Assessing Risks for Cardiovascular Disease: Blood Pressure Measurement and Lipid Profile Screenings

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Evidence-Based Medicine

- Use established guidelines to support your clinical decisions...
- Hypertension
  - JNC VII
- Hyperlipidemia
  - NCEP ATP-III

What is Hypertension?

<table>
<thead>
<tr>
<th>Classification</th>
<th>SBP* mmHg</th>
<th>DBP* mmHg</th>
<th>Lifestyle Modification</th>
<th>Without Compelling Indication</th>
<th>With Compelling Indications (See Table 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;140</td>
<td>&lt;90</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140-159</td>
<td>90-99</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>&gt;160</td>
<td>&gt;100</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

SBP, systolic blood pressure; DBP, diastolic blood pressure.

Drug abbreviations: ARB, angiotensin-converting enzyme inhibitor; ATRA, angiotensin receptor blocker; BB, beta blocker; CCB, calcium channel blocker.

1. Treatment determined by highest BP category is.
2. Initial antihypertensive therapy should be used cautiously in those at risk for orthostatic hypotension.
3. Treat patients with diabetes, chronic disease, or diabetes in BP goal of systolic blood.

z Use established guidelines to support your clinical decisions.

z Hypertension
  - JNC VII

z Hyperlipidemia
  - NCEP ATP-III
Benefits of Lowering Blood Pressure

- Antihypertensive therapy has been associated with reductions in incidence of:
  - Stroke 35–40%;
  - Myocardial infarction 20–25%;
  - Heart failure > 50%.
- In patients with Stage 1 Hypertension + CVD risk factors, a sustained 12 mmHg reduction in SBP over 10 years will prevent 1 death for every 11 patients treated.

Screenings vs. Diagnosis

- Pharmacists should remind patients that these BP measurements are SCREENINGS not diagnosis.
- Diagnosis of hypertension includes multiple BP readings on different days and physical examination.
- The physical examination should include:
  - An appropriate measurement of BP, with verification in the contralateral arm;
  - Examination of the optic fundi;
  - Calculation of body mass index (BMI) (measurement of waist circumference also may be useful);
  - Auscultation for carotid, abdominal, and femoral bruits; palpation of the thyroid gland;
  - Thorough examination of the heart and lungs;
  - Examination of the abdomen for enlarged kidneys, masses, and abnormal aortic pulsation;
  - Palpation of the lower extremities for edema and pulses; and neurological assessment.
- Pharmacists usually aren't performing this level of physical examination.
- However, screenings identify the need for further examination.

Accurate blood pressure measurement

- Healthcare providers should use the auscultatory method with a properly calibrated and validated instrument.
- Patients should be:
  - Seated quietly, relaxed for at least 5 minutes in a chair (rather than on an exam table), and should not have smoked or ingested caffeine within 30 minutes prior to measurement.
  - With feet on the floor
  - Arm supported at heart level usually on a table.
  - Measurement of BP in the standing may be indicated periodically.
- Locate the brachial artery along the upper inner arm by palpation.
- Wrap the deflated cuff of appropriate size snugly and firmly around the arm about 2.5 cm above the antecubital space.
  - Cuff bladder should encircle at least 80 percent of the arm.
  - The arrow on the cuff should point to the area where the brachial artery is palpable.
Accurate blood pressure measurement

- Ask the patient what their SBP usually is to determine the level for maximal inflation.
- If they are unaware of their SBP, observe the pressure at which the radial pulse is no longer palpable as the cuff is rapidly inflated and adding 30mm Hg. Then rapidly and steadily deflate the cuff. Wait at least 15-30 seconds before reinflating.
- Position the head of the stethoscope over the palpated brachial artery below the cuff at the antecubital fossa. The stethoscope head should be applied with light pressure, ensuring skin contact at all points.
- Heavy pressure may distort sounds.
- Use the bell head to enhance sound detection as the sound generated over the vessels is relatively low in frequency.

