



Dear Health Care Professional,

In 2009, 26% of Idaho adults surveyed reported being diagnosed with high blood pressure. We expect that including our undiagnosed population Idaho is close to the national estimates of 1 in 3 adults.

High blood pressure is one of the major modifiable risk factors for cardiovascular disease, kidney disease, and diabetes. Proper blood pressure measurements are vital for decisions regarding major diagnostic and therapeutic recommendations and must be correct, valid and reliable. When diagnosed early, Idaho citizens can change behaviors that can have serious consequences on their quality of life. This is especially true for the increasing number of Idahoans with diabetes. Identifying and managing high blood pressure early and continuously can prevent heart attacks and strokes.

We hope you will use this video and information to help you continue to provide accurate blood pressure readings and health promotion education. The Toolkit provides information on accurately and reliably taking a blood pressure measurement, how to properly maintain the blood pressure equipment, and patient education materials and tools. An [online order form](#) for the free patient education materials and tools is included in the Toolkit. We hope you will find the materials valuable. This Toolkit is a result of collaboration between the Idaho Heart Disease and Stroke Prevention Program, the Idaho Diabetes Prevention and Control Program and Boise State University School of Nursing.

After viewing the materials and video you may access a Certificate of Completion for educational hours, by submitting the online Blood Pressure Toolkit evaluation form. *Note: the certificate will only become available after submitting the online evaluation form; which you can only access after watching the video. If you are using the Blood Pressure Toolkit as a group-study please complete the evaluation on behalf of all participants.*

If you need technical assistance with the online Blood Pressure Toolkit please contact 208-334-0648 or 208-334-5559.

Sincerely,

Handwritten signature of April Dunham in black ink.

April Dunham  
Program Manager  
Idaho Heart Disease & Stroke Prevention

Handwritten signature of Mimi Hartman-Cunningham in black ink.

Mimi Hartman-Cunningham, MA, RD, CDE  
Program Manager  
Idaho Diabetes Prevention & Control Program



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## REFERENCES

- American Academy of Family Physicians [www.familydoctor.org](http://www.familydoctor.org)
- American Heart Association [www.americanheart.org](http://www.americanheart.org)
- National Heart, Lung and Blood Institute (NHLBI) [www.nhlbi.nih.gov/hbp](http://www.nhlbi.nih.gov/hbp)
- Blood Pressure Guidelines [www.nhlbi.nih.gov/guidelines/hypertension/index.htm](http://www.nhlbi.nih.gov/guidelines/hypertension/index.htm)
- Dash Eating Plan (Available from NHLBI) [www.nhlbi.nih.gov](http://www.nhlbi.nih.gov)
- National High Blood Pressure Education [www.nhlbi.nih.gov/about/nhbpep/index.htm](http://www.nhlbi.nih.gov/about/nhbpep/index.htm)



## Reference Card From the

# Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)

## EVALUATION

### CLASSIFICATION OF BLOOD PRESSURE (BP)\*

CATEGORY	SBP mmHg		DBP mmHg
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Hypertension, Stage 1	140-159	or	90-99
Hypertension, Stage 2	≥160	or	≥100

\* See *Blood Pressure Measurement Techniques* (reverse side)

Key: SBP = systolic blood pressure DBP = diastolic blood pressure

### DIAGNOSTIC WORKUP OF HYPERTENSION

- Assess risk factors and comorbidities.
- Reveal identifiable causes of hypertension.
- Assess presence of target organ damage.
- Conduct history and physical examination.
- Obtain laboratory tests: urinalysis, blood glucose, hematocrit and lipid panel, serum potassium, creatinine, and calcium. Optional: urinary albumin/creatinine ratio.
- Obtain electrocardiogram.

### ASSESS FOR MAJOR CARDIOVASCULAR DISEASE (CVD) RISK FACTORS

- Hypertension
- Obesity (body mass index  $\geq 30$  kg/m<sup>2</sup>)
- Dyslipidemia
- Diabetes mellitus
- Cigarette smoking
- Physical inactivity
- Microalbuminuria, estimated glomerular filtration rate  $< 60$  mL/min
- Age ( $> 55$  for men,  $> 65$  for women)
- Family history of premature CVD (men age  $< 55$ , women age  $< 65$ )

### ASSESS FOR IDENTIFIABLE CAUSES OF HYPERTENSION

- Sleep apnea
- Drug induced/related
- Chronic kidney disease
- Primary aldosteronism
- Renovascular disease
- Cushing's syndrome or steroid therapy
- Pheochromocytoma
- Coarctation of aorta
- Thyroid/parathyroid disease



