

Diagnostic Guidelines for Blood Pressure Screening Techniques



Course Author(s): Connie M. Kracher, PhD, MSD

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Disclaimer: Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Conflict of Interest Disclosure Statement

- The author reports no conflicts of interest associated with this course.

Introduction - Blood Pressure Screening

In November 2017, the American Heart Association (AHA) created new hypertension guidelines. The new guidelines were developed by the American College of Cardiology, AHA, and nine other national healthcare organizations after a review of over 900 published studies in the latest (2003) published report: Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. With the new national guidelines, nearly half of U.S. adults 20 years and older will be diagnosed with high blood pressure or hypertension. This means there are 1 in 4 men and 1 in 5 women that are not aware they have hypertension, have not been treated, or their hypertension has not been controlled. With an aging population and lifestyle choices of young adult and adult patients, the prevalence of hypertension is expected to increase. Many patients see a dentist more frequently than medical professionals, providing the dental team an opportunity to screen and monitor blood pressure measurements and discuss correlational systemic conditions.

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Overview

The death rate from hypertension-related diseases (high blood pressure) in the United States increased nearly 11% between 2005 and 2015. Related conditions to hypertension include cardiovascular diseases (CVD), stroke, and chronic kidney diseases. In a survey conducted by Malamed of more than 2,700 dentists in North America, 14,000 potentially life-threatening emergencies occurred while patients were in their dental practice. Hypertension is linked to risk factors that fall into two categories: 1) risk factors that are outside the patient's control, such as family history, age, gender, and race, and 2) risk factors that the patient can control, such as physical activity, heart-healthy diet, overweight or obesity, medications and supplements, drug and alcohol use.

Other variables such as tobacco, stress, and physiological conditions e.g. sleep apnea are additional risk factors that contribute to hypertension. Obesity is a global issue, with a direct link to sleep apnea and other systemic conditions e.g. diabetes, cardiovascular, and metabolic syndrome. Obese patients are at an increased risk for hypertension and coronary

heart disease, the most common type of heart disease. New studies show obesity may also increase the chance of peripheral artery disease (PAD) e.g. arms, legs, and feet. PAD is not just a senior disease. Currently 6.8 million Americans ages 40 and older were diagnosed with peripheral artery disease. We also need to screen our young adult patients. The Centers for Disease Control (CDC) recently reported the prevalence of obesity in the U.S. was 18.5%, affecting 13.7 million children and adolescents. The CDC has also reported that children and adolescents have high blood pressure, with 4% of youth aged 12-19 years old diagnosed with hypertension and another 10% having elevated blood pressure (previously prehypertension). Recent research studies are suggesting a causal relationship between overweight young adults and heart problems and an increased risk of ischemic stroke in young adults.

Taking patient blood pressure measurements during dental examinations is critical to our patient's overall health. A baseline blood pressure reading should be established and then monitored at future dental appointments by dental staff. It is important for medical and dental providers to tell our patients what their blood pressure readings are each time, so that they can keep track of differences themselves. The 2017 guidelines recommend taking on average, 2-3 blood pressure readings on at least two different occasions to provide baseline data on each patient. Factors that may affect the accuracy of blood pressure measurements include caffeine, recent physical activity, smoking, and stress to name a few. Screening for blood pressure by dental professionals has proven to be extremely effective since many patients with hypertension may be unaware of their condition, as hypertension can develop slowly over time.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Recognize causes of hypertension.
- Determine how to assess identifiable causes of hypertension.
- Explain the terms systolic, diastolic, and pulse pressures.
- Identify the various blood pressure categories.
- List factors that influence blood pressure.

- Explain the equipment needed to determine blood pressure.
- Demonstrate how to take blood pressure measurements.
- Discuss follow-up recommendations for patient treatment.
- Discuss various resources for lifestyle modification recommendations.

Glossary

antecubital fossa – The inside crease of the elbow.

brachial artery – Main artery of the arm.

blood pressure – The force exerted by the blood on the blood vessel walls.

Cushing’s Syndrome – Abnormal bodily condition that is caused by excess corticosteroids.

coarctation – A narrowing or constricting, especially of the aorta or a blood vessel.

diastolic pressure – The lowest pressure; it is the effect of ventricular relaxation.

hypertension – High blood pressure.

