

**Pharmacy Based Activities to Reverse and Manage Disease (PhARMD):
The Hypertension Project
Training Manual DRAFT**

Table of Contents

Purpose / Overview / Objectives	page 1
Blood Pressure	pages 2-5
Introduction	
Measuring blood pressure using a monitor (Omron)	
Measuring blood pressure manually	
Cholesterol	pages 6-8
Introduction	
Measuring cholesterol using a monitor (PTS CardioCheck)	
Diabetes Mellitus	pages 9-10
Introduction	
Body Mass Index	page 11
Introduction	
Calculation	

Purpose

The PhARMD program is designed to provide trained technicians to screen the general public for the presence of hypertension and to recommend appropriate courses of action when such conditions are detected.

Overview

This four hour training program will prepare laboratory technicians to administer blood pressure tests, interpret the results, and provide the client with feedback that will steer them toward appropriate medical attention.

Objectives

As a result of attending this program, each participant should:

- Understand the significance of the blood pressure within the body
- Be able to administer blood pressure tests and interpret the results
- Be able to provide the client with accurate feedback concerning their blood pressure levels
- Be able to direct the client to their physician or HMO without causing undue stress
- Know how to maintain logs of services provided

**Pharmacy Based Activities to Reverse and Manage Disease (PhARMD):
The Hypertension Project
Training Manual DRAFT**

Blood Pressure

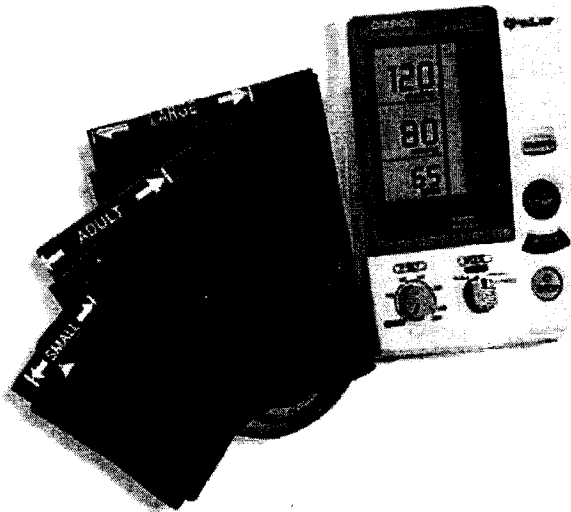
Blood pressure is the amount of force exerted on the walls of the blood vessels or arteries as blood flows through them. High blood pressure or hypertension, occurs when there is a lot of stress in the arteries. There are two different pressures that are measured when a blood pressure reading is taken. The first is the systolic pressure. This is the pressure present in the vessels as the heart beats and fills the vessels with blood increasing the pressure. The second is the diastolic pressure. This is the pressure in the heart when the heart relaxes.. Below is a classification of blood pressure for adults 18 years and older.

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	And	<80
Normal	<130	And	<85
High-normal	130-139	Or	85-89
Hypertension			
Stage 1	140-159	Or	90-99
Stage 2	160-179	Or	100-109
Stage 3	≥180	Or	≥110

Many people do not know that they have high blood pressure. It is very important that hypertension is detected early because uncontrolled hypertension can lead to heart failure, stroke, kidney failure, and even death.

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The Hypertension Project
Training Manual DRAFT**

Measuring blood pressure using a monitor (Omron):



From: www.safehomeproducts.com/shp/hh/omron_blood_pressure_monitors.asp#907

1. Sit in a chair with feet placed flat on the floor and place arm on a table so that the cuff is at the same level as the heart. Also make sure that the correct cuff size is used since a cuff that is too small or too large will give incorrect readings.
2. Make sure that the sleeves are rolled up high enough so that the patient can put the arm through the cuff loop. Make sure that the bottom edge of the cuff is about one-half inch above the elbow. Make sure that the Green Marker on the cuff is above the brachial artery (fig.1).



Fig. 1

From: <http://bs-dwoodman4.unl.edu/physio/Physiology/bplab.htm>

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The Hypertension Project
Training Manual DRAFT**

3. Pull the end of the cuff so that the entire cuff is evenly tightened around the arm and press the hook material firmly against the side of the cuff.
4. Press the on/off button on the machine.
5. After the "heart" symbol appears on the panel, press the start button and remain still until the measurement is complete.
6. When the measurement is complete, the monitor will display the blood pressure and pulse rate, and then automatically deflate the cuff.
7. If another measurement is needed, wait about 2-3 minutes before taking another measurement.