- Rapidly and steadily inflate the cuff.
- Release the air in the cuff so that the pressure falls at a rate of 2 to 3 mm per second.
- SBP = point at which the first of two or more sounds is heard (phase 1)
- DBP = point before the disappearance of sounds (phase 5)
- At least two measurements should be made. Clinicians should provide to patients, verbally and in writing, their specific BP numbers AND BP goals.

JNC VII

- Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
- This work was supported entirely by the National Heart, Lung, and Blood Institute.
- Express version (34 pages) http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf
The report's key messages

- If >50 yo, a SBP > 140 mmHg is a MUCH more important CVD risk factor than DBP.
- The risk of CVD doubles with each increment of 20/10 mmHg (beginning at 115/75 mmHg)
- "Prehypertensive" = SBP 120–139 mmHg OR DBP 80–89 mmHg
  - requires lifestyle modifications to prevent CVD.
- Use thiazide diuretics for most patients with uncomplicated hypertension, either alone or in combination.

The report's key messages (continued)

- MOST patients will require **two or more** antihypertensive medications to achieve goal blood pressure
- If blood pressure is >20/10 mmHg above goal blood pressure, initiate therapy with two agents, one of which should be a thiazide diuretic.
- For therapy to work, patients must be MOTIVATED. Empathy builds trust and is a potent motivator.

Addition of Pre-hypertension

<table>
<thead>
<tr>
<th>Stage</th>
<th>Prehypertension</th>
<th>SBP*</th>
<th>DBP*</th>
<th>Lifestyle Modifications</th>
<th>Weekly Compliance</th>
<th>Write Compliance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>SBP &lt;120, DBP &lt;80</td>
<td>+</td>
<td>+</td>
<td>Yes</td>
<td>Weekly</td>
<td>None</td>
</tr>
<tr>
<td>Stage 1</td>
<td>120–139/80–89</td>
<td>+</td>
<td>+</td>
<td>Yes</td>
<td>Weekly</td>
<td>None</td>
</tr>
<tr>
<td>Stage 2</td>
<td>140–159/90–99</td>
<td>+</td>
<td>+</td>
<td>Yes</td>
<td>Weekly</td>
<td>None</td>
</tr>
</tbody>
</table>

*SBP and DBP are equal to or greater than the values shown.

**Please note that this content is a summary and does not replace professional medical advice.**
Major Cardiovascular Risk Factors

- Hypertension*
- Cigarette smoking
- Obesity* (body mass index $\geq 30$ kg/m$^2$)
- Physical inactivity
- Dyslipidemia*
- Diabetes mellitus*
- Microalbuminuria or estimated GFR < 60 mL/min
- Age (older than 55 for men, 65 for women)
- Family history of premature cardiovascular disease (men under age 55 or women under age 65)

GFR = glomerular filtration rate.
* Components of the metabolic syndrome.

Identifiable Causes of Hypertension

- Sleep apnea
- Drug-induced causes
- Chronic kidney disease
- Primary aldosteronism
- Renovascular disease
- Chronic steroid therapy and Cushing’s syndrome
- Pheochromocytoma
- Coarctation of the aorta
- Thyroid or parathyroid disease

Target Organ Damage

- Heart
  - Left ventricular hypertrophy
  - Angina or prior myocardial infarction
  - Prior coronary revascularization
  - Heart failure
- Brain
  - Stroke or transient ischemic attack
- Chronic kidney disease
- Peripheral arterial disease
- Retinopathy
**Goals of Antihypertensive Therapy**

- **Ultimate goal**: reduction of cardiovascular and renal morbidity and mortality.
- **Primary focus is achieving the SBP goal**, since most patients will reach the DBP goal once SBP is at goal.
- Achieving <140/90 mmHg is associated with a decrease in CVD complications.
- In patients with hypertension and diabetes or renal disease, the BP goal is <130/80 mmHg.

**Lifestyle Modifications**

- Adoption of healthy lifestyles by ALL persons is critical.
- Reduce BP
- Enhance antihypertensive drug efficacy
- Decrease cardiovascular risk.

