

Hypertension Backgrounder

What is Hypertension and How is it Diagnosed?

- Hypertension, also known as high blood pressure, is a condition in which blood vessels have persistently raised pressure, causing the heart to work harder when pumping blood through these vessels.¹
- More than one billion people worldwide live with hypertension and, in the U.S., approximately 45 percent of adults live with the disease.^{1,2}
 - It is the leading cause of cardiovascular disease worldwide, including heart attack, stroke and chronic kidney disease (CKD), and a major risk for premature mortality.³
 - Additional cardiovascular risk factors found commonly in people with hypertension include diabetes, lipid disorders, obesity, and unhealthy lifestyle habits such as alcohol consumption and smoking.⁴
- Early effects of hypertension can include subtle target organ damage such as left-ventricular hypertrophy and cognitive dysfunction.⁵
- Over time, uncontrolled hypertension can lead to heart failure, atrial fibrillation, valvular heart disease, peripheral arterial disease and aortic syndromes, CKD and end stage renal disease, dementia, and Alzheimer's disease.^{6,7,8}
- A person is diagnosed with hypertension when they present with a systolic blood pressure (SBP) reading of above 140 mm Hg or a diastolic blood pressure (DBP) reading greater than 90 mm Hg. Some professional guidelines have a lower threshold of a SBP above 130 mm Hg or a DBP greater than 80 mm Hg.^{4,9}

Symptoms of Hypertension

- Hypertension can be asymptomatic, so people may be unaware they have it. The only way to detect hypertension is to have a health care professional measure blood pressure.¹
- When symptoms do present, they may include:¹
 - Early morning headaches
 - Nosebleeds
 - Irregular heart rhythms
 - Vision changes
 - Buzzing in the ears
- Severe hypertension may present with:
 - Fatigue
 - Nausea
 - Vomiting
 - Confusion
 - Anxiety
 - Chest pain
 - Muscle tremors

Hypertension in the Body

- The renin-angiotensin-aldosterone system (RAAS) is a hormone system within the body that is critical for the regulation of blood pressure, acting primarily through the peptide hormone angiotensin (Ang) II, a potent vasoconstrictor.¹⁰
- Angiotensinogen (AGT) is the most upstream precursor of subsequent angiotensin peptides and its cleavage represents the initial, rate-limiting step in the eventual formation of Ang II.¹⁰

Unmet Need in Hypertension

- Despite well-established management strategies, such as lifestyle modifications and several classes of available anti-hypertensive treatments, fewer than 20 percent of people with hypertension have their disease under control.^{1,6}
- Poor adherence, including failure to take medication as often as prescribed or persist on therapy, is common in people on daily oral anti-hypertensive medications and is a major cause of inadequate blood pressure control, including blood pressure fluctuations and variability between doses.^{4,11,12,13}
 - It has been estimated that 50 to 80 percent of people are nonadherent or suboptimally adherent to their anti-hypertensive treatment.¹⁴
- Blood pressure variability consists of fluctuations in short-, mid-, and long-term blood pressure patterns and correlates closely with target organ damage and an increased risk of cardiovascular events, independent of mean blood pressure.^{13,15}

¹ Hypertension. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/hypertension>. Published September 2019. Accessed April 2021.

² Ostchega, Y. et al. *National Center for Health Statistics*. 2020;364.

³ Mills, K. et al. *Nature Reviews Nephrology*. 2020;16:223-237.

⁴ Unger, T. et al. *Hypertension*. 2020;75:1334-1357.

⁵ Mennuni, S. et al. *Nature Journal of Human Hypertension*. 2014;28:74-79.

⁶ Oparil, S. et al. *Nature Reviews Disease Primers*. 2018;18014.

⁷ Nazarzadeh, M. et al. *JAMA Cardiology*. 2019;4(8):788-795.

⁸ Thorin, E. *Hypertension*. 2015;65:36-38.

⁹ Flack, J. and Adekola, B. *Trends in Cardiovascular Medicine*. 2020;30(3):160-164.

¹⁰ Benigni, A. et al. *EMBO Molecular Medicine*. 2010;2(7):247-257.

¹¹ Burnier, M. and Egan, B. *Circulation Research*. 2019;124:1124-1140.

¹² Jackson, RE and Bellamy, MC. *BJA Education*. 2015;15(6):280-285.

¹³ Chadachan, VM. et al. *International Journal of General Medicine*. 2018;11:241-254.

¹⁴ Carey, R. et al. *Hypertension*. 2018;72(5):e53-e90.

¹⁵ Choi, HJ. *Korean Journal of Family Medicine*. 2012;33(6):330-335.