Assessing Risks for Cardiovascular Disease in a Pharmacy Setting

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Washington State Pharmacy Association

Evidence-Based Medicine

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

What is Hypertension?

Table 1. Classification and management of blood pressure for adults*

<table>
<thead>
<tr>
<th>Stage</th>
<th>SBP (mm Hg)</th>
<th>DBP (mm Hg)</th>
<th>Lifestyle modification</th>
<th>Initial drug therapy</th>
<th>Other drug therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 Hypertension</td>
<td>140 – 159</td>
<td>90 – 99</td>
<td>Yes</td>
<td>Thiazide diuretic or ACE inhibitor, ARB, or BB</td>
<td>ARB, BB, or ACE inhibitor</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>160 or more</td>
<td>100 or more</td>
<td>Yes</td>
<td>Target achievement for most hypertensives: ACE inhibitor or ARB, or (BB or CECA)</td>
<td></td>
</tr>
</tbody>
</table>

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

Drug abbreviations: ACE, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blockers; BB, betablocker; CECA, calcium channel blockers.

* Initial treated hypertension should be aimed at a level of 140/90 mm Hg or lower for most hypertensives.

1. Initial treatment should be aimed at a level of 140/90 mm Hg or lower for most hypertensives.
2. Initial treatment should be aimed at a level of 140/90 mm Hg or lower for most hypertensives.
3. Initial treatment should be aimed at a level of 140/90 mm Hg or lower for most hypertensives.

* *Based on the 2017 American College of Cardiology/American Heart Association (ACC/AHA) Hypertension Guideline.*
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 12mmHg reduction in SBP over 10 years will prevent 1 death for every 11 patients treated.

Screenings vs. Diagnosis

- High results from SCREENINGS are not a diagnosis of hypertension.
- Diagnosis of hypertension includes multiple BP readings on different days and physical examination.
  - The physical examination should include:
    - Verification in the contralateral arm;
    - Examination of the optic fundi;
    - Calculation of body mass index (BMI);
    - Auscultation for carotid, abdominal, and femoral bruits;
    - Palpation of thyroid gland;
    - Thorough examination of heart and lungs;
    - Examination of 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
- 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.
  - Both 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.
Accurate blood pressure measurement

- 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.

- 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 re-inflating.

- 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/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 years old, SBP>140 mmHg is a MUCH more important CVD risk factor than DBP.
- The risk of CVD doubles with each increment of 20/10mmHg (beginning at 115/75mmHg)
- "Prehypertensive"=SBP of 120–139mmHg OR DBP of 80–89mmHg
  - 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>BP Classification</th>
<th>SBP*</th>
<th>DBP*</th>
<th>OTC Medication</th>
<th>Weekly Compliance</th>
<th>Write Compliance</th>
<th>Indication (See Table)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td></td>
<td>No antihypertensive drug included</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>SBP-139</td>
<td>DBP-89</td>
<td>Yes</td>
<td>Thiazide, CECA, Combination with OTC Medication</td>
<td>Thiazide, CECA, Combination with OTC Medication</td>
<td>Thiazide, CECA, Combination with OTC Medication</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>SBP140</td>
<td>DBP100</td>
<td>Yes</td>
<td>Two drugs combination for most patients with and without evidence of LVH &amp; if SBP 150/100</td>
<td>Two drugs combination for most patients with and without evidence of LVH &amp; if SBP 150/100</td>
<td>Two drugs combination for most patients with and without evidence of LVH &amp; if SBP 150/100</td>
</tr>
</tbody>
</table>

* BP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

- Drug abbreviations: CECA, angiotensin converting enzyme inhibitors; ARB, angiotensin receptor blockers; BZ, benzodiazepine; OTC, over-the-counter drugs.
- Treatment down the highest BP category.
- Initial combined therapy should be used judiciously in those at risk for critical hypertension.
- Treat patients with diuretics if needed to BP goal of ≤130/80 mmHg.
Major Cardiovascular Risk Factors

- Hypertension*
- Cigarette smoking
- Obesity* (body mass index ≥30 kg/m2)
- 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.

