

3. Pathophysiology of elevated blood pressure and hypertension

Persistently high BP in systemic arteries is the hallmark of hypertension, which is the most important modifiable risk factor for all-cause and CVD morbidity and mortality globally.² Most patients with hypertension have essential or primary hypertension, where the exact cause remains unknown, while an estimated 10% have secondary hypertension, with an identifiable cause (notably some studies indicate that the prevalence of secondary hypertension may be substantially higher, with modern systematic screening).¹⁰

The pathophysiology of hypertension involves complex interactions between environmental and behavioural factors, genes, hormonal networks, and multiple organ systems (renal, cardiovascular, and central nervous system¹¹) (Figure 1). In addition, vascular and immune

mechanisms are involved.¹² Dysregulation of these processes leads to hypertension, which if uncontrolled, can lead to hypertension-mediated organ damage (HMOD) and adverse CVD outcomes.

Details on the pathophysiological processes, molecular mechanisms, and environmental and psychosocial elements that underlie hypertension are provided in the [Supplementary text](#) (Supplementary data online).

4. Clinical consequences of elevated blood pressure and hypertension

Longstanding hypertension causes organ damage and ultimately leads to cardiovascular, cerebrovascular, and clinical renal disease, which are all major contributors to the global burden of chronic disease

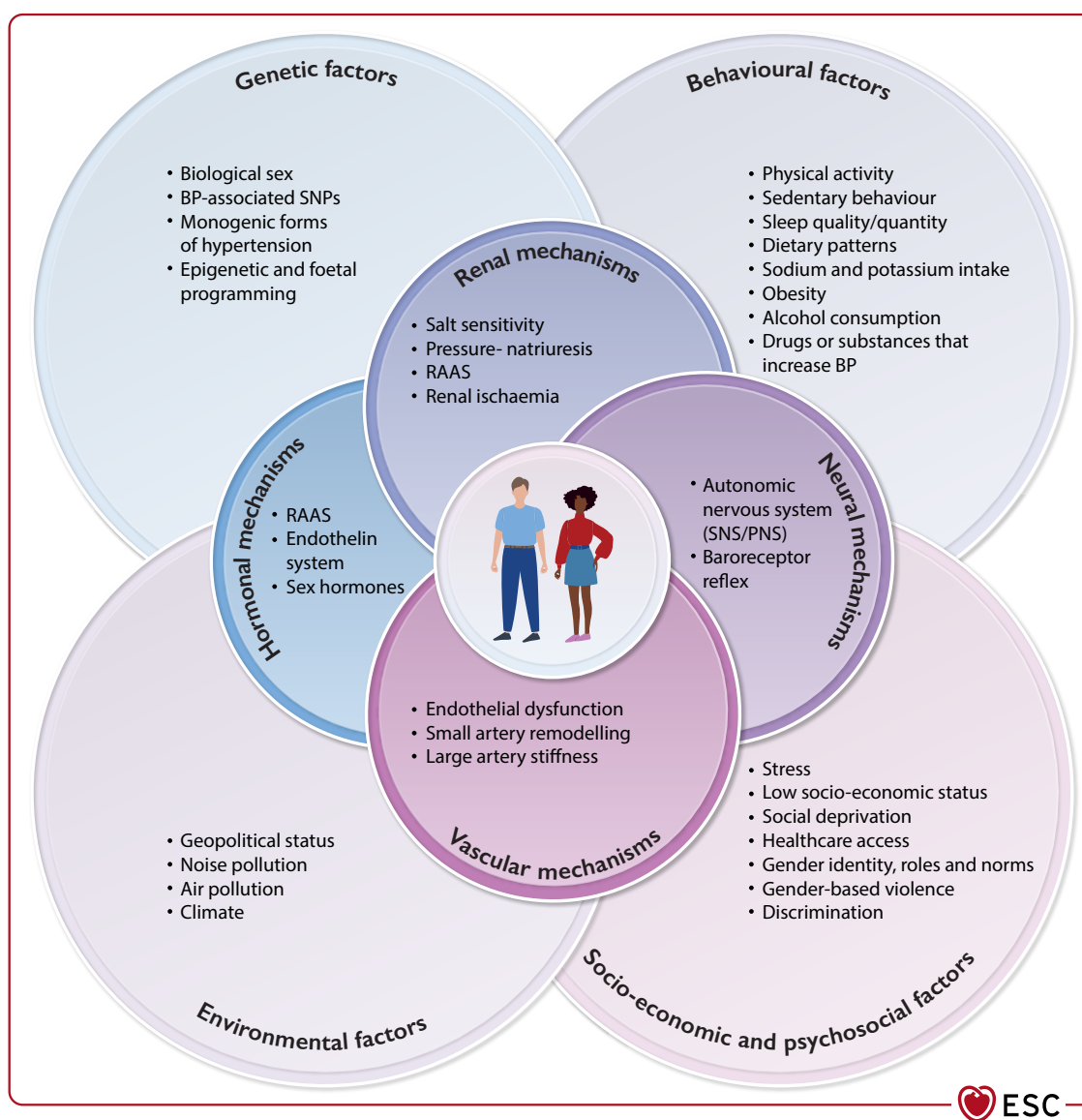


Figure 1 Pathophysiology of elevated blood pressure and hypertension. BP, blood pressure; PNS, parasympathetic nervous system; RAAS, renin-angiotensin-aldosterone system; SNP, single-nucleotide polymorphism; SNS, sympathetic nervous system. Complex interplay between genes, environmental, and behavioural factors, organs, physiological systems, and neurohumoral processes contribute to BP regulation. Dysfunction of these processes leads to hypertension. The contribution of these factors to elevated BP and hypertension may differ among males and females.