Korotkoff sounds – Arterial sounds heard through a stethoscope that change with varying cuff pressure and that are used to determine systolic and diastolic blood pressure.

mm Hg – Millimeters of mercury.

pulse pressure – The difference between the systolic and diastolic pressure.

renovascular disease – A progressive condition that causes narrowing or blockage of the renal arteries or veins.

sleep apnea – Brief periods of recurrent cessation of breathing during sleep.

systolic pressure – The peak or highest pressure, it is caused by ventricular contraction.

sphygmomanometer – The blood pressure cuff or machine.

Blood Pressure

Nearly half of American adults have high blood pressure or hypertension. Having high blood pressure places your patients at risk for systemic diseases, such as heart disease and stroke. Heart disease is *the* leading cause of death and stroke is the third-leading cause of death in the United States. Twenty-five percent of adults have elevated (formerly prehypertension) blood pressure measurements that are higher than normal. Elevated blood pressure measurements are a red flag to dental and medical providers of our patients risk for hypertension.

Blood pressure (BP) is the force exerted by the blood on the blood vessel walls. This force makes a noise called **Korotkoff** sounds. When the left ventricle of the heart contracts, blood is forced out into the aorta and travels through the large arteries to the smaller arteries, arterioles, and capillaries. During the course of the cardiac cycle, blood pressure is changing constantly.

Systolic Pressure

Systolic pressure is the peak or highest pressure. It is caused when the heart muscle contracts. The normal systolic pressure is less than 120 mm Hg. With patients over 50 years of age, a systolic reading higher than 140 mm Hg is a greater risk factor with cardiovascular disease, than a high diastolic reading.

Diastolic Pressure

Diastolic pressure is the lowest pressure. It measures the pressure in the arteries between heartbeats (when the heart muscle is resting between beats and refilling the blood.) The normal diastolic pressure is less than 80 mm Hg.

Pulse Pressure

Pulse pressure is the difference between the systolic and the diastolic pressures. The normal or safe difference is less than 45 mm Hg.

Blood Pressure Categories

The AHA recommends BP screening occur starting at age 20, unless a medical condition or other variables such as obesity would require a patient younger than 20 years of age be screened and monitored. BP readings defined by the AHA include normal, elevated (formerly

prehypertension), two stages of hypertension, and hypertensive crisis.

Elevated (formally prehypertension) is a designation meant to alert patients of the need to intervene and prevent hypertension. Patients in this designation have increasing health risks and need to make lifestyle changes to return to a normal reading. If changes are not made, prehypertension may progress into hypertension – a serious health risk. Dental and medical providers should reassess BP at future appointments.

Treatment options for Stage 1 hypertension may require prescription medications based on their risk of atherosclerotic cardiovascular disease (ASCVD), e.g., heart attack or stroke. For Stage 2, medical providers are likely to prescribe a combination of blood pressure medication and lifestyle changes. With both stages of hypertension, dental providers should refer to the patient’s source of care (medical provider).

The stage of hypertension that requires immediate medical attention is hypertensive crisis, where BP readings exceeds 180/120. If the patient has these readings, let the patient rest and test again. While the patient rests, check to see if your patient is experiencing any of the following: chest pain, shortness of breath, back pain, numbness or weakness, change in vision or difficulty speaking. If they are, contact 911 immediately.

What are the Symptoms for High Blood Pressure?

The AHA continues to call hypertension (high blood pressure) the “silent killer.” There are no concrete symptoms for high blood pressure. Headaches, dizziness, and nosebleeds (epistaxis) are not usually caused by high blood pressure, unless the patient is in hypertensive crisis (systolic 180 or greater and/or diastolic 120 or greater). In this case, you should call 911. Facial flushing may occur with high blood pressure, but high blood pressure is not the cause of

Blood Pressure Category	Systolic mm Hg	Diastolic mm Hg
Normal	Less than 120 and	Less than 80
Elevated (formerly prehypertension)	120–129 and	Less than 80
High Blood Pressure (Hypertension) Stage 1	130–139 or	80–89
High Blood Pressure (Hypertension) Stage 2	140 or higher or	90 or higher
Hypertensive Crisis	Higher than 180 and/or	Higher than 120
Source: American Heart Association 2017		

facial flushing. Factors such as spicy foods, sun exposure, cold weather, hot drinks, medical conditions, and exercise are more of the cause of facial flushing. Although dizziness is not the cause of high blood pressure, it may be a side effect of some blood pressure medications. In addition to extreme blood pressure readings, severe headaches and nosebleeds, patients may also experience severe anxiety and shortness of breath. Again, it must be stressed that if your patient is in hypertensive crisis (systolic 180 or greater and/or diastolic 120 or greater) they must receive emergency care immediately – call 911.