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.
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 1. Lifestyle modifications in blood pressure management**

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>Achieve a SBP of (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>Maintain normal bodyweight</td>
<td>130/80 <strong>±10</strong> mmHg</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>Consume a diet rich in fruits, vegetables, and low-fat products with a reduced content of saturated and total fat.</td>
<td>≥8 mg sodium or &lt;100 mg sodium cholesterol</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>Reduce dietary sodium intake to no more than 1,500 mg per day.</td>
<td>≥8 mg sodium or &lt;100 mg sodium cholesterol</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Engage in regular aerobic physical activity such as brisk walking (≥ 30 min per day, most days of the week).</td>
<td>≥8 mg sodium or &lt;100 mg sodium cholesterol</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>Limit consumption to no more than 2 drinks (1 oz or 30 mL ethanol: e.g., 1 can beer, 2 oz wine, or 5 oz of proof whiskey) per day in men and to no more than 1 drink per day in women and lighter weight persons.</td>
<td>≥8 mg sodium or &lt;100 mg sodium cholesterol</td>
</tr>
</tbody>
</table>

DASH: Dietary Approaches to Stop Hypertension
- For overall cardiovascular risk reduction, stop smoking.
- The effects of implementing these modifications are dose and time dependent, and could be greater for some individuals.
Medications for Treatment of Hypertension

- Diuretics
  - Thiazide (HCTZ)
  - Loop (Furosemide)
- Beta Blockers (metoprolol)
- Calcium Channel Blockers
  - Non-Dihydropyridines (diltiazem)
  - Dihydropyridines (amlodipine)
- ACE Inhibitors (lisinopril)
- Angiotensin II Receptor Blockers –ARBs (losartan)
- Alpha 1 Blockers (terazosin)
- Central Alpha 2 agonists (clonidine)
- Vasodilators (hydralazine)

Follow-up and Monitoring

- Once drug therapy is initiated, 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.

Table 6: Clinical trial and guideline basis for congestive indications for individual drug classes

<table>
<thead>
<tr>
<th>Congestive Indication</th>
<th>Recommended Doses</th>
<th>Clinical Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumocardiomegaly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High cardiac disease risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrial septal prd.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Congestive indications for antihypertensive drugs are based on benefits from outcome studies or selected clinical guidelines. For the congestive indication outlined in parallel with the BP, the congestive indication is managed in parallel with the BP.
2 Drug abbreviations: ARB = angiotensin receptor blockers, ACE = angiotensin converting enzyme inhibitors, AAD = anticoagulants.
3 Conditions for which clinical trials demonstrate benefit of specific classes of anti-hypertensive drugs.
4 Trended dose length paralleled benefit of specific classes of anti-hypertensive drugs.
Hyperlipidemia

- Elevated cholesterol levels in the blood
- Also known as
  - High Cholesterol
  - Hypercholesterolemia
  - Dyslipidemia

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)
  - Goal is generally <200mg/dL

- **LDL (bad) cholesterol**
  - The main source of cholesterol buildup and blockage in the arteries. Goals vary but generally <130mg/dL

- **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. **Goal is >60mg/dL**

What Do Cholesterol Numbers Mean?

- **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) **Goal=LDL goal + 30mg/ dL**
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
  - 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

Test them to determine lipid levels—Obtain complete lipid 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</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 (worth one CHD risk equivalent):

- Clinical Coronary Heart Disease (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 CHD Risk Factors
- 2+ CHD 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+ CHD risk factors with 10 yr risk for CHD>20%)
- "Very High Risk" (2004 Update)
  - Established CHD 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.**

LDL Cholesterol Goals and Outcomes for Therapeutic Lifestyle Changes (TLC) and Drug Therapy in Different Risk Categories.