- Major lifestyle modifications shown to lower BP include:
  - weight reduction in overweight or obese individuals,
  - adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan which is rich in potassium and calcium,
  - dietary sodium reduction,
  - physical activity,
  - and moderation of alcohol consumption.

- Combinations of two lifestyle modifications can achieve even better results.
  - For example, a 1,600 mg sodium DASH eating plan has effects similar to single drug therapy.
### Table 6. Lifestyle modifications to manage hypertension

<table>
<thead>
<tr>
<th>Measure</th>
<th>Recommendations</th>
<th>Ambulatory SBP (mm Hg, Mean, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>Maintain normal bodyweight (body mass index 18.5–24.9 kg/m²).</td>
<td>120–140 mm Hg (80–100 mm Hg)</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>Consume a diet rich in fruits, vegetables, and limited daily sodium intake.</td>
<td>120–140 mm Hg (80–100 mm Hg)</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>Reduce daily sodium intake to no more than 150 mmol or 3.5 g sodium per day.</td>
<td>120–140 mm Hg (80–100 mm Hg)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Engage in regular aerobic physical activity, 30 min per day (≥ 2 days weekly).</td>
<td>120–140 mm Hg (80–100 mm Hg)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Limit consumption to no more than 2 drinks (≤ 30 g ethanol) per day.</td>
<td>120–140 mm Hg (80–100 mm Hg)</td>
</tr>
</tbody>
</table>

**DASH:** Dietary Approaches to Stop Hypertension
- For details on sodium reduction, stop smoking.
- The effect of implementing these modifications is dose and time dependent, and effective for some individuals.

### Table 6. Drug therapies for hypertension

<table>
<thead>
<tr>
<th>Category</th>
<th>Drugs (Brand Name)</th>
<th>Uses some names on the market (Brand Names)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>Hydrochlorothiazide (Acoragen), Indapamide (Zetia): 15 mg, 30 mg</td>
<td>HCTZ (Hytrin), Aldactone (sodium), Losartan (Trental)</td>
</tr>
<tr>
<td>Long-acting diuretics</td>
<td>Prototype: Indapamide (Zetia), Generic: 15 mg, 30 mg, 60 mg, 120 mg</td>
<td>HCTZ (Hytrin), Aldactone (sodium), Losartan (Trental)</td>
</tr>
<tr>
<td>Angiotensin II receptor antagonist</td>
<td>Candesartan (Atacand), Valsartan (Casodil), Losartan (Trental)</td>
<td>Candesartan (Atacand), Valsartan (Casodil), Losartan (Trental)</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>Prototype: Metoprolol (Lopressor), Generic: 25 mg, 50 mg, 100 mg</td>
<td>Metoprolol (Lopressor), Generic: 25 mg, 50 mg, 100 mg</td>
</tr>
<tr>
<td>Beta blockers with additional sympatholytics</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
</tr>
<tr>
<td>Combined alpha and beta blockers</td>
<td>Candesartan (Atacand), Losartan (Trental), Hydralazine (Hydralazine)</td>
<td>Candesartan (Atacand), Losartan (Trental), Hydralazine (Hydralazine)</td>
</tr>
</tbody>
</table>

### Table 6. Drug therapies for hypertension (continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Drugs (Brand Name)</th>
<th>Uses some names on the market (Brand Names)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitors</td>
<td>Prototype: Enalapril (Vasotec), Generic: 2.5 mg, 5 mg, 10 mg, 20 mg</td>
<td>Enalapril (Vasotec), Generic: 2.5 mg, 5 mg, 10 mg, 20 mg</td>
</tr>
<tr>
<td>Angiotensin II antagonists</td>
<td>Candesartan (Atacand), Valsartan (Casodil), Losartan (Trental)</td>
<td>Candesartan (Atacand), Valsartan (Casodil), Losartan (Trental)</td>
</tr>
<tr>
<td>Calcium channel blockers – long-acting</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
</tr>
<tr>
<td>Calcium channel blockers – short-acting</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
<td>Nifedipine (Procardia), Amlodipine (Norvasc), Hydralazine (Hydralazine)</td>
</tr>
</tbody>
</table>

