

Blood Pressure Down Under, but Down Under What? US and Australian Hypertension Guideline Conversation

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Australia shares similar blood pressure (BP) profiles within the community as the United States, Europe, and many other countries.¹ Hypertension is common, many people are not aware they have it and treatment often falls short of targets. Improvement in smoking rates and other cardiovascular risk factors is being countered by increased obesity and diabetes mellitus. Hypertension is seen more often in disadvantaged people, in rural communities, and particularly indigenous Australians.² This is a familiar story around the world and it will not surprise that Australian hypertension guidelines have generally been fairly similar to recommendations in the major European and US guidelines.

The American College of Cardiology/American Heart Association (ACC/AHA) recently revised guidelines for the diagnosis, treatment, and management of hypertension.³ Among a host of revisions, which have been referred to as radical,⁴ there are; lower cut offs for the diagnosis of hypertension (BP $\geq 130/80$ mmHg, previously set at $\geq 140/90$ mmHg), similarly lower BP criteria for initiating antihypertensive medications, and revised BP targets for individuals already undergoing treatment. US population implications of these changes include an additional 31 million US individuals considered hypertensive just because of the change in threshold, 4.2 million of these newly diagnosed are now eligible for antihypertensive medication.⁵ Additionally, over half (53%) of those currently medicated (55 million individuals) are in need of improved antihypertensive control to meet newly defined targets.

The process for developing these ACC/AHA guidelines was gold standard with extensive review of the evidence, broad consultation, and rigorous attention to conflict of interest. In this context, it will not surprise if other countries follow the same line and draw similar conclusions. After all the evidence is the evidence! There will always be some

divergence as local factors and local evidence comes into play and there are reputations at risk, but the major principles should hold.

Australian guidelines are produced under the auspices of the National Heart Foundation (NHF). The most recent version was released at the end of 2016 after a 3-year period of consultation, evaluation, and consideration.⁶ The NHF guidelines were endorsed widely throughout Australia (eg, Kidney Health Australia, National Stroke Foundation, and The High Blood Pressure Research Council of Australia) and recommended as a clinical resource in general practice by the Royal Australian College of General Practitioners.

The NHF of Australia Guidelines for the Diagnosis and Management of Hypertension in Adults largely reflect the previous guidelines adopted in the United States and are currently used throughout clinical and research practice throughout Australia.⁶ SPRINT (Systolic Blood Pressure Intervention Trial)⁷ was of course also released at the end of 2016 as the NHF guideline committee was holding its final meetings and what had been a somewhat languorous affair certainly speeded up at the end.

The guideline committee responded somewhat bravely to this most recent piece of evidence. The recommendations supported a systolic BP target of 120 mmHg in some people. The recommendation was confined to people who fitted the specific criteria for participation in the SPRINT study. The extent to which this should be generalized to other people with hypertension was understandably left open. However, Australian clinicians are less concerned than others by the possible effects of the specific BP measurement protocol on the results of the SPRINT study as automated devices are universally in use in primary practice.

On this question of BP targets for therapy in high-risk subsets of the hypertension population, the Australian guidelines are already closely aligned with the ACC/AHA guidelines released at the end of 2017. However, other things were not changed and there are now significant differences in important areas between Australian and ACC/AHA recommendations (Table 1).

The most controversial area in the United States and elsewhere has been the ACC/AHA definition of hypertension as BP $\geq 130/80$ mmHg. In the course of a short presentation at the AHA annual meeting, almost half of the US adult population now have hypertension.⁵

The NHF defines a clinical BP reading of $\geq 140/90$ mmHg in the general population as hypertensive. Those with persistent BP $\geq 160/100$ mmHg are recommended antihypertensive therapy. The treatment target for uncomplicated hypertension is $< 140/90$ mmHg.

The opinions expressed in this editorial are not necessarily those of the editors or of the American Heart Association.

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Table 1. Guidelines 2017 ACC/AHA and NHF of Australia

Sub Groups	2017 ACC/AHA	NHF Australia
Guideline: definition of hypertension		
Systolic blood pressure, mm Hg		
General population	≥130	≥140
Diastolic blood pressure, mm Hg		
General population	≥80	≥90
Guideline: recommended antihypertensive medication		
Systolic blood pressure, mm Hg		
General population	≥140	≥160
Diabetes mellitus or CKD	≥130	≥140
High cardiovascular disease risk	≥130	≥140
Age ≥65 y	≥130	
Diastolic blood pressure, mm Hg		
General population	≥90	≥100
Diabetes mellitus or CKD	≥80	≥90
High cardiovascular disease risk	≥80	≥90
Guideline: treatment goal among those taking antihypertensive medications		
Systolic blood pressure, mm Hg		
General population	<130	<140
Diabetes mellitus or CKD		<120
High cardiovascular disease risk		<120
Age ≥65 y	<130	
Age ≥75 y		<120
Diastolic blood pressure, mm Hg		
General population	<80	<90
Diabetes mellitus or CKD	<80	<90
High cardiovascular disease risk		

ACC/AHA indicates American College of Cardiology/American Heart Association; CKD, chronic kidney disease; and NHF, National Heart Foundation.

