

## OPINION

# What is new in the 2018 Chinese hypertension guideline and the implication for the management of hypertension in Asia?

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## Abstract

The new Chinese hypertension guideline comprehensively covers almost all major aspects in the management of hypertension. In this new guideline, hypertension remains defined as a systolic/diastolic blood pressure of at least 140/90 mm Hg. For

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risk assessment, a qualitative approach is used similarly as in previous Chinese guidelines according to the blood pressure level and the presence or absence of other risk factors, target organ damage, cardiovascular complications, and comorbid diseases. The therapeutic target is 140/90 mm Hg in general, and if tolerated, especially in high-risk patients, can be more stringent, that is, 130/80 mm Hg. However, a less stringent target, that is, 150/90 mm Hg, is used in the younger (65-79 years, if tolerated, 140/90 mm Hg) and older elderly ( $\geq 80$  years). Five classes of antihypertensive drugs, including  $\beta$ -blockers, can be used either in initial monotherapy or combination. The guideline also provided information on the management of hypertension in several special groups of patients and in the presence of secondary causes of hypertension. To implement the guideline recommendations, several nationwide hypertension control initiatives are being undertaken with new technology. The new technological platforms hopefully will help improve the management of hypertension and generate scientific evidence for future hypertension guidelines, including a possible Asian hypertension guideline in the near future.

**1 | INTRODUCTION**

The new Chinese hypertension guideline was recently published in both Chinese<sup>1</sup> and English literature.<sup>2</sup> This is the fourth Chinese hypertension guideline,<sup>1,2</sup> since the first, second<sup>3</sup>, and third<sup>4</sup> in 1999, 2005, and 2011, respectively. The first Chinese hypertension guideline was printed in a booklet, and the second<sup>3</sup> and third<sup>4</sup> were published in the Chinese literature with an English summary. The Chinese Hypertension League (CHL) organized the discussions, writing, and publication of these guideline documents.<sup>1-4</sup> These documents including the present new one were comprehensive, with the focus on various issues in relation to the management of hypertension in China. The writing committees of these guidelines considered various levels of evidence from China, if there were, and otherwise from other countries. Only in the new guidelines, evidence was graded, and recommendations were classified.<sup>1,2</sup>

In the past two decades with these hypertension guidelines, China changed substantially in almost all aspects including disease burden and management. With regard to hypertension, there was a huge change in the prevalence as well as management. Because of increasing longevity and changes in lifestyle, the prevalence of hypertension (systolic/diastolic blood pressure  $\geq 140/90$  mm Hg or the use of antihypertensive medication) in China increased from 11.3% in 1991<sup>5</sup> to 18.8% in 2002<sup>6</sup> and to 27.9% in 2012-2015.<sup>7</sup> Because of the increasing effort of health professionals and coverage of health insurance, the awareness, treatment, and control rate of hypertension increased from 26.6% to 30.2% and to 46.9%, from 12.1% to 24.7% and to 40.7%, and from 2.8% to 6.1% and to 15.3%, respectively.<sup>5-7</sup> These Chinese hypertension guidelines should have been a part of the endeavor for a better control of hypertension in China. In this brief review, several major features of the new Chinese hypertension guideline are discussed.

**2 | DEFINITION OF HYPERTENSION**

The new Chinese hypertension guideline was published at a critical time, shortly after the American<sup>8</sup> and European<sup>9</sup> and before the Japanese hypertension guidelines.<sup>10</sup> As previously explained in a commentary on the 2017 American hypertension guidelines,<sup>11</sup> we do not change the definition of hypertension from the current diagnostic threshold of 140/90 to 130/80 mm Hg of systolic/diastolic blood pressure (Table 1).<sup>1,2</sup> The committee by and large agrees that blood pressure in the range of 130-139/80-89 mm Hg confers significant cardiovascular risk and should be seriously considered in cardiovascular prevention.<sup>12</sup> However, the current status of blood pressure control in China does not encourage such a change now.

