Cardiometabolic Risk Management Guidelines in Primary Care

Guideline Developing Team
Cardiometabolic Risk Management Guidelines in Primary Care

دليل معالجة منذرات أمراض القلب والسكر في الرعاية الصحية الأولية

Guideline Developing Team

بسم الله الرحمن الرحيم

الحمد لله رب العالمين والصلاة والسلام على خاتم الأنبياء والمرسلين سيدنا محمد وعلى آله وصحبه أجمعين
 دولي قيادتنا الحكيمة وولي رأسي خادم الحرمين الشريفين وسمو ولي عهد الأمر يحفظهما الله جل عنيتها
 أهميتها من أجل الارتفاع بالخدمات الصحية وتوجيه التوجه الصحيح لخدم المواطنين والمقيمين في كافة
 أنحاء المملكة.

أن من أهم أسباب النهضة الصحية التي تشهدها المملكة في المجال الصحي التخطيط السليم للبرامج الصحية
 المختلفة وحتى تكون هذه البرامج الصحية أكثر فاعلية فإنها تحتاج إلى أداة وطنية مدونة ومراعاة وتتناسب
 مع إنسان المكان وتنبأ معاً مع أحدث وسائل العلاج المبنية على البرهان ليترتكز عليها مساعدة المعالجين في مجال
 الرعاية الصحية لتقديم خدمة أفضل ومفيدة عامة.

وفي هذا السياق يأتي هذا الدليل العلمي الذي تم إعداده من قبل وزارة الصحة لمساعد في إكتشاف متغيرات
 الأمراض القلبية والوعائية والسكر في الرعاية الصحية الأولية في المملكة العربية السعودية كخطوة علمية
 للمساهمة في علاج هذه الأمراض بحيث يكون لأي طبيب في الرعاية الصحية استخدام هذا الدليل والاستفادة
 منه.

وختاما أسأل الله العلي القدير أن يوفقنا جميعاً إلى ما يحبه ويرضاه وأن يجعل عملنا كلها خالصة لوجهة الكريم
 والله ولي التوفيق.

وزير الصحة
د عبدالعزيز الربيعة

In the name of Allah the most gracious, the most merciful

Praise is to Allah, and prayers and peace upon Prophet Muhammad and all his
family and companions.

Our prudent leadership led by the custodian of the two holy mosques and
his highness the heir and crown prince, have given a great deal of attention
and care to promote and improve health services in order to deliver optimal
healthcare to all residents of the Kingdom of Saudi Arabia.

Effective planning is one of the most important factors for the advancement
of health services in the kingdom. In order to make the health services more
efficient, it is vital to have reliable clinical guidelines that are adapted to the
local needs, aids in the rational decision making and evidence based to improve
the patients’ outcomes.

In this context, guidelines for the primary prevention of cardiovascular diseases
in primary health care was prepared by the Ministry of Health to help in the
detection of predisposing factors to cardiovascular diseases and diabetes at
the primary health level in the kingdom. This is a huge step that contributes to
the control of these diseases where any physician in the primary health system
use this evidence guide and benefit from it.

In conclusion, I ask Allah the almighty to guide us all to what pleases him,
and to let all our scientific endeavors solely for his satisfaction. And Allah is the
guardian of conciliation.

Minister of health
Dr. Abdullah Abdul Aziz Alrabia
أسماء اللجان
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Testimonial

«The CMR 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
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«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
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Introduction & Methods
Cardiometabolic Risk Management Guidelines

Background: are these guidelines necessary?

Cardiometabolic risk factors (CMR) consist of a cluster of modifiable classic and emerging risk factors and markers that identify individuals these increased risk of 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.1-3

This cluster is very common worldwide and in Saudi Arabia, as well.4-6 Collectively, these factors form the biggest health problem facing the world today.7 Their presence is associated with significantly increased CVD morbidity, including coronary heart disease, MI, and stroke.8 Both total mortality and CV mortality are also significantly more prevalent in subjects with MetSyn compared with subjects without MetSyn.8 In addition, many non-CV morbidities, such as cancer and arthritis are associated with obesity. Nevertheless, management programs relating to CMR factors were reported to have poor access and effectiveness in Saudi Primary Health Care (PHC).9-11

As part of a quality improvement initiative in Qatif PHC, chronic care services, delivered to hypertensive and diabetic patients, were evaluated using the “Chronic Care Model” (CCM). This model entails a thorough assessment of the current situation, including through the views of both the service providers and the patients.12

As a result, primary care providers claim that it is difficult to follow multiple guidelines for the same patient, who will usually have multiple CMR factors, and in addition, there is hesitancy to follow guidelines developed for non-primary care providers. They advocate for the development of common guidelines which address this issue, and considers the the difficulties that nurses face in following guidelines written in non-native languages.13

Prevalence of CMR factors – KSA 2006 4-7

![Prevalence of CMR factors in Saudi Arabia, 2006](image)

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

**Cardiometabolic Risk**

**Metabolic Syndrome**
- Abdominal obesity
- Elevated BP (≥130/85)
- Elevated FBS (≥ 110)
- Elevated S. Tg (> 150)
- Low HDL (< 40)
- Elevated LDL (≥ 130)
- Smoking
- Inflammatory markers
- Insulin resistance

**Chronic Care Model (CCM)**

CCM is a blueprint for high patient-centered chronic care. It addresses six elements:
1. Community
2. Health Care Delivery System
3. Self-Management Support
4. Delivery System Design
5. Decision Support
6. Clinical Information System

**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, pharmacologic therapy, self-management, as well as prevention and diagnosis of CMR-associated complications.
3. To provide suggestions for the management of the delivery system, the clinical information system and the quality of care.
4. The information contained in these CMR Guidelines is intended primarily for PHC providers including physicians, nurses, and other health care professionals.
5. These CMR Guidelines are designed to assist clinicians by providing a framework for the evaluation and treatment of CMR patients, and are not intended to replace a clinician’s judgment.

Clinical Highlights and Recommendations

1. Focus on cardiovascular risk (CVR) reduction (blood pressure control, 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 through annual screening for renal function.
4. Screen for renal function using more sensitive tools including albumin creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR).
5. Screen every individual > 45 years of age and obese individuals for CMR factors.
6. Involve other community nurses (those involved in vital signs measurement and laboratory results) in chronic care.
7. Use clinical information to identify individuals with a higher need for care.
8. Use quality indicators and electronic data management for monitoring the performance.
11. Screen for depression.
12. 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 multifactorial interventions are recommended.
1. Decrease the percentage of patients with poorly controlled blood sugars, and/or blood pressure (BP) and low density lipoproteins (LDL).
2. Decrease the percentage of patients with cardiovascular risk.
3. Increase the percentage of patients for whom recommended work-ups (including glycated hemoglobin (A1c) and LDL) are done.
4. Increase the percentage of patients for whom recommended treatment goals are met.
5. Improve self-management skills, including the adoption of a healthy lifestyle and weight reduction.
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 patients aged ≥ 45 years or with BMI > 30 that are screened for CMR.
10. Increase the percentage of hypertensive-diabetic patients for whom ACEI has been prescribed.
11. Increase the percentage of high CVR patients for whom ASA has been prescribed.
12. Increase the percentage of high CVR patients for whom statin has been prescribed.

Methodology

(The process is outlined in page 14)

The development of these guidelines 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 year 2001 to 2010.

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 are also referenced.

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

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

The recommendations within these guideline are
concordant with those made by most international guidelines, with some minor adaptations for 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, these guidelines were evaluated, repeatedly, using the agreed instrument (www.agreecollaboration.org).

However, many pages have been written or translated into Arabic, to facilitate their implementation by users, especially nurses. These include recommendations related to lifestyle management and information management.

On the other hand, users are welcome to translate the entire guide line should be one word into Arabic or any other language. 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 and Quality Management)
2. Registers Diaries: These can be found in chapter 9 (Information and Quality Management)
3. Quality Indicators: Found in chapter 9 (Information and 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, by electronic access in PDF format with dynamic links, online or in the supplemented compact disc.
6. Clinical Algorithms are found in multiple places in these guidelines which contain algorithms for:
   a. Cardiometabolic Risk Screening.
   b. Chronic Management of CMR.
   c. Assessing Renal Function in CMR.
   d. Foot Care in Diabetes Mellitus.
   e. Initial Approach to High BP in PHC.
   f. BP Control: Chronic Management.
   g. Initial Management of Symptomatic Hyperglycemia.
   h. Glycemic Control: Chronic Management
   i. LDL Control: Initiation of Drug Treatment
   j. Lifestyle Management (in Arabic only)
   k. Patient Recall System.
7. Training Plan: Training modules have been developed to orient and train health care providers on the skills required to manage cardiometabolic risk. These include competency exams and certificates to ensure acquisition of the necessary skills.

Expected barriers in implementation

A few barriers may hamper the dissemination and implementation of these guidelines. These include difficulties in affording stable trained staff assigned for chronic care; laboratory tests such as ACR, A1C and lipid profile; medications such as statin; apparatus such as
proper cuffs, tuning forks and sensory monofilaments; and stationery such as guideline printings, educational material and encounter forms.

Good coordination with ophthalmologists and dentists for routine eye and oral screenings is crucial. In addition, barriers to effective referrals to specialists including cardiologists,

Conflict of Interest
There are no financial or other conflict of interest matters to disclose.

How to use these guidelines?
- **If you are looking for the background to or details of a specific procedure or subject:**
  1. Locate the procedure or the subject in the general algorithm, pages 10 and 19 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^{10}, or the chronic management algorithm^{19}.
  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 for each procedure.

- **If you are looking for the explanation of a term:**
  1. Try to find it in the section “abbreviations and glossary”.^{10}

**Red-colored page numbers are hyperlinked.**
Outline of the Guideline Development

Definition of process June 2006
- Training of team members
- Review of providers’ views
- Outline needs and priorities

Formation of dedicated teams
- Review of EB guidelines and reviews
- Review of published literature
- Review of others’ practice

Review of reports
- Building a consensus
- Prepare a draft guideline report
- Formulate report into algorithm format
- Review content validity & evidence
- Review readability and flow of procedures
- Preliminary revision

Providers’ review Jan 2008
- Peer review (external)
- Specialists’ review
- Final revision June 2008

Pre-testing
- Introducing the guideline

Final Guideline
- Implementation
- Guideline Update April 2010

Figure 3. CMR Guideline Development Process
Screening
Case Identification Algorithm

Chronic Disease Nurse & Physician

- Measure BP in each visit
- Measure weight in each visit
- Calculate BMI annually

Laboratory Nurse

- FBS ≥ 100 (5.6 mmol) or RBS ≥ 140 (7.8 mmol)
- TC ≥ 240 (6 mmol) or LDL ≥ 160 (4 mmol)

Vital Signs Nurse / Physician

- BMI ≥ 30
- Age ≥ 35
- SBP ≥ 130 OR DBP ≥ 85

Yes & No CMR Card

- Introduce CMR
- Register in New CMR List
- Put CMR1 Card

Yes

- Inform Dr. if BP ≥ 180/110
- If new HTN:
  - Register in New CMR List
  - Put CMR1 Card

No

- Inform Dr. if BS ≥ 300 (17 mmol)
- If new DM:
  - Register in New CMR List
  - Put CMR1 Card

No & 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

High BP, FBS, LDL or CVR

- Lifestyle Management Algorithm
- Repeat CMR Screening

Yes

- A- Communicate & Agree
- B- CVR Screening

No

- A- Communicate & Agree
- B- Confirm Dx & Classify
  - ↑ BMI; ↑ BP; ↑ FBS; ↑ Chole
- C- Clinical Assessment
  - ↑ BMI; ↑ BP; ↑ FBS; ↑ Chole
- D- Enforce Quick Lifestyle Advise

Enter case in Chronic Disease Register

CVR Screening Algorithm

Case Identification Algorithm

A- Consider BP ≥ 130/80 as high in patients having DM, CKD (Chronic Kidney Disease), HF (Heart Failure) or CAD (Coronary Artery Disease).

- Superscript numbers (”) refer to page numbers in this guideline.
- Superscript alphabets (”) refer to a note in the same page.
- Underscript italic letters between large brackets (”) refer to level of recommendation.
- CVR: CardioVascular Risk.
Obesity: Screening & Classification

1. Measure weight in each clinic visit.
2. Calculate body mass index (BMI) at least once each year.
   \[ BMI = \frac{\text{weight}}{\text{height}^2} \text{ OR } BMI = \frac{\text{kg}}{\text{m} \times \text{m}} \]
   Example: Weight = 70 kg and Height = 1.60 m. Then,
   \[ BMI = 70 \div 1.6^2 \text{ OR } BMI = 70 \div 1.6 \div 1.6 = 27.34 \]
3. Waist Circumference (WC) should be measured, at least, in overweight persons to better classify obesity.

Table 1: Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated 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>Underweight</td>
<td>&lt; 18.5</td>
<td>-</td>
<td>Advise for Good Lifestyle</td>
</tr>
<tr>
<td>Normal†</td>
<td>18.5–24.9</td>
<td>-</td>
<td>Advise for Good Lifestyle</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0–29.9</td>
<td>Increased</td>
<td>High</td>
</tr>
<tr>
<td>Obesity I</td>
<td>30.0–34.9</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Obesity II</td>
<td>35.0–39.9</td>
<td>Very High</td>
<td>Very High</td>
</tr>
<tr>
<td>Obesity III</td>
<td>≥ 40</td>
<td>Extremely High</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.

How is waist circumference measured?

1. Locate the top of the hip bone. Place the tape measure evenly around the bare abdomen above the level of this bone (mid - point between the lower margin of the least palpable rib and the top of the iliac crest).
2. Use a stretch-resistant tape, with the tape parallel to the floor.
3. Read the tape measure and record the waist circumference in inches or centimeters.
4. The subject should stand with feet close together, and arms at the side and should wear little clothing.
5. The subject should be relaxed, and the measurements should be taken at the end of a normal expiration.
6. 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.

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.

BMI CALCULATOR

References:

Hypertension: Screening, Classification & Diagnosis

1. Blood pressure should be measured 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 over a period of one to several weeks, with at least two blood pressure readings at each visit.

Definitions, classification and actions of blood pressure levels (mmHg)

<table>
<thead>
<tr>
<th>Category</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</td>
</tr>
<tr>
<td>Normal</td>
<td>120 – 129</td>
<td>80 – 84</td>
<td>Advise for Good Lifestyle</td>
</tr>
<tr>
<td>High normal (Pre-Hypertension)</td>
<td>130 – 139</td>
<td>85 – 89</td>
<td>Advise for Lifestyle Change</td>
</tr>
<tr>
<td>Grade 1 hypertension (mild)</td>
<td>140 – 159</td>
<td>90 – 99</td>
<td>Evaluate and Confirm within 2 months</td>
</tr>
<tr>
<td>Grade 2 hypertension (moderate)</td>
<td>160 – 179</td>
<td>100 – 109</td>
<td>Evaluate and Confirm within 1 month</td>
</tr>
<tr>
<td>Grade 3 hypertension (severe)</td>
<td>≥ 180</td>
<td>≥ 110</td>
<td>Evaluate and treat immediately</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>≥ 140</td>
<td>&lt; 90</td>
<td></td>
</tr>
</tbody>
</table>

Hypertensive Urgency:
Grade 3 HTN without signs of Acute TOD

≥ 180 ≥ 110 Evaluate and treat immediately

Hypertensive Urgency:
Grade 3 HTN without signs of Acute TOD

≥ 220 ≥ 120 Evaluate, treat and consider admission

Hypertensive Emergency:
Grade 3 HTN with suspicious signs of Acute TOD

≥ 180 ≥ 110 Evaluate, Call Ambulance, Stabilize, treat immediately and refer immediately

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.

