345 Hypertension and Prehypertension

Definition/Cut-off Value

Hypertension is defined as high blood pressure which may eventually cause health problems and includes chronic hypertension during pregnancy, preeclampsia, eclampsia, chronic hypertension with superimposed preeclampsia, and gestational hypertension (1, 2, 3).

Prehypertension is defined as being at high risk for developing hypertension, based on blood pressure levels.

Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant Category and Priority Level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III, IV, V or VI
Infants	I
Children	III

Justification

Hypertension (HTN), commonly referred to as high blood pressure, occurs when the force of blood against artery walls is high enough that it may eventually cause health problems. Hypertension is measured in terms of both systolic blood pressure (pressure in blood vessels when the heart contracts) and diastolic blood pressure (pressure in blood vessels when the heart rests between contractions). Two main factors in the body increase levels of blood pressure – a higher volume of blood being pumped by the heart and narrower arteries. Untreated HTN leads to many degenerative diseases, including congestive heart failure, end-stage renal disease, and peripheral vascular disease. People with HTN are often asymptomatic; diagnosis is based on measuring levels of blood pressure. (1)

Blood pressure levels in adults are typically classified as follows, with the first number representing systolic blood pressure and the second number diastolic blood pressure (2, 3):

- Normal blood pressure: <120/<80 mmHg (millimeters of mercury)
- Prehypertension: consistent readings of 120-139/80-89 mmHg
- Hypertension: consistent readings of ≥140/≥90 mmHg

About 75 million adults in the United States (1 in every 3) have HTN, and about the same number have prehypertension. Unfortunately, only half of adults in the United States with HTN have their blood pressure under control, and HTN leads to at least 410,000 deaths in the United States annually. (2)

Hypertension is considered either primary/essential (there is no identifiable cause) or secondary (there is an identifiable cause). Some identifiable causes include sleep apnea, kidney problems, diabetes, some tumors, thyroid problems, inflammation, and blood vessel defects. In addition, several medications (e.g., some birth control, cold medicines, decongestants, pain relievers) as well as illegal substances can significantly raise blood pressure. (1)

Risk factors for HTN include the following (1, 2):

- Age (Risk increases with age.)
- Race/ethnicity (In the United States, people of African descent experience disproportionately higher rates of HTN compared to other races/ethnicities. Causes for this racial disparity in rates of HTN are complex and multifactorial [4, 5].)
- Family history
- Overweight or obesity (This causes more blood to be pumped by the heart.)
- Physical inactivity (This is associated with a higher heart rate, which increases the force of blood against arteries.)
- Tobacco use (This increases blood pressure during use. Chemicals in tobacco also lead to narrowing of arteries.)
- Second-hand exposure to tobacco smoke
- Excessive sodium intake (This causes fluid retention, which increases blood pressure.)
- Inadequate potassium intake (This causes an excessive amount of sodium in the blood.)
- Excessive alcohol intake (This can damage the heart over time.)
- Stress
- Prehypertension
- Pregnancy
- Male gender

Hypertension is a serious condition that can lead to a variety of health problems, including the following (1, 3):

- Cardiac pathologies, including heart attack, stroke, aneurysm, and heart failure
- Metabolic syndrome
- Chronic kidney disease
- Eye damage and vision loss
- Memory/understanding problems and dementia
- Gestational diabetes, preeclampsia, and perinatal mortality

Management of HTN includes lifestyle modifications and medication. In prehypertensive individuals, implementing lifestyle changes can prevent or delay the onset of HTN. In hypertensive individuals, dietary intervention is not only effective in reducing blood pressure but also in delaying or avoiding drug treatment.

Lifestyle changes to manage HTN and prehypertension include the following:

- Have blood pressure checked at least yearly or as recommended by one's healthcare provider. For those at risk of HTN, regular monitoring of blood pressure is crucial. Blood pressure levels greater than 180/120 mmHg are extremely dangerous and require immediate medical attention (3).
- Consume a diet consistent with the Dietary Guidelines for Americans or follow the Dietary Approaches to Stop Hypertension (DASH) eating plan. Details regarding the DASH eating plan can be found on the National Heart, Lung, and Blood Institute's website, www.nhlbi.nih.gov/health-topics/dash-eating-plan.
- Engage in regular physical activity.
- Achieve and maintain a healthy weight.
- Limit alcohol and avoid any use of tobacco, marijuana or illegal substances.