Modifiable and Relatively Fixed Risk Factors that Influence Blood Pressure

Several risk factors are associated with the development of hypertension:

- Family History – parents or other immediate family members who have high blood pressure increase your patient’s risk. The AHA recommends monitoring blood pressure readings, identifying any changes.
- Age – as U.S. adults age, the more likely blood pressure readings can increase. Blood vessels lose elastic quality which can increase blood pressure.
- Gender-related risk patterns – until age 45, men are more likely to have high blood pressure than women. However, as women reach 65 years and older (after menopause) they are more likely to develop high blood pressure, due to loss of estrogen. However, hormone replacement therapy (HRT) has not shown to lower blood pressure.
- Race – Black patients tend to develop high blood pressure at a younger age and is more severe than White patients.
- Overweight/obesity and lack of physical activity – weight gain places a strain in the heart and the circulatory system, increasing your patients’ risk for cardiovascular disease, diabetes, and stroke.
- Unhealthy diet – high in calories, saturated fat, carbohydrates, and sodium can contribute to weight gain and an increase in sodium blood levels.
- Sleep apnea – correlated with lack of sleep and oxygen levels can contribute to high blood pressure.
- Drinking alcohol in excess – regular, heavy use of alcohol can contribute to

cardiovascular disease, stroke, irregular heartbeats, and cancer to name a few conditions.

- Tobacco use – current cigarette and secondhand smoking increases blood pressure temporarily and damages arteries.
- Stress – contributes to behaviors that can exacerbate blood pressure such as poor diet, lack of physical activity, and the use of tobacco and alcohol products.

Left untreated, high blood pressure increases the load of the heart and arteries causing damage to the circulatory system over time, such as heart enlargement, atherosclerosis where the walls of the arteries become stiff and brittle as fatty deposits develop inside the artery walls. Untreated high blood pressure may lead to coronary heart disease, angina, myocardial infarction, stroke, kidney damage, peripheral artery disease, and heart failure. Recent statistics indicate 74% of U.S. adults who have congestive heart failure, 77% who have had a stroke, and 69% who have had a myocardial infarction had blood pressure readings over 140/90.

Assessment for Identifiable Ideologies of Hypertension

There are also many medications, supplements, and physiological conditions that play a role in hypertension. The medical history should include questions on:

- NSAIDs
- Decongestants
- Amphetamines
- Antidepressants
- Atypical antipsychotics
- Angiogenesis inhibitor
- Systemic corticosteroids
- Oral contraceptives
- Caffeine (intake > 300 mg/d)
- Alcohol
- Herbal supplements e.g., ginkgo, ginseng, licorice, and St. John’s wort
- Recreational drugs

Common Physiological Causes

- Diabetes mellitus
- Dyslipidemia/Hypercholesterolemia (high lipid/high cholesterol readings)
- Renal parenchymal diseases
- Renovascular diseases

- Primary aldosteronism
- Drug or alcohol-induced
- Obstructive sleep apnea

Uncommon Physiological Causes

- Pheochromocytoma/paraganglioma
- Cushing’s syndrome
- Hypothyroidism
- Hyperthyroidism
- Primary hyperparathyroidism
- Congenital adrenal hyperplasia
- Undiagnosed or repaired aortic coarctation
- Mineralocorticoid excess syndromes (other than primary aldosteronism)
- Acromegaly

With the new AHA guidelines, medical providers are encouraged to utilize the atherosclerotic cardiovascular disease risk calculator (ASCVD) to assess the patient’s risk of developing heart disease or stroke within 10 years. The calculator is a standardized guideline to predict risk and recommend management strategies for those at risk of ASCVD. It includes a history questionnaire of ASCVD e.g., acute coronary syndrome, myocardial infarction, stable angina, coronary/or other arterial revascularization, stroke, transient ischemic attack, or peripheral artery disease.