Nonetheless, the Chinese hypertension guideline has similar recommendations on the use of ambulatory or home blood pressure in the management of hypertension as the other guidelines,<sup>8-10</sup> including the proposed diagnostic thresholds.<sup>1,2</sup> The Chinese guideline encourages the wide use of these out-of-office techniques of blood pressure

**TABLE 1** Blood pressure classification in the 2018 Chinese hypertension guidelines<sup>1,2</sup>

Classification	Systolic blood pressure (mm Hg)	Diastolic blood pressure (mm Hg)
Normal	<120 &	<80
High normal	120-139 &/or	80-89
Hypertension	$\geq 140$ &/or	$\geq 90$
Stage 1 (mild)	140-159 &/or	90-99
Stage 2 (moderate)	160-179 &/or	100-109
Stage 3 (severe)	$\geq 180$ &/or	$\geq 110$
Isolated systolic hypertension	$\geq 140$ &	<90

measurement.<sup>1,2</sup> A specific guideline on home blood pressure monitoring was published and recommended that everybody should measure blood pressure at home regularly for the identification of high blood pressure in “normotensive” people and for the management of hypertension in hypertensive patients.<sup>13</sup> A Web-based and WeChat-linked technological platform was established for data analysis and interpretation of ambulatory blood pressure monitoring.<sup>14</sup> Hopefully, with the use of these sophisticated blood pressure measuring techniques, the management of hypertension in China would be significantly improved to a much higher level in the next one to two decades.

### 3 | RISK ASSESSMENT

The Chinese hypertension guideline continues with qualitative or semi-quantitative risk assessment according to the level of systolic and diastolic blood pressure and the presence or absence of risk factors, target organ damage, cardiovascular complications, and comorbid diseases (Figure 1).<sup>1,2</sup> There are several major changes to the scheme of risk stratification. High-normal blood pressure in the range of 130–139 mm Hg systolic or 85–89 diastolic is added as a separate column of the diagram. In addition, diabetes mellitus is classified into two categories according to the absence or presence of target organ damage. Chronic kidney disease is also classified into two groups, that is, stage 3 or stage 4–5.<sup>1,2</sup>

In fact, Chinese epidemiologists have developed several quantitative risk scores in the past two decades.<sup>15–18</sup> These risk scores might help improve risk assessment in the management of hypertension in the Chinese population. However, there might be some serious drawbacks if applied now. These scores are probability estimates. A 20% of probability indicates very high cardiovascular risk,

but if not communicated sufficiently with the Chinese physicians and patients, may be considered a minority and hence a minor risk. These scores might have to be linked with the current semi-quantitative cardiovascular risk evaluations.

### 4 | THERAPEUTIC TARGET

The new Chinese guideline recommends a therapeutic target of 140/90 mm Hg in general, 130/80 mm Hg in patients at high cardiovascular risk, and 150/90 in the elderly ( $\geq 65$  years). In the younger (65–79 years of age) but not older elderly ( $\geq 80$  years), a more stringent target of 140/90 mm Hg can also be considered if tolerated.<sup>1,2</sup>

The Chinese guideline does not provide the lower limit of therapeutic target for antihypertensive treatment, as do the European guidelines.<sup>9</sup> The committee felt that such recommendation is probably not needed, because a less stringent therapeutic target is recommended in the Chinese guideline,<sup>1,2</sup> and because the control rate of hypertension is generally low in the Chinese population.<sup>7</sup>

### 5 | THERAPEUTIC STRATEGIES

The new Chinese hypertension guidelines recommends the use of long-acting antihypertensive drugs, often in combination and full dosages.<sup>1,2</sup> There is growing evidence that long-acting agents, especially in combination<sup>19,20</sup> and full dosages,<sup>21</sup> are more efficacious in reducing blood pressure and controlling hypertension.<sup>22,23</sup> However, the guideline keeps recommending initial combination therapy only in stage 2 or more severe hypertension or those at

Other risk factors and disease history	Blood pressure (mmHg)			
	Systolic 130~139 and/or Diastolic 85~89	Systolic 140~159 and/or Diastolic 90~99	Systolic 160~179 and/or Diastolic 100~109	Systolic $\geq 180$ and/or Diastolic $\geq 110$
None	/	low	medium	high
1 to 2 risk factors	low	medium	medium/high	very high
$\geq 3$ risk factors, target organ damage, CKD 3; or uncomplicated diabetes mellitus	medium/high	high	high	very high
Symptomatic CVD, CKD $\geq 4$ , or complicated diabetes mellitus	high/very high	very high	very high	very high

**FIGURE 1** Cardiovascular risk assessment and stratification in the 2018 Chinese hypertension guidelines.<sup>1,2</sup> CKD, chronic kidney disease; CVD, cardiovascular disease

high cardiovascular risk in whom a stringent therapeutic target of treatment is considered. The recommendation may change in the future guidelines, with increasing availability of single-pill combination antihypertensive drugs and the changes in pricing policy for antihypertensive drugs.<sup>24</sup>