7
Follow-up and Monitoring

- Once drug therapy is initiated, most patients should return for monthly follow-ups until the BP goal is reached.
- More frequent visits will be necessary for patients with stage 2 hypertension or with complicating comorbid conditions.
- Serum potassium and creatinine should be monitored 1–2 times/year.
- After BP is at goal and stable, follow-up visits can usually be every 3-6 months.
- Tobacco avoidance should be promoted vigorously.
- Low-dose aspirin therapy should be considered only when BP is controlled, because the risk of hemorrhagic stroke is increased in patients with uncontrolled hypertension.
Antihypertensive Drug Choice Pearls

Potential favorable effects
- Thiazide diuretics are useful in slowing demineralization in osteoporosis.
- Beta-Blockers can be useful in the treatment of:
  - atrial tachyarrhythmias/fibrillation,
  - migraine,
  - thyrotoxicosis (short term),
  - essential tremor, or
  - perioperative hypertension.
- Calcium Channel Blockers may be useful in Raynaud’s syndrome and certain arrhythmias.
- Alpha-blockers may be useful in prostatism.

Potential unfavorable effects
- Thiazide diuretics should be used cautiously in patients with gout or a history of hyponatremia.
- Beta-Blockers should generally be avoided in patients with asthma, reactive airways disease, or 2nd or 3rd degree heart block.
- ACE-I’s and ARB’s are contraindicated during pregnancy.
- ACE-I’s should not be used in individuals with a history of angioedema.
- Aldosterone antagonists and potassium-sparing diuretics can cause hyperkalemia and should be avoided in patients with serum potassium values > 5.0 mEq/L while not taking medications.
What Do Cholesterol Numbers Mean?

- **Total cholesterol**: Includes High-density lipoproteins (HDL), Low-density lipoproteins (LDL), Very low-density lipoproteins (VLDL), and Intermediate-density lipoproteins (IDL)
- **LDL (bad) cholesterol**: The main source of cholesterol buildup and blockage in the arteries
- **HDL (good) cholesterol**: Helps keep cholesterol from building up in the arteries. HDL protects against heart disease, so for HDL, higher numbers are better. A level less that 40 mg/dL is low and it increases your risk for heart disease.
- **Triglycerides**: Another form of fat in your blood. Triglycerides can also raise the risk of heart disease. Levels that are borderline high (150-199 mg/dL) or high (200 mg/dL or more) may need treatment in some people.
- **Non-HDL Cholesterol**: Includes Low-density lipoproteins (LDL), Very low-density lipoproteins (VLDL) and Intermediate-density lipoproteins (IDL)

National Cholesterol Education Program (NCEP) ATP-III Guidelines

- Released in 2001 and Updated April 2004
- Recommending more aggressive treatment for people at risk.
- A complete lipid profile as the initial test
- More aggressive treatment for high cholesterol through cholesterol-lowering drugs and therapeutic lifestyle changes
- Higher recommended levels of HDL cholesterol (>40 mg/dL)
- Lower recommended levels of LDL cholesterol (<130 mg/dL) depending upon major risk factors
- Increased focus on treating high triglycerides
- An assessment of risk status using Framingham risk scoring

ATP III Guidelines At-A-Glance Quick Desk Reference

- National Cholesterol Education Program
- 2004 Update
**Determine lipoprotein levels—**
Obtain complete lipoprotein profile after 9 to 12 hour fast.