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The Hypertension Project
Training Manual DRAFT**

Measuring blood pressure manually:

1. Put the stethoscope into the ears with the ear pieces facing forward towards you.
2. Place the stethoscope disk on the inner side of the elbow above the brachial artery (fig.2). Do not use your thumb to hold the stethoscope because you will end up taking your own pressure.

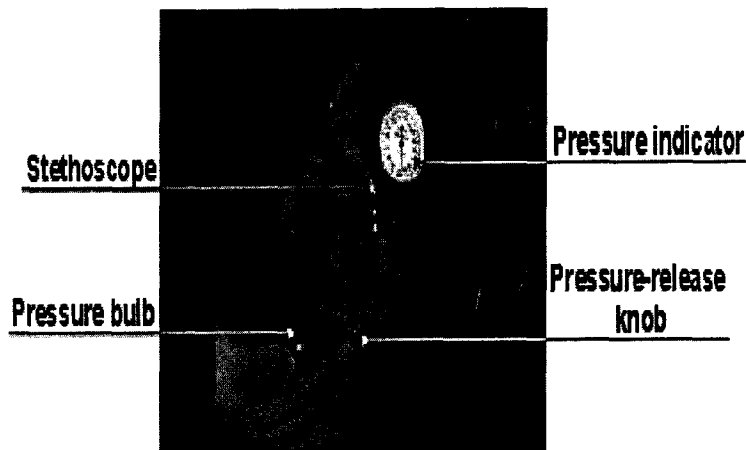


Fig. 2

From: <http://bs-dwoodman4.unl.edu/physio/Physiology/bplab.htm>

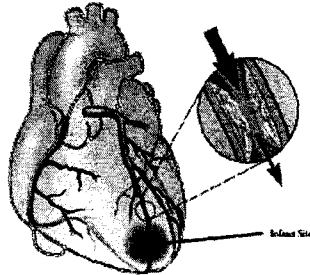
3. Rapidly inflate the cuff by squeezing the rubber bulb to about 180-200mmHg. Make sure to inflate the cuff rapidly since inflating too slowly will cause a false reading.
4. Slightly loosen the pressure release knob and slowly let some air out of the cuff. Deflate the cuff by 3-5mmHg per second on the pressure indicator.
5. As you let the air out, you will begin to hear the heartbeat. Listen carefully for the first sound. Check the blood pressure reading by looking at the pointer on the dial. This reading is the systolic pressure.
6. Continue to deflate the cuff. Listen to the heartbeat. You will hear the heartbeat stop at some point. Check the reading on the dial. This is the diastolic pressure. It is the last sound.
7. If you want to repeat the measurement, wait 2-3 minutes before reinflating the cuff.
8. Repeat blood pressure after the patient stands for 2-3 minutes.

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The Hypertension Project
Training Manual DRAFT**

Cholesterol

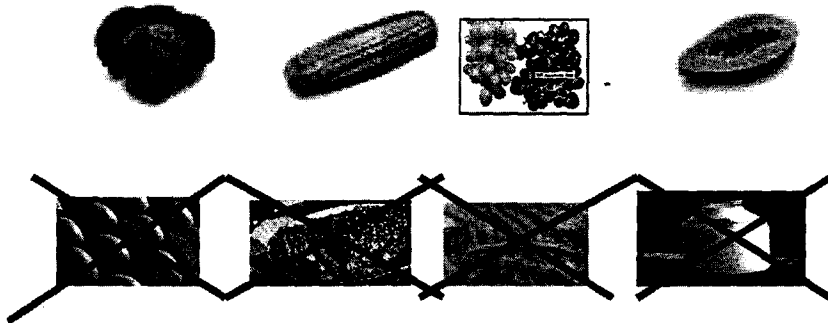
Cholesterol is a waxy, fat-like substance that is made in the body by the liver. Our bodies need cholesterol to:

- Maintain healthy cell walls
- Make hormones
- Make vitamin D
- Make bile acids, which aid in fat digestion



From: <http://diabetes.about.com/library/>

Sometimes our bodies make more cholesterol than we need, and this excess cholesterol circulates in the bloodstream. High levels of cholesterol in the blood can clog blood vessels and increase the risk for heart disease and stroke. Our bodies can make too much cholesterol when we eat too much saturated fats, this is the king of fat that we found in animal-based foods such as meat and dairy products. Only animal-based foods such as meat, eggs, and dairy products contain cholesterol. Plant foods such as fruits, vegetables, and grains do not contain cholesterol.



There are different types of cholesterol and not all cholesterol is harmful:

1. Low-density lipoprotein (LDL) cholesterol is a bad type of cholesterol that is most likely to clog blood vessels, increasing your risk for heart disease.
2. High-density lipoprotein (HDL) cholesterol is a good type of cholesterol that helps clear the LDL cholesterol out of the blood and reduces your risk for heart disease.