N.B.: Diabetic patients found to have repeat systolic blood pressure 130 mmHg or diastolic blood pressure 80 mmHg confirms a diagnosis of hypertension.

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/m²⁸ and, if normal, should be repeated at 3-year intervals.⁹
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 ᵉ for diabetes, i.e. those who:
   - 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>Category</th>
<th>Fasting Blood Sugar (FBS)</th>
<th>Oral Glucose Tolerance Test (OGTT)</th>
<th>Random Blood Sugar (RBS)</th>
<th>A1c</th>
<th>Action</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 ⁷⁻¹</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 ⁷⁻¹</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>≥ 126 mg/dL (6.9 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 6.5 %</td>
<td>Evaluate¹⁻² and Confirm within 1 week</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>≥ 126 mg/dL (6.9 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 6.5 %</td>
<td>Evaluate ⁵⁻⁷ immediately</td>
</tr>
<tr>
<td>Symptomatic</td>
<td>≥ 126 mg/dL (6.9 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 200 mg/dL (11 mmol/l)</td>
<td>≥ 6.5 %</td>
<td>Evaluate ⁵⁻⁷ immediately</td>
</tr>
<tr>
<td>How Performed:</td>
<td>Blood sugar is measured after at least an 8 hour fast (no caloric intake)</td>
<td>75-gram glucose load (drink) is ingested after at least an 8 hour fast; blood sugar is measured at 2 hours</td>
<td>Blood glucose is measured at any time regardless of eating</td>
<td>Blood glucose is measured at any time regardless of eating</td>
<td></td>
</tr>
</tbody>
</table>

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-1 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 66 for further details.

References:
Dyslipidemia: Screening, Classification & Diagnosis

1. Complete lipoprotein profile (T. Chole, S. Tg, LDL and HDL) must be obtained after a 12-hour fast.
2. Keeping tourniquet in place longer than 3 minutes may cause a 5% variation in lipid values.
3. If lipid measurement is high, further 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 must the to be noted on the lab request.
6. LDL is recommended as the target of treatment.[A]
7. No specific targets for HDL or Tg levels have been determined in clinical trials, although 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 1.8 mmol/L or 70 mg/dL.

Desirable LDL levels in each category of cardiovascular risk, and intervention strategy.

<table>
<thead>
<tr>
<th>CV Risk</th>
<th>LDL levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 70 mg/dL</td>
</tr>
<tr>
<td>Average risk</td>
<td>&lt; 1.8 mmol/L</td>
</tr>
<tr>
<td>Healthy Lifestyle</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td>Low-Moderate added risk</td>
<td>Lifestyle intervention</td>
</tr>
<tr>
<td>High added risk</td>
<td>Lifestyle + Drug intervention</td>
</tr>
<tr>
<td>Very high added risk</td>
<td>Lifestyle + Drug intervention</td>
</tr>
</tbody>
</table>

References:
Cardiovascular Risk (CVR) Screening

- **Assess CVR for:**
  1. Individuals aged > 45 years (for males, preferably, aged > 35 years).
  2. All obese individuals.
  3. All hypertensive, diabetic or dyslipidemic individuals.

- **Repeat CVR assessment:**
  - Every 10 years for low risk individuals.
  - Every 5 years for intermediate risk individuals.
  - Annually for high risk individuals and hypertensive, diabetic or dyslipidemic individuals.

- **Use CMR1 (CMR Encounter Form no. 1) to help you in the assessment.**

**Aim:**
To identify individuals at high risk of developing cardiovascular disease (CVD). These include individuals with DM, hypertension, hypercholesterolemia, morbid obesity and multiple risk factors for CVD.

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

**How:**
1. **Take a history of:**
   - Sedentary lifestyle (assess level of exercise).
   - DM, HTN, dyslipidemia and vascular disease.
   - Smoking.
2. Is there a family history of premature cardiovascular disease/death (males aged <55; females aged <65 years)?
3. **Measure:**
   - a. BMI ± waist circumference
   - b. BP
   - c. FBS and Lipid profile
4. **Stratify CVR risk:**
   - Management of hypertension, hypercholesterolemia and obesity are related to the quantification of total CV risk; i.e. the chance of developing a major CV event (stroke or MI) in 10 years.

**Stratification of CVR to quantify prognosis.**

<table>
<thead>
<tr>
<th>Other risk 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>Grade 1: SBP 140–159 or DBP 90–99</td>
<td>Grade 2: SBP 160–179 or DBP 100–109</td>
</tr>
<tr>
<td>Grade 3: SBP &gt; 180 or DBP &gt; 110</td>
<td></td>
</tr>
<tr>
<td>No other risk factors A</td>
<td>Average risk</td>
</tr>
<tr>
<td>1-2 risk factors A</td>
<td>Average risk</td>
</tr>
<tr>
<td>3 or more RF A, MetSyn D, TOD B or DM C</td>
<td>Low added risk</td>
</tr>
<tr>
<td>CVRD C</td>
<td>Moderate added risk</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. 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 > 100 M, > 90 F) or BMI ≥ 30 B
- Smoking
- Family history of premature CV disease (M <55; F <65 years)
- Impaired FBS or impaired GTT B
- Dyslipidemia:
  - TC ≥ 200 mg/dl (5.1 mmol/L); or
  - LDL-C ≥ 130 mg/dl (3.3 mmol/L); or
  - HDL-C: M < 40 mg/dl (1.0 mmol/L); F < 45 mg/dl (1.1 mmol/L); or
  - TG >150 mg/dl (1.7 mmol/L)

**B. Sub-clinical Target Organ Damage (TOD)**
- LVH (by ECG or Echo)
- Ankle/brachial BP index < 0.9 (if available)
- S. creatinine > 1.2
- Low eGFR or CrCl <60 e
- 24hr-microalbuminuria ≥30, or ACR>30 e
C. Established CV or Renal Disease (CVRD)

- CVA: ischaemic stroke; cerebral hemorrhage; TIA
- Heart disease: MI; angina; coronary revascularization; heart failure
- Renal disease: DM nephropathy; renal impairment (S. Cr > 1.4); 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
- BP ≥ 130/85 mmHg
- Impaired FBS ≥ 100 mg/dL (5.6 mmol/l)
- High TG > 150 mg/dl (1.7 mmol/L)
- Low HDL-cholesterol < 40 mg/dl (1 mmol/L)

References:

Assessment
Assessment of Obesity

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

Assessment helps to find answers to the following questions:

1. What is the class of the obesity?
2. What other CV risk factors does the patient have? 27
3. What is the risk of developing CVD? 27
4. Is there any comorbid condition? e.g., depression 41, eating disorders 29, sleep apnea 8, arthritis, or use of medication. 21
5. Is it a secondary obesity? 32
6. How much does the obesity affect the individual’s quality of life? e.g., mobility, self-esteem, socializing.
7. Discuss Lifestyle. 78
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, and the benefits of treatment? 21
10. Has there been any attempt to lose weight? If so, why was it not effective?
11. Is the individual ready to start changing? 34
12. Is the individual a candidate for medication therapy or surgical interventions? 52
13. Is there any indication for specialist referral? 52

Classify Obesity

14. Waist Circumference 23 should be measured, at least, in overweight persons to better classify obesity.

<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>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?

References:

### Comorbidities associated with overweight and obesity

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

<table>
<thead>
<tr>
<th>Endocrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic syndrome</td>
</tr>
<tr>
<td>DM-2 (61%)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
</tr>
<tr>
<td>Polycystic ovarian syndrome</td>
</tr>
<tr>
<td>Reduced fertility and menstrual disorders</td>
</tr>
<tr>
<td>Breast (11%) and uterine cancer (34%)</td>
</tr>
<tr>
<td>Pregnancy complications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea</td>
</tr>
<tr>
<td>Obstructive sleep apnea</td>
</tr>
<tr>
<td>Hyperventilation syndrome</td>
</tr>
<tr>
<td>Pickwickian syndrome</td>
</tr>
<tr>
<td>Asthma</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gastrointestinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro-esophageal reflux diseases</td>
</tr>
<tr>
<td>Fatty liver disease</td>
</tr>
<tr>
<td>Cholelithiasis (30%)</td>
</tr>
<tr>
<td>Hernias</td>
</tr>
<tr>
<td>Pancreatitis</td>
</tr>
<tr>
<td>Colonic cancer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cutaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stretch marks</td>
</tr>
<tr>
<td>Status pigmentation of the legs</td>
</tr>
<tr>
<td>Lymphedema</td>
</tr>
<tr>
<td>Cellulitis</td>
</tr>
<tr>
<td>Intertrigo and carbuncles</td>
</tr>
<tr>
<td>Acanthosis nigricans</td>
</tr>
<tr>
<td>Skin tags</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Genitourinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary stress incontinence</td>
</tr>
<tr>
<td>Obesity related glomerulopathy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psychological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression/ low self esteem</td>
</tr>
<tr>
<td>Body image disturbances</td>
</tr>
<tr>
<td>Social stigmatization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neurologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Idiopathic intracranial hypertension</td>
</tr>
<tr>
<td>Meralgia parasthetica</td>
</tr>
<tr>
<td>Dementia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased surgical risk</td>
</tr>
<tr>
<td>Increased post operative complications</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 syndrome.
3. Insulinoma.
4. Hypothalamic obesity.
5. Polycystic ovarian 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, sulphonyleureas, insulin, adrenergic antagonists, serotonin antagonists [especially cyproheptadine]).
10. Eating disorders (especially binge-eating disorder, bulimia nervosa, and night-eating disorder).
11. Hypogonadism.

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**  
(daytime sleepiness, loud snoring, gasping or choking episodes during sleep and awakening headaches)

• Measurement of neck circumference (>17 inches in men, >16 inches in women)  
• Polysomnography for oxygen desaturation, apnea and hypopneic events.  
• ENT examination for upper airway obstruction

**Suspected Alveolar Hyperventilation (Pickwickian) syndrome**  
(Hypersomnolence, right sided heart failure including elevated JVP, hepatomegaly and lower limb edema)

• Polysomnography (to rule out obstructive sleep apnea)  
• CBC to rule out polycythemia.  
• Blood gases (Pco2 often elevated)  
• Chest X-ray (enlarged heart and elevated hemi-diaphragm)  
• ECG: right atrial and right ventricular enlargement  
• Pulmonary Function Test: reduced vital capacity and respiratory reserve volume.

**Suspected Hypothyroidism**

• TSH

**Suspected Cushing’s syndrome**  
(moon face, thin skin that bruise easily, severe fatigue, striae)

• Elevated late-night salivary cortisol level (>7.0 nmol/L diagnostic, 3.0-7.0 nmol/L equivocal)  
• Repeatedly elevated measurements of cortisol secretion (late night salivary cortisol or urine free cortisol, upper normal 110-138 nmol/dL)

**Suspected Polycystic Ovarian Syndrome**  
(oligomenorrhea, hirsutism, enlarged ovaries may be palpable, hypercholesterolemia, impaired glucose tolerance, persistent acne and androgenic alopecia)

• Morning blood draw for total testosterone, free and weakly testosterone, DHEAS, prolactin, TSH and early morning 17-hydroxyprogesteron.

References:
## 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></td>
</tr>
<tr>
<td>• Monoamine oxidase inhibitors (non-selective): Isocarboxazid, Phenelzine, tranylcypromine</td>
<td></td>
</tr>
<tr>
<td>• Selective serotonin reuptake inhibitors: 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, Barrier methods</td>
</tr>
<tr>
<td>• Hormonal contraceptives</td>
<td>NSAIDs</td>
</tr>
<tr>
<td>• Corticosteroids</td>
<td></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</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 patient readiness to lose weight

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

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

<table>
<thead>
<tr>
<th>Not important</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How interested are you in losing weight at this time?

<table>
<thead>
<tr>
<th>Not interested</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very interested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How confident are you to lose weight at this time?

<table>
<thead>
<tr>
<th>Not confident</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Ask targeted questions:
aiming to gain more information about your patient and to involve him/her in a self-reflection process that
may facilitate readiness to change. For example:

- What is difficult about managing your weight?
- How does being overweight affect you?
- What can you not do, now, that you would like to do if you weighed less?

References

## Stages of Change Model to assess Readiness to Loose Weight

<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>I am not really interested in weight loss. It is not a problem.</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>

### References

Assessment of Hypertension

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

Use CMR Encounter Form no. 2 (CMR-2) to help you in this assessment.

Assessment helps to find answers to the following questions:
1. What is the level of the BP?
2. Is it a secondary HTN?
3. What other CV risk factors does the patient have?
4. Is there any complication (TOD)?
5. What is the current management, if any?
6. How is the quality of life?
7. What is the risk or developing CVD?

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).
- Symptoms of TOD:
  - Brain 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.
- Lifestyle (including amount of physical exercise, dietary habits and psychosocial factors that might influence the management of hypertension).
- Previous antihypertensive therapy: drugs used; efficacy and adverse effects; herbs and other traditional therapy.
- Use of other medications that might raise the BP.
- Features of secondary hypertension.
- History of snoring and sleep apnea.
- 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).
- 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.
- Measure BMI and waist circumference.
- 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.
- In suspected white-coat HTN (WCH), use home BP measurement (HBPM) or refer the patient for ambulatory (24-hr) BP measurement (ABPM). 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

A: Secondary Hypertension: Causes and Clinical Features

<table>
<thead>
<tr>
<th>Causes</th>
<th>Clinical Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephropathy</td>
<td>- Kidney disease in the family (polycystic kidney disease)</td>
</tr>
<tr>
<td></td>
<td>- Episodes of blood or proteins in the urine, urinary infections, swelling of body</td>
</tr>
<tr>
<td></td>
<td>- Elevated S. creatinine, urinary sediment or casts.</td>
</tr>
<tr>
<td></td>
<td>- Abnormal renal USS.</td>
</tr>
<tr>
<td>Renovascular HTN</td>
<td>- Initial onset before age 30 or after age 50 years.</td>
</tr>
<tr>
<td></td>
<td>- BP over 180/110.</td>
</tr>
<tr>
<td></td>
<td>- Hemorrhages and exudates in the fundi.</td>
</tr>
<tr>
<td></td>
<td>- Presence of abdominal bruit over renal arteries.</td>
</tr>
<tr>
<td></td>
<td>- Diminishing BP control.</td>
</tr>
<tr>
<td></td>
<td>- Women of child bearing age.</td>
</tr>
<tr>
<td></td>
<td>- Sudden worsening of previously controlled hypertension.</td>
</tr>
<tr>
<td></td>
<td>- Unexplained episodes of pulmonary edema.</td>
</tr>
<tr>
<td></td>
<td>- Acute decline in renal function with ACEI or ARB.</td>
</tr>
<tr>
<td></td>
<td>- Unexplained decline in renal function.</td>
</tr>
<tr>
<td>Pheo-chromocytoma</td>
<td>- Episodic symptoms: headache, flushing, sweating and palpitations.</td>
</tr>
<tr>
<td></td>
<td>- Extremely labile BP.</td>
</tr>
<tr>
<td></td>
<td>- Skin stigmata of neurofibromatosis.</td>
</tr>
<tr>
<td>Cushing’s syndrome</td>
<td>- Typical general appearance: truncal obesity, stretch marks</td>
</tr>
<tr>
<td>Conn’s syndrome</td>
<td>- Weakness, cramps, polyuria.</td>
</tr>
<tr>
<td></td>
<td>- K+ &lt; 3.5 or diuretic-induced K+ (&lt; 3.0).</td>
</tr>
<tr>
<td></td>
<td>- Incidental adrenal mass.</td>
</tr>
<tr>
<td>Acromegaly</td>
<td>- Tall stature, typical facies with prominent lower jaw, broad spade shaped hands</td>
</tr>
<tr>
<td>Coarctation of the aorta</td>
<td>- High BP in upper limbs but not in lower limbs. Delayed or weak femoral pulses</td>
</tr>
<tr>
<td>Drugs</td>
<td>- Contraceptive pill, anti-inflammatory drugs, steroids, sympathomimetics, nasal</td>
</tr>
<tr>
<td></td>
<td>decongestants, appetite suppressants, cyclosporine, erythropoietin, licorice,</td>
</tr>
<tr>
<td></td>
<td>antidepressants, tacrolimus, cocaine, amphetamines, other illicit drugs, dietary</td>
</tr>
<tr>
<td></td>
<td>supplements and medicines (e.g., ephedra, ma huang, bitter orange)</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>- Symptoms and signs of hyper- or hypothyroid.</td>
</tr>
<tr>
<td></td>
<td>- Thyromegaly or thyroid nodule</td>
</tr>
</tbody>
</table>