<table>
<thead>
<tr>
<th>ATP III Classification of LDL, Total, and HDL Cholesterol (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LDL Cholesterol — Primary Target of Therapy</strong></td>
</tr>
<tr>
<td>&lt;100</td>
</tr>
<tr>
<td>100-129</td>
</tr>
<tr>
<td>130-159</td>
</tr>
<tr>
<td>160-189</td>
</tr>
<tr>
<td>≥190</td>
</tr>
<tr>
<td><strong>Total Cholesterol</strong></td>
</tr>
<tr>
<td>&lt;200</td>
</tr>
<tr>
<td>200-239</td>
</tr>
<tr>
<td>240-279</td>
</tr>
<tr>
<td>≥280</td>
</tr>
<tr>
<td><strong>HDL Cholesterol</strong></td>
</tr>
<tr>
<td>&lt;40</td>
</tr>
<tr>
<td>≥60</td>
</tr>
</tbody>
</table>

**Identify presence of clinical atherosclerotic disease (CHD risk equivalent):**

- Clinical CHD
- Symptomatic carotid artery disease
- Peripheral arterial disease
- Abdominal aortic aneurysm.

Note: in ATP III, diabetes is regarded as a CHD risk equivalent.

**Determine presence of major risk factors (other than LDL):**

- Cigarette smoking
- Hypertension (BP >140/90 mmHg or on antihypertensive medication)
- Low HDL cholesterol (<40 mg/dL)*
- Family history of premature CHD (CHD in male first degree relative <55 years; CHD in female first degree relative <65 years)
- Age (men >45 years; women >55 years)

* HDL cholesterol >60 mg/dL counts as a “negative” risk factor; its presence removes one risk factor from the total count.
Determine risk category:

- 0-1 CVD Risk Factors
- 2+ CVD Risk Factors with 10 yr risk for CHD < 20%
- "High Risk"
  - All Persons with CHD and CHD Risk Equivalents (noncoronary forms of clinical atherosclerotic disease, diabetes and 2+ CVD risk factors with 10 yr risk for CHD > 20%)
- "Very High Risk" (2004 Update)
  - Established CVD and:
    - Multiple major risk factors (i.e. diabetes)
    - Severe or poorly controlled risk factors (i.e. smoking)
    - Multiple risk factors of Metabolic Syndrome
    - Acute Coronary Syndrome

LDL Goals and Treatment in Different Risk Categories.

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL Goal</th>
<th>LDL Lower in Adults</th>
<th>LDL Lower in Adults</th>
<th>LDL Lower in Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD or CVD Risk Factors (10 year risk &gt; 20%)</td>
<td>LDL (mg/dL)</td>
<td>LDL (mg/dL)</td>
<td>LDL (mg/dL)</td>
<td>LDL (mg/dL)</td>
</tr>
<tr>
<td>0-1 CVD Risk Factors</td>
<td>130 mg/dL</td>
<td>160 mg/dL</td>
<td>190 mg/dL</td>
<td>(TGW-5 mg/dL)</td>
</tr>
<tr>
<td>2+ CVD Risk Factors (10 year risk &gt; 20%)</td>
<td>100 mg/dL</td>
<td>130 mg/dL</td>
<td>160 mg/dL</td>
<td>(TGW-5 mg/dL)</td>
</tr>
<tr>
<td>CHD, Diabetes, or Other Major Cardiovascular Risk Factors</td>
<td>100 mg/dL</td>
<td>130 mg/dL</td>
<td>160 mg/dL</td>
<td>(TGW-5 mg/dL)</td>
</tr>
</tbody>
</table>

If 2+ risk factors (other than LDL) are present without CHD or CHD risk equivalent, assess 10-year CHD risk (see Framingham tables).

- Three levels of 10-year risk:
  - >20% — CHD risk equivalent
  - High Risk to "Very High Risk"
  - 10-20% — "Moderate High Risk"
  - <10%
Framingham Risk Assessment

- 10 year Risk Percentage
- Point System
- Gender Specific
- Age
- Total Cholesterol
- Systolic Blood Pressure
- HDL Cholesterol
- Smoking Status
Initiate therapeutic lifestyle changes (TLC) if LDL is above goal.

- TLC Diet:
  - Saturated fat <7% of calories, cholesterol <200 mg/day
  - Consider increased viscous (soluble) fiber (10-25 g/day) and plant stanols/sterols
  - (2g/day) as therapeutic options to enhance LDL lowering
  - Weight management
  - Increased physical activity.