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL Goal</th>
<th>LDL Level at Which to Initiate Therapeutic Lifestyle Changes (TLC)</th>
<th>LDL Level at Which to Consider Drug Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD or CHD Risk Equivalents (10-year risk 40%)</td>
<td>&lt;100 mg/dl</td>
<td>≥100 mg/dl</td>
<td>≥190 mg/dl (100-129 mg/dl, drug optional)</td>
</tr>
<tr>
<td>2+ Risk Factors (Relative risk 40%)</td>
<td>&lt;130 mg/dl</td>
<td>≥130 mg/dl</td>
<td>10-year risk 10-20%; ≥130 mg/dl</td>
</tr>
<tr>
<td>0-1 Risk Factor*</td>
<td>&lt;160 mg/dl</td>
<td>≥160 mg/dl</td>
<td>10-year risk &gt;30%; ≥200 mg/dl</td>
</tr>
</tbody>
</table>

*Some authorities recommend use of CHD lowering drugs in this category if an LDL cholesterol ≥130 mg/dl cannot be achieved by Therapeutic Lifestyle Changes, if there are more than 1 risk factor, if the patient has diabetes, or if there is an additional CHD risk equivalent. |
*Annual average of people with ≥1 risk factor have a 10-year risk ≥20% or ≥10% in people with ≥2 risk factors is ≥10% risk.

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**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%
  - “Moderately 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**

- Drugs Affection Lipid Metabolism
  - **HMGCoA Reductase Inhibitors “Statins”**
    - Atorvastatin, fluvastatin, lovastatin, pravastatin, rosuvastatin, simvastatin (Cervistatin pulled)
  - Fibric Acids
    - Gemfibrozil, fenofibrate
  - Bile Acid Sequestrants
    - Cholestyramine, Colestipol
  - Nicotinic Acid
    - Niaspan
### Table: Percent changes in TC, LDL, HDL, and TG from the STELLAR Study

<table>
<thead>
<tr>
<th>Drug</th>
<th>Cholesterol (TC)</th>
<th>LDL</th>
<th>HDL</th>
<th>TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atorvastatin 10mg</td>
<td>-29</td>
<td>-25</td>
<td>6</td>
<td>-10</td>
</tr>
<tr>
<td>Fluvastatin 40mg</td>
<td>-19</td>
<td>-25</td>
<td>4</td>
<td>-14</td>
</tr>
<tr>
<td>Lovastatin 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>-36</td>
<td>14</td>
<td>-10</td>
</tr>
</tbody>
</table>

- **Table**: Percent changes in TC, LDL, HDL, and TG from the STELLAR Study
  

### Metabolic syndrome

- **Clinical Identification**
  - Any Three of the following:
    - Abdominal Obesity
      - Men > 40in or Women > 35in
    - Low HDL
      - Men < 40mg/dL or Women < 50mg/dL
    - High Triglycerides > 150mg/dL
    - High Blood Pressure > 130/85mmHg
    - Fasting Glucose > 110mg/dL
  - Treat after 3 months of TLC.
    - EXERCISE
    - Treat components
Treatment of Low HDL

- Reach LDL goal then
- EXERCISE

Treat elevated triglycerides.

<table>
<thead>
<tr>
<th>ATP III Classification of Serum Triglycerides (mg/dL)</th>
<th></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>

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

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 moderately-high risk persons (2+ risk factors and 10 yr risk 10-20%), the recommended LDL-C goal is <130mg/dL
- In HIGH RISK persons, the recommended LDL-C goal is <100mg/dL
- In VERY HIGH RISK, 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

The Cholestech LDX® System

- Measures a complete lipid profile plus glucose in only 5 minutes from a simple fingerstick.
- Also tests ALT and CRP

Key Features

- Small, lightweight, and portable
- Includes printer that provides duplicate copies of test results
- Factory calibrated
- Fingerstick...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 Cassettes**
- 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)
  - Hs-CRP (High Sensitivity C-Reactive Protein)
  - 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

- Before taking the fingerstick sample, prepare your testing area
  - Make sure cassette is room temperature (allow 10 minutes out of refrigerator)
  - Run Self Test on Cholestech 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
  - Ensure the sharps container and garbage cans are in close proximity

- Use Lancet device to pierce the skin on the finger tip
  - Make sure patient's hands are warm and clean (free of soap and lotion residue = elevates TRG)
  - 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 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

Testing with Cholestech LDX cont.

- 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 Cholestech
  - 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.cholestech.com
  - Order 800-733-0404

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%.
Payment for services

- Screenings are predominantly a cash pay service
  - Ranging from $30-$50
- Identify who benefits from the services
  - Some employers-healthy employees mean less sick days (example BOEING)
  - 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

Questions?