبذول عندما شعرت بالألم؟

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

هل شعرت بالألم في غضون 10 دقائق؟

هل شعرت بآي وقت سابق بالألم شديد في الصدر استمر لصف ساعة أو مايزيد على ذلك؟

أ. قصور تروية القلب:

 هل أجبت بنعم على أي من الأسئلة 3.4.5.6.7 فهناك نشأ قد أصبت بقصور تروية القلب

وب. قصور تروية الدماغ:

 هل أجبت بنعم على السؤال 8 فهناك نشأ قد أصبت بقصور تروية الدماغ

وتتحاج إلى استشارة الطبيب

*إذا أجبت بلا انتقل إلى السؤال 8، وان أجبت بنعم تابع*

*إذا أجبت بنعم على أي من الأسئلة 7,6,5,4,3 فربما تكون قد أصبت بقصور تروية القلب*
• Uses: Education of patient about proper home-care of foot for diabetic patients.
How to choose Your Shoes & Socks

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

Chapter 8 - Educational Tools

كيف تختار الحذاء والجوارب المناسبين؟

اختيار الحذاء المناسب

يجب أن يكون مقاس الحذاء مناسباً للقدم بحيث لا يكون ضاغطاً على أطراف الأصابع ونهاية القدم.

احرص على اختيار الحذاء الطري واللائم من الداخل.

تجنب الصنادل المكشوفة والكعب العالي، وهذا الأحذية ذات الأساور الضيقة.

عند شرائه حذاء جديد اتبع ما يلي:

1. قم بقياس الحذاء في المساء، فعادة تتورم القدم في نهاية اليوم.
2. جرب الحذاء الجديد لمدة نصف ساعة في المنزل ثم قم بفحص القدم لوجود أي جروح سطحية، إذا كانت موجودة عليك باستخدام مقاس أكبر للحذاء.
3. يجب زيادة مدة الاستخدام بتدريج، ساعتين ثم ثلاث ساعات.

اختيار الجوارب المناسبة

1. استخدم الجوارب القطنية لأنها تمتص العرق.
2. ابتعد عن الجوارب المصنوعة من النايلون.
3. ابتعد عن الجوارب الضيقة فإنها تقلل وصول الدم للقدم.
4. ابتعد عن الجوارب القصيرة فإنها تترتب من القدم.
5. اختر الجوارب الفضفاضة، فهي تظهر وجود نقط الدم والافرازات.
6. يجب أن تكون الجوارب مطهرة.

نصائح عامة

• لا تستخدم الحذاء بدون جوارب.
• تأكد من خلو الحذاء من الأجسام الحادة أو الحمضي.
• إذا ضعفت تعمل على موزين، مباشرة ومسائية، قد يكون هناك حذاء تستعمله لمسة قصيرة، حتى تغير من نقاط الضغط على القدمين، ولتعطيك فرصة لفحص.
• لا تستخدم نفس الجوارب أكثر من مرة قبل غسله.
• يفضل استخدام الجوارب الصوفية في الشتاء، والقصوبية في الصيف، دون الجوارب المصترونة من النايلون.
• لا تمشي حالي القدمين مين أي معتن، وخصوصاً بدون المنزل أو أثناء الرحلات.
• هناك أحياناً حاجة خاصة لحذاء من البيت والبحر.
• بالإضافة عند الحاجة، لزيادة تعقوم الحذاء.
• يمكنك استخدام التثبيتات Insoles.

Edited by the Chronic Care Quality Improvement Team, KSA 2020. CMRcpg@gmail.com
• Uses: Education of patient about healthier alternatives in lifestyle.