References:
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.120

Assessment helps to finding answers for the following questions:
1. What is the type of DM?
2. Is it secondary?
3. What other CVD risk factors does the patient have?
4. What complications does the patient have?
5. What is the current management, if any?
6. Is the patient’s DM controlled?
7. How is the patient’s quality of life?
8. What is the risk of developing CVD? 27

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:
   • Symptoms and treatment of chronic eye, kidney or nerve disease.
   • Genitourinary and gastrointestinal function.
   • Heart, peripheral vascular, foot, and cerebrovascular complications associated with DM.
6. Use of medications and herbs that may affect blood glucose levels.
7. Risk factors for CVD, including smoking, hypertension, obesity, dyslipidemia, and family history.
8. History and treatment of other conditions, including endocrine and eating disorders.
9. Assessment for mood disorder.43
10. Family history of diabetes and other endocrine disorders.
11. Cultural, psychosocial, educational, and economic factors that might influence the management of diabetes.78
12. Nutritional habits, weight history and physical activity. 78
13. Tobacco, alcohol, and/or controlled substance use. 78
14. Contraception and reproductive and sexual history.
15. Immunization against influenza and pneumococcus.

Physical examination
1. BMI and waist circumference. 23
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.46
12. Skin examination (for acanthosis nigricans, insulin-injection sites, infections, and dyslipidemia).
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).
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).45
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.
   b. Genetic defects in insulin action.
   c. Diseases of the exocrine pancreas.
   d. Endocrinopathies.
   e. Drug- or chemical-induced.
   f. Infections.
   g. Uncommon forms of immune-mediated diabetes.
   h. Other genetic syndromes sometimes associated with diabetes.
   i. Gestational diabetes mellitus (GDM)

**Reference:**
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.\[120\]

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 of the initial test, before beginning or changing therapy.
- The sample should not be performed during stress or acute illness, such as recent MI, stroke, pregnancy, trauma, weight loss or following the use of certain drugs, and should not be 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>
<tr>
<td></td>
<td></td>
<td>Beta-adrenergic blockers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Progestins</td>
</tr>
</tbody>
</table>

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

Genetics disorders:

Consider the possibility of a genetic disorder if TC ≥ 300mg/dL (7.8 mmol/L) or if there is a family history of premature coronary heart disease.

B: LDL Cholesterol Goals.*

<table>
<thead>
<tr>
<th>Risk category 26, 27</th>
<th>LDL goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High CV Risk</td>
<td>&lt;70 mg/dL (1.8 mmol/L) [A]</td>
</tr>
<tr>
<td>High CV Risk</td>
<td>&lt;100 mg/dL (2.5 mmol/L) [A]</td>
</tr>
<tr>
<td>Low/ Moderate added CV Risk</td>
<td>&lt;200 mg/dL (5 mmol/L) [A]</td>
</tr>
</tbody>
</table>

* or 50% reduction of initial LDL-C in individuals for whom drug treatment is initiated.

References

Screening for Depression

**Why do we screen for depression?**

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. Depression has been linked to poor glycemic control, less optimal lifestyle and self-care habits, higher obesity, and higher morbidity and mortality.
3. Screening improves the accurate identification of depressed patients in PHC.
4. 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.
5. Early recognition of depression symptoms, and prompt treatment, and referral lead to improved self-care and quality of life and decrease clinical morbidity.

**How do we screen for depression?**

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

**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 the table.
4. Identify and monitor the severity of depression every 2-4 weeks, as below. Consult a specialist if there is no improvement.

<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>

**Severity of depression:**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Depression Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 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>

**References:**

## PHQ-9 Quick Depression Assessment Questionnaire

### اسنانة تقصی التأثیر

<table>
<thead>
<tr>
<th>Question</th>
<th>Nearly Every Day (3)</th>
<th>Several Days (2)</th>
<th>Less Than Half the Days (1)</th>
<th>No More Than 1 Day (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feeling down, depressed, or hopeless.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. Little interest or pleasure in doing things.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. Feeling tired or having little energy.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. Trouble concentrating or remembering details.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. Moving or speaking slower than usual.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. Thinking that you would be better off dead; suicide thoughts.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total Score:**

Refer to page 42 in this guideline for the interpretation of this questionnaire.


Translated and validated by the CCCQI Quality Improvement Team, Qatif Primary Health Care, Saudi Arabia 2009.
Assessing Renal Function in CMR

**References:**

**Assessing Renal Function**

- **Annual Urine Dipstick for Protein + eGFR**

  - **Proteinuria or eGFR < 60**
    - No
    - Yes
      - **ACR**

        - **ACR < 30**
          - Confirm in 3 months
        - **ACR > 30**
          - **ACR = 30 - 300**
            - Confirm in 3 months
          - **ACR > 300**
            - Refer to Nephrologist

- **Start ACEI or ARB** (even if BP < target) titrated to max. tolerable dose.
- **Glycemic control** (A1C ~ 7%)
- **BP control** (<130/80 in DM; <140/90 in non-DM).
- **Start Statin and control LDL to target.**
- **Review medication interaction & CI.**

**Stages of Chronic Kidney Disease (CKD): A Clinical Action Plan**

<table>
<thead>
<tr>
<th>CKD Stage</th>
<th>eGFR</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1: Kidney damage* with normal or ↑ eGFR</td>
<td>&gt; 90</td>
<td>Dx + treat, treat comorbidities, slow progression, ↓ CVD risk</td>
</tr>
<tr>
<td>Stage 2: Kidney damage with mild ↓ eGFR</td>
<td>60-89</td>
<td>Monitor progression</td>
</tr>
<tr>
<td>Stage 3: Moderate ↓ eGFR</td>
<td>30-59</td>
<td>Evaluate + treat complications; refer to a nephrologist</td>
</tr>
<tr>
<td>Stage 4: Severe ↓ eGFR</td>
<td>15-29</td>
<td>Prepare for kidney replacement therapy</td>
</tr>
<tr>
<td>Stage 5: Kidney failure</td>
<td>&lt; 15</td>
<td>Kidney replacement therapy</td>
</tr>
</tbody>
</table>

* most commonly microalbuminuria.

**A** - Estimated GFR (MDRD method) from S. Cr: eGFR mL/min/1.73 m² = 186 x Scr -1.154 x Age -0.203 (x 0.742 if Female) (x 1.21 if African)

**B** - ACR = Urinary Albumin-Creatinine Ratio, expressed as mg/g.
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? 

Yes

- 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.

No

Foot Care Education

Comprehensive Foot Assessment every 3-6 months

Comprehensive Foot Assessment

A- Direct Visual Foot Inspection

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

Note Skin condition:
- Callus
- Ulcer
- Redness
- Warmth
- Maceration
- Fissure
- Swelling
- Dryness

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 1.5 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
- Previous amputation R3
- Previous/Current Ulceration R3
- Structural foot deformity R2
- Extensive Plantar callus R2

R1-3 refers to Risk Category

References:
Chapter 5

Control
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

**Focused Visits**

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

**Annual Visits**

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

Annual Assessment of Complications:
- Targeted History + Physical Exam
- Cardiovascular + Cerebrovascular Assessment
- Renal Assessment
- Foot Exam + Risk Assessment (for DM pts.)
- Dilated Eye Exam (Refer to Ophthalmology)
- Re-Estimate CV Risk
- Mood Assessment
- Immunization & Opportunistic Preventive Care

**The encounter form that may be used at this step**

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

BMI ≥ 30

- 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

2° Obesity, BMI > 50, Complex disease state, or Resistant to respond?

- Assess

BMI ≥ 30

Lifestyle modification program
CVR management

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

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

A- Weight-loss Goal: 5%-10% of body weight, or 0.5-1 kg/wk for 6 months.

B- Lifestyle Modification Program

Nutrition: Reduce energy intake by 500-1000 kcal/d.
Physical activity: Initially 30 mins of moderate intensity 3-5 x/wk; then ≥ 60 mins on most days. Add endurance exercise training.

Cognitive behavior therapy

References
Management of Obesity

Management aims to:
- Improve pre-existing obesity-related comorbidities.
- Reduce the future risk of obesity-related comorbidities.
- Improve physical, mental and social wellbeing.

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

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

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 program, to minimize 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.

Dietary advice
- Dietary interventions for weight loss should be calculated to produce a 600 kcal/day energy deficit. This results in a progressive weight loss of 0.5-1 g per week.
- Dietary advice should be tailored to the preferences of the individual patient.
- Emphasize the importance of eating breakfast daily and regulating meal times.
- Encourage patient to read food labels when purchasing food items.
- Provide lower calorie substitution to the patient’s usual diet.
- Encourage pre-planning of food and snacks.
- Avoid places and situation that encourage weight gain.

Behavioral modifications
Behavioral modifications are useful adjunct to diet and physical activity. They facilitate the assessment of patient motivation and readiness to implement a management plan and encourage the patient to take steps toward treatment.
- **Goal setting:** allows patients to develop realistic expectations and aim at practical individualized strategies for weight loss.
- **Self-monitoring:** regular self-weighing.
- **Stimulus control:** environmental modification to enhance behavior that support weight management.
- **Slowing rate of eating:**
- **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.
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:
  - BMI ≥ 30, or BMI ≥ 28 with concomitant obesity-related risk factors or diseases (hypertension, dyslipidemia, CHD, DM-2 or sleep apnea.
  - Therapy should 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:
  - BMI ≥ 35 kg/m².
  - Presence of one or more severe comorbidities which are expected to improve significantly with weight reduction (e.g., severe mobility problems, arthritis, DM-2).
  - Evidence of completion of a structured weight management program involving diet, physical activity, and behavioral and drug interventions, which did not result in significant and sustained improvement in the comorbidities.
- Health care professionals should undertake the following in all patients post bariatric surgery:
  - Simple clinical assessments of micronutrient status (e.g., ask about hair loss, neuropathic symptoms, skin and oral lesions, muscle weakness), and
  - Simple blood tests (e.g., full blood count, calcium, magnesium, phosphate and albumin).
- 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.
- 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.

Types of Bariatric Procedures

- Restrictive (e.g., vertical banded gastroplasty, laparoscopic adjustable gastric band)
- Resective (stand alone sleeve gastrectomy)
- Malabsorptive (e.g., gastric by Bass procedures, bili-pancreatic diversion)

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

Any Acute TOD? Yes

A: Symptoms & Signs of Acute TOD

- Neurologic: Unusual headache, Confusion, Somnolence, Stupor, Visual loss, Seizure, Dysarthria, Focal Neurologic deficit, Coma
- Cardiac: SOB, Chest pain/ Intercapular/ 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.
2. Aggressive lowering of BP (>25%) may induce cerebral, myocardial or renal ischemia.
3. Avoid short-acting Nifedipine (oral and sublingual).

References:
Blood Pressure Control: Chronic Management

References:
BP Control: Choice of a Plan

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

1. Stratify the level of CVR using table 1, below. For more details refer to page 27.
2. Match the level in table 1 with its corresponding plan in table 2.
3. Refer to page 27 for lifestyle change; page 54 for drug treatment; and page 61 for glycemic control.
4. Refer to the appropriate specialist for the management of TOD and CVRD, and continue treatment.

Table 1: Stratify CVR

<table>
<thead>
<tr>
<th>Other risk factors and disease history</th>
<th>Blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal: SBP 120–129 or DBP 80–84</td>
</tr>
<tr>
<td>No other risk factors</td>
<td>Average risk</td>
</tr>
<tr>
<td>1-2 risk factors</td>
<td>Low added risk</td>
</tr>
<tr>
<td>3 or more RF, MetSyn, TOD or diabetes</td>
<td>Moderate added risk</td>
</tr>
<tr>
<td>CVRD</td>
<td>High added risk</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.

Table 2: Match CVR with its corresponding plan

<table>
<thead>
<tr>
<th>Other risk factors and disease history</th>
<th>Blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal: SBP 120–129 or DBP 80–84</td>
</tr>
<tr>
<td>No other risk factors</td>
<td>No BP intervention</td>
</tr>
<tr>
<td>1-2 risk factors</td>
<td>Lifestyle changes</td>
</tr>
<tr>
<td>3 or more RF, MetSyn, TOD or diabetes</td>
<td>Lifestyle changes</td>
</tr>
<tr>
<td>CVRD</td>
<td>Drug treatment and lifestyle changes *</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.

* Consider the use of statin 68 and aspirin 70 in these risk groups.