For the choice of antihypertensive agents, the guideline recommends five classes of antihypertensive drugs, that is, angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs),  $\beta$ -blockers, dihydropyridine calcium channel blockers (CCBs), and thiazide diuretics.<sup>1,2</sup> The preferred combinations include an ACEI or an ARB with a thiazide diuretic or a CCB and a CCB with a thiazide diuretic or a  $\beta$ -blocker. The latter two combinations are different from other guidelines.<sup>8,9</sup> A CCB and thiazide diuretic combination has been previously proven to be effective in blood pressure lowering and stroke prevention in the Felodipine Event Reduction (FEVER) trial.<sup>25-28</sup> A recent trial in black African population demonstrated that a CCB (amlodipine)/thiazide diuretic (hydrochlorothiazide) combination was superior to an ACEI (perindopril)/thiazide diuretic (hydrochlorothiazide) combination in blood pressure lowering on both clinic and ambulatory measurements.<sup>29</sup> The CCB/ $\beta$ -blocker combination is recommended in the Chinese guideline mainly because in Chinese secondary and tertiary hospitals, hypertension is managed by cardiologists who believe that  $\beta$ -blockade is often needed in cardiovascular disease management, especially in association with calcium channel blockade.

## 6 | SPECIAL POPULATIONS

The Chinese hypertension guideline provides comprehensive information on several special groups of patients, including the elderly, children and adolescents, pregnancy and preeclampsia, and patients with stroke, coronary artery disease, acute and chronic heart failure, chronic kidney disease, diabetes mellitus, the metabolic syndrome, peripheral arterial disease, resistant hypertension, hypertensive emergency and urgency, or peri-operative hypertension.<sup>1,2</sup> It is noteworthy that these are highly diverse patients, and there is not always evidence available to support any recommendation in these patients. Some members of the committee, however, believe that the guideline should cover these important clinical issues.

## 7 | SECONDARY HYPERTENSION

The Chinese hypertension guideline provides brief information on secondary hypertension, such as renal parenchymal and renovascular hypertension, aortic coarctation, obstructive sleep apnea and hypopnea, primary aldosteronism and other adrenal hypertension, drug-induced hypertension, and various forms of monogenic hypertension.<sup>1,2</sup> However, the guideline does not clearly indicate the target population for screen, as did the 2017 American guidelines.<sup>8</sup>

With the technological advances over the recent years, it probably comes of age for secondary hypertension screening in most,

if not all, hypertensive patients. A platform, called intelligent Hypertension Excellence Centre (iHEC), is being established in secondary and tertiary hospitals all over China.<sup>14</sup> Hopefully, tens of thousands of hypertension specialists can be nurtured in the next decade. In the meantime, a primary aldosteronism screening program is being undertaken in these centers of excellence with the use of a newly developed chemiluminescence method for plasma renin and aldosterone measurement.<sup>14</sup> With this automated measurement technique, primary aldosteronism can be screened in massive populations, such as newly diagnosed hypertensive patients.

## 8 | CONCLUSIONS AND PERSPECTIVES

The prevalence of hypertension is doomed to rapidly increase in the next few decades in China. Because of the huge number of hypertensive patients, it is probably pragmatic to focus on those with much higher blood pressure (eg,  $\geq 140/90$  mm Hg) and higher cardiovascular risk, as recommended in the new Chinese hypertension guidelines.<sup>1,2</sup> To implement the recommendations of the Chinese hypertension guidelines, new platforms and major initiatives are needed. Several technological platforms, such as those mentioned above, are being established. Several nationwide hypertension control programs have been started in the framework of the Healthy China 2030 Initiative, with a goal of 50% control rate of hypertension by 2030.<sup>14,30</sup>

The new technological platforms, if used, may also help improve the management of hypertension in the other parts of the world, especially Asia. More importantly, these platforms may also provide technical support for research in a large number of hypertensive patients to generate scientific evidence on both monitoring and therapeutics of hypertension. With the emerging evidence and via collaboration among experts from Asia and other parts of the world,<sup>22,23,31-33</sup> an Asian hypertension guideline might be ready to go. This Asian guideline may mainly deal with actionable issues in the management of hypertension in Asia, such as blood pressure monitoring tools, therapeutic targets, choices of antihypertensive drugs, protocols for the screen and management of secondary hypertension and patients at high cardiovascular risk, and so on.

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