ORIGINAL ARTICLE

Awareness of the Japanese Society of Hypertension Guidelines for the Management of Hypertension and their use in clinical practices: 2009 survey results

Taku Obara^{1,2}, Sergio Ramón Gutiérrez Ubeda³, Takayoshi Ohkubo⁴, Hideo Matsuura⁵, Toshihiko Ishimitsu⁶, Masanobu Takata⁷, Hiromi Rakugi⁸ and Yutaka Imai⁹ on behalf of Japanese Society of Hypertension Recurrent Education Committee

The objective of this study was to investigate physicians' awareness and use of the Japanese Society of Hypertension (JSH) Guidelines for the Management of Hypertension (JSH2004 and JSH2009), and determine what changes need to be implemented in the future. A questionnaire was used to survey physicians' awareness and their use of JSH2004 and JSH2009. Physicians attending educational seminars on hypertension that were held during the months after the publication of JSH2009 (January–April 2009) were asked to participate in the survey. Of the 5795 respondents, 88% were aware of the JSH2009 publication. Furthermore, physicians were also aware of JSH2004, with about 90% using JSH2004 in their practice. A hypertension blood pressure (BP) reference value of 140/90 mm Hg was used by 55% in office BP, whereas 31% used 135/85 mm Hg for home BP. Target BP levels used by physicians were 130/80 mm Hg for patients with diabetes or kidney disease (52%) and for elderly patients with diabetes or kidney disease (45%), whereas 140/90 mm Hg was used for elderly patients with low cardiovascular disease risk (44%) and for patients with chronic-phase stroke (27%). Answers to the questionnaire varied among physicians according to sex, age, workplace and specialty. The majority of the participating Japanese physicians were familiar with both JSH2004 and JSH2009, with many following the guidelines in their practice. However, some physicians use different reference values for hypertension and target BP levels. Physicians' adherence to and use of the guidelines should be regularly examined and promoted.

Hypertension Research (2015) 38, 400–404; doi:10.1038/hr.2015.21; published online 2 April 2015

Keywords: awareness; guidelines; practice

INTRODUCTION

When clinical practice guidelines are rigorously developed, they have the potential to improve clinician and patient health-care decisions, and to enhance health-care quality and outcomes.¹ Toward this end, the Japanese Society of Hypertension (JSH) published their first guidelines on the management of hypertension in 2000,² with new versions developed and published in 2004 (JSH2004),³ 2009 (JSH2009)⁴ and 2014 (JSH2014).⁵ Ikeda *et al.*⁶ determined that the rates of access, familiarity and utilization of JSH2000 were 87.0%, 81.6% and 68.9%, respectively. They also found that of the 1400 clinical physicians surveyed during 2004, 17.1% used 160/95 mm Hg as the systolic/diastolic blood pressure (BP) reference value for hypertension diagnoses. However, it remains unknown as to whether

the Japanese physicians are aware of JSH2004 and JSH2009 with regard to managing hypertension on the basis of new reference values for hypertension diagnosis and target BP levels. The objective of this study was to investigate physicians' practices and their awareness of JSH2004 and JSH2009, and to determine what needs to be done in the future to ensure that evaluations and treatments of patients use the most up-to-date values.

METHODS

A questionnaire was used to survey the practices of physicians and their awareness of JSH2004 and JSH2009. Physicians who attended educational seminars on hypertension that were presented throughout Japan during the months after the publication of JSH2009 (January–April 2009) were asked to

¹Department of Preventive Medicine and Epidemiology, Tohoku University Tohoku Medical Megabank Organization, Sendai, Japan; ²Department of Molecular Epidemiology, Tohoku University Graduate School of Medicine, Sendai, Japan; ³Department of Geriatric Behavioral Neurology, Tohoku University Graduate School of Medicine, Sendai, Japan; ⁴Department of Hygiene and Public Health, Teikyo University School of Medicine, Tokyo, Japan; ⁵Saiseikai Kure Hospital, Kure, Japan; ⁶Department of Cardiology and Nephrology, Dokkyo Medical University, Tochigi, Japan; ⁷Toyama Teishin Hospital, Toyama, Japan; ⁸Department of Geriatric Medicine and Nephrology, Osaka University Graduate School of Medicine, Osaka, Japan and ⁹Department of Planning for Drug Development and Clinical Evaluation, Tohoku University Graduate School of Pharmaceutical Sciences, Sendai, Japan

Correspondence: Professor Y. Imai, Department of Planning for Drug Development and clinical Evaluation, Tohoku University Graduate School of Pharmaceutical Sciences, 2-1 Seiryō-cho, Aoba-Ku, Sendai, Miyagi 980-8575, Japan.