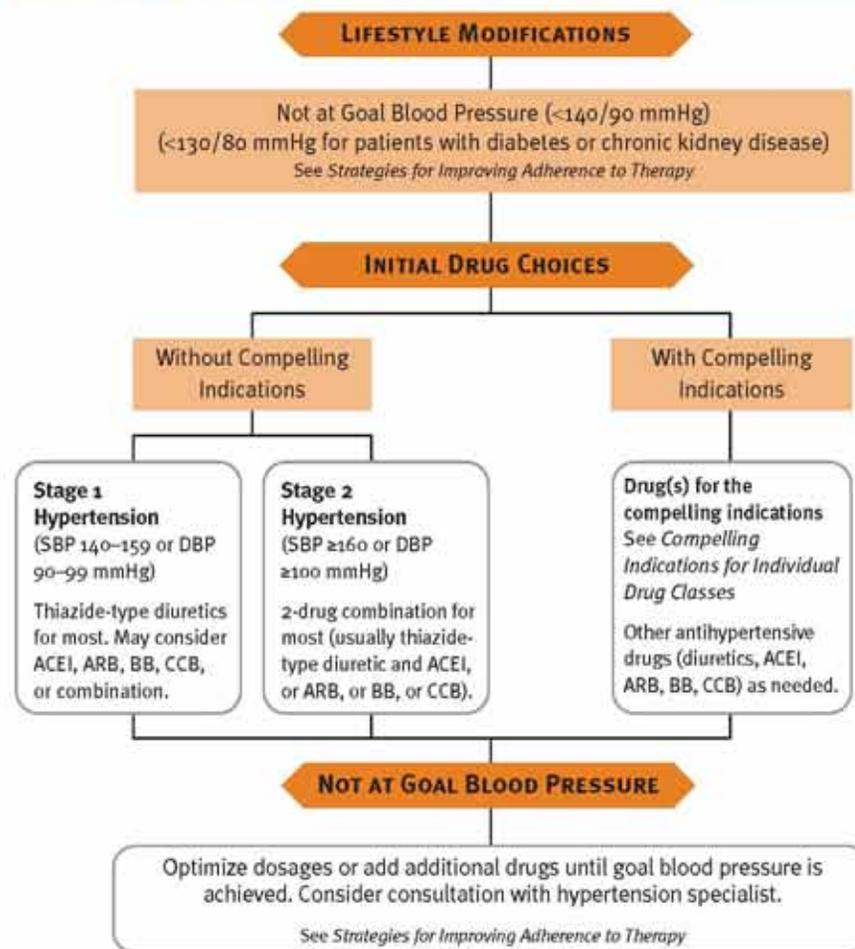
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health  
National Heart, Lung, and Blood Institute

## TREATMENT

### PRINCIPLES OF HYPERTENSION TREATMENT

- Treat to BP  $< 140/90$  mmHg or BP  $< 130/80$  mmHg in patients with diabetes or chronic kidney disease.
- Majority of patients will require two medications to reach goal.

### ALGORITHM FOR TREATMENT OF HYPERTENSION



## BLOOD PRESSURE MEASUREMENT TECHNIQUES

METHOD	NOTES
In-office	Two readings, 5 minutes apart, sitting in chair. Confirm elevated reading in contralateral arm.
Ambulatory BP monitoring	Indicated for evaluation of "white coat hypertension." Absence of 10–20 percent BP decrease during sleep may indicate increased CVD risk.
Patient self-check	Provides information on response to therapy. May help improve adherence to therapy and is useful for evaluating "white coat hypertension."

## CAUSES OF RESISTANT HYPERTENSION

- Improper BP measurement
- Excess sodium intake
- Inadequate diuretic therapy
- Medication
  - Inadequate doses
  - Drug actions and interactions (e.g., nonsteroidal anti-inflammatory drugs (NSAIDs), illicit drugs, sympathomimetics, oral contraceptives)
  - Over-the-counter (OTC) drugs and herbal supplements
- Excess alcohol intake
- Identifiable causes of hypertension (see reverse side)