<table>
<thead>
<tr>
<th>If done ✓</th>
<th>If not done ❌</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Change eating habits to be more healthy.</td>
<td><strong>1.</strong> Continue eating unhealthy habits.</td>
</tr>
<tr>
<td><strong>2.</strong> Eat more vegetables and fruits.</td>
<td><strong>2.</strong> Eat less vegetables and fruits.</td>
</tr>
<tr>
<td><strong>3.</strong> Reduce salt intake and choose low-salt products.</td>
<td><strong>3.</strong> Eat more salty foods.</td>
</tr>
<tr>
<td><strong>4.</strong> Drink non-soda beverages.</td>
<td><strong>4.</strong> Drink soda.</td>
</tr>
<tr>
<td><strong>5.</strong> Choose leaner and healthier meat.</td>
<td><strong>5.</strong> Eat fatty meat.</td>
</tr>
<tr>
<td><strong>6.</strong> Choose milk products with less fat.</td>
<td><strong>6.</strong> Eat full-fat milk products.</td>
</tr>
<tr>
<td><strong>7.</strong> Eat less fast food and takeout food.</td>
<td><strong>7.</strong> Eat more fast food and takeout food.</td>
</tr>
</tbody>
</table>

Useful Educational Tools:
- **CMR-22** Change your lifestyle.
Uses: Education of patient about the benefits of regular exercise, and how to start.

- Begin by increasing your daily activity a little.
- Continue to increase your activity over the next few weeks, until you reach your goal.
- Half an hour of physical activity can help:
  - Reduce the risk of heart disease and stroke.
  - Increase your energy and productivity.
  - Reduce psychological stress and improve your mood.
  - Control your weight.
  - Lower your blood pressure.
  - Lower your cholesterol.
  - Control your blood sugar and prevent diabetes.

من أجل قلب أكثر حيوية ونشاط

غير أسلوب عيشك وحياتك

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

فوائد المشي الرياضي

- خفض الضغوط اليومية
- تحسين القلب
- تحسين الدورة الدموية وتثنين
- خفض ضغط الدم
- خفض الكوليسترول والدهون الزائدة
- تقوية العضلات
- مرونة في المفاصل
- تقوية العظام
Few Tips to Lose Weight

- Uses: Education of patient about loosing weight for overweight CMR patients.
يتغير نمط الحياة (الغذاء، النشاط البدني، النوم) عند الذهاب للحج أو السفر، لذا نورد لكم فيما يلي أهم النصائح للمحافظة على سلامتكم أثناء الحج:

1. قم بزيارة الطبيب قبل شهر واحد على الأقل من موعد الرحلة لعمل التالي:
   - تقييم وضعكم الصحي.
   - تحديد المضاعفات التي قد ت تعرض لها أثناء سفركم وكيفية التعامل معها.
   - أخذ التطعيمات اللازمة.
   - تعديل جرعات بعض الأدوية التي تتناولها، حيث يلزم.

الفجأة:

1. - تناول غذاء متوازن وصحي.
   - تجنب حذف الوجبات.
   - تناول كميات كافية من الماء وقلل من تناول المشروبات المحتوية على الكافيين.
   - في الأجواء الحارة، تناول كميات كافية من الماء وقلل من تناول المشروبات المحتوية على الكافيين.
   - خذ قسطًا من الراحة عند القيام بنشاط بدني غير معتاد، وتأكد من أخذ حاجتك من النوم.

2. الإعداد لسفر الطبيب:

   - أـ: احمل ملابس تناسب الجو الذي ستسافر له.
   - بـ: احمل ضعف الكمية التي تحتاجها من الأدوية أثناء السفر، وضعها في حقيبة اليد ولا تنسحها مع العفش، وحافظ عليها في درجة الحرارة المناسبة.
   - تـ: إذا كان هناك طبيب مع المجموعة التي ستشارف معها، من الأفضل إخباره وبعض المسافرين الآخرين بوضعك الصحي.
   - ثـ: تأكد من حصولك على تقرير طبي وبطاقة تعريفية لتوضيح حالتك الصحية والأدوية التي تتناولها، خصوصًا إذا كنت تأخذ إبر الأنسولين أو نصحك طبيبك بعمل قياس السكر.
   - جـ: لا تنسى أن تذهب للطبيب مراكز، تتمكن من حل أي مشكلة تواجهك مع شركة الطيران عند الاعتراض على كمية الأدوية أو نوعها أو الأجهزة والأدوات الأخرى.
   - حـ: إذا كانت مدة الرحلة أكثر من ساعتين، فمن الأفضل المكث لبعض الخطوات كل ساعة لتجنب الإصابة بجلطات الرجل.