If lifestyle changes alone do not sufficiently reduce blood pressure, medications may be prescribed. These include angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium channel blockers, and/or diuretics (3).

Pregnant Women

Hypertension occurs in 6-8% of all pregnancies in the United States. Any HTN during pregnancy can lead to preeclampsia, eclampsia, stroke, pregnancy induction, and/or placental abruption. Because HTN during pregnancy can tighten the mother's blood vessels (including those in the umbilical cord), it can reduce oxygen and nutrients to the infant, potentially causing prematurity, low birth weight, and fetal growth restriction. (6)

Hypertensive disorders of pregnancy are categorized as follows:

- **Chronic Hypertension during Pregnancy**:
    - Definition: Hypertension is present before pregnancy or is diagnosed before 20 weeks gestation (6, 7).
    - It increases the risk of developing more severe HTN during pregnancy, gestational diabetes, and perinatal mortality. In infants, it may lead to fetal growth restriction and, additionally, exposure to antihypertensive medications may cause fetal growth restriction and malformation. (7)
    - Treatment includes frequent, regular monitoring of blood pressure**.** It is typically suggested that women with well-controlled blood pressure who exercised regularly before pregnancy continue moderate physical activity during pregnancy, unless contraindicated. Women should check with their healthcare provider for individualized guidance. (7)
- **Preeclampsia**:
    - Definition: Onset of hypertension during pregnancy, typically with proteinuria, and usually after 20 weeks gestation. For some women, proteinuria does not occur; for these women, preeclampsia is diagnosed as hypertension with thrombocytopenia, impaired liver function, renal insufficiency, pulmonary edema, and/or cerebral or visual disturbances. (7)

- The most common type of hypertensive disorder during pregnancy, preeclampsia occurs in 3.4% of pregnancies in the United States and is associated with one maternal death per 100,000 live births in developed countries (7, 8). Worldwide, it leads to the death of over 60,000 women annually (9).
- Risk factors include history of preeclampsia, chronic HTN, chronic kidney disease, history of thrombocytopenia, in vitro fertilization, diabetes, auto-immune disorders (such as lupus), uterine artery notching, family history of preeclampsia, obesity, polycystic ovarian syndrome, giving birth for the first time, multifetal pregnancy, pregnancy interval greater than 10 years, and being older than 40 years (6, 7, 9, 10, 11). Low dietary and serum calcium levels are also associated with preeclampsia (9).
- Clinical signs include any of the following: proteinuria, low blood platelet count, abnormal kidney or liver function, and fluid in the lungs. Symptoms can include sudden weight gain, swelling of face or hands, upper abdominal pain, difficulty breathing, changes in vision (including seeing spots), severe headache, nausea, and/or vomiting. (7)
- For pregnant women, preeclampsia can lead to pulmonary edema (fluid build-up in the lungs), heart attack, stroke, acute respiratory distress syndrome (difficulty breathing due to fluid leaking into the lungs), coagulopathy (blood unable to clot), severe renal failure, retinal injury, liver rupture, placental abruption, hemolysis (breakdown of red blood cells), caesarean delivery, and/or death. Women with preeclampsia are at greater risk for postpartum depression, future HTN, heart attack, stroke, congestive heart failure, and metabolic disease; these risks increase with repeated incidence of preeclampsia and with preterm delivery (7, 8, 10, 12). The infant of a woman with preeclampsia is at greater risk for caesarean delivery, preterm birth, low birth weight, small for gestational age, and/or stillbirth (8, 12). For the children of mothers who had preeclampsia, they are at heightened risk of bronchopulmonary dysplasia (form of chronic lung disease), cerebral palsy, cardiovascular dysfunction, learning disabilities, and lower IQ (10, 12).
- Currently, there is inconclusive evidence on preventative measures for preeclampsia in future pregnancies. However, when dietary calcium is inadequate, research indicates adequate dietary calcium or supplementation (1.5-2 grams/day) may help prevent preeclampsia (7, 8, 9, 13). Dietary folate and folic acid supplementation during pregnancy has also been associated with lower risk of preeclampsia (12, 14).
- Treatment for preeclampsia depends on severity and other individual factors. For women with preeclampsia without severe features (hypertension with proteinuria after 20 weeks gestation), the American College of Obstetricians and Gynecologists (ACOG) currently suggests that strict bed rest *not* be routinely prescribed (although there may be situations in which different levels of rest, including bed rest and hospitalization, may be indicated) (7). For women with severe preeclampsia, treatment should occur in an inpatient setting, and ACOG recommends early delivery of the infant to prevent additional harm to the mother and infant (7, 10). The only known cure for preeclampsia during pregnancy is the delivery of the infant and placenta (10, 12).