## COMPELLING INDICATIONS FOR INDIVIDUAL DRUG CLASSES

COMPELLING INDICATION	INITIAL THERAPY OPTIONS
• Heart failure	THIAZ, BB, ACEI, ARB, ALDO ANT
• Post myocardial infarction	BB, ACEI, ALDO ANT
• High CVD risk	THIAZ, BB, ACEI, CCB
• Diabetes	THIAZ, BB, ACEI, ARB, CCB
• Chronic kidney disease	ACEI, ARB
• Recurrent stroke prevention	THIAZ, ACEI

Key: THIAZ = thiazide diuretic, ACEI = angiotensin converting enzyme inhibitor, ARB = angiotensin receptor blocker, BB = beta blocker, CCB = calcium channel blocker, ALDO ANT = aldosterone antagonist

## STRATEGIES FOR IMPROVING ADHERENCE TO THERAPY

- Clinician empathy increases patient trust, motivation, and adherence to therapy.
- Physicians should consider their patients' cultural beliefs and individual attitudes in formulating therapy.

The National High Blood Pressure Education Program is coordinated by the National Heart, Lung, and Blood Institute (NHLBI) at the National Institutes of Health. Copies of the JNC 7 Report are available on the NHLBI Web site at <http://www.nhlbi.nih.gov> or from the NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD 20824-0105; Phone: 301-592-8573 or 240-629-3255 (TTY); Fax: 301-592-8563.

## PRINCIPLES OF LIFESTYLE MODIFICATION

- Encourage healthy lifestyles for all individuals.
- Prescribe lifestyle modifications for all patients with prehypertension and hypertension.
- Components of lifestyle modifications include weight reduction, DASH eating plan, dietary sodium reduction, aerobic physical activity, and moderation of alcohol consumption.

## LIFESTYLE MODIFICATION RECOMMENDATIONS

MODIFICATION	RECOMMENDATION	AVG. SBP REDUCTION RANGE†
Weight reduction	Maintain normal body weight (body mass index 18.5–24.9 kg/m <sup>2</sup> ).	5–20 mmHg/10 kg
DASH eating plan	Adopt a diet rich in fruits, vegetables, and lowfat dairy products with reduced content of saturated and total fat.	8–14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to ≤100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg
Aerobic physical activity	Regular aerobic physical activity (e.g., brisk walking) at least 30 minutes per day, most days of the week.	4–9 mmHg
Moderation of alcohol consumption	Men: limit to ≤2 drinks* per day. Women and lighter weight persons: limit to ≤1 drink* per day.	2–4 mmHg

\* 1 drink = 1/2 oz or 15 mL ethanol (e.g., 12 oz beer, 5 oz wine, 1.5 oz 80-proof whiskey).

† Effects are dose and time dependent.



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health  
National Heart, Lung, and Blood Institute  
National High Blood Pressure Education Program

NIH Publication No. 03-5231

May 2003



# Idaho Adult Type 2 Diabetes Clinical Practice Guidelines

2012

## Supporting Organizations

- Blue Cross of Idaho
- Diabetes and Internal Medicine Associates
- Diabetes Resource Center West Valley Medical Center
- Family Health Services
- Garden City Community Clinic
- Glenns Ferry Health Center, Inc.
- Gritman Medical Center
- Humphreys Diabetes Center
- Idaho Academy of Family Physicians
- Idaho Diabetes Prevention and Control Program
- Idaho Medicaid
- Idaho Primary Care Association
- Idaho Public Health Districts
- Madison Memorial Hospital
- Mini Cassia Community Health Care Clinic
- North Idaho Health Network
- PacificSource Health Plans
- Qualis Health
- Regence Blue Shield of Idaho
- Rocky Mountain Diabetes and Osteoporosis Center
- Saint Alphonsus Diabetes Care and Education Program

Frequency	Procedure/Test	Action or Goal
<b>Every Visit</b>	Interval history	Review glucose testing log, hypoglycemic episodes, and tobacco use with patient
	Blood pressure	< 130/80 mmHg Individualize goals as necessary
	Weight	Obtain weight or preferably BMI
	Foot exam	Inspect skin for signs of pressure areas and breakdown
	Medication review and adjustment	Glucose lowering medications Antihypertensives if HTN present (ACE/ARB) Lipid controlling medications Antiplatelet therapy* Immunizations as indicated
<b>Quarterly to Semi-Annually</b>	A1C	Test 4 times/year; 2 times/year if in good control General goal: <7% Individual patient goal: as close to normal as possible while avoiding hypoglycemia*
<b>At Least Once Each Year</b>	Assessment of patient knowledge of diabetes, nutrition and self-management skills	Provide or refer for training in self-management and nutrition as needed, based on assessment
<b>Annually</b>	Foot risk assessment	Inspect, check pulses, conduct monofilament exam
	Nephropathy screening	For patients without known nephropathy, screen for microalbuminuria. Normal < 30 mcg of albumin per mg creatinine
		Measure serum creatinine to estimate GFR
		If nephropathy present, treat and monitor
	Lipid profile every 2 years unless abnormal	LDL= < 100 mg/dl; <70mg/dl if CVD or at risk HDL = men: > 40 mg/dl; women: > 50 mg/dl
	Retinal eye exam every 2 years unless abnormal	Dilated retinal exam by eye care professional
Dental exam	Counsel on importance of regular dental exams	