3. نصائح إضافية لمرضى السكري:

   - أـ: قم بقياس السكر، خصوصًا قبل القياس بنشاط بدني.
   - بـ: تناول وجبات خفيفة أو مشروبات محتوية على السكر قبل القياس بنشاط بدني عند الحاجة.
   - تـ: تأكد من حملك لبعض الأطعمة أو المشروبات المحتوية على السكر في جميع الأوقات لتناولها في حال انخفاض السكر.
   - ثـ: اتبع إرشادات العناية بالقدمين"، واحترام الحذاء والجواب المناسبة.".
   - جـ: راجع الطبيب فورًا عند إصابتك بجرح أو التهاب في القدم.

4. نصائح إضافية للرحلات التي تزيد مدتها عن ثلاثة شهور:

   - أـ: تأكد من حصولك على تأمين طبي أثناء السفر.
   - بـ: قم بزيارة الطبيب عند وصولك لوجهتك لتعرفه بحالات الصحية.
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 proteiniuria 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)
9. Percentage of CMR patients who have comprehensive foot assessment in the past 1 year. (ST)
10. Level of satisfaction in CMR patients. (LT)
11. Level of quality-of-life (QoL) in CMR patients. (LT)
12. Percentage of CMR patients who lost to follow up (> 6 months or missed 3 successive visits). (ST)
13. Percentage of composite CMR control, including to-target BP, A1c, LDL, non-smoking and BMI.

**References:**
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 المحافظة على نظام مواعيد فعال ركيزة، أساسية وعالية الأهمية، في رعاية الأمراض المزمنة. فضلا عن تقليلها للتكاليف والمضاعفات.

تضيف أتمتة نظام المواعيد قيمة كبيرة إلى نظام استدعاء المراجعين، ورفع مستوى الالتزام.
الهدف:
- توثيق حالات مرض القلب والشرايين المكتشفة يومياً.
- ربط الحالات المكتشفة لدى العلامات الحيوية والمختبر بمسار الرعاية المزمنة.
- خلق نظام تعاون بين الجهات المكتشفة (مرسوم العلامات الحيوية أو ممرضة المختبر) ووجهة تقييم وتتابع الحالات (مرسوم الرعاية المزمنة)، وذلك لفرض تقليل الحالات المكتشفة، وتصحح الرعاية الصحية المناسبة.

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

كيفية التسجيل:
- توضع علامة (✓) عند اكتشاف أحد عوامل الخطر (من قبل ممرضة العلامات الحيوية أو ممرضة المختبر) حسب ما هو مدون في صفحة 24.
- يتم تسجيل الاستمارة لمرضية الأمراض المزمنة بشكل دوري (لا يزيد عن أسبوع) لتسكين إجراءات الخدمة كما هو مبين في صفحة 25.
- تستخدم ممرضة الأمراض المزمنة تسجيل الحالات في السجل الدائم وتوفر ذلك في أسفل هذه الاستمارة.
- تحتفظ الاستمارة في ملف خاص مرتبة حسب التاريخ بحيث يكون التاريخ الأحدث هو الأعلى.
- الهدف من ذلك هو التقليل من حالات الأمراض المزمنة المكتشفة بدون الإجراءات اللازمة (ص 24 الربيع الأزرق).

**فرز الخطر المزمن (دورة)**

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الهدف:
حصر ومتابعة حالات منذرات أمراض القلب والأوعية الدموية المكتشفة داخل نطاق عمل المركز الصحي.

الفائدة:
• سريرياً: تحديد الحالات التي بحاجة لرعاية أكبر كمتخللتين وعلي الخطورة ومن فيهم مضاعفات.
• إحصائياً: حصر الحالات.
1. عدد المتبقي داخل وخارج المركز الصحي، وتسجيله إلى العدد المتوقع.
2. نسبة الإصابة لدى الذكور والإنسات لعوامل الخطورة ومضاعفاتها.

يقوم تسجيل الحالات في السجل:
• ممرضة الرعاية المزمنة.

كيفية التسجيل:
1. يُسجل الرقم التسلسلي للمراجع مع بيانات المريض.
2. يُسجل تاريخ التشخيص في خانة (✓) أو الاشتباه في خانة (؟).
3. في حالات المجموع يتم جمع جميع الحالات المسجلة في تلك الصفحة بالقلم الرصاص حتى يمكن تحديثها عند تغيير المعلومات التي تحتويها.
4. في حال تلقي المريض الرعاية خارج المركز الصحي، يُسجل ذلك في خانة ملاحظات.
5. يحسب وتسجيل درجة الخطورة بالقلم الرصاص حتى يمكن تحديثها دورياً.
6. يسجل في خانة المضاعفات الرقم الخاص بنوع المضاعفات حسب ما هو موجود في نهاية السجل.