References:

### Which Anti-Hypertensive Agent to use?

<table>
<thead>
<tr>
<th>Risk factor / Disease</th>
<th>1st Choice</th>
<th>Second-line Choice</th>
<th>Cautions/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension without compelling indications</td>
<td>Thiazide diuretics, β-blockers, ACEI, ARBs, or long-acting CCBs (consider ASA and statins in selected patients)</td>
<td>Combination of 1st choice drugs</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>for specific agents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated systolic hypertension without</td>
<td>Thiazide diuretics, ARBs or long-acting DHP-CCBs</td>
<td>Combination of 1st choice drugs</td>
<td>Hypokalemia should be avoided by using K⁺-sparing agents in those prescribed diuretics</td>
</tr>
<tr>
<td>compelling indications for specific agents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus with nephropathy</td>
<td>ACEI or ARBs</td>
<td>Addition of thiazide diuretics, cardio-selective β-blockers, or long-acting CCBs</td>
<td>If serum creatinine level is &gt;2 mg/dL, 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</td>
<td>ACEI, ARBs or thiazide diuretics</td>
<td>Combination of 1st choice drugs or addition of cardio-selective β-blockers ± long-acting CCBs</td>
<td></td>
</tr>
<tr>
<td>without nephropathy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metabolic syndrome</td>
<td>ACEI or CCB</td>
<td>ARB</td>
<td></td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>Recurrent AF: ACEI, ARB</td>
<td>Permanent AF: BB, NDHP-CCB</td>
<td></td>
</tr>
<tr>
<td>Angina</td>
<td>Beta-blockers and ACEI</td>
<td>Long-acting CCBs</td>
<td>Avoid short-acting nifidipine</td>
</tr>
<tr>
<td>Established atherosclerotic disease</td>
<td>ACEI added to other therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous myocardial infarction</td>
<td>Beta-blockers and ACEI</td>
<td>Combination of additional agents</td>
<td></td>
</tr>
<tr>
<td>Heart failure</td>
<td>ACEI, β-blockers and spironolactone</td>
<td>ARBs; thiazide or loop diuretics, as additive therapy</td>
<td>Avoid non-DHP CCBs (diltiazem, verapamil)</td>
</tr>
<tr>
<td>Previous CVA or TIA</td>
<td>ACEI/diuretic combination</td>
<td></td>
<td>Blood pressure reduction reduces recurrent cerebrovascular events</td>
</tr>
<tr>
<td>Chronic kidney Disease; Microalbuminuria</td>
<td>ACEI (diuretics as additive Rx)</td>
<td>ARB</td>
<td>Avoid ACEIs in bilateral renal artery stenosis</td>
</tr>
<tr>
<td>Left ventricular hypertrophy (LVH)</td>
<td>ACEI, ARBs, long acting CCBs, thiazide diuretics (β-blockers for those under 60 years)</td>
<td></td>
<td>Avoid hydralazine and minoxidil</td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td>ACEI added to other therapy</td>
<td>CCB</td>
<td>Avoid β-blockers with severe disease</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>No special recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly (isolated Syst HTN)</td>
<td>Diuretic; CCB</td>
<td></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</td>
<td>Propranolol and labetolol are preferred if a BB is indicated</td>
<td></td>
<td>Diuretics may reduce milk volume.</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Methyl dopa, labetol, CCB</td>
<td></td>
<td>ACEIs and ARBs should be avoided (associated with adverse fetal and neonatal renal effects.)</td>
</tr>
<tr>
<td>Smokers</td>
<td></td>
<td></td>
<td>Interferes with the beneficial effects of β-blockers</td>
</tr>
<tr>
<td>Bronchospasm;</td>
<td></td>
<td></td>
<td>BBs should generally be avoided</td>
</tr>
<tr>
<td>2nd/3rd degree heart block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperthyroidism; Anxiety; S. Tachycardia</td>
<td>β-blockers</td>
<td></td>
<td></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>Frequency</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Caution</th>
<th>Compelling Contraindications</th>
<th>Potential Side Effects</th>
</tr>
</thead>
</table>
| Thiazides or thiazide-like Diuretics | Chlorothalidone  
Indapamide  
Hydrochlorothiazide (HCT) | 12.5-25  
1.25-2.5  
12.5-25 | 1-2 | • Elderly patient, isolated systolic hypertension,  
• Heart failure, secondary stroke prevention | • Renal insufficiency (loop diuretics for Cr > 2)  
• Edema states | • Action blocked by NSAID  
• Cardiac arrhythmia  
• Glucose intolerance; ↑Tg  
• Hypertrophic cardiomyopathy | | }

#### Angiotensin converting enzyme inhibitors (ACEI)

- Captopril  
- Enalapril  
- Lisinopril  
- Perindopril

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Usual Dose (mg/Day)</th>
<th>Frequency</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Caution</th>
<th>Compelling Contraindications</th>
<th>Potential Side Effects</th>
</tr>
</thead>
</table>
| Captopril                    | 25-150              | 2-3       | • Heart failure  
• Left ventricular dysfunction  
• Post-MI or established coronary heart dis.  
• Diabetic nephropathy  
• Secondary stroke prevention | • Chronic renal disease  
• Type 2 diabetic nephropathy  
• Proteinuric renal disease  
• Unilateral Renovascular hypertension | • Renal impairment†  
• Peripheral vascular disease †  
• Antacids and NSAID effect of ACEI  
• Allopurinol; Digoxin; K⁺; K⁺-sparing diuretics | | }

#### β blockers (BB)

- Atenolol  
- Metoprolol  
- Propranolol  
- Bisoprolol

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Usual Dose (mg/Day)</th>
<th>Frequency</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Caution</th>
<th>Compelling Contraindications</th>
<th>Potential Side Effects</th>
</tr>
</thead>
</table>
| Atenolol                     | 25-100              | 1         | • Angina pectoris;  
• Post-MI; congestive heart failure  
• Pregnancy  
• Tachyarrhythmias | • Heart failure  
• Supraventricular arrhythmia  
• Anxiety; essential tremor; migraine  
• Glaucoma | • Heart failure†  
• Peripheral vascular disease  
• Diabetes  
• Rhinitis; Dyslipidemia; Pheochromocytoma; Depression; Mild Asthma  
• Nicotine reduce bio-availability  
• may increase warfarin activity | | }

- BB and α blockers: carvedilol

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Usual Dose (mg/Day)</th>
<th>Frequency</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Caution</th>
<th>Compelling Contraindications</th>
<th>Potential Side Effects</th>
</tr>
</thead>
</table>
| Carvedilol                   | 12.5-50             | 2         | • Angina pectoris;  
• Post-MI; congestive heart failure  
• Pregnancy  
• Tachyarrhythmias | • Heart failure  
• Supraventricular arrhythmia  
• Anxiety; essential tremor; migraine  
• Glaucoma | • Heart failure†  
• Peripheral vascular disease  
• Diabetes  
• Rhinitis; Dyslipidemia; Pheochromocytoma; Depression; Mild Asthma  
• Nicotine reduce bio-availability  
• may increase warfarin activity | | }

#### Compelling Contraindications

- Pregnancy  
- Renovascular disease

#### Potential Side Effects

- Periodic Cr., Electrolyte, WBC  
- Angioedema  
- Cough  
- Tachycardia  
- ↑ Cr. + K⁺  
- Nausea  
- Hypertension  
- Diarrhea  
- Fatigue  
- Taste disorders  
- Agranulocytosis

- Heart failure  
- Fatigue  
- Cold extremities  
- Claudication  
- Confusion  
- Vivid dreams  
- Insomnia  
- Depression  
- Dizziness  
- Bradycardia
<table>
<thead>
<tr>
<th>Class Of Drug</th>
<th>Drugs</th>
<th>Usual Dose (mg/Day)</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Caution</th>
<th>Compelling Contraindications</th>
<th>Potential Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcium channel blockers (CCB)</strong></td>
<td><strong>Amlodipine Nifedipine LA</strong></td>
<td>2.5-10 30-60</td>
<td>• Elderly patient, isolated systolic hypertension • DM</td>
<td>• Angina • Esophageal spasm</td>
<td>Liver disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Angiotensin II receptor blockers ARB</strong></td>
<td><strong>Valsartan Losartan (Cozaar), Olmesartan Telmisartan</strong></td>
<td>80-320 25-100 20-40 20-80</td>
<td>• ACEI intolerance • Type 2 DM nephropathy • Hypertension with LVH • Heart failure in ACE intolerant patients, after MI • LV dysfunction after MI. Intolerance of other antihypertensive drugs. Proteinuric renal disease. Chronic renal disease. Heart failure.</td>
<td>• Renal impairment* • Peripheral vascular disease* • Fluconazole ↓ losartan level • NSAID ↓ effect of ARB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Centrally acting drugs</strong></td>
<td><strong>Methyldopa</strong></td>
<td>250–1,000</td>
<td>• Pregnancy</td>
<td>• Postural hypotension • Heart failure*</td>
<td>Urinary incontinence</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>α-blockers</strong></td>
<td><strong>Doxazosin Prazosin</strong></td>
<td>1-16 2-20</td>
<td>• Benign prostatic hypertrophy</td>
<td>• Postural hypotension • Heart failure</td>
<td>Renal failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diuretics (loop)</strong></td>
<td><strong>Furosemide (Lasix®)</strong></td>
<td>20-80</td>
<td>• Renal insufficiency; • Congestive heart failure</td>
<td>• Renal failure • Hyperkalaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diuretics (anti-aldosterone)</strong></td>
<td><strong>Spironolactone (Aldactone®)</strong></td>
<td>25-50</td>
<td>• Congestive heart failure; • Post-myocardial infarction</td>
<td>• Renal failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calcium channel blockers CCB</strong></td>
<td><strong>Verapamil Diltiazem</strong></td>
<td>80-320</td>
<td>• Angina pectoris; • Carotid atherosclerosis; • Supraventricular tachycardia</td>
<td>• Elderly patient • Migraine</td>
<td>Combination with β blockade • Mild Heart failure A-V block (grade 2 or 3) • Congestive heart failure</td>
<td>Constipation • Heart block</td>
<td></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 failure but should only be used with caution, close supervision, and specialist advice when there is established and significant renal impairment.
D Caution with angiotensin converting enzyme inhibitors and angiotensin II receptor blockers in peripheral vascular disease because of association with renovascular disease.
E ACEI and ARB are sometimes used in patients with renovascular disease under specialist supervision.
F β-blockers are used increasingly to treat stable heart failure but may worsen heart failure.
G In heart failure when used as monotherapy.

References:
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 the 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:**

1. 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.
2. 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.
3. Do not combine two drugs of the same class.
4. Combine agents at medium doses. this can be more effective than a high-dose single agent. and can result in fewer side effects.
5. A Combination is more effective if a medicine from column 1 is combined with another from column 2.

**Note on short-acting Nifidipine**

Short-acting nifidipine was associated with the development of TIA in two studies, and has been implicated as a cause of cardiovascular morbidity and mortality.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>ACE inhibitors</td>
</tr>
<tr>
<td>CC Blockers</td>
<td>AR blockers</td>
</tr>
<tr>
<td>β-Blockers</td>
<td></td>
</tr>
</tbody>
</table>

**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.

```
Suspected WCH

Target organ damage?
  No
  Home BP Measurement

Av. BP < 125/75
Av. BP < 125/75 – 135/85
Av. BP > 135/85

Av. BP < 130/80
Av. BP > 130/80

Continue to monitor BP
Ambulatory BP Measurement
Start Treatment
```

References:

Initial Management of Symptomatic Hyperglycemia

Symptoms suggestive of Hyperglycemia
(Polyuria, Polydipsia, Unexplained weight loss)

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

Acute illness, or
- Sick looking, or
- Pregnancy, or
- Remarkable weight loss, or
- Ketonuria, or
- RBS ≥ 300 (17 mmol/L)

No
- Quick Lifestyle advise
- Full evaluation within 1-5 day
- Control of hyperglycemia

Yes
- Stabilize
  - Start IVF 0.9% NaCl 1 L in 1st hr, then .5L/hr.
  - Rapid- or Short-acting Insulin 0.15 iu/kg SQ.
  - Check blood sugar ½ hourly.
  - Consider Referral if having acute illness or blood sugar remains > 300 (17 mmol/L) after 1 hr.

Review plan within 1-5 days after discharge

References:
Management of Hypoglycemia

Suspected Hypoglycemia
Symptoms + Signs ±
RBS < 70 mg/dL (4 mmol/L)

Assess ABC & Check Vital Signs

Is Patient ALERT?

Yes

- Oral Sugar 20 g (2 teaspoons or 3 cubes)
- Check blood sugar Q 15 mins.
- Another Oral Sugar if RBS < 70 mg/dL (4 mmol/L)

Review plan within 1-5 days after discharge to prevent recurrence.

No

- Stabilize (ABC, IV access, O2)
- Give IV 20 ml Glucose 50%, or 50 ml IV Glucose 20%
- Reassess Q 5 mins.
- Check blood sugar Q 15 mins.

Is Patient ALERT?

No

- Refer for hospital management
- Review plan within 1-5 days after discharge

Yes

Identify and correct cause of hypoglycemia:
- Medication
- Diet & Exercise
- Psychosocial
- Infection
- Drugs (toxicology)
- Metabolic disease

Refer:
- Unidentifiable causes.
- Prolonged hypoglycemia

Hypoglycemia Signs & Symptoms:
- Mild (Autonomic): tremors, palpitations, sweating, excessive hunger.
- Moderate (Neuroglycopenic): headache, mood changes, irritability, paraesthesia, 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:
4. Institute for Clinical Systems Improvement. Diagnosis and Management of Type 2 Diabetes Mellitus in Adults. 15th Ed, April 2012. www.icsi.org.
**Glycemic Control: Chronic Management**

**START HERE**

- **A1C < 8%** or
  - **Av. FBS < 180 (10 mmol/L)**
  - **Lifestyle changes**
  - **SMBG**
  - **Review in 4-6 weeks**

- **A1C 8-9%** or
  - **Av. FBS 180-240 (10 – 13.3 mmol/L)**
  - **If taking:**
    - **No Medication:**
      - Start Metformin
    - **Single Medication:**
      - Increase dose or add a 2nd drug (different class)
    - **Two Medications:**
      - Increase dose or Refer
      - Consider insulin therapy
  - **Review in 1-4 weeks**

- **A1C > 9%** or
  - **Av. FBS > 240 (13.3 mmol/L)**
  - **Lifestyle changes**
  - **If taking:**
    - **No Medication:**
      - Start Metformin+Sulphonylurea
    - **Single Medication:**
      - Optimize dose + add a 2nd drug (different class)
    - **Two Medications:**
      - Optimize doses or Refer
      - Consider insulin therapy
  - **Review in 1-4 weeks**

**Review:**
- **Av. FBS ± Av. PPBS**
- **Lifestyle plan**

**Glycemic control reached?**
- **Yes**
  - **Review every 3-4 months:**
    - **Av. FBS, Av. PPBS ± A1C**
    - **Lifestyle plan**
- **No**
  - **Review every 2-3 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.

**References:**
4. Institute for Clinical Systems Improvement. Diagnosis and Management of Type 2 Diabetes Mellitus in Adults. 15th Ed., April 2012.
## Antiglycemic Agents

### Drug Class
- Sulfonylureas
- Biguanides
- Thiazolidinediones (TZD)
- Dipeptidyl Peptidase-4 (DPP4i)
- α-glucosidase Inhibitors
- PPAR-γ Agonists

### Medications
- Glipizide
- Glibenclamide
- Gliclazide
- Glimepiride
- Metformin
- Repaglinide
- Nateglinide
- Apros 25 mg
- Miglitol
- Acarbose
- Pioglitazone
- Rosiglitazone
- Sitagliptin

### Actions
- **Sulfonylureas**: Stimulates insulin secretion, targets hepatic cells, decreases hepatic glucose production.
- **Biguanides**: Decreases insulin release, decreases hepatic glucose production.
- **Thiazolidinediones (TZD)**: Slows absorption of carbohydrates, reduces post-prandial blood sugar.
- **DPP4i**: More rapid onset of effect and shorter duration of action than sulfonylurea.
- **α-glucosidase Inhibitors**: Augments glucose-induced insulin output.
- **PPAR-γ Agonists**: Regulates insulin responsive genes necessary for glucose and lipid metabolism.

### Indications
- DM-2 alone or in combination with insulin, metformin, or TZD.
- DM-2 alone or in combination with sulfonylurea or insulin.
- DM-2 with failed conventional oral therapy.
- Repaglinide may be used in combination with TZDs.
- Sulfa-allergic pts.
- Hypoglycemia on low doses of sulfonylurea.
- DM-2 alone or in combination with metformin or insulin.
- Post-prandial hyperglycemia.
- DM-2 with failed conventional oral therapy.
- Concurrent use with metformin, sulfonylurea, insulin and as monotherapy.
- DM-2 monotherapy.
- Combination with metformin or TZD.

### Contraindications & Precautions
- Use with caution in sulfa-allergic patients.
- Use caution with renal or hepatic insufficiency.
- DO NOT USE with renal (Cr>1.4) or hepatic insufficiency, COPD.
- Unstable Cong. Heart Failure.
- Excessive alcohol intake.
- Age > 80 years.
- Acetazolamide.
- Chronic intestinal disease.
- Renal dysfunction (creatinine > 2.0).
- Cirrhosis.
- CHF III & IV.
- Abnormal LFTs.
- CAUTION in ladies @ ↑ risk of fracture.
- May resume ovulation in anovulatory women.
- Use with caution in renal insufficiency.
- May need lower dose of sulfonylurea to prevent hypoglycemia.