This guideline is in agreement with the American Diabetes Association (ADA). This guideline should not be construed as representing standards of care nor as a substitute for individualized evaluation and treatment based on clinical circumstances. For more information, including full documentation for the above clinical recommendations, consult the ADA website at [professional.diabetes.org/CPR\\_search.aspx](http://professional.diabetes.org/CPR_search.aspx) or contact the ADA at 1.800.DIABETES.

\* Detailed recommendations available at: [care.diabetesjournals.org](http://care.diabetesjournals.org).

For more information go to [www.diabetes.idaho.gov](http://www.diabetes.idaho.gov).

Saint Alphonsus Diabetes Care and Education Program

Shoshone Bannock Tribes

St. Joseph Diabetes Center

St. Luke's Health System

The Friendship Clinic

Treasure Valley Endocrinology, P.C. Dr. Foote

Treasure Valley Family YMCA



## **LIFESTYLE CHANGES TO LOWER BLOOD PRESSURE**

Lifestyle changes can help to prevent and/or manage high blood pressure. “Adoption of healthy lifestyles by all persons is critical for the prevention of high blood pressure and is an indispensable part of the management of those with hypertension. Major lifestyle modifications shown to lower blood pressure include weight reduction in those individuals who are overweight or obese, adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan, dietary sodium reduction, increase of physical activity, and moderation of alcohol consumption”. (JNC7)

### **1. Lose Weight if Overweight or Obese**

The latest national guidelines state that increased weight is a risk factor for cardiovascular disease, thus increasing the chance of having heart attacks or strokes. Provide the patient with their Body Mass Index (BMI) value and waist measurement and discuss their status. Provide patient with educational materials. [Free patient materials available; see Materials Order Form for more detail.]

### **2. Adopt the DASH Eating Plan**

The DASH eating plan (Dietary Approaches to Stop Hypertension) is high in fruits and vegetables (which are rich in potassium, calcium and magnesium). The plan recommends low fat dairy products and lean meats to reduce saturated fat and cholesterol. This eating plan has been proven to help reduce BP. In fact a 1500mg sodium DASH eating plan has effects similar to single drug therapy. (JNC7) Provide patient with educational materials on the DASH eating plan and review with the patient. [Free patient materials available; see Materials Order Form for more detail.]

### **3. Reduce Sodium Intake**

The benefit of limiting sodium intake to prevent or control high blood pressure has been a controversial issue for years. The National Institutes of Health (NIH) in May 2000 released the results of a clinical study that showed a large benefit to blood pressure from reduced dietary sodium. The DASH-Sodium trial, a multicenter 14-week feeding study showed that “the lower the amount of sodium in the diet, the lower the blood pressure, for both those with and without hypertension. Provide patient with educational materials. [Free patient materials available; see Materials Order Form for more detail.]

### **4. Increase Aerobic Physical Activity**

Regular physical activity should be encouraged as a means of weight control, to improve cardiovascular fitness and to reduce blood pressure. Current guidelines are for individuals to have at least 2.5 hours of moderate-intensity physical activity per week. Provide patient with educational materials. [Free patient materials available; see Materials Order Form for more detail.]

### **5. Limit Alcohol**

Men should limit their alcohol consumption to less than 24 ounces of beer, 10 ounces of wine, or 2 ounces of liquor per day and only half these amounts for women and lighter weight persons. Review these guidelines with patients who consume alcohol.

### **6. Stop Smoking!**

Advise and assist patients to stop smoking if they smoke. Provide patient materials on smoking cessation. [Free patient materials available; see Materials Order Form for more detail.]