المصطلحات المستخدمة للتأكد من تقدير مستوى الخطأ في التسجيل:
1. بقارح السجل مرفقاً في تحديد état et l'état de santé وتحديد المتلازمة في حالة × في حالة ×.
2. قائمة التخليص أو الأطوار أو الحالة وأواقع الأعراض في حالة × في حالة ×.
3. سبب التحفيز والحالة الرئيسية المرضية والمرجعية بتحويل ×.
4. عدد حالات السجل في حالة ×.

السجل الدائم لمنذرات أمراض القلب والأوعية الدموية

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السـجل اليومي لـنزـرات أمراض القلب والشرايين

الغرض:
حصر وـمتابعة زيـارات المراجعين لـعـيادة الأمراض الـزمنـة ومواعيدها.

الفائدة:
1. توثيق وـمتابعة مواعيـد الـعـيادة، والتذكـير بها.
2. توثيق الزيارات الخاصـة بالـعـيادة.
3. حـصر التحـلفين وـمتابعتـهم وـتـجديـد المواعيدهم.
4. توثيق عدد الحالات التي يتم تـثقيفها.
5. استخـراج الإحصائيات:
أ. عدد زوار العيادة بمـوعد وبدون موـعد.
ب. عدد ونسبة المنتظمين والـتـخلفين.

٨. من الذي يسجل في السـجل؟
ممرـة الرعاية الـزمنـة.

٩. كيف يتم التـسجيل فيه؟
أ. الـزيارات بمـوعد:
١. دون بيانات المراجع.
٢. ضع عـلامـة (✓) عند عـامل الخطرـة.
٣. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.
٤. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.
٥. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.
٦. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.
٧. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.

١٠. مراجـعات بدون مواعيده:
١. دون بيانات المراجع.
٢. ضع عـلامـة (✓) عند عـامل الخطرـة.
٣. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.
٤. أخـبر المراجع بـمواعيـد ضع عـلامـة (✓) عند عـامل الخطرـة.

١١. استخـراج الإحصائيـات:
أ. عدد زوار العيادة بمـوعد وبدون موـعد.
ب. عدد ونسبة المنتظمين والـتـخلفين.

١٢. الفائدة:
١. توثيق عدد زيـارات المراجعين واعداـد الحالـات التي يتم تـثقيفها.
٢. حصر ومتـبـاعـة مواعيـد الـعـيادة، والتذكـير بها.
٣. توثيق الزيارات الخاصـة بالـعـيادة.
٤. حصر التحـلفين وـمـتابعتـهم وـتـجـديـد الموـاعيدهم.
٥. استخـراج الإحصائيات:
أ. عدد زوار العيادة بمـوعد وبدون موـعد.
ب. عدد ونسبة المنتظمين والـتـخلفين.
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\textsuperscript{144}, CMR-3\textsuperscript{145} and CMR-4\textsuperscript{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\textsuperscript{145} and CMR-4\textsuperscript{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.
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 Encounter Form

Table 2: Estimate CVD Risk

When to use?
- To estimate risk of developing major CVD.
- To use table 2 to estimate risk of developing major CVD.

When to use?
1. Then, use table 2

Who is in charge?
- Chronic Care manager (nurse) or if not affordable, the attending physician.

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.