To date, there has been no formal review of the Australian guidelines in response to ACC/AHA. The usual process involves a multidisciplinary steering committee supported by an independent literature review.

There has also yet to be an analysis and interpretation of the potential impact of US guideline changes in the Australian setting. Specifically, the lower threshold for hypertensive diagnosis increases the proportion of individuals classified as having high BP. It is of interest who these individuals are, for example, would the reclassification lead to a greater proportion of younger adults being considered unhealthy who would otherwise have been within normal range? It is also of interest what proportion would be considered eligible for antihypertensive medications, and also how many individuals would require intensified treatment because of failing to meet newly defined BP targets. We provide population estimates of the implications of such changes using the 2014–2015 Australian Health Survey data.

The 2014–2015 Australian Health Survey was a population health survey conducted via face-to-face interviews

with usual residents in just under 15 000 private dwellings throughout all States and Territories of Australia.⁸ The survey used a stratified, multistage area sampling method and was reflective of ≈97% of the Australian population. Weighting was used to account for the sampling strategy. Although child and adolescent data were collected, the present analysis focuses on adults aged 20 years and over to allow comparisons with international estimates of hypertension guideline changes which have been reported only in adults. BP was measured twice using a standardized protocol and an automated device. If there was a significant difference between readings (>10 mm Hg) for diastolic or systolic BP, then a third reading was taken. Further details pertaining to the 2014–2015 Australian Health Survey methodology and findings have been reported elsewhere.⁸

Among Australian adults aged 20 years and over, 26% of the population were hypertensive according to the present NHF Australian guidelines (Table 2). Lowering thresholds, as in the ACC/AHA 2017 guidelines to ≥130/80 mm Hg, would almost double the proportion of Australian adults classified as hypertensive (51%). There are ≈18 million Australian individuals aged 20 years and over. Half of this population or 9 million would be classified as hypertensive, and a quarter would be newly diagnosed under new guidelines. Thirty-five percent of adults aged 20 to 44 years would be classified as hypertensive, compared with 11% under current NHF guidelines. This is an additional 2 million Australian adults aged 20 to 44 years. Although a quarter (24%) of individuals aged 45 to 54 years would be considered hypertensive under NHF guidelines, there would be over half (54%) classified under ACC/AHA guidelines. The same trend is seen among 55- to 64-year-old age group (64% versus 36%) and 65 to 74 year olds (69% versus 42%).

Hypertension definitions aside, there are other differences that would impact on treatment and medication targets for individuals. Lowering the threshold for treatment recommendations markedly increases the proportion of people eligible for antihypertensive medication (22% compared with 9%). Of those who are already receiving antihypertensive medications (≈27% of the total adult sample reported taking antihypertensives including diuretics, β-blocking agents, calcium channel blockers, or agents acting on the renin–angiotensin system), over two-thirds of this group (69%) would require intensified treatment because of failing to meet BP targets compared with 43% who currently fail to meet NHF targets. Although antihypertensives are relatively inexpensive, the increase in the number of people requiring therapy would have an economic impact at both an individual and national level, but so, of course, would be any benefits of lower BP across half of the community. Increases in proportions eligible for both treatment and increased treatment are consistent across age groups, sexes, and for people who self-reported having current, long-term heart disease, diabetes mellitus, or chronic kidney disease.

The greatest change with the newly proposed guidelines is an increase in the number of people considered unhealthy who previously would have fallen within healthy normal ranges, and an increase in the people who are ineffectively treated for hypertension. These changes are likely to impact

Table 2. Percentage of Australian Adults Meeting the Definition for Hypertension, Eligible for Treatment, and Recommended for Treatment Increase According to the 2017 ACC/AHA Guideline, and the NHF of Australia Guideline Based on the 2014–2015 Australian National Health Survey