## COMMON CAUSES OF BLOOD PRESSURE MEASUREMENT ERRORS

### Manometer

Cause	Effect	Correction
Loss of mercury.	Reading too low.	Have mercury added.
Too much mercury.	Reading too high.	Have extra mercury removed or have system cleaned.
Clogged diaphragm.	Mercury will not rise easily or bounces.	Have diaphragm replaced.
Dirty mercury or dirty acrylic tube.	Mercury meniscus is irregular and reading is impaired.	Have mercury and acrylic tube cleaned.

### Inflation System

Cause	Effect	Correction
Bladder too small.	High reading.	Use the proper size cuff. The circumference and <u>diameter</u> of the arm determines the size needed.
Bladder too large.	Low reading.	Use the proper size cuff. The circumference and <u>diameter</u> of the arm determines the size needed.
A leak in the bladder or tubing.	Mercury continues to fall when valve is closed.	Replace bladder or tubing.
Bladder not centered over artery.	High reading.	Use proper technique.
Cuff not applied snugly.	High reading.	Reapply cuff.
Cuff applied over clothing.	Incorrect reading.	Apply cuff to bare arm.
Pressure bulb has air leaks.	Mercury continues to fall when valve is closed.	Replace bulb.
Control valve "sticks."	Unable to control deflation.	Replace valve.
Control valve dirty, worn, or has broken parts.	Mercury continues to fall when valve is closed.	Have valve repaired or replaced.

### Stethoscope

Cause	Effect	Correction
Ear tips not forward.	Impairs screener's ability to hear the BP sounds.	Use proper technique.
Stethoscope placed under cuff or near tubing.	False sounds-incorrect reading.	Use proper technique.
Stethoscope applied with heavy pressure.	Sounds may be heard below the true diastolic resulting in an incorrect reading.	Use proper technique.



## COMMON CAUSES OF BLOOD PRESSURE MEASUREMENT ERRORS

(CONTINUED)

### Screeenee

Cause	Effect	Correction
Slouched.	High reading.	Have screenee sit up straight.
Brachial pulse below heart level.	High reading.	Place arm so that brachial is at heart level.
Arm not fully supported on stable surface.	High reading.	Place entire arm on desk, table.
Brachial pulse above heart level.	Low reading.	Place arm so that brachial is at heart level.
Clothing around arm too tight.	Incorrect reading.	Remove clothing on arm.
Leaning on arm.	High reading.	Have screenee sit back in chair with no weight on arm.

### Screener

Cause	Effect	Correction
Inflation rate slow or inconsistent.	Incorrect reading may cause auscultatory gap.	Maintain rapid and constant inflation rate.
Cuff inflated too high.	Painful to screenee and may cause incorrect reading.	Determine MIL.
Deflation rate too slow.	High diastolic reading and may cause auscultatory gap.	Deflate at 2-3 mmHg per second.
Deflation rate too fast.	Low reading.	Deflate at 2-3 mmHg per second.
Cuff reinflated after deflation has begun.	Incorrect reading.	Deflate cuff completely. Wait 15-30 seconds before reinflating.
Observer bias, digit preference, cut-point bias, previous reading bias or fatigue.	Incorrect reading.	Be aware of and on guard against these problems.



## **TESTING ANEROID MANOMETERS FOR ACCURACY**

The aneroid manometer consists of a round gauge connected by tubing to a blood pressure. This instrument is reliable and easy to use as long as it is checked regularly to determine its accuracy (every 3-6 months depending on frequency of use). The mechanical workings of the aneroid manometer are more easily disturbed than those of a mercury manometer. The dial at the zero mark of an aneroid under no pressure does not mean that the instrument will provide accurate readings. The aneroid must be checked against a mercury manometer (at several points throughout the range) to establish its accuracy. Mercury manometers will provide accurate readings if the mercury is at "0" on the scale when the instrument is not under any pressure and if the mercury is not dirty or does not bounce excessively on deflation. Companies that specialize in servicing and repair of laboratory equipment can usually test and calibrate aneroids.

### **Test for Accuracy of Aneroid Manometers**

#### **Equipment needed:**

- Aneroid manometer to be tested.
- Mercury manometer.
- Y-Connector. (Note: A "calibration Y-Connector" can be purchased at most medical supply firms.)
- Bulb and valve from aneroid.

#### **Technique:**

- Remove coiled tubing from mercury manometer. Connect one end of "Y" connector to mercury manometer.
- Connect the other end of "Y" to aneroid manometer gauge.
- Connect tail of "Y" tubing to aneroid's pressure bulb.
- Hold aneroid gauge at same level as mercury manometer (for accurate viewing).
- Inflate mercury gauge to 4 different test levels (60, 120, 180, and 240 mmHg).
- Compare aneroid reading to reading on mercury manometer at each level and compute average deviation.
- If not accurate within plus or minus 2-4 mmHg at any one test level or as an average deviation of the four test levels, then discontinue use and replace or repair faulty gauge.