- It is important to note that *postpartum* preeclampsia can occur, regardless of whether it was present during pregnancy. It is usually diagnosed within 48 hours of delivery but can occur up to 6 weeks postpartum. Thus, women during this period should monitor for preeclampsia symptoms and contact their healthcare provider immediately if they occur. (6, 7)

- **Chronic Hypertension with Superimposed Preeclampsia**:
  - Definition: Hypertension is present before pregnancy, and preeclampsia develops during pregnancy. It is classified as either "with severe features" (hypertension with proteinuria before 20 weeks gestation with organ problems) or "without severe features" (hypertension with proteinuria after 20 weeks gestation). (6, 7)

- **Eclampsia:**
  - Definition: Eclampsia is the presence of new-onset grand mal seizures in a woman with preeclampsia. Eclampsia can occur before, during, or after labor. It may be preceded by severe headaches, blurred vision, sensitivity to light, abdominal pain, hyperreflexia (over-reactive reflexes), and altered mental status. (7)
  - Eclampsia is a critical situation and can lead to maternal death. Treatment typically includes parenteral magnesium sulfate in an inpatient setting. Once the mother's condition is stabilized, ACOG recommends the delivery of the infant. Treatment with magnesium sulfate may also be continued after delivery, if needed. (7)
  - Please note that due to the critical nature of eclampsia and its treatment in an inpatient setting, women with eclampsia are not encountered within a WIC setting.

- **Gestational Hypertension**:
  - Definition: Onset of hypertension during pregnancy, usually after 20 weeks gestation, and without proteinuria. It usually resolves after delivery but does increase the risk of developing chronic HTN. (6)

The term "pregnancy-induced hypertension" includes preeclampsia, eclampsia and gestational hypertension. Please note that a low-sodium diet and/or weight loss is not recommended as treatment for HTN *during* pregnancy.

Breastfeeding

A systematic study done by the Agency for Healthcare Research and Quality found that there is an inverse relationship between duration of breastfeeding and HTN: the longer a woman breastfeeds, the less risk she has for developing HTN (15). Similarly, women with hypertension should be encouraged to breastfeed, unless contraindicated (16). If postpartum women require antihypertensive medications, medications should be chosen that are compatible with breastfeeding, if possible. It is thus very important for the mother to discuss her breastfeeding status and goals with her healthcare provider to determine the best infant feeding and medication plan.

Children

Hypertension among children is a serious condition and may eventually lead to hypertension and chronic disease in adulthood. The definition of HTN is based on the normative distribution of blood pressure in healthy children. In 2017, the American Academy of Pediatrics (AAP) updated their pediatric HTN

diagnostic tools to account for the sex, age and height of the child. For more information about the definition and classification of HTN in children see the AAP *Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents*: https://pediatrics.aappublications.org/content/140/3/e20171904.