### Drug Therapy for Hyperlipidemia

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Agent and Brand Name</th>
<th>Dose Information</th>
<th>Side Effects</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMG-CoA Reductase Inhibitor</td>
<td>Rosuvastatin (Crestor)</td>
<td>AstraZeneca</td>
<td>STELLAR Study-Head to Head comparing all “Statins”</td>
<td></td>
</tr>
</tbody>
</table>
Table: Percent changes in TC, LDL, HDL, and TG as witnessed in the STELLAR Study


<table>
<thead>
<tr>
<th>Drug</th>
<th>Cholesterol (TG)</th>
<th>LDL</th>
<th>HDL</th>
<th>TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atorvastatin 10mg</td>
<td>-29</td>
<td>-38</td>
<td>6</td>
<td>-19</td>
</tr>
<tr>
<td>Fluvastatin 40mg</td>
<td>-19</td>
<td>-25</td>
<td>4</td>
<td>-14</td>
</tr>
<tr>
<td>Levastatin 20mg</td>
<td>-17</td>
<td>-24</td>
<td>7</td>
<td>-10</td>
</tr>
<tr>
<td>Pravastatin 40mg</td>
<td>-25</td>
<td>-34</td>
<td>12</td>
<td>-24</td>
</tr>
<tr>
<td>Simvastatin 20mg</td>
<td>-28</td>
<td>-38</td>
<td>8</td>
<td>-15</td>
</tr>
<tr>
<td>Rosuvastatin 10mg</td>
<td>-36</td>
<td>-56</td>
<td>14</td>
<td>-10</td>
</tr>
</tbody>
</table>

Identify metabolic syndrome and treat, if present, after 3 months of TLC.

Clinical Identification of the Metabolic Syndrome – Any 3 of the Following:

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Defining Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal obesity</td>
<td>Waist circumference &gt; 102 cm (40 in)</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>&lt; 40 mg/dl</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≥ 120/80 mmHg</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>≥ 110 mg/dl</td>
</tr>
</tbody>
</table>

- Abdominal obesity is associated with insulin resistance and the metabolic syndrome. However, the presence of abdominal obesity is more highly correlated with the metabolic risk factors than a raised body mass index (BMI). Therefore, the simple measure of waist circumference is recommended to identify the body weight component of the metabolic syndrome. Some non-patients can develop multiple metabolic risk factors when the waist circumference is only moderately increased, e.g., > 102 cm (40 in). Such patients may have a strong genetic contribution to their condition. They should benefit from changes in the lifestyle, similarly to men with peripheral increases in waist circumference.

Treatment of Metabolic Syndrome

Treatment of the metabolic syndrome

- Treat underlying causes (abdominal obesity and physical inactivity):
  - Intensify weight management
  - Increase physical activity.

- Treat lipid and non-lipid risk factors if they persist despite these lifestyle therapies:
  - Treat hypertension
  - Use statins for CAD patients to reduce prothrombotic state
  - Treat elevated triglycerides and/or low HDL as shown in Step 3.
Treat elevated triglycerides.

ATP III Classification of Serum Triglycerides (mg/dL)

<table>
<thead>
<tr>
<th>Triglycerides (mg/dL)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;150</td>
<td>Normal</td>
</tr>
<tr>
<td>150-199</td>
<td>Borderline high</td>
</tr>
<tr>
<td>200-499</td>
<td>High</td>
</tr>
<tr>
<td>≥500</td>
<td>Very high</td>
</tr>
</tbody>
</table>

Treatment of elevated triglycerides (≥150 mg/dL)

- Primary aim of therapy is to reach LDL goal
- Intensely weight management
- Increase physical activity
- If triglycerides ≥200 mg/dL, after LDL goal is reached, set secondary goal for non-HDL cholesterol (total – HDL) 30 mg/dL higher than LDL goal.