### Common Side Effects
- Hypoglycemia and weight gain.
- Diarrhea, nausea, abdominal bloating, anorexia, metallic taste.

### Lab Monitoring
- **Baseline creatinine, LFTs**
- **LFTs every 2 months in 1st year, then PRN (ALT)**
- **Baseline creatinine**

### Dose Adjustment
- 1-2 weeks
- 2-4 weeks
- 1-2 weeks
- 2-4 weeks
- 2-4 weeks

### Usual Dose
- **Glipizide**: 5 mg od-20 mg bid ac.
- **Glibenclamide**: 1.25 mg od-10 mg bid ac.
- **Gliclazide**: 40 mg od-160 mg bid ac.
- **Glimepiride**: 1-4 mg od w/meal.
- **Metformin**: 500 mg od-1000 mg bid.
- **Repaglinide**: 0.5-2 mg tid w/each meal.
- **Nateglinide**: 60-120 mg tid w/each meal.
- **Apros**: 25 mg-100 mg tid.
- **Miglitol**: 10 mg-40 mg tid w/meal.
- **Acarbose**: 25 mg-100 mg od.
- **Pioglitazone**: 30 mg od.
- **Rosiglitazone**: 4 mg od-8 mg bid.
- **Sitagliptin**: 100 mg od with or without food.

### Maximum Daily Dose
- **Glipizide**: 40 mg.
- **Glibenclamide**: 20 mg.
- **Gliclazide**: 320 mg.
- **Glimepiride**: 8 mg.
- **Metformin**: 2500 mg.
- **Repaglinide**: 16 mg.
- **Nateglinide**: 560 mg.
- **Apros**: 360 mg.
- **Miglitol**: 45 mg.
- **Acarbose**: 100 mg od.
- **Pioglitazone**: 45 mg.
- **Rosiglitazone**: 8 mg.
- **Sitagliptin**: 100 mg od.

### Cost
- **Glipizide**: $1.99.
- **Glibenclamide**: $1.29.
- **Gliclazide**: $2.59.
- **Glimepiride**: $1.89.
- **Metformin**: $0.65.
- **Repaglinide**: $1.39.
- **Nateglinide**: $1.29.
- **Apros**: $6.49.
- **Miglitol**: $0.99.
- **Acarbose**: $4.99.
- **Pioglitazone**: $3.99.
- **Rosiglitazone**: $2.99.
- **Sitagliptin**: $1.99.

### References:
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 GI intolerance; if not tolerated, lower the dose or consider a trial of extended absorption metformin tablets.
- Do not combine two drugs of the same class.
- Combine agents at medium doses. this 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. Hemoglobinopathies, hemolysis and blood loss interfere with its accuracy.
  2. Fructosamine (reflects glycemic control in the last 1-2 weeks) might be used instead, if available.
  3. Determining the 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.

Levels of Glycemic Control:

<table>
<thead>
<tr>
<th>Target Test</th>
<th>Test Range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1c &lt; 7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average FBS</td>
<td>90 - 130 mg/dL</td>
<td>5 - 7.2 mmol/L</td>
</tr>
<tr>
<td>Average 2hr-PBS &lt; 180 mg/dL</td>
<td>10 mmol/L</td>
<td></td>
</tr>
<tr>
<td>Average bedtime &lt; 120 mg/dL</td>
<td>6.7 mmol/L</td>
<td></td>
</tr>
</tbody>
</table>

Limitations on use of A1C in DM

- In people who have hemoglobin variants such as HbS (sickle cell trait), some A1C tests give falsely high or low readings that can lead to the over-treatment or under-treatment of diabetes.
- Laboratories use many different methods for measuring A1C, but some of these methods can give inaccurate results when the patient has a hemoglobin variant such as sickle cell trait.
- The National Glycohemoglobin Standardization Program in America (www.ngsp.org) provides information about which assay methods are appropriate for patients with hemoglobinopathies.
- **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.

References:

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 must 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>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid-acting (Aspart - Lispro)</td>
<td>5–15 min</td>
<td>30–90 min</td>
<td>&lt; 5 hours</td>
</tr>
<tr>
<td>Short-acting (Regular)</td>
<td>30–60 min</td>
<td>2–3 hours</td>
<td>5–8 hours</td>
</tr>
<tr>
<td>Intermediate (basal - NPH)</td>
<td>2–4 hours</td>
<td>4–10 hours</td>
<td>10–16 hours</td>
</tr>
<tr>
<td>Long-acting (basal - Glargine)</td>
<td>2–4 hours</td>
<td>No peak</td>
<td>20–24 hours</td>
</tr>
<tr>
<td>Premixed (70% NPH+30% regular)</td>
<td>30–60 min</td>
<td>Dual</td>
<td>10–16 hours</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 types</td>
<td>NPH - Glargine</td>
<td>NPH+Regular</td>
<td>Glargine+Rapid</td>
<td></td>
</tr>
</tbody>
</table>

- Preferably begin with human NPH insulin, taken at bedtime or twice daily according to need.
- Consider, as an alternative, using insulin glargine for:
  - Persons who experience significant nocturnal hypoglycemia, while using NPH insulin.
  - Persons who require assistance from a carer or health care professional to administer their insulin injections.
  - Persons whose lifestyle is significantly restricted by recurrent symptomatic hypoglycemic episodes.
  - Persons who would otherwise need once daily basal insulin injections in combination with oral glucose-lowering medications.

Is the PHC setting ready for insulin therapy?

When starting insulin therapy, use a structured Program 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:

Insulin Therapy: General Algorithm

Is PHC setting ready for Insulin therapy?

Yes → Refer

No → Educate

Is patient Fit and Ready for Insulin therapy?

Yes → Measure blood sugar (FBS+ Pre-Lunch + Pre-Supper + Bedtime) For 3 days in a week

No → Refer

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 → Continue monitoring FBS, average blood sugar & A1C every 1-3 months

No → Refer

Consider transition to a different regimen
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, especially 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. The following table guides this task.

<table>
<thead>
<tr>
<th>Meal</th>
<th>Pre-meal Blood Sugar</th>
<th>bolus dose in current meal</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</td>
<td>Basal insulin</td>
</tr>
<tr>
<td>Lunch</td>
<td>90-130 mg/dL (5-7.2 mmol/L)</td>
<td>no change</td>
<td>Bolus insulin @ Breakfast</td>
</tr>
<tr>
<td>Supper</td>
<td>&gt; 130 mg/dL (7.2 mmol/L)</td>
<td>+ 2 iu</td>
<td>Bolus insulin @ Lunch</td>
</tr>
</tbody>
</table>

**References:**

Insulin Therapy: Suggested Regimen

- ↑ A1C ≥ 7.5%.
- ↑ Av. FBS > 130 mg/dL (7.2 mmol/L).
- Near-max oral hypoglycemic meds.
- No Hypoglycemic S+S.
- PHC is ready for Insulin Rx.
- Patient is ready for Insulin Rx.

Start Basal Insulin:
- Bedtime NPH 5-10 iu or 0.1-0.2 iu/kg.
- Continue oral medication.

Titrated insulin dose weekly (2 iu increments) till Av. FBS < 130 (7.2 mmol/L)

- 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/L)

Av FBS 80 - 130 (4.5 - 7.2 mmol/L)

No

Noct. Hypoglycemia? Yes
- Consider:
  - Change to Insulin glargine
  - ↓ sulphonylurea dose

A1C > 7.5% 

Av FBS > 130 (7.2 mmol/L)

Av FBS 80 - 130 (4.5 - 7.2 mmol/L)

No

Pre-Lunch BS > 130? (7.2 mmol/L) Yes
- Add 2-4 iu RI pre-breakfast.
- Titrate weekly till BS < 130 (7.2 mmol/L)
- Reassess BS, A1C, S+S.

Pre-Supper BS > 130? (7.2 mmol/L) Yes
- Add 2-4 iu NPH pre-breakfast or RI pre-lunch.
- Titrate weekly till BS < 130 (7.2 mmol/L)
- Reassess BS, A1C, S+S.

Bedtime BS > 130? (7.2 mmol/L) Yes
- Add 2-4 iu RI pre-supper.
- Titrate weekly till BS < 130 (7.2 mmol/L)
- Reassess BS, A1C, S+S.

Av FBS: Average FBS - RI: Regular Insulin

Monitor monthly and afford open support
Lipid Control & Statin Therapy

Assess CV Risk

High CV Risk?

Yes

LDL goal met for individual’s CV risk?

Yes

Intensify Lifestyle plan
Optimize drug Rx
Consider referral: After 1 yr. of Rx
If Genetic cause is suspected

No

LDL goal met for individual’s CV risk?

No

Lifestyle changes
Review LDL every 8±4 weeks
Consider drug Rx after 3-6 months

Start Statin
Continue Lifestyle plan

Review in 8±4 weeks:
LDL
LFT
Lifestyle plan
Side effects

No

Yes

Review every 6-12 months:
LDL
LFT
Lifestyle plan
Side effects

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) Fenofobrate (200 mg od)</td>
</tr>
</tbody>
</table>
| Physiologic outcomes | LDL reduction: ↓ 20-50%  
                           HDL increase: ↑ 5-15%  
                           Triglycerides decrease: ↓ 10-30% | LDL reduction: ↓ 10-15%  
                                                                            HDL increase: ↑ 10-15%  
                                                                            Triglycerides decrease: ↓ 20-50% |
| Indications         | Lower LDL cholesterol in patients with:  
                           CHD, multiple risk factors, or very high LDL | TG > 400 mg/dl (5 mmol/L) |
| Contraindications   | Absolute:  
                           Active or chronic liver disease  
                           Concomitant use fibric acid derivatives, pregnancy  
                           Relative:  
                           Pregnancy  
                           Severe Liver or Renal disease, cholelithiasis |
| Common Side Effects | Mild GI complaints,  
                           Not common: Myopathy  
                           Rare: Hepatotoxicity  
                           Mild GI complaints,  
                           Not common: Gallstones  
                           Rare: Hepatotoxicity |
| Liver enzyme monitoring | 0, 3, 6 months, then q 6 month | 0, 3, 6 months, then annually |
| CPK monitoring      | Complaints of muscle aches/pains/cramps | Complaints of muscle aches/pains/cramps |

### Notes on the use of Statins:
1. The clinical benefit is largely independent of the type of statin used, but depends on the extent of LDL lowering.
2. Calculate the percentage reduction of LDL-C required to achieve the set goal. Choose a statin that, on average, can provide this reduction.
3. The response to statin treatment is variable, up-titration to reach the target is mandatory.
4. A 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 Considerations:
   - **DO**
     - Check baseline renal function and TSH prior to initiating statin therapy.
     - Check ALT and AST levels prior to prescribing a statin and prior to any planned increase in statin dose.
     - Consider the potential for drug-drug interactions when prescribing statins. Vitamin E intake may reduce the benefit of statins.
     - Counsel patients to discontinue statin therapy during a short course of a macrolide antibiotic (erythromycin, azithromycin, and clarithromycin).
     - Be alert for patient characteristics that may increase the risk for myopathy during statin therapy, such as advanced age, renal or liver impairment, diabetes with evidence of hepatic fatty changes, hypothyroidism, surgery, trauma, ischemia-reperfusion, debilitated status, and heavy exercise.
     - Provide patient education regarding recognition and reporting of symptoms of myopathy during statin therapy.
     - Consider referral for patients requiring combination lipid-lowering therapy.
   - **DON’T**
     - Prescribe high-dose statin for elderly patients and patients with renal insufficiency, or in combination with fibrates.
     - Do not exceed 20 mg simvastatin daily with amlodipine.

### References
Aspirin Therapy

- Aspirin (ASA) reduces the risk of cardiovascular events 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:
- Very High CV Risk:
  - Commence low-dose ASA (75-150 mg).
- High CV Risk:
  - Commence low-dose ASA (75-150 mg) unless contraindicated. Low-dose ASA is as effective as higher daily doses and may be associated with fewer side effects.
- Low-Medium CV Risk:
  - The risk of a significant adverse effect (bleeding) outweighs the benefits of ASA for the prevention of CVD.

ASA Contraindications:
- ASA allergy:
  - Patients with documented ASA allergy may consider clopidogrel (75mg/day) as an alternative.
- ASA intolerance.
- Uncontrolled blood Pressure.
- Active peptic ulceration.
- 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:
Acute Coronary Syndrome in Primary Care

**Acute Chest Syndrome Approach in PHC**

**Suspected ACS**
- Chest Pain in the last 72 hours but now Pain Free
- Chest Pain current Or Develops further chest pain after recent ACS
- Chest Pain resolved, but signs of complications, such as pulmonary edema

- **Stabilize the patient.**
- **IV Access**
- **Do not delay transfer to hospital.**
- **Manage pain with GTN and/or Opioid.**
- **Give a single dose of 324 mg aspirin unless the person is allergic (4x81mg)**
- **Check O₂ saturation and administer O₂ if appropriate (>94% in non-COPD; 88-92% in COPD)**
- **Monitor Pain ± other Sx, Pulse, BP, O₂, ECG.**

**START HERE**

- **12-lead ECG**
  - **Normal**
    - Refer to Cardiology Clinic Today
  - **Abnormal or NA**
    - Refer to Emergency NOW

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

- Pain in the chest and/or other areas (for example, the arms, back or jaw) lasting longer than 15 minutes.
- Chest pain associated with nausea and vomiting, marked sweating, breathlessness, or particularly a combination of these.
- Chest pain associated with haemo dynamic instability.
- New onset chest pain, or abrupt deterioration in previously stable angina, with recurrent chest pain occurring frequently and with little or no exertion, and with episodes often lasting longer than 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 two of the three 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**

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); and
  - Persons who have immunosuppression.
- Annual vaccination is recommended for all health-care personnel.

Pneumococcal vaccine:
- Vaccinate all previously unvaccinated adults aged 65 years.
- Vaccinate all adults who smoke cigarettes, have chronic CVD (e.g., congestive heart failure, cardiomyopathy), chronic pulmonary disease (e.g., COPD, emphysema, adults with asthma), diabetes mellitus, chronic renal failure or sickle cell disease.
- Revaccinate after 5 years, any person above 65 years and at high risk of serious pneumococcal disease.

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 of diabetes, particularly cardiovascular disease 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 two years. Consequently, it is wise to have mammograms done for all of the eligible population, and diabetic ladies in particular.

References:
Non-pharmacological Management
Lifestyle Management

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Lifestyle Management

تقييم وتصحيح النمط المعيشي
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لifestyle Change

etzt نمط العيش (الحياة)

ماذا يعني تصحيح نمط العيش?

تعتبر المريض أن يفهم المرض، ويتعرف كيف يتعامل معه، ويعرف كيف يتحكم فيه. ويهدف إلى العمل سويًّا مع المريض، بشكل نشط، من أجل تصحيح سلوكه في عدة جوانب، وهي:

1. التغذية:

- تبني نظام داش DASH.
- وجبة غذائية غنية بالخضروات والفواكه.
- منتجات الألبان قليلة الدسم.
- تقليل الدهون المشبعة والدهون بشكل عام.
- إيقاف تناول الوجبات بالليل.
- تقليل وتوزيع استهلاك السعرات الحرارية (ع绿水青山).

2. النشاط البدني:

- القيام بنشاط حركي لمدة 30 دقيقة في اليوم.

