

## ASIAN CARDIOVASCULAR LANDSCAPE

# Toward “Zero” Cardiovascular Events in Asia

## The HOPE Asia Network

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According to the World Health Organization, ischemic heart disease and stroke were the top 2 leading causes of death in 2019. For the period 2000 to 2019, coronary heart disease (CHD) remained the number 1 killer. More people than ever before are dying of heart disease (nearly 9 million worldwide in 2019, an increase of more than 2 million compared with 2000). The estimated total number of worldwide deaths each year from cardiovascular disease (CVD) is 17.9 million, nearly one-third of all deaths worldwide. A total of 85% of all CVD deaths are the result of myocardial infarction and stroke, and more than three-fourths of all CVD deaths occur in low- and middle-income countries.

As a region, Asia has experienced increasing socioeconomic prosperity over recent decades. Improvements in socioeconomic status are often paralleled by an increase in the prevalence of CVD. Therefore, the improving socioeconomic status across much of Asia means that the region has high rates of CVD and CVD-related mortality. More than one-half of the world's population lives in Asia, and this means that the prevalence of CVD and the absolute numbers of affected individuals in the region are high. As a result, the effective management of CVD in Asia has global, as well as local, implications.

This imperative to reduce CVD morbidity and mortality in Asia was a key driver behind the establishment of the HOPE Asia (Hypertension Cardiovascular Outcome Prevention and Evidence in Asia) Network in 2016. The mission of the HOPE Asia Network is to

improve the management of hypertension and organ protection toward achieving “zero” cardiovascular events in Asia (1). Key goals include examining and analyzing existing evidence, developing consensus on clinically relevant topics in hypertension and CVD, facilitating research, disseminating evidence, and fostering young researchers.

Consistent with these goals, the HOPE Asia Network members have written dozens of documents on behalf of the Network over the last 5 years, including several Asia-specific guidance documents. These documents include consensus guidelines and associated practice points relating to the implementation of both home and ambulatory blood pressure (BP) monitoring in clinical practice, a review of mental health problems and hypertension in older adults, the current status of adherence interventions for hypertension management, a comprehensive review of the association between hypertension and stroke in Asia, the AsiaBP@Home study (the first Asia-wide home BP study), and discussion around the development of Asia-specific tools for cardiovascular risk assessment.

### ASIAN CHARACTERISTICS OF CARDIOVASCULAR DISEASE

Risk factors for CVD are generally similar in individuals from Asia compared with other regions (1). These factors include hypertension, smoking, cholesterol levels, diabetes mellitus, and obesity



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**ABBREVIATIONS  
AND ACRONYMS****AF** = atrial fibrillation**BP** = blood pressure**CHD** = coronary heart disease**CVD** = cardiovascular disease

(Figure 1). However, there are also several risk factors that have increased importance in individuals from Asia (e.g., salt sensitivity and dietary habits, seasonal variation, BP variability, and environmental pollution levels) (Figure 1), and there are important differences in the CVD risk profile of Asians compared with Western populations.

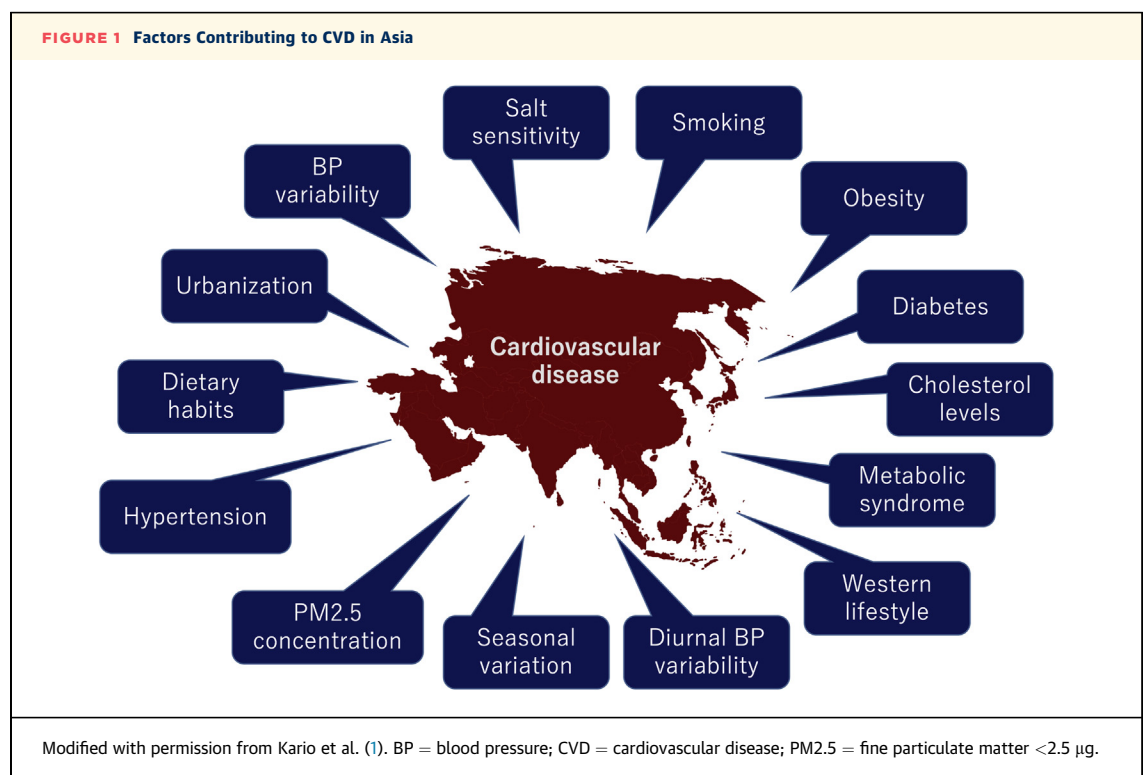
One such difference is that CHD is the most common cardiovascular complication of hypertension in Western countries, whereas there is a higher burden of stroke-related versus CHD-related mortality in some parts of Asia. The relationship between increasing BP and the rate of CVD events also differs in Asians compared with Western or White populations, with the former showing a steeper slope for this association than the latter (2). With respect to obesity, the prevalence of this CVD risk factor is rising rapidly in Asia, and Asians are likely to develop pre-hypertension at a lower body mass index and with smaller body mass index increments than Europeans (3). In turn, obesity and the metabolic syndrome increase salt sensitivity, which is an important issue for Asian populations with respect to the development of hypertension. Additionally, BP variability (especially an exaggerated morning BP surge and nocturnal hypertension) is