**Comparison of LDL Cholesterol and Non-HDL Cholesterol Goals for Three Risk Categories**

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL Goal (mg/dL)</th>
<th>Non-HDL Goal (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD or CHD+His</td>
<td>&lt;100</td>
<td>&lt;130</td>
</tr>
<tr>
<td>10 year risk CHD ≥20%</td>
<td>&lt;130</td>
<td>&lt;160</td>
</tr>
<tr>
<td>Multiple ≥2 risk factors and ≤10 year risk ≥20%</td>
<td>&lt;130</td>
<td>&lt;160</td>
</tr>
<tr>
<td>≥1 risk factor</td>
<td>&lt;130</td>
<td>&lt;160</td>
</tr>
</tbody>
</table>

If triglycerides 200-499 mg/dL, after LDL goal is reached, consider adding drug if needed to reach non-HDL goal:
- Intensely therapy with LDL lowering drug, or
- Add niacin or fibrate to further lower LDL.

If triglycerides ≥500 mg/dL, first lower triglycerides to prevent pancreatitis:
- Very low-fat diet (45% of calories from fat)
- Weight management and physical activity
- Fiber or nicoic acid
- Reduce triglycerides ≥500 mg/dL, turn to LDL lowering therapy.

Treatment of Low HDL

**Treatment of low HDL cholesterol (<40 mg/dL)**

- First reach LDL goal, then:
- Intensely weight management and increase physical activity
- If triglycerides 200-499 mg/dL, achieve non-HDL goal
- If triglycerides ≥200 mg/dL, (isolated low HDL), in CHD or CHD equivalent, consider niacin or fibrate.
### 2004 Update ATP III

- Five Major Trials since the ATP III was originally published in May 2001
  - HPS
  - PROSPER
  - ALLHAT
  - ASCOT-LLA
  - PROVE IT

### ATPIII Update Summary

- In high risk persons, the recommended LDL-C goal is <100mg/dL but when risk in very high, an LDL-C of <70mg/dL is a therapeutic option.

- When a high risk patient has high TG or low HDL-C, consideration should be given to combining a fibrate or nicotinic acid with a LDL-lowering drug

- In moderately-high risk persons (2+ risk factors and 10 yr risk 10-20%), the recommended LDL-C goal is <130mg/dL but when risk in very high, an LDL-C of <100mg/dL is a therapeutic option.

### Identify and Manage Patients at Risk of Heart Disease

- Pharmacists are uniquely positioned to help combat heart disease through early identification and on-going disease management.

- Project ImPACT: Hyperlipidemia, pharmacists doubled compliance rates and helped patients to achieve target lipid levels as a result of the value-added service.
  - 93% of patients were in compliance with drug therapy as compared to previous studies where only 40% of patients remained in compliance.
  - Over 62% of these patients have reached National Cholesterol Education Panel (NCEP) goals as compared to other studies where treatment to goal was as low as 8%.
The Cholestech LDX® System

- Measures a complete lipid profile plus glucose in only 5 minutes from a simple fingerstick.
- ALT now available in 5 minutes

Key Features

- Small, lightweight, and portable
- Includes printer that provides duplicate copies of test results
- Factory calibrated
- Fast and simple procedure saves time, enhances productivity
- Requires only a single drop of blood from a simple fingerstick and eliminates the anxiety of venipuncture.
- Provides quick feedback for on-the-spot adjustment of therapy and improved patient compliance
- CLIA-waived system and meets all relevant National Cholesterol Education Program (NCEP) guidelines for precision and accuracy
Test Cassette

- Large variety of testing options
  - Total Cholesterol
  - Total Cholesterol and Glucose
  - Total Cholesterol and HDL Panel
  - Total Cholesterol, HDL, and Glucose Panel
  - Total Cholesterol, HDL, Triglycerides, TC/HDL ratio, estimate of LDL and VLDL
  - Total Cholesterol, HDL, Triglycerides, Glucose, TC/HDL ratio, estimate of LDL and VLDL
  - ALT (Alanine Aminotransferase)
  - GDX machine
  - HbA1c

Supplies

- Lancets
- Capillary Tubes
- Capillary Plungers
- Accessory Tray
- Band-aids
- Gauze
- Alcohol swabs