3. إنقاص الوزن:

- وذلك من خلال:
  1. المحافظة على مؤشر الكتلة أقل من 25.
  2. تقليل الوزن الحالي بمرور 10% خلال 12 شهراً، من خلال تقليل السعرات الحرارية وزيادة الحركة، إضافة إلى الرعاية الذاتية.
  3. تجاوز المريض من إتباع برامج غذائية خاصة بتخفيف الوزن ومنطقة بالنمط الغذائي.

4. التدخين:

- الامتناع عن التدخين.

5. الكحول:

- الامتناع عن الكحول.

فوائد تصحيح نمط العيش الجيد على منصات أمراض القلب والشرايين:

1. تحسين مستوى الضغط الإبراطي والانقباضي.
2. تحسين مستوى السكر والدهون في الدم.
3. يقلل من خطر الإصابة بالسكتة القلبية والجلطات.
## Dietary Assessment Questionnaire

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<td>7 أتناول من النحوم أكثر من 2 حصة يوميا</td>
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<td>9 أفضل الوجبات السريعة في المناسبات الاجتماعية أتشجع على الأكل أكثر</td>
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<td>10 عند شعوري بالتوتر أقبل أكثر على الطعام</td>
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<td>13 لا أرغب في تناول الأطعمة المقلية</td>
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<td>14 أتناول القهوة بعد كل وجبة</td>
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<td>15 أهتم الوجبات الرئيسية الثلاث</td>
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### مجموع النقاط

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### القياس

**النتيجة:**

- $\leq 35$ نقطة: نمط غذائي جيد، يشجع في الاستمرار عليه.
- $36-44$ نقطة: نمط غذائي مقبول، توجد فرصة لتصحيحه للأفضل.
- $\geq 45$ نقطة: نمط غذائي سيئ، يحتاج إلى تصحيح.

### كيفية استخدام الاستبانة:

1. يتم التقييم خلال شهر من تشخيص الحاله.
2. يحفظ في ملف خاص لدى ممرضة الرعاية المزمنة مرتب حسب رقم المريض.
3. تلتقي الاستبانة بعد مرور سنة من استخدامها.
4. يتم جمع النقاط بالقيم التالية: أوافق بشدة = 4، أوافق = 3، لا أوافق = 2، لا أوافق بشدة = 1.

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## استبانة تقييم النشاط الحركي

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<tr>
<th>السؤال</th>
<th>م</th>
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</thead>
<tbody>
<tr>
<td>لا أبدًا رأي تحركي بشدّة في التنفس عند صعود الدرج.</td>
<td>1</td>
</tr>
<tr>
<td>مهمة جداً رأي تحركي بشدّة في التمارين الرياضية في حياة الإنسان.</td>
<td>2</td>
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<tr>
<td>لا أبدًا رأي تحركي بشدّة في استخدام التلفزيون أو الكمبيوتر.</td>
<td>3</td>
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<tr>
<td>في قليل من الأوقات.</td>
<td>4</td>
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<tr>
<td>نسبة مئوية من الوقت في ممارسة الرياضة المذكورة.</td>
<td>5</td>
</tr>
<tr>
<td>مرة واحدة في الأسبوع.</td>
<td>6</td>
</tr>
</tbody>
</table>

**النتيجة:**

- 1/11 لا أوافق بشدة
- 2/11-17 أوافق
- 3/11 يوافق بشدة

**النقطة المجموعية:**

<table>
<thead>
<tr>
<th>السؤال</th>
<th>رقم الملف العائلي</th>
<th>رقم الملف الفردي</th>
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</thead>
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**تقييم الاستبانة:**

- 4. يتم التقييم خلال شهر من تشخيص الحالة.
- 5. يتم التقييم خلال شهر من تشخيص الحالة.
- 6. تتم الاستبانة بعد مرور سنة من استخدامها.
- 7. يتم جمع النقاط بالقيم التالية: أوافق بشدة = 1, أوافق = 2, لا أوافق = 3, لا أوافق بشدة = 4.

الممرضة/الطبيب: ___________________________ بتاريخ ___________________________
## تقديم التدخين

<table>
<thead>
<tr>
<th>السؤال</th>
<th>قيمة 1</th>
<th>قيمة 2</th>
<th>قيمة 3</th>
<th>قيمة 4</th>
<th>م</th>
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</thead>
<tbody>
<tr>
<td>1. أنا أعتقد أن التدخين خطر جداً.</td>
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<td>2. إذا أردت إبنك أو ابنتك التدخين فهذا لا مشكلة؟</td>
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<td>3. أعتقد أن التدخين غير صحي وليس غير سيئ.</td>
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<td>4. إذا كان هناك قانون يمنع التدخين في الدولة، فما هو موقفك؟</td>
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<td>5. أنت تعتبر أن مخاطرة التدخين مضر؟</td>
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### مجموع النقاط

#### هل لديك رغبة في التوقف عن التدخين؟

| نوعاً ما | لا | نعمًا ما | لا | لا
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#### النتيجة:

- 28-31: لا اوافق بشدة
- 20-21: اوافق
- 16-17: اوافق بشدة
- 16: اوافق
- 11: اوافق
- 10-15: اوافق
- 9-8: اوافق

#### كيفية استخدام الاستدبي:

1. يتم التقييم خلال شهر من تشخيص الحالة.
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الرعاية الذاتية

الرعاية الذاتية تتضمن تعليم المريض فهم المرض المزمن وكيفية التصرف والتحكم فيه.

الأهداف:

1. تدريب المريض على استخدام مهاراته الذاتية (مثل: قياس سكر الدم في البيت وفحص القدم) وتطويرها للعناية بنفسه.
2. مساعدة المريض على التأقلم مع الصعوبات والتحديات التي تواجهه.
3. تقليل المضاعفات والأعراض المصاحبة.

كيف يتم تعليم المريض على الرعاية الذاتية:

1. بناء العلاقة بين مقدم الخدمة والمريض.
2. تقييم رغبات الشخص ( مدى قابلية الشخص للتغيير من عدمه).
3. شرح العادات الصحية المرغوبة، والغير مرغوب فيها، وأثرها على الصحة العامة.
4. وضع خطة للتنفيذ وتنفيذها (ولا تغفل مشاركة المريض في الخطة الموضوعة ومناقشة توجهاته).
5. متابعة المريض أثناء تنفيذ الخطة: إن التذكير والتشجيع من قبل أعضاء الفريق يساهمان في تحقيق أهداف العلاج والتحكم في المرض.
6. توقيع الخطة وتطوراتها: يساهم التوثيق الجيد في تسهيل المتابعة وتذكير المريض بها. ويمكن استخدام بطاقات الرعاية الذاتية لهذا الغرض.

أدوات مساعدة في الرعاية الذاتية:

- نظام داش لتصحيح النمط الغذائي.
- أنواع الرياضة.
- مذكرة غذائية (ماذا يوجد في طبقك؟).
- الهرم الغذائي.
- صحن الغذاء.
- معلومات خاصة بالملح.
- أعراض قصور القلب والدماغ.
- العناية بالقدمين.
- كيف تختر الحذاء والجوارب المناسبة؟
بطاقة الرعاية الذاتية

الفائدة:

1. رفع ويعض مرضي احتمالات مراجعم مشكلته الصحية.
2. تساهم في ذكر المريض بأهداف العلاج، وتسهيل متابعة ذلك.

المعنيون بالبطاقة:

1. ممرضة الرعاية المتممة.
2. المريض: يأخذها معه للذكاء (فته أنك الذين لديهم م鹀ات مماثلة، سواء في حضور المواعيد أو تصحح أخطائهم، أو الالتزام بالدواء، أو الوصول إلى مستويات تحميل مقبولة.

كيفية التسجيل:

1. بعدا في كل زيارة، تمت فيها مراجعة وضع المريض، ورعايته مشكلته الصحية.
2. الوضع الحالي:

أ. يُدون مستوى الرعاية الذاتي التي يساهم بها المريض في علاج مشكلته الصحية، حيث الرقم 1 يشير إلى أداء ضعيف في الالتزام بالمؤثر

ب. توضع دائرة حول الرقم المُنذر على الوضع الحالي، لكل مؤثر سلبي.

ج. في الزيارة المقبلة: توضع دائرة أخرى حول الرقم المُنذر على الوضع الحالي. إذا كان نفس الوضع السابق، توضع الدائرة حول الدائرة السابقة.

3. الهدف المتبقي على الوصول إليه في الزيارة المقبلة.

وكتبة في المرجح الذي يعكس وضع المريض الحالي.

4. جدول بالأدوية المستخدمة حاليًا وجرعاتها وأهدافها، وكذلك آثارها الجانبية المحتملة.

5. جدول بالأدوية التي ينبغي قياسها دوريًا، والهدف الأمثل المطلوب.

6. جدول المواعيد ومدى الالتزام المريض بها.

7. تدون جميع البيانات ذات العلاقة في نافذة CMR-S و CMR-3 و تسجيل العادة.

المواضيع.
Self-Management Card:
Important Steps to Lower Cardiovascular Risk
Extra Tools
How to introduce CMR program for the attendees?

Program CMR special for the early detection of risk factors for heart and vascular diseases, such as high blood pressure, fats, diabetes, and obesity.

This program includes a detailed description of the program I talked about. Watch this program to evaluate the health status of your heart, especially in your overall health. This program contains useful information for you.

If you permit, leave your phone number and I will contact you to arrange a suitable time for you to open a special assessment window for you, if you wish.

How to introduce CMR program on phone?

Salam Alaykom and peace...

How are you? I hope you are well...

With you Asia Mohamed from the Health Center of Almala.

Dear Ahmad, remember that you did blood tests in our center two days ago. One of the tests you did was for fats. Your fat level was slightly high, and if left unchecked, this high fat level could lead to heart problems in the long term.

However, this situation can be controlled by doing a comprehensive assessment. We have a special program for people with high fat levels. If you want to perform this assessment, you will have an appointment with a chronic care nurse on the coming Sunday.

How to deliver quick lifestyle advice?

- **After blood pressure measurement:**

  Pressure is normal, try to keep it in this range (70/110 mm Hg - 90/130 mm Hg) is normal, but slightly high. Try to reduce the salt in your diet (avoid processed foods, for example).

  Pressure is high, try to keep it in this range (120/80 mm Hg) and try to reduce the salt in your diet (in Germany, for example).

- **After weight measurement:**

  Your weight is 58 kg, your height is 175 cm, and your body mass index is 23.5 kg/m². This is normal, but slightly high. It is recommended to reduce your weight (if you are high) until it reaches a healthy level. Reduce your daily calorie intake from fats and sugars (more exercise - more vegetables).

  Your weight is 85 kg, your height is 160 cm, and your body mass index is 25 kg/m². You have a slightly high body mass index. It is recommended to reduce your daily calorie intake from fats and sugars (more exercise - more vegetables).

- **After high blood sugar measurement:**

  Your blood sugar is 78 mg/dL, which is within the normal range. It is recommended to reduce your daily calorie intake from fats and sugars (more exercise - more vegetables).

  Your blood sugar is 102 mg/dL, which is high. It is recommended to reduce your daily calorie intake from fats and sugars (more exercise - more vegetables).

Other Quick Life Style Advices:

1. Avoid eating foods with high salt content.
2. Control your weight loss.
3. Reduce the amount of salt in your diet.
4. Avoid fried foods and highly processed foods.
5. Increase the amount of exercise and vegetables.
6. Reduce the consumption of sugar, especially sweets.
7. Drink plenty of water.
8. Control your blood pressure, but also control your diet and other lifestyle changes to reduce the risk of heart disease.
## Standards for BP Measurement

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<th>Task</th>
<th>Rationale</th>
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| **Selecting Equipment** | • Use mercury manometer or a recently calibrated aneroid manometer with the center of the mercury column or aneroid dial at eye level.  
• 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.  
• Use the bell of the stethoscope. Ideally the bell should be placed above the medial epicondyle and medial to the biceps tendon (brachial artery).  
• If the meniscus of the Hg or aneroid gauge is not level with your vision, a reading may be read higher or lower.  
• A too small cuff will give falsely high readings. A too large cuff may give a false low reading but with less clinical significance.  
• The stethoscope bell is designed to listen to low-pitched sounds.  
• The early and late BP sounds are low-pitched. |
| **Preparing The Patient** | • The patient should avoid eating, smoking, caffeine, exercise, and drinking alcohol ½-1 hour before BP measurement.  
• Have the patient sit quietly for a period at rest with both feet flat on the floor and back supported prior to measurement.  
• No clothing should be between the BP cuff and the arm.  
• The patient’s arm should be supported or allowed to rest on a solid surface so the inner aspect of the bend of the elbow is level with the heart.  
• Readings will vary after exercise, eating, smoking, drinking alcohol or having caffeine (e.g. differences of 5-15 mm Hg with cup of coffee or cola within 15 minutes).  
• Any change in posture or activity causes BP to change.  
• Extra noise from the bell of the stethoscope rubbing against clothing could cause a false BP reading.  
• The difference between lower and higher positions of the arm can cause differences in measurements of as much as 10 mm Hg systolic and diastolic. If the patient’s arm is tense, measurement can vary by up to 15 mm Hg (systolic more than diastolic.) |
| **Taking An Initial Measurement** | • Secure the BP cuff evenly and snugly around the arm, 2-4 cm above the antecubital space (at the elbow). Center the bladder (inflatable bag) over the brachial artery.  
• While inflating the bladder, palpate radial pulse to estimate systolic BP.  
• Inflate the cuff quickly to 30 mm Hg above the palpatory BP.  
• Deflate bladder at 2-3 mm Hg per second.  
• Record the first of at least two consecutive sounds as the systolic.  
• Diastolic is identified by the last sound heard.  
• Helpful hint: If the tones are difficult to hear, elevate arm while clenching and relaxing the fist, for 15 seconds to drain the veins. Then lower arm and repeat auscultation.  
• A loose BP cuff results in a falsely higher level of systolic and diastolic BP.  
• Failure to center the cuff can result in a falsely high reading.  
• An auscultatory gap (absence of sound for 20-40 mm Hg) occurs in 5% of hypertensives. Palpatory BP will help to avoid incorrectly recording the systolic below the gap.  
• Inflating the cuff too high can cause pain and result in a falsely high reading.  
• If the pressure is released too quickly, you could record the systolic BP falsely low as the first systolic tap is missed and the diastolic falsely high. If you deflate too slowly, you could record the diastolic falsely high.  
• The last sound heard is easier than muffling for observers to accurately record. In some patients, for example, children or pregnant women, sounds are heard to near 0. In these cases, record both muffling and 0, e.g. 150/80/0. The muffling value is then considered the diastolic pressure. |
| **Confirming Initial Elevation** | • If BP is elevated and the patient had initially waited quietly for five minutes, repeat BP in 1-2 minutes.  
• Record both measurements.  
• If BP is elevated but the patient had not initially waited quietly for five minutes, now allow for a five-minute rest. Re-measure BP and record it as the first reading.  
• If this BP is still elevated, repeat the measurement in 1-2 minutes, record it as the second measurement.  
• Because BP normally varies up to 10 mm Hg it is necessary to take two readings to obtain the most accurate present BP. The 2 readings must be < 10 mmHg variant, otherwise repeat till you obtain 2 successive readings < 10 mmHg variant.  
• A time interval of 1-2 minutes between cuff inflations is necessary to reduce forearm engorgement. |

Adapted from ICSI 2005 Park Nicollet Health Services.
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 days and nights over several days.
- No alarm reaction to BP measurement.
- Good reproducibility.
- Good prognostic value.
- Relatively low cost.
- Patient-friendly.
- Involvement of patient in management.
- Availability of digital storage, printouts, PC downloads, and tele-transmission of BP values.
- Improvement of patients’ compliance.
- Improvement of BP control rates.