Sub Group	% (95% CI) With Hypertension		% (95% CI) Recommended Antihypertensive Treatment Based on Blood Pressure Reading and Medication Status		% (95% CI) Recommended Increased Antihypertensive Treatment (Among Those Already Medicated)	
	2017 ACC/AHA Guideline $\geq 130/80$ mm Hg	NHF Guidelines $\geq 140/90$ mm Hg	2017 ACC/AHA Guideline $\geq 140/90$ mm Hg	NHF Guidelines $\geq 160/100$ mm Hg	2017 ACC/AHA Guideline $< 130/80$ mm Hg	NHF Guidelines $< 140/90$ mm Hg
Overall	51.2 (50.0–52.4)	26.0 (25.0–27.1)	22.0 (20.8–23.3)*	9.4 (8.6–10.3)*	69.1 (67.0–71.2)	43.1 (40.9–45.4)
Age group						
20–44	34.6 (32.7–36.5)	11.4 (10.2–12.7)	11.2 (9.9–12.6)*	2.6 (2.0–3.4)*	58.8 (48.7–68.2)	24.2 (17.1–33.1)
45–54	53.7 (50.7–56.7)	24.3 (21.8–27.0)	23.2 (20.3–26.4)*	9.1 (7.3–11.3)*	69.4 (62.8–75.2)	38.7 (32.0–45.8)
55–64	64.2 (61.5–66.9)	36.2 (33.6–39.0)	37.0 (33.1–40.6)*	15.2 (12.6–18.1)*	72.7 (68.5–76.6)	42.5 (38.0–47.2)
65–74	68.6 (65.8–71.3)	41.8 (39.0–44.8)	83.0 (80.7–85.0)	28.9 (24.7–33.5)*	70.9 (67.2–74.4)	43.9 (40.0–47.8)
75+	66.3 (62.9–69.5)	47.5 (44.0–51.1)	87.6 (85.1–89.7)	50.3 (43.3–57.3)*	66.2 (62.2–70.0)	49.0 (44.8–53.2)
Men	54.4 (52.5–56.3)	28.2 (26.5–29.8)	23.0 (21.1–25.1)*	9.7 (8.5–11.1)*	67.7 (64.7–70.7)	44.2 (41.0–47.5)
Women	48.5 (47.0–50.1)	24.2 (22.9–25.6)	21.2 (19.7–22.8)*	9.1 (8.1–10.3)*	70.6 (67.7–73.4)	42.0 (38.9–45.1)
Diabetes mellitus, CKD, CVD	64.7 (62.8–66.5)	38.5 (36.6–40.4)	84.0 (82.5–85.4)	74.3 (72.6–76.0)	69.6 (67.3–71.7)	43.6 (41.3–46.0)

Proportions relate to within cell only, for example using the 2017 ACC/AHA guidelines, the proportion of individuals classified as hypertensive in the 20–44 y age group was 34.6%. The blood pressure readings in the second row relate to general population systolic and diastolic readings, for specific subgroup cut offs (Table 1). ACC/AHA indicates American College of Cardiology/American Heart Association; CI, confidence interval; CKD, chronic kidney disease; CVD, cardiovascular disease; and NHF, National Heart Foundation.

*Excludes individuals who reported having diabetes mellitus, heart disease, or chronic kidney disease.

the most on specific subgroups would already face specific health challenges and are disadvantaged in terms of access to health services and facilities such as Indigenous Australians.

The NHF and other Australian practice guidelines appropriately consider absolute, multifactor risk over single indicators as a marker for cardiovascular health and risk of chronic disease. However, these changes would require a review of the method for assessing risk given that the approved Framingham-derived risk calculator is limited for use in adults aged 45 years and over (or 35 years and over for Aboriginal and Torres Strait Islander Australians). With a change in diagnostic threshold to 130/80 mm Hg many younger individuals would become newly diagnosed as hypertensive. In particular, a large proportion of the younger group with BPs in the ranges of 130 to 140 mm Hg systolic or 80 to 90 mm Hg diastolic will be considered low risk by standard multivariate assessment. However, multivariate techniques using risk calculators generally have only a 5- or 10-year horizon.

Last, the lowering of the threshold of hypertension diagnosis and BP targets demands consideration of how lifestyle, largely driving clinical risk, will be incorporated into broader prevention messages. Is an earlier diagnosis of hypertension as a single risk factor an encouragement to people for better behaviors or is it unnecessary medicalization of a large proportion of the population?

The efficiency of ascertainment of hypertension is already limited and many people with hypertension defined by existing thresholds are unaware of it.² Public knowledge of the lifetime

risk for cardiovascular disease associated with hypertension is low.⁹ These are areas where new approaches will be required if lower thresholds for diagnosis of hypertension and lower BP targets for therapy are adopted, a considerable challenge for primary care. There are also the issues of incorrect diagnosis from mismeasurement, white coat hypertension, and complications from treatment-induced hypotension,¹⁰ all of which would persist as challenges with any form of guideline review.

However, it seems there is a trend supported by evidence toward closer alignment of normal, optimal, and target BP. That should be a good thing in providing better clarity for both consumers and clinicians. In the meantime, there will always be debate as we seek an inflection that we know does not exist in the relationship between BP and risk of cardiovascular disease.

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Disclosures

None.

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