greater in Asians than in Whites, and abnormal BP variability is a known risk factor for CVD events (4). Furthermore, rates of masked hypertension, another important risk factor for CVD (including stroke), in Asia are nearly double those in Europe (5).

The prevalence of atrial fibrillation (AF) is lower in Asians than in Whites. However, AF is associated with a high disease burden in Asia and is an important risk factor for stroke (6). Rates of heart failure also appear to be slightly lower in Asian versus Western populations. Nevertheless, similar to AF, the disease burden for heart failure in Asia is high, at least in part because of the large population in this region.

The optimal approach to prevention and treatment of CVD may also be region specific. For example, in patients from the East Asian region, the 24-h BP reduction achieved during treatment with a calcium-channel blocker was greater than that with agents of other drug classes, with a weighted mean difference in systolic BP of 5 mmHg and in diastolic BP of 3 mmHg (7).

As well as differences between Asia and the rest of the world, there are also marked variations in the BP control rate, metabolic profile, incidence of cardiovascular events, and phenotypes of CVD among countries and regions within Asia (1), thus



highlighting the need for and importance of local research to inform local practice.

### ASIA-LED ADVANCES IN TECHNOLOGY

Out-of-office BP monitoring plays a key role in the diagnosis and management of hypertension. There is now a substantial body of evidence showing that home and/or ambulatory BP readings provide better prognostic information with respect to target organ damage and CVD risk than office BP measurements.

Technological advances in out-of-office BP monitoring have the potential to make it easier for patients to monitor their own BP continuously and to facilitate telemedicine-based management strategies to minimize CVD risk (8).

Asian companies and researchers are leaders in this field. For example, new watch-type wrist devices for BP measurement, developed by Omron Healthcare, Kyoto, Japan, have been validated against currently accepted standards and against existing ambulatory BP monitoring techniques, as summarized by Kario et al. (8). In addition, home and ambulatory BP monitoring devices that can measure physical activity and environmental conditions at the same time as daytime and nighttime BP values have been developed by A&D, Tokyo, Japan (9). An information and communication technology-based multisensory monitoring system that incorporates environmental data (temperature, illumination, humidity) at different locations within a house and linked to a wrist-type high-sensitivity actigraph worn by an individual should provide data on different conditions and triggers relating to all aspects of daily living, thereby facilitating prediction of large dynamic BP surges associated with risky environmental conditions to prevent CVD events (9).

The ability to consider the contribution of environmental factors is important because some Asian countries have significant seasonal variation of BP that may partly explain seasonal variation of CVD events. The goal is to use information and

communication technology-based anticipation telemedicine to facilitate the personalized prediction of future BP variability and related CVD risk on the basis of an algorithm informed by time series-based individual big data, with the aim of reducing the occurrence of CVD events. Another potential role for big data collected by wearable out-of-office BP monitoring devices is in the development of artificial intelligence strategies, such as to predict hypertension development (10).

### PERSPECTIVES

Much is now known about the Asia-specific features of CVD, but there is still much to learn. Expanding knowledge in this area is essential to manage and overcome the rising tide of CVD in Asia, to improve patient outcomes, and to facilitate the provision of efficient and effective personalized health care in a region characterized by diversity. The ongoing activities of the HOPE Asian Network will contribute to these important goals, along with other Asia-focused research and publications.

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