How often should measurements be taken?
- 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 http://www.dableducational.org.
- Auscultatory devices are not recommended.

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 mm Hg for asleep average and 130/80 mm Hg for 24-hour average blood pressure.

Indications of ABPM
- Suspected white-coat HTN (WCH).
- Suspected nocturnal HTN.
- Resistant hypertension.
- Elderly patient.
- Hypertension of pregnancy.
- Evaluation of hypotension.
- Autonomic failure.

Clinical Indications
- Suspected white-coat HTN (WCH).
- Suspected nocturnal HTN.
- Resistant hypertension.
- Elderly patient.
- Hypertension of pregnancy.
- Evaluation of hypotension.
- Autonomic failure.

References:
Chapter 7  Extra Tools

Home Blood Pressure & Sugar Log Diary

- Use these diaries (self-management tools) to monitor home blood pressure and sugar, for 3 weeks.

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
كيف تصف الحركة؟

الخطوات الواجب إتباعها في النشاط الحركي:

1. استخدام الملابس القطنية الخفيفة عند ممارسة التمارين الرياضية لكي لا ترتفع درجة حرارة الجسم.
2. عمل تمارين إحماء (مثل مجموعة أورار القفص) قبل ممارسة الرياضة لتفعيل الدورة الدموية وتقليل خطر التعب.
3. عمل تمارين الاستطالة (مثل مط أوتار العقب) قبل ممارسة الرياضة لتفعيل العضلات، وإزالة التقلصات، وتفاديها. ومارس لمدة 10 دقائق.
4. امسك نفس النفس لمدة 60 ثانية ثم امسك نفس النفس لثانية ثم امسك نفس النفس.
5. امسك نفس النفس لثانية ثم امسك نفس النفس.
6. امسك نفس النفس لثانية ثم امسك نفس النفس.
7. امسك نفس النفس لثانية ثم امسك نفس النفس.
8. امسك نفس النفس لثانية ثم امسك نفس النفس.
9. امسك نفس النفس لثانية ثم امسك نفس النفس.
10. امسك نفس النفس لثانية.

الحالة المثلى للقلب للسما بالODY بعد أن يستخدم للممارسة الرياضية لعدة أشهر:

الجايدة الأقصى لنبضات القلب = 220 - العمر

مثال: شخص عمره 40 سنة، يحتاج للوصول إلى 80% من الحد الأقصى لنبضات قلبه (يساوي 220 - 40 = 180 نبضة في الدقيقة).

عند تقديم الاستشارة في الرياضة يؤخذ في الاعتبار حالات القلب التالية، والتي تحتاج إلى استشارة متخصصة:

• فشل في وظائف البطين الأيسر من القلب.
• ضيق في الصدر.
• عدم انتظام في ضربات البطين.
• مرض شخص حديثا بإعتلال في عضلة القلب لفترة أقل من 6 أسابيع.
• ضيق في الشريان التاجي.

لذا ننصح ذوي الحالات السابقة بإتباع الآتي:

• الإكثار من التمارين الهوائية (الاسترخاء).
• التدرج في مستوى الجهد الرياضي خلال ممارسة النشاط البدني.
• الامتناع عن رياضة حمل الإثقال.
• البدء بتقليل النشاط إذا شعر البدن بالتعب أو الاجتهاد.
• التوقف عن التمارين الرياضية إذا شعر البدن بألم في الصدر أو غثيان.
• استشارة الطبيب في حالة ظهور أعراض مثل ضيق النفس، دوخة، أو دعابة جدية تزول بالراحة.
### Levels of Exercise

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lowest Level</strong></td>
<td>Physical activity (3–4 km/hour)</td>
</tr>
<tr>
<td></td>
<td>Cycling for leisure (5 km/hour)</td>
</tr>
<tr>
<td></td>
<td>Walking for fitness (12 km/hour)</td>
</tr>
<tr>
<td></td>
<td>Walking at a moderate pace (5 km/hour)</td>
</tr>
<tr>
<td></td>
<td>Home-based activities - such as housework and hobbies</td>
</tr>
<tr>
<td></td>
<td>Sports activities (such as badminton, tennis)</td>
</tr>
<tr>
<td></td>
<td>Aerobic exercise (moderate intensity, interval training)</td>
</tr>
</tbody>
</table>

**Middle Level**

- Jogging for leisure (10 km/hour) or more |
- Cycling at a comfortable pace (16–20 km/hour) |
- Walking with a fitness buddy or on a treadmill |
- Swimming at a moderate pace |
- Physical activities at home |
- Performing sports activities (such as soccer, squash) |
- Participating in regular sports games |

**Highest Level**

- Jogging at high intensity (15 km/hour) or more |
- Cycling at a high intensity (30 km/hour) or more |
- Participating in triathlons or marathons |
- Participating in high-intensity sports activities |
- Engaging in competitive sports activities |
- Participating in extreme sports activities |

**Note:** Exercise at your own pace, consult a professional before starting any exercise regime.
DASH Dietary Recipe

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

<table>
<thead>
<tr>
<th>5% of Calories</th>
<th>10% of Calories</th>
<th>20% of Calories</th>
<th>30% of Calories</th>
<th>40% of Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and vegetables</td>
<td>Grains</td>
<td>Fat-free or low-fat milk and milk products</td>
<td>Protein-rich foods</td>
<td>Saturated fats</td>
</tr>
</tbody>
</table>

**Grains**: Include whole grains, such as whole wheat bread, brown rice, and oatmeal.

**Fruits and vegetables**: Include a variety of fruits and vegetables every day.

**Protein-rich foods**: Include lean meats, poultry, fish, beans, and legumes.

**Saturated fats**: Limit intake of saturated fats from foods such as red meat, full-fat dairy products, and high-fat processed foods.
Diet Diary

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Chapter 8

Patients’ Educational Tools & Pamphlets
Cardiovascular Diseases Prevention Program

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Read the Dietary Card while shopping

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

### Dietary Card

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serving Size</strong></td>
</tr>
<tr>
<td><strong>Calories</strong></td>
</tr>
<tr>
<td><strong>Total Fat</strong></td>
</tr>
<tr>
<td><strong>Saturated Fat</strong></td>
</tr>
<tr>
<td><strong>Cholesterol</strong></td>
</tr>
<tr>
<td><strong>Sodium</strong></td>
</tr>
<tr>
<td><strong>Total Carbohydrate</strong></td>
</tr>
<tr>
<td><strong>Dietary Fiber</strong></td>
</tr>
</tbody>
</table>

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Salt in Your Diet

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Diet Pyramid & Plate

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
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 أي وقت سابق بألم أو عدم ارتباة، أو ضغط أو تقل تدفق الدم؟
- عادة أجاب بال钇 الأسئلة 6: وان أجاب بالنعم تابع:  

هل قلقت من الجبهة المبطولة عندما شعرت بالألم خلال المشي؟
- عدد الأسئلة 6: وان أجاب بالنعم تابع:  

هل زال الألم عندما وقعتت عن المشي، (عندما تناولت حبة تحت اللسان)؟
- عدد الأسئلة 6: وان أجاب بالنعم تابع:  

هل زال الألم في غضون 10 دقائق؟
- عدد الأسئلة 6: وان أجاب بالنعم تابع:  

هل شعرت في وقت سابق بالصدأ شديد في الصدر استمر نصف ساعة أو مايبدو على ذلك؟
- عدد الأسئلة 6: وان أجاب بالنعم تابع:  

ب. قصور تروية الدماغ:

هل شعرت في وقت سابق بأي من الأعراض التالية:
- صعوبة في التنفس
- ضعف بأحد ذراعيك أو ساقيك
- تقل في أحد أجزاء جسدك؟
- عدد الأسئلة 6: وان أجاب بالنعم تابع:  

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Foot Care for Diabetic Patients

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
How to choose Your Shoes & Socks

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Change Your LifeStyle: Diet & Weight

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

### Arabic Translation
غير أسلوب عيشك وحياتك: راقب وزنك وأكلك

<table>
<thead>
<tr>
<th>تجربة النشاط البدني</th>
<th>بدأنا أو زياد الوزن</th>
</tr>
</thead>
<tbody>
<tr>
<td>تناول الخضروات والفاكهة الطازجة</td>
<td>تناول الخضروات والفاكهة الطازجة بالتفصيل</td>
</tr>
<tr>
<td>تشترط لحية أو الحليب قبل الوجبة أو اللحن قبل الوجبة أو الوريد</td>
<td>تضفي ملح أثناء الأكل</td>
</tr>
<tr>
<td>تبدأ الملح أثناء السفرة</td>
<td>تبدأ الحسيب والألوستر والحلوى</td>
</tr>
<tr>
<td>تستخدم منها بديلًا لتناول اللحوم أو الدهون</td>
<td>تستخدم منها بديلًا لتناول اللحوم أو الدهون</td>
</tr>
<tr>
<td>تتناول الخضروات والفاكهة الطازجة بشكل مباشر</td>
<td>تتناول الخضروات والفاكهة الطازجة بشكل مباشر</td>
</tr>
<tr>
<td>تتناول اللحم إلى الحد الأدنى أو أقربه</td>
<td>تتناول اللحم إلى الحد الأدنى أو أقربه</td>
</tr>
<tr>
<td>استهلاك بروتينات الدهون والبروتينات</td>
<td>استهلاك بروتينات الدهون والبروتينات</td>
</tr>
<tr>
<td>تناول الأطعمة البروتينية بكميات صغيرة</td>
<td>تناول الأطعمة البروتينية بكميات صغيرة</td>
</tr>
<tr>
<td>تناول الأطعمة الممطرة بكميات صغيرة</td>
<td>تناول الأطعمة الممطرة بكميات صغيرة</td>
</tr>
<tr>
<td>تناول الأطعمة السريعة بكميات صغيرة</td>
<td>تناول الأطعمة السريعة بكميات صغيرة</td>
</tr>
<tr>
<td>تتناول الوجبات الخاصة بكميات صغيرة</td>
<td>تتناول الوجبات الخاصة بكميات صغيرة</td>
</tr>
<tr>
<td>تناول الوجبات الخاصة بكميات صغيرة</td>
<td>تناول الوجبات الخاصة بكميات صغيرة</td>
</tr>
</tbody>
</table>

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Change Your LifeStyle: Be Active

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Few Tips to Loose Weight

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

Note: You may download a soft copy, or order hard copies of this brochure from www.ketoshealth.
Information & Quality Management
Quality Measures

The purpose of these guidelines is to control CMR. However, producing guidelines alone is insufficient to address this goal. There must be a continuous process of implementation involving education and audit, including a number of quality measures to be used nationally and worldwide. For this purpose, a dedicated team has been assigned to this task. The team has paid many efforts to review and appraise the commonly used measures. As a result, the following measures have been selected. Selection has been 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), as agreed by the team.
4. Measures are grouped in three categories (short, intermediate or long-term measure).

Measures selected:
([ST, IT and LT stand respectively for short, intermediate and long-term measure])

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

Obese Individuals:
11. Percentage of obese patients who have maintained stable BMI or achieved a reduction in BMI within a 12-month period. ([IT])
12. Percentage of obese patients who self-report they are physically active. ([IT])

Diabetic Individuals:
13. Percentage of patients who have with diabetes mellitus (DM), heart failure, coronary artery disease or renal disease and have BP < 130/80 mm Hg in their last clinic visit. ([IT])
14. Percentage of DM patients with A1c ≤ 7%. ([IT])
15. Percentage of DM patients who have MAU measured once or more. ([ST])
16. Percentage of DM patients with last readings of A1c > 8%, LDL > 130 mg/dl, or BP > 140/90 mm Hg. ([IT])
17. Percentage of DM patients who have had visual foot inspection in the last 3 months. ([ST])
18. Percentage of DM or HTN patients who have had dilated eye exam in the past 1 year. ([IT])
19. Percentage of DM patients who have had A1C measured once or more in the past 1 year. ([IT])
20. Percentage of DM patients with who have had an A1C test in the last year greater than 8%. ([IT])
21. Percentage of DM patients with microalbuminuria or proteinuria who have had ACEI prescribed. ([ST])
22. Percentage of DM patients with hypertension who have ACEI prescribed. ([ST])

Hypertensive Individuals:
23. Percentage of hypertensive patients whose most recent BP recording was ≤140/90. ([IT])
24. Percentage of visits from non-CMR (not diagnosed and labeled to have CMR) patients visits with BP ≥140/90 and with documented plans of care for hypertension. ([ST])

Smoking Individuals:
25. Percentage of Chronic Care tobacco users counseled to quit in last 1 year. ([ST])

ALL CMR Individuals:
26. Percentage of CMR patient with < target LDL. ([IT])
27. Percentage of CMR patients who have LDL measured once or more in the past 1 year. ([IT])
28. Percentage of CMR patients who have eGFR measured once or more in the past 1 year. ([IT])
29. Percentage of high-CV risk patients who were prescribed Aspirin. ([ST])
30. Percentage of high-CV risk patients who were prescribed Statin. ([ST])
31. Percentage of admission to hospital for long and short complication. ([IT])
32. Percentage of CMR complications: ([IT])
   1) Myocardial infarction (MI)
   2) Stroke (CVA)
   3) Cardiovascular events.
   4) Nephropathy
   5) End-stage renal disease.
   6) Sexual Dysfunction
   7) Proliferative or Stage III hypertensive retinopathy
   8) Blindness (DM only)
   9) Lower extremity amputations. (DM only)
33. Percentage of CMR patients who have had a comprehensive foot assessment in the past 1 year. ([IT])
34. Level of satisfaction and QoL in CMR patients. ([IT])
35. Percentage of CMR patients who could not follow up follow up (for > 6 months or missed 3 successive visits.) ([IT])

References:
CMR Patient Recall Algorithm

1. Schedule Appointment & Register
2. Call patient for appointment info
3. Document call in Appt Register
4. Patient attended?
   - Yes: Default/Reschedule Appt
   - No: Call patient for appointment reminder

النظام جدولة مواعيد الرعاية المزمنة

1. جدول الموعد، وسجله في سجل المواعيد
2. اتصل بالإخطار للإبلاغ بالموعد
3. وشك الإتصال في سجل المواعيد
4. هل حضر المرضى؟
   - نعم: دونه في سجل التخلف
   - لا: اتصل بالإخطار للإبلاغ بالموعد
الهدف:
- رصد وتوثيق حالات منذرات أمراض القلب والشرايين المكتشفة يومياً.

الفائدة:
- ربط الحالات المكتشفة لدى العلامات الحيوية والمختبر بمسار الرعاية المزمنة في المركز الصحي.
- خلق قناة اتصال بين الجهة المكتشفة للحالة (ممرضة العلامات الحيوية أو ممرضة المختبر) وجهة تقييم وتتبع حالة (مرضة الرعاية المزمنة). وذلك لفرض تقليل الحالات التي لم تتلقى الرعاية الصحية المناسبة.

المعنيون بتسجيل الحالات في النموذج وقراءتها:
- ممرضة العلامات الحيوية.
- ممرضة المختبر.
- ممرضة الرعاية المزمنة.

كيفية التسجيل:
- توضع علامة (✓) عند اكتشاف أحد عوامل الخطورة من قبل ممرضة العلامات الحيوية أو ممرضة المختبر حسب ما هو مدون في صفحة 18.
- يتم تسليم الاستمارة لممرضة الأمراض المزمنة بشكل دوري (لا يزيد عن أسبوع) لتسكين إجراءات الخدمة كما هو مبين في صفحة 18.
- تستلم ممرضة الأمراض المزمنة تسجيل الحالات في السجل الدائم وتتوثق ذلك في أسفل هذه الاستمارة.
- تحتفظ الإستمارة في ملف خاص (مرتبة حسب التاريخ بحيث يكون التاريخ الأحدث هو الأعلى) للفحص والتوثيق وراجعية الأداء.
- يتم مراجعة صفحة 18 من قبل ممرضة الأمراض المزمنة (المرضع الأزرق) لمعرفة ما يجب عمله للمريض.