#### **Additional checks:**

- Bladder: Should be intact without leaks. Center of bladder should be marked.
- Tubing: Should have no leaks.
- Valve: Should not stick or leak.
- Cuff: Should fasten securely.



## **SUMMARY OF BLOOD PRESSURE MEASUREMENT TECHNIQUE**

### **1. Patient position:**

- a. Seated with feet flat on floor.
- b. Leaning against back of chair, not on their arm.
- c. Entire arm fully supported on table with brachial artery at heart level.
- d. Upper arm should be bare — **do not apply cuff over clothing.**

### **2. Cuff size:**

- a. Most modern cuffs are marked with range lines to denote need to use larger or smaller cuff.
- b. If cuff isn't marked, the screener must ensure that the rubber bladder covers 80% of the circumference of the arm (100% in children) and that the width of the bladder covers 40% of the circumference of the arm.

### **3. Cuff placement:**

- a. Apply the proper-sized cuff **snugly** to bare upper arm.
- b. Place center of bladder directly above brachial artery.
- c. Place bottom edges of cuff about 1" above the crease in the elbow.

### **4. Palpate (feel) for radial pulse.**

### **5. Inflate manometer while palpating radial pulse:**

- a. Note level at which radial pulse disappears.
- b. Release air from cuff rapidly.

### **6. Wait 15 seconds and then:**

- a. Palpate brachial pulse.
- b. Place ear tips of stethoscope in ears with tips facing forward.
- c. Place stethoscope over brachial artery **not touching the cuff.**

### **7. Measure blood pressure by:**

- a. Rapidly inflating cuff to a level 20-30 mmHg above the point where the radial pulse disappeared.
- b. While slowly releasing the air in the cuff, listen for the Korotkoff sounds.

**The first of two consecutive sounds is recorded as the systolic pressure.  
The diastolic is recorded at the level where the sound disappears.**

### **8. When the sound disappears:**

- a. Continue to deflate the cuff slowly for another 10 mmHg.
- b. If no further sounds are heard, rapidly release all air in the cuff and record the BP.



## RECOMMENDATIONS AND MATERIALS FOR EDUCATING YOUR PATIENTS

This information should be individualized to each patient. Written educational materials should be appropriate for the patient's literacy level, culturally sensitive, and available to patients to take with them when they leave. Every patient should be minimally educated according to the following recommendations at the time of BP measurement.

### Protocol

1. List and briefly explain the controllable and uncontrollable risk factors for heart disease and stroke.

Controllable	Uncontrollable
Smoking	<b>Heredity</b> (history in immediate family of a CVD event or sudden death before age 55)
Obesity	<b>Gender</b> (risk is higher starting at age 45 in men - age 55 in women)
High blood pressure	<b>Race</b>
Lack of exercise	<b>History of prior cardiovascular event</b>
High blood cholesterol	
Low HDL cholesterol	
Diet	

2. Educate the individual about the risk factors he/she has, identifying those risks that the patient could improve through lifestyle behavior modification. Discuss any co-morbid conditions and complications (i.e. chronic kidney disease, diabetes, etc.) with patient.
3. Provide patient with a written copy of their blood pressure numbers and explain where their results fall according to national guidelines. [Free patient materials available; see online [Material Order Form](#) for more detail.]
4. Tell the patient that a single blood pressure measurement does not constitute a diagnosis of hypertension.
5. If you are not the patient's primary healthcare provider, refer the patient to their health care provider for further counseling if their BP measurement is not within normal range and/or if they need counseling for any other risk factor. Refer patient to services as appropriate, a dietician for nutrition counseling or smoking cessation services.
6. Answer any questions the patient may have about his/her results.



**Thank you for reviewing the provider materials please proceed to the [Blood Pressure Sights & Sounds Video](#).** Note: while watching the video, it will be helpful to have the “Summary of Blood Pressure Measurement Technique” from page 10 in front of you.

If the link above does not work please copy and paste the following URL into your web browser:

<http://healthandwelfare.idaho.gov/Health/DiseasesConditions/HeartDiseaseStrokePrevention/BloodPressureToolkit/BloodPressureSightsandSoundsVideo/tabid/2150/Default.aspx>