Early detection of high blood pressure in children is crucial for preventing future health concerns. Thus, the AAP recommends that blood pressure be measured annually once children are three years old. For children under three years of age, healthcare providers should measure blood pressure at every visit if the child has a risk factor for developing HTN. (17)

The prevalence of HTN among children and adolescents in the United States is around 3.5%. About 2-4% U.S. children and adolescents experience persistently elevated blood pressure. Higher rates are experienced by boys and among Hispanic and non-Hispanic African American children compared to white children. (17)

For most children with HTN, there is no specific, identifiable cause (thus, it is considered primary HTN). Some children, however, do experience HTN as a direct result of medications, kidney disease, endocrine disorders, or congenital heart defects. Risk factors for elevated blood pressure and HTN among children include the following (17):

- Family history of HTN, including maternal HTN during pregnancy
- Overweight and obesity (including high weight-for-length in infants)
- History of prematurity, low birth weight, and/or small for gestational age
- High sodium intake

Hypertension during childhood has implications for both current and long-term health. Health outcomes of HTN occurring in children may include the following (17):

- Dyslipidemia and cardiovascular damage
- Learning disabilities, impaired neurocognition and executive functioning
- In adulthood: HTN, metabolic syndrome, and cardiovascular disease

For the management of HTN in children, the AAP recommends the following lifestyle changes:

- Achieve and maintain a healthy weight-for-length or BMI (body mass index).
- Follow an age-appropriate DASH-type eating plan.
- Participate in moderate to vigorous physical activity at least 3-5 days per week, 30-60 minutes per session.
- Get adequate sleep (more than 7 hours a night).

For more information about HTN among children, please see the Centers for Disease Control and Prevention's website *High Blood Pressure during Childhood and Adolescence* at: https://www.cdc.gov/bloodpressure/youth.htm.

Implications for WIC Nutrition Services

The WIC Program provides support to participants with hypertension/prehypertension by offering fruits, vegetables, whole grains, legumes, low-fat dairy, and fish, which are important components of the

DASH eating plan. WIC nutrition staff also offer nutrition education and counseling as well as referrals to smoking cessation and substance use treatment if needed, which are critical to the management of hypertension/prehypertension. In addition, WIC staff can assist participants by:

For Pregnant Women with Hypertension:

- Asking probing questions to determine the type of hypertension they have been diagnosed with during pregnancy.
- Encouraging them to start prenatal care as soon as possible and to attend all health care appointments. Health status and blood pressure should be monitored frequently by healthcare provider. The healthcare provider may also recommend regular self-monitoring of blood pressure.
- Informing them of the symptoms of preeclampsia and of the importance of contacting their healthcare provider immediately if they occur. Also, inform them that preeclampsia can occur postpartum.
- Counseling them on healthy weight gain, prenatal vitamin use, and a nutritious diet, including adequate calcium intake. For women with low calcium intake, refer them to their healthcare provider to discuss whether a calcium supplement is appropriate. Please note that a low-sodium diet and/or weight loss is not recommended as treatment for HTN *during* pregnancy.
- Encouraging them to discuss individualized physical activity recommendations with their healthcare provider.
- Informing them that hypertension during pregnancy increases their risk of future HTN, cardiovascular disease, and stroke.
- Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources (https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide).
- Referring to local home visiting programs for health monitoring and support, if available.

For Postpartum Women with Hypertension:

- Asking probing questions to determine the type of hypertension they experienced during pregnancy and are now experiencing.
- Informing them of the symptoms of postpartum preeclampsia and of the importance of contacting their healthcare provider immediately if they occur.
- Providing breastfeeding promotion and support, unless contraindicated. Encourage women to discuss their breastfeeding status and goals with their healthcare provider, especially if medications are prescribed.
- Encouraging them to attend all health care appointments, including their 4-6 week postpartum visit; to develop a plan for future pregnancies; to discuss health conditions and medication needs with their healthcare provider; and to have their BMI, blood pressure, lipids, and fasting glucose assessed yearly (3).

- Counseling them on achieving and maintaining a healthy weight, physical activity, following a diet consistent with the Dietary Guidelines for Americans or the DASH diet.
- Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources (https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide).
- Referring them to their healthcare provider to discuss whether a calcium or folic acid supplement is appropriate, if intake of these nutrients seems inadequate.
- Referring to local home visiting programs for health monitoring and support, if available.

For Children with Hypertension:

- Encouraging caregivers to take children to all health care appointments.
- Counseling caregivers on: healthy pediatric weight gain and, for children with high weight-for-length or obesity, discussing strategies for achieving and maintaining a healthy weight; age-specific, DASH-type eating habits; and the importance of adequate sleep and physical activity in children.

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Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.