Conditions when Measuring Blood Pressure in the Dental Office

The new BP guidelines suggest before blood pressure readings are taken the following conditions should occur at least 30 minutes prior to measurement to provide the most accurate blood pressure reading: no smoking, no exercise, and no caffeinated beverages, as these actions may cause a short-term rise in blood pressure. They also recommend the patient go to the bathroom before the test, as having a full bladder can change their blood pressure reading. It is recommended the patient sit for at least 5 minutes before their BP is taken, as movement can cause a short-term rise in blood pressure. It is also recommended you take 2-3 readings 1-2 minutes apart and record all results.

Types of Blood Pressure Devices

Blood pressure measurement devices are categorized as: manual sphygmomanometers, digital non-portable for upper arm with

automatic inflation, digital portable for upper arm with automatic inflation, digital portable for wrist with automatic inflation, and digital portable for finger with automatic inflation. In recent testing by Consumer Reports, 29 models were tested with trained medical personnel conducting 6,000 readings on men and women. The upper arm cuff devices were found to be more accurate than wrist devices. The AHA recommends an automatic, cuff-style, upper-arm monitor. The Omron brand (Figure 1) continues to be rated high by Consumer Reports. Recent testing by Consumer Reports also rated Rite Aid, A&D Medical, and ReliOn (Walmart) high for consistent accuracy.

For manual sphygmomanometers, the **sphygmomanometer** (blood pressure cuff or machine) consists of an inflatable cuff and two tubes; one tube is connected to the pressure hand control bulb and the other tube to the pressure gauge (Figure 2). The size of the patient determines the size of the cuff selected. There are several cuff sizes. The cuff width should be 20% greater than the diameter of the arm. When a cuff is too narrow, the blood pressure reading is too high; when the cuff is too large, the reading is too low.

Selection Criteria for BP Cuff Size

Arm Circumference	Usual Cuff Size
22-26 cm	Small Adult
27-34 cm	Adult
35-44 cm	Large Adult
Source: American Heart Association	

The **stethoscope**, a listening aid that magnifies sound is used with manual devices and consists of two earpieces that are connected by tubes that carry the sound to the earpieces from the end piece, which is placed over the artery (Figure 3). Dental professionals should invest in quality stethoscopes that detect sound easily.



Figure 1. Digital, portable automated unit.



Figure 2. Sphygmomanometer.



Figure 3. Stethoscope.

Providers should not have to strain to hear sounds. Replace parts to existing stethoscopes or replace entire stethoscope if necessary.

Accurate Measurement of Blood Pressure in the Office

1. Preparing the Patient

- a. Explain to your patient ahead of time that you will be taking their blood pressure. Ask the patient to avoid caffeine, exercise, and smoking for at least 30 minutes before BP measurements.
- b. Before you seat the patient, ask the patient to empty their bladder, as this can cause an increase in blood pressure.
- c. Seat the patient comfortably for at least 5 minutes in a non-dental chair, with their arm slightly flexed, palm up and the entire forearm supported on a level surface, even with the heart. Feet are flat on the floor (legs not crossed) and back supported.
- d. Neither the patient or the provider should be talking during the rest period or during BP measurements.
- e. Take BP measurements over your patient's bare arm, not over clothing.
- f. At the first visit, record BP in both arms. Use the arm that gives the higher reading for subsequent readings. It is important that the patient always be in the same position using the same arm. Differences in body position and arm used can make a difference in the reading of 10 mm Hg or more.
- g. Separate repeated measurements by 1-2 minutes.

2. Apply the Cuff

- a. Apply the completely deflated cuff to the patient's arm, supported at the level of the heart.
- b. Place the portion of the cuff that contains the inflatable bladder directly over the brachial artery. The cuff may have an arrow to show the point that should be placed over the artery (Figure 4). The lower edge of the cuff is placed one inch above the antecubital fossa (inside crease of the elbow). The key is to fasten the cuff evenly and snugly (Figure 5).
- c. Adjust the position of the gauge for convenient reading.
- d. Palpate the area between the antecubital fossa and cuff to locate the brachial artery pulse found on the inside of the forearm. The stethoscope end piece is placed over the spot where the brachial pulse is felt (Figure 5).
- e. Position the stethoscope earpieces in your ears, with the tips directed forward.

3. Locate the Radial Pulse

- a. On the same arm, feel the inside of the wrist, above the thumb with your index and middle fingers until you feel the pulse.
- b. Hold your fingers on the pulse.

4. Inflate the Cuff

- a. Close the needle valve (air lock) attached to the hand control bulb firmly by turning it clockwise, but not too tight so it may be released easily.