Testing with Cholestech LDX

- Stick
- Click
- Done
Testing with Cholestech LDX cont

**Stick**
- Before taking the fingerstick sample, prepare your testing place
  - Make sure cassette is room temperature (allow 10 minutes)
  - Run Self Test on Analyzer by pressing RUN
  - Remove from packaging and arrange on a clean surface the following: cassettes, lancets, capillary tubes and plungers, alcohol swabs, gauze/cotton balls, band-aids
  - Insure the sharps container and garbage cans are in close proximity

- Use Lancet device to pierce the skin on the finger tip
  - Make sure patients hands are warm and clean (free of soap and lotion residue)
  - Gently massage finger from base to tip to increase blood flow
  - Wipe site with alcohol swab
  - Firmly place lancet flush against the finger tip preferably outside surface of the ring finger on the right hand
  - Perform a deep and firm puncture –GOOD BLOOD FLOW IN THE KEY
  - Wipe off first drop of blood with cotton ball or gauze because it contains tissue fluid
  - Squeeze the finger with a “Pulse” the finger until a large drop of blood has accumulated do not “milk” the finger.

- Collect blood sample from fingerstick in capillary tube
  - Once the fingerstick occurs, move quickly to prevent clotting.
  - Collect sample in capillary tube in less than 10 seconds
  - Use plunger to add sample to test cassette in less than 5 minutes
  - Keep the patient’s hand below the level of the heart
  - Easiest to hold the capillary tube and plunger horizontally (or at a slight descending angle if necessary) to the drop of blood.
  - Touch the end of the capillary tube to the drop of blood and fill capillary tube to the black mark
  - If blood flow stops, wipe finger firmly with gauze to reopen the puncture.
  - Dispense the sample toward the white material in the Cassette sample well
Testing with Cholestech LDX cont.

- Click
  - Load cassette immediately into the Cholestech
  - Hold cassette horizontally and don’t touch the black bar or magnetic strip
  - Black Reaction must face the Analyzer and Brown Magnetic Stripe must be on the right.
  - Press RUN to close drawer and start test

- Done
  - Results are ready to discuss with patient in 5 minutes
  - When test is complete, the LDX will beep, and results will appear on the screen
  - Press DATA button for more results.
  - Press DATA again for the Framingham Risk. Press RUN to calculate or STOP to skip and print the results

- Testing with Cholestech LDX cont.

- If you decide to run the Framingham Risk, you can calculate it on the Cholestech.
- Collect the necessary patient information:
  - Gender
  - Diabetes
  - Smoking Status
  - Age (>30 years old)
  - ECG-LVH
  - Systolic BP
  - Year to Run the Risk Prediction (4-12 yrs)

- Press STOP to close panel and end test
- Press DATA again to recall the last tests result. Only the last test can be recalled
Quality Assurance

- Optics Check Cassette
  - Checks the optical system on the Analyzer
  - Run once daily before patient samples are tested
  - Run after the Cholestech LDX System has been moved or serviced
- Quality Controls
  - Gently turn control bottles 6-7 times to mix them
  - Run QC on each
    - new shipment of cassettes
    - new lot of cassettes
    - Run of patient samples

Educational materials

- Training video for staff
- Educational pamphlets
  - Download at www.cholestechn.com
  - Order 800-733-0404

Payment for services

- Screenings are predominantly a cash pay service
  - Ranging from $30-$40
- Identify who benefits from the services
  - Some employers-healthy employees mean less sick days
  - Drug manufacturers-increase compliance
  - Patients who want to see if the co-pays are worth the money
Where can you do screenings?

- **Hospital-Based Testing**
  - Outpatient Lipid and Diabetes Clinics
  - Occupational Health/Corporate Wellness
  - Cardiac Rehabilitation units
- **Employee Wellness Programs**
- **Managed Care Programs**
- **Community Screening and Health Education**
  - Community Outreach, Point-of-Care Testing (POCT)
  - Community pharmacy based services
  - Smoking Cessation programs