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
## السجل اليومي لمرضى أمراض القلب والشرايين

**الغرض:**
حصر ومتابعة زيارات المراجعين لعيادة الأمراض المزمنة ومواعيدها.

**الفائدة:**
1. توثيق ومتابعة مواعيد عيادة، والذكر بها.
2. توثيق زيارات المراجع، بالحالة والذكرب بها.
3. حصر المتخلفين ومتابعتهم وتجديد المواعيد لهم.
4. توثيق عدد الحالات التي يتم تنفيذها.
5. استخراج الإحصائيات:
   a. عدد زوار الدراسة يتزامن بمواعيد.
   b. عدد ونسبة المتسامين والمتخلفين.

من الذي يسجل في السجل؟
ممرض الرعاية المزمنة.

كيف يتم التسجيل فيه؟

**أ - الزيارات بموعد:**
1. دون بيانات المراجع.
2. ضع علامة (√) عند عامل الخطورة المصاب به ودون الموعد القادم.
3. آخر المراجع بالموعد.
   a. باللهجة أو شخصياً، وثق ذلك بعلامة (√) في خانة آخر المراجع.
4. اتصل بالمريض قبل الموعد بيوم ووثب ذلك بعلامة (√).
5. عند حضور الموعد ضع علامة (√) في خانة "حضور الموعد" أو علامة (×) في حال تخلفه.
6. أعطي المراجع موعدًا قادمًا وسجله في خانة الموعد القادم، وكذلك في صفحة يوم الموعد.
7. ضع علامة (√) في خانة التثقيف الصحي إذا أعطي، أو علامة (×) إذا لم يعط

**ب - الزيارات بدون موعد:**
1. دون بيانات المراجع.
2. ضع علامة (√) عند عامل الخطورة المصاب به ودون الموعد القادم.
3. أعطي المراجع موعدًا قادمًا وسجله في صفحة يوم الموعد.
4. ضع علامة (√) في خانة التثقيف الصحي إذا أعطي، أو علامة (×) إذا لم يعط

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
CVS & DM Electronic Management System

Cardiovascular & Diabetes Electronic Management System (CVDEMS) is a quality-improvement software that has been designed to assist providers in collecting information in a database and generating reports, through computer systems.

It was, originally, a freeware developed for organizations participating in chronic disease management programs of the Bureau of Primary Health Care and, HRSA/HHS. The local team, CCCQI, has modified the software and added new features, such as bilingual capability, an appointment system and local statistical reports.

Taking into account the significant role of information management in the management of chronic diseases, the CCCQI highly recommends such a program to be included in the service provided for CMR patients.

CVDEMS uses advanced methods that help in the provision of enhanced care and better management for cardiovascular disease and diabetic patients.

It collects different types of information (input) such as:

1. Demographic information.
2. Health profile, including complications.
3. Referrals and procedures.
4. Lab requests and results.
5. Services provided such as education, medication and vaccination.

The information that is entered into and stored in this system could be used to generate different types of reports (output) such as:

1. Registered summary reports for appointments and defaulters.
2. Statistics for number of cases detected or followed-up in CMR patients.
3. Quality indicators of services and outcome. Many reports could be traced and constructed. Through just a click, the following lists and reports can be traced to detail patients who have:
   - Had A1C done.
   - Had Documented a self-management goal.
   - Taken aspirin or statin.
   - Had smoking status documented.
   - Had BP < 140/90.
   - Had a lipid profile.
   - Had LDL < 130.
   - Had a foot or eye exam.
4. Visit notes (medical report) for latest investigations, treatment and complications.

Note: You may order a copy of this software from www.ketoshealth.
بطاقة متابعة العلاج اللادوائي

الغرض:
- توثيق العلاج اللادوائي لحالات منذرات أمراض القلب والشرايين، ومتابعة ذلك في كل زيارة للمريض إلى عيادة الرعاية المزمنة.

الفائدة:
- تساعد مقدم الخدمة على معرفة ما يجب أن يقدمه للمريض في كل زياره.

المعنيون بالبطاقة:
- ممرضة الرعاية المزمنة.

كيفية التسجيل:
1. يتم تقسيم البطاقة حسب أنماط العيادة وتعود عوامل متغيرة يسعى مقدم الخدمة إلى تصحيحها.
2. في كل عمود، دون تقييم الحالة في الجهة اليمنى، ونوع التثقيف المعطى في الجهة اليسرى من الحقل.
3. ضع علامة (√) على المشكلة الصحية.
4. التقييم:
   1. دون ذلك في الطرف الأيمن من كل خانة.
   2. استخدم الرموز المدونة في أسفل البطاقة.
   3. استعن في تقييم الرعاية الذاتية بإفاده المريض.
   4. استعن في تقييم الهدف المتفق عليه مع المريض في خانة الهدف، لمتابعته في الزيارة المقبلة، علما بأن الهدف المثالي مدون في آخر عمود.
5. التقييم العام:
   1. دون ذلك من واقع بطاقة التقييم السنوي.
   2. دون الهدف المتفق عليه مع المريض في حالة الهدف، وتجبيته في الزيارة اللاحقة، علما بأن الهدف المثالي مدون في آخر عمود.
   3. تكرر متابعة العلاج اللادوائي كلما دعت الحاجة وبحد أدنى مرتين سنوياً، وذلك عند استقرار الحالة.
6. يُنصح وضع المريض والتثقيف المعطى في بطاقة المتابعة السريرية.

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
Current Symptoms: (For details, Refer to CMR Guideline section 4)
- Orthostatic
- Polyuria + Polydipsia
- Polyphagia
- Blurred vision
- Dizziness
- Numbness
- Recurrent infections (UTI, Thrush, Tenia, …)

Asymptomatic Screening
- Hirustism
- Palpitation + Sweating
- Easy bruising
- Sleep apnea
- Headache
- Muscle cramps
- Fatigability
- Claudication
- Polyuria
- Polydepsia
- Others:

PMH: (When?) For details, Refer to CMR Guideline section 4
- Pre-eclampsia
- Gest. DM/ Big Baby
- DM
- Dyslipidaemia
- Angina
- Dyspnea
- Thyroid Dysfunction
- Syncope
- Stroke
- TIA
- Br.Asthma
- COPD
- HTN
- Uropathy
- CCU admission
- Coronary catherterization
- Gout
- Impotence
- Rec. Infections
- Others:

Family Hx: (Who / at what age?) For details, Refer to CMR Guideline section 4
- HTN
- Renal Disease
- IHD
- Premature CV Death or CVD
- DM
- Dyslipidaemia
- Stroke

Drug Hx: (Mark & write Drug & Dose) For details, Refer to CMR Guideline section 4
- Anti HTN
- OCP
- NSAID
- Corticosteroids
- Decongestants
- Anabolicss
- Amphetamine (Job)
- Thyroid replacement
- Antidepressants
- Antipsychotics
- ……...……………………………..

Psychosocial Hx: For details, Refer to CMR Guideline page 6-1
- Dietary Habits (High Salt / High Fat / Low Fruit & Veg)
- Herbs
- Tobacco
- Alcohol
- Recent Weight gain
- Low Mood
- Physical inactivity
- Stress
- Sleep Dysfunction

Physical Exam: For details, Refer to CMR Guideline section 4
- BP Lt. arm = Rt. arm = Standing (Elderly/DM) = Pulse =
- General
- BMI =
- Waist =
- Carotid Bruit
- Aortic Valve
- Abdominal:
- Oesophagus:
- Chest:
- Oesophagus:
- Heart Sounds
- Carotid Bruit
- Oesophageal:
- Oesophageal:
- LL:
- Oedema
- Oliguria
- CNS:
- Basal Neurologic deficit

Investigations: For details, Refer to CMR Guideline section 4
- CBC
- FBS
- Chol
- LDL
- HDL
- TG
- U+E
- Cr
- Uric Acid
- Ca
- Urinalysis
- ECG
- TFT

Mark □ with a Y if done or requested. Mark O with a Y if positive. Elaborate marked in space provided. Fill results in annual chart (CMR4) and flow chart (CMR3) where appropriate. Use CMR1 for stratification of CVD risk. Italics indicates possible secondary cause.

Primary Health Care

Done by …………………………….………. on ………….... / ………….… / ……………………....

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
**CVD Risk Screening**

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

### Table 1: Assess RF, scTOD and CVRD

<table>
<thead>
<tr>
<th>Risk Factors for CVD (RF)</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: M &gt; 55 years; F &gt; 65 years (Mark ✓ Yes)</td>
<td></td>
</tr>
<tr>
<td>Grade of Blood Pressure (take 2 below)</td>
<td></td>
</tr>
<tr>
<td>High Pulse Pressure (SBP &gt; 160 + DBP &lt; 70 in elderly)</td>
<td></td>
</tr>
<tr>
<td>Obesity (BMI &gt; 30) or Waist Circumference M ≥ 102; F ≥ 88 cm</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
</tr>
<tr>
<td>Family history of premature cardiovascular disease (diabetes or stroke)</td>
<td></td>
</tr>
<tr>
<td>Impaired FBS or GTT</td>
<td></td>
</tr>
<tr>
<td>High Pulse Pressure (SBP &gt; 160 + DBP &lt; 70 in elderly)</td>
<td></td>
</tr>
<tr>
<td>Obesity (BMI &gt; 30) or Waist Circumference M ≥ 102; F ≥ 88 cm</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
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<tr>
<td>Family history of premature cardiovascular disease (diabetes or stroke)</td>
<td></td>
</tr>
<tr>
<td>Impaired FBS or GTT</td>
<td></td>
</tr>
</tbody>
</table>

### Sub-Clinical Target Organ Damage (scTOD)

<table>
<thead>
<tr>
<th>sCVD Risk</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricular hypertrophy (ECG or Echo)</td>
<td></td>
</tr>
<tr>
<td>S Cr. &gt; 1.2 mg/dl</td>
<td></td>
</tr>
<tr>
<td>Low eGFR or CrCl &lt; 60 μmol/l</td>
<td></td>
</tr>
<tr>
<td>24h Microalbuminuria ≥ 30 or ACR &gt; 30 μmol/g</td>
<td></td>
</tr>
<tr>
<td>Ankle/Brachial BP index &lt; 0.9 (if available)</td>
<td></td>
</tr>
</tbody>
</table>

### Established Cardiovascular or Renal Disease (CVRD)

<table>
<thead>
<tr>
<th>sCVD Risk</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischaemic stroke</td>
<td></td>
</tr>
<tr>
<td>Cerebral hemorrhage</td>
<td></td>
</tr>
<tr>
<td>Transient ischaemic attack</td>
<td></td>
</tr>
</tbody>
</table>

### Renal disease

<table>
<thead>
<tr>
<th>sCVD Risk</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic nephropathy</td>
<td></td>
</tr>
<tr>
<td>Renal impairment (S Cr &gt; 14 mg/dl; proteinuria &gt; 300 mg/24 h)</td>
<td></td>
</tr>
</tbody>
</table>

### Peripheral Vascular disease

<table>
<thead>
<tr>
<th>sCVD Risk</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissection aneurysm</td>
<td></td>
</tr>
<tr>
<td>Symptomatic peripheral arterial disease</td>
<td></td>
</tr>
</tbody>
</table>

### Advanced hypertensive retinopathy

<table>
<thead>
<tr>
<th>sCVD Risk</th>
<th>Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhages or exudates</td>
<td></td>
</tr>
<tr>
<td>Papilloedema</td>
<td></td>
</tr>
</tbody>
</table>

| Total CVD Risk | Year: |

### Blood Pressure (mm Hg)

<table>
<thead>
<tr>
<th>Normal</th>
<th>High Normal</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP 120-129 or DBP 80-84</td>
<td>SBP 130-139 or DBP 85-89</td>
<td>SBP 140-149 or DBP 90-99</td>
<td>SBP 160-179 or DBP 100-109</td>
<td>SBP ≥ 180 or DBP ≥ 110</td>
</tr>
<tr>
<td>Low Risk</td>
<td>Low Risk</td>
<td>Low Risk</td>
<td>Moderate Risk</td>
<td>High Risk</td>
</tr>
<tr>
<td>1-2 other Risk Factors</td>
<td>Moderate Risk</td>
<td>High Risk</td>
<td>High Risk</td>
<td>High Risk</td>
</tr>
<tr>
<td>≥ 3 Risk Factors, MetSyn, scTOD or DM</td>
<td>Moderate Risk</td>
<td>High Risk</td>
<td>High Risk</td>
<td>High Risk</td>
</tr>
<tr>
<td>CVRD</td>
<td>High Risk</td>
<td>Moderate Risk</td>
<td>High Risk</td>
<td>High Risk</td>
</tr>
</tbody>
</table>

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
### CMR-3: Focused Visits Encounter Form

#### Note:
You may download a soft copy, or order hard copies of this form from www.ketoshealth.
**CMR-4: Annual Assessment Encounter Form**

**CMR Annual Assessment**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>on / 14</td>
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</tr>
</tbody>
</table>

**Family Hx:**
- [ ] DM
- [ ] HTN
- [ ] Prem. CVD
- [ ] B (Sudden Death, Stroke, MI, PAD)
- [ ] S

**Other Complications**

<table>
<thead>
<tr>
<th>CVD Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
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<td>L</td>
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<td>L</td>
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</table>

**Vaccination, Mammogram, DEXA**

**Doctor’s Initials**

<table>
<thead>
<tr>
<th>CMR / VFP</th>
<th>USS</th>
<th>Ex. ECG / Echo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Others (if indicated)**

- [ ] Compliance

**Use CVD Risk Assessment Chart CMR1 to estimate CVD Risk.**

**Needed for estimation of CVD risk.**

**CMR4: Annual Assessment Encounter Form**

Note: You may download a soft copy, or order hard copies of this form from www.ketoshealth.
Feedback Form

Cardiometabolic Risk Management Guideline

To: CMR Guidelines’ Developing Team,

I have reviewed the following sections:

☐ Introduction & Methods
☐ General Algorithms
☐ Screening
☐ Assessment
☐ Control
☐ Non-pharmacological Management
☐ Extra Tools
☐ Educational Tools & Pamphlets
☐ Information & Quality Management

And found that the guidelines:

☐ Comply with the basics of clinical practice.
☐ Comply with the basics of clinical practice, provided the following modifications are done.
☐ Does not comply with the basics of clinical practice.

<table>
<thead>
<tr>
<th>S</th>
<th>Page No. or Section</th>
<th>Requirement for Addition/ Deletion/ Modification</th>
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<tbody>
<tr>
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<td>3.</td>
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S Page No. or Section Requirement for Addition/ Deletion/ Modification

Reviewer’s name & signature:

Date:
Feedback Form (Cont’d)

Cardiometabolic Risk Management Guideline

Feedback Form

On the other hand, I suggest the following modifications/additions/deletions:

<table>
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<td>7.</td>
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</tbody>
</table>

Submit major suggestion & contribution to be a member of the developing team of next edition. We will be so glad.

Reviewer’s name & signature:

Date:

Bader A. Almustafa, P. O. Box 545, Qatif 31911, S. Arabia. Fax +966 3 852 6834 - Bader.Almustafa@gmail.com