Figure 4.



Figure 5.

- The patient should be seated in a non-dental chair with feet flat on the floor (legs not crossed), with one arm resting at the level of their heart.
- Wrap the deflated cuff around the arm snugly about 3 cm above the elbow.
- Try to keep the cuff as flat as possible.

- b. Pump to inflate the cuff until the radial pulse stops. Note the mercury level at which the pulse disappears.
- c. Look at the dial, and pump to 20 or 30 mm Hg beyond where the radial pulse was no longer felt. This is called the Maximum Inflation Level (MIL). It means that the pressure of the cuff collapses the brachial artery and no blood is flowing through the artery.

5. Position the Stethoscope End Piece

- a. Place the end piece of the stethoscope over the palpated brachial artery, in the one-inch space above the antecubital fossa, and slightly toward the inner side of the arm. Hold tightly in place.

- b. It is important the stethoscope can detect sounds easily. The provider should not strain to hear sounds. If so, it is recommended stethoscope parts are replaced or the entire stethoscope is replaced if necessary.

6. Deflate the Cuff Gradually

- a. Release the air lock slowly counterclockwise 2 to 3 mm per second, so the dial drops very gradually and steadily.
- b. Listen for the first Korotkoff sound: systole (“tap, tap”). Note the number on the dial, which is the systolic pressure. This is the beginning of the flow of blood past the cuff.
- c. Continue to release the pressure slowly. The sound will continue, first becoming louder, then diminishing and becoming muffled, until finally disappearing. Note the number on the dial where the last distinct tap was heard (not the muffled sound). This number is the diastolic pressure.
- d. Let the rest of the air out rapidly.

7. Repeat for Confirmation

- a. Wait 1-2 minutes before inflating the cuff region again. More than one reading is needed to determine an average and ensure a correct reading.
- b. The new guidelines recommend an average of >2 readings be obtained on >2 occasions to estimate the patient’s level of BP.

8. Record SBP and DBP

- a. Write the date and arm used.
- b. Record systolic (SBP) and diastolic (DBP) as a fraction. Example: R Arm, Nov. 3, 20XX 120/80.
- c. The new guidelines recommend noting the time of the most recent BP medication taken by the patient before BP measurements.
- d. The new guidelines also recommend patients are provided with their SDP/DBP readings both verbally and in writing.

Automatic Device Blood Pressure Procedures

Preparation of the patient is the same when using an automatic arm blood pressure device e.g., Omron. However, the manufacturer’s

instructions for using an automatic blood pressure device can be different. Read the manufacturer's instructions carefully before using the device.

Hypertension should not be diagnosed with only one reading. Blood pressure reading should be taken in a variety of different situations e.g., dental office, medical office, patient's home. As we know, some patients may experience hypertension from being in our dental office.

In a study published in Lancet about the accuracy of BP readings in both arms, the researchers indicated a systolic number difference of 10-15 mm Hg or more could be an indication of a more serious problem, such as narrowing arteries, decreased blood flow to the brain, and a significantly increased chance of heart attack and stroke. Should the dental professional see such BP readings, they should take the BP readings again after approximately 5-10 minutes. If the BP readings received are still inconsistent (10-15 mm Hg) between the patient's arms, the patient should be referred to their medical provider (source of care).

Lifestyle Modification Recommendations for Patients

General nonpharmacological intervention recommendations dental professionals can discuss:

- Weight loss

- Heart-healthy diet e.g., DASH
 - Sodium reduction e.g., <1500 mg/d
 - Potassium supplementation e.g. 3500-5000 mg/d
- Increased physical activity e.g., aerobic, dynamic resistance, isometric resistance
- Moderation in alcohol intake e.g., no more than 2 drinks for men and 1 for women per day

Time restraints at dental appointments prevent in-depth counseling for patients. It is recommended doctors and their staff provide information from professional websites, such as the AHA. Their professionals link provides guidelines and statements, as well as tools such as Get with the Guidelines on Heart Failure and Stroke, Target: BP, Stroke, and Heart Failure. The AHA also has additional links to Healthy Living and Health Topics, providing educational materials for your patients.