---

C R-2: Initial-ossessment Encounter Form

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. Suspicions 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-3: Focused Visits Encounter Form**

**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](image-url)
CMR-4: Annual Assessment Encounter Form

**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**

![Plan of Care Diagram]

- **Date (month/year)**
- **Name:**
- **DOB / Age:**
- **Sex:**
- **Job:**
- **Tel:**
- **File no.:**
- **Primary Health Care:**
- **CMRcpg@gmail.com**

**Target of Priority**

- **Vaccination**
- **CVD Risk A**
- **Other Complications**

**Hb / Hct**

**Uric Acid / Ca**

**K+ / Na+**

**ALT / AST**

**Geriatric/Fall Assessment**

- **Mood**
- **Oral / Dental Exam**

**CP.E. General**

- **Update Family Hx.**
- **(complications & side effects);**
- **Other Complications**

**Note:**

- **Dr**  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  D  ®  E  M  O  S  D  ®  E  M  O  S

- **Diagnosis**

- **CMR Risk**

- **Plan of Care**

- **Primary Health Care**

**When needed for every CMR patient.**

الفحص:

• توثيق العلاج اللاأدوائي لحالات مذذات أمراض القلب والذين، ومعتبكة ذلك في كل زيارة للمريض إلى عيادة الرعاية المنزلية.

الفائدة:

• تساعد مقدم الخدمة على معرفة ما يجب أن يقدمه للمريض في كل زيارة.

ال aunون بالفائدة:

• مرضية الرعاية المزمنة.

كيفية التسجيل:

1. تم تقسيم البطاقة حسب أباظ البيع. وهو عوامل متغيرة يسعى مقدم الخدمة إلى تصورها.
2. في كل عمود، دون تقييم الحالة في الجهاء اليمنى، ووضع التقييم المطلق في الجهاء السبئي من الإخلال.
3. وضع علامة على المشاكل الصحية.

العادي:

1. دون ذلك من الطرف الأيمن من كل خانة.
2. استخدم الرموز الملونة في أسفل البطاقة.
3. استعن في تقييم الرعاية الذاتية بإقود المريض.
4. استعن في تقييم حط الامم بالاستبانات الخاصة بها من الناحية الرياضية.
5. استعن في تقييم الحالة النفسية بالاستبانات الخاصة بها من الناحية الاجتماعية والاقتصادية.
6. استعن في تقييم الحالة الاجتماعية بالاستبانات الخاصة بها من الناحية الاجتماعية والاقتصادية.
7. استعد دواء المزمنة في أسفل البطاقة.
8. استعد الرموز الملونة في أسفل البطاقة.
9. التقييم العام:

• دون ذلك من واقع بطاقة التقييم السنوي 4 CMR.

• دون الهذف المتعلق على المريض في حالة الهدف، متابعة في الزيارة المقبلة، عملاً بأن الهذف المتعلق دون في آخر عمود.

• تكرر تقييم العلاج اللاأدوائي كلما دعت الحاجة وجد أداً مرتين سنويًا، وذلك عند استقرار الحالة.

• يُخصّ وضع المريض والتقييم المستخلص في بطاقات المتابعة السريرية 3 CMR.
Urgency

الحالات العاجلة
Symptoms suggestive of Hyperglycemia (Polyuria, Polydipsia, Unexplained weight ↓)

- Vital signs
- History & General Exam
- Urine dipstick for ketones
- Random blood sugar

Any of:
- Acute illness.
- Sick looking, Pregnancy.
- Acute weight loss, or Ketonuria.
- RBS ≥ 300 (17 mmol/L)
- Risk of DKA (RBS> 400; SBP<100; RR>20)

Quick Lifestyle advise
- Full evaluation within 1-5 day
- Control of hyperglycemia

Review plan within 1-5 days after discharge

References:
Management of Hypoglycemia

Hypoglycemia Signs & Symptoms:
- Mild (Autonomic): tremors, palpitations, sweating, excessive hunger.
- Moderate (Neuroglycopenic): headache, mood changes, irritability, paraesthesias, 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:
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
- Evaluate Heart, Lungs, neck veins, and Lower Limbs for Heart Failure; Fundus; Pulses for Aortic Dissection; Brief mental status; Gross motor exam

Any Acute TOD? Or BP ≥ 220/120

Hypertensive Emergency

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

Hypertensive Urgency

- Relax in quite dim room.
- Resume dose, if missing, or initiate Oral Long-acting Anti-HTN, or Immediate-acting Anti-HTN.
- 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/ Interscapular/ epigastric, Nocturia, Pulmonary Edema
Renal: Oliguria, Azotemia, Proteinuria, Hematuria
GI: Nausea, Vomiting
Fundoscopic: Wide cup, Papilloedema

B: Drugs for hypertensive urgencies

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

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

References:
**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

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