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The Hypertension Project
Training Manual DRAFT**

Major risk factors associated with high cholesterol:

1. Cigarette smoking
2. Hypertension
3. Low HDL cholesterol (<40 mg/dl)
4. Family history of premature coronary heart disease.
5. Age (men>45 years; women >55 years)

Cholesterol Parameters:

LDL cholesterol

<100	Optimal
100-129	Above optimal
130-159	Borderline high
160-189	High
>190	Very High

Total Cholesterol

<200	Desirable
200-239	Borderline High
>240	High

HDL Cholesterol

<40	Low
>60	High

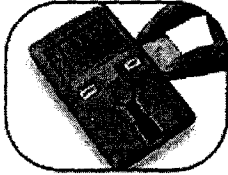
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The Hypertension Project
Training Manual DRAFT**

Measuring cholesterol using a monitor (PTS CardioCheck)

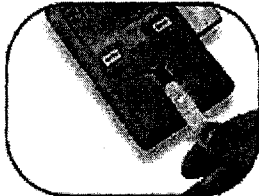
Equipment: PTS CardioCheck

How to use:

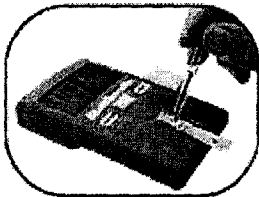
Step1: Insert memo chip and turn on instrument.



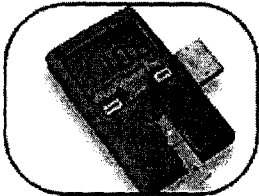
Step 2: Insert test strip into instrument.



Step 3: Apply blood sample using capillary blood collector.



Step 4: Read results.



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The Hypertension Project
Training Manual DRAFT**

Diabetes

Diabetes is a condition in which the body cannot use food properly. To understand diabetes, you need to know how your body uses food. The food that you eat turns into sugar in the stomach and intestines. It enters the bloodstream where it is carried to your body's cells. Insulin, a natural hormone made in the pancreas, is needed to help the sugar enter your cells. Insulin is like a key, opening up the cell so it can let sugar in. After entering the cell, the sugar is used for energy. If your body produces little or no insulin, or does not properly use the insulin it does make, you have diabetes.

There are two kinds of diabetes:

Type I diabetes: Usually starts in children, the body stops making insulin completely.

Type II diabetes: Called adult-onset diabetes, the body still makes some insulin, but cannot use it properly.

Risk factors for diabetes:

1. Family history
2. Obesity
3. Age greater than 45 years
4. Certain ethnic groups (African-Americans, Hispanic-Americans)
5. Diabetes during pregnancy or baby weighing more than 9 pounds
6. High blood pressure
7. High blood levels of triglycerides (a type of fat molecule)
8. High blood cholesterol level

Hyperglycemia (high blood sugar) can be caused by:

- too much food or the wrong foods -
- too little or no exercise
- too little diabetes medication or not taking diabetes medication as instructed
- too much stress
- infection or illness
- diabetes medication not being used properly in your body
- menstruation

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Training Manual DRAFT**

Hypoglycemia (low blood sugar) can be caused by:

- not following your meal plan - not eating enough food or changing your meal times
- too much exercise - getting unplanned exercise or exercising for a long time without eating a snack
- too much medication or a change in the time you take your medication - taking too much insulin or diabetes pills or changing the time you take your medicine
- stress - too much stress in your life
- side-effect of other medications
- alcohol intake, especially without food

Our bodies desire blood glucose to be maintained between **70 mg/dl and 110 mg/dl**. Below 70 is termed "hypoglycemia". Above 110 can be normal if you have eaten within 2 to 3 hours. That is why your doctor wants to measure your blood glucose while you are fasting...it should be between 70 and 110. Even after you have eaten, however, your glucose should be below 180. Above 180 is termed "hyperglycemia" (which translates to mean "too much glucose in the blood").

**Pharmacy Based Activities to Reverse and Manage Disease (PhARMD):
The Hypertension Project
Training Manual DRAFT**

Body Mass Index

Body Mass Index (BMI) is a measure that attempts to correct weight changes for height. Below is a list of the BMI ranges in normal, overweight, and obese patients.

Normal: 20-24.9

Overweight: 27-29

Obese: ≥ 30

Increased BMI values can lead to hypertension, stroke, arthritis, cardiovascular disease, and death.

How to calculate a BMI:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (in)}} * 703.1$$

Or

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}}$$

Conversions:

1 kg = 2.2 pounds

1 inch = 2.54 cm

1 foot = 12 inches

1 meter = 100 cm

Either one of the formulas above can be used to calculate the BMI.