Summary

With almost half of the U.S. adult population diagnosed with hypertension, blood pressure measurements should be screened and monitored on a regular basis in the dental practice. This course provides dental professionals the information needed for hypertension assessment, as well as the appropriate method of taking blood pressure measurements, and links to professional websites providing educational materials for lifestyle modifications.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: www.dentalcare.com/en-us/professional-education/ce-courses/ce490/start-test

- 1. When looking at the patient's blood pressure in their chart the _____ is the lower number.**
 - A. diastolic
 - B. systolic
 - C. pulse
- 2. If a patient's systolic blood pressure is 150-159 after repeated attempts, the dental professional will _____.**
 - A. recheck in 1 year
 - B. confirm within 2 months
 - C. refer to source of care (medical provider)
 - D. refer to source of care immediately
- 3. Before blood pressure is taken it is recommended there is _____ at least 30 minutes prior to BP measurements.**
 - A. no smoking
 - B. no exercise
 - C. no caffeine
 - D. All of the above.
- 4. The _____ pressure reading is the highest pressure and is the effect of ventricular contraction.**
 - A. diastolic
 - B. systolic
 - C. pulse
- 5. A blood pressure range of 130-139/80-89 is considered to be _____.**
 - A. normal
 - B. prehypertension
 - C. hypertension stage 1
 - D. hypertension stage 2
- 6. For a patient with blood pressure readings of 121/82, the dental professional will recommend to _____.**
 - A. reassess at future appointments
 - B. refer to source of care (medical provider)
 - C. refer to source of care immediately
 - D. None of the above.
- 7. The diastolic pressure is the _____.**
 - A. first sound you hear
 - B. last distinct sound you hear
 - C. very last sound you hear
 - D. muffled sound you hear

8. **Hypertension should not be diagnosed with only one reading. Blood pressure reading should be taken in a variety of different situations e.g., dental office, medical office, home, as some patients experience hypertension in the dental office.**
- A. Both statements are true.
 - B. The first statement is true. The second statement is false.
 - C. The first statement is false. The second statement is true.
 - D. Both statements are false.
9. **A higher percentage of men than women have high blood pressure until 45 years of age. After 64 years of age, a much higher percentage of women have high blood pressure than men.**
- A. Both statements are true.
 - B. The first statement is true. The second statement is false.
 - C. The first statement is false. The second statement is true.
 - D. Both statements are false.
10. **When taking a blood pressure the inflatable bladder of the cuff is placed directly over the _____ artery.**
- A. radial
 - B. carotid
 - C. brachial
 - D. femoral
11. **There are no concrete symptoms for high blood pressure. A flushed face, headache, and nosebleeds may not be symptoms of high blood pressure.**
- A. Both statements are true.
 - B. The first statement is true. The second statement is false.
 - C. The first statement is false. The second statement is true.
 - D. Both statements are false.
12. **To verify you have a more accurate blood pressure reading, how many times should you take your patient's blood pressure at their appointment?**
- A. 1 time
 - B. 2-3 times with at least 1 minute between readings
 - C. 2-3 times immediately without waiting
 - D. 8-10 times with 1 minute between readings
13. **Stress contributes to behaviors that can exacerbate (worsen) blood pressure. Poor diet, lack of physical activity, and the use of tobacco and/or alcohol products are behaviors that may occur when our patient is stressed.**
- A. Both statements are true.
 - B. The first statement is true. The second statement is false.
 - C. The first statement is false. The second statement is true.
 - D. Both statements are false.
14. **Patients in hypertensive crisis should receive immediate emergency treatment. What is the blood pressure reading for a patient considered to be in hypertensive crisis?**
- A. 140/70 mm Hg
 - B. 150/80 mm Hg
 - C. 160/90 mm Hg
 - D. >180/>120 mm Hg

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Additional Resources

Sources for Patient Educational Materials:

- [American Heart Association \(AHA\)](#)
- [Centers for Disease Control \(CDC\) – High Blood Pressure Educational Materials for Patients](#)
- [National Heart, Blood, and Lung Institute \(NHLBI\) Health Information Center](#)

About the Author

Connie M. Kracher, PhD, MSD



Dr. Kracher is an Associate Professor of Biology and Director of the Institute for Research at Purdue University Fort Wayne. Dr. Kracher is a national Key Opinion Leader (KOL) for several R&Ds, consultant for national dental organizations, and has presented for the American Dental Association, American Dental Education Association, and the World Dental Federation. Dr. Kracher is a member of several professional organizations, including the American Association of Dental Research.

Email: kracher@ipfw.edu