E-mail: dontaku@mail.tains.tohoku.ac.jp

Received 5 August 2014; revised 29 September 2014; accepted 2 December 2014; published online 2 April 2015

participate in the survey. The questionnaire, which was developed by the members of the JSH, was distributed and collected just before the start of each of the seminars. The survey questions were designed to examine the characteristics of the physicians, their awareness of the JSH2009 publication and the use of JSH2004 in their practice. The survey also examined the hypertension reference values used for both office and home BP, optimal BP levels used for office BP and the target BP levels used for patients with diabetes or kidney disease, elderly patients with diabetes or kidney disease, patients with low cardiovascular disease risk and patients with chronic-phase stroke as compared with values recommended in JSH2004. We used a chi-square test to compare answers among physicians according to sex, age, workplace and specialty. Statistical analyses were conducted using the SAS package (Version 9.3; SAS Institute, Cary, NC, USA).

RESULTS

Of the 12 306 physicians who attended the educational seminars in 2009, a total of 6904 (56%) responded to the questionnaire. We excluded 449 subjects from the analysis due to insufficient data on the physician's age, sex, workplace and specialty. In addition, 660 questionnaires were filled out by physicians who attended more than one meeting and filled out multiple forms. Thus, after deleting these duplicate questionnaires, the analysis examined 5795 physicians who correctly completed the questionnaire. Table 1 presents the characteristics of these physicians.

Whereas ~88% of the physicians were familiar with the JSH2009 publication, almost 11% were completely unaware. In addition, almost all physicians (95.5%) were aware of JSH2004. The proportion of physicians who did not use JSH2004 in their practice was 4.4%. Of the physicians using the guidelines, 29.0% partly, 59.5% mostly and 4.3% faithfully used the recommended reference values.

Proportions of the physicians who used the JSH guidelines for the hypertension BP reference values for office BP were 72% for systolic BP (140 mm Hg), 60% for diastolic BP (90 mm Hg) and 55% for systolic/diastolic BP (Table 2). Proportions of physicians that used the JSH reference guidelines for evaluating the hypertension BP values performed at the patient's homes were 36% for systolic BP (135 mm Hg), 43% for diastolic BP (85 mm Hg) and 31% for systolic/diastolic BP (Table 2). Proportions of physicians who used the JSH reference guidelines for evaluating the optimal level for office BP were 26% for systolic BP (120 mm Hg), 49% for diastolic BP (80 mm Hg) and 16% for systolic/diastolic BP (Table 2).

Proportions of physicians who used the JSH guidelines for the target BP levels among patients with diabetes or kidney disease were 68% for

systolic BP (130 mm Hg), 62% for diastolic BP (80 mm Hg) and 52% for systolic/diastolic BP (Table 3). Proportions of physicians who used the JSH guidelines for the target BP levels among elderly patients with diabetes or kidney disease were 61% for systolic BP (130 mm Hg), 57% for diastolic BP (80 mm Hg) and 45% for systolic/diastolic BP (Table 3). Proportions of physicians who used the JSH guidelines for the target BP levels among elderly patients with a low cardiovascular disease risk were 67% for systolic BP (140 mm Hg), 51% for diastolic BP (90 mm Hg) and 44% for systolic/diastolic BP (Table 3). Proportions of physicians who used the JSH guidelines for the target BP levels among patients with chronic-phase stroke were 44% for systolic BP (140 mm Hg), 29% for diastolic BP (90 mm Hg) and 27% for systolic/diastolic BP (Table 3).

More than 90% of physicians were aware of JSH2004 regardless of their sex, age, workplace and specialty. Internists aged 40–69 years

Table 2 Reference values used during office and home BP measurements (*n* = 5795)

(1) Hypertension for office BP

(a) Systolic	
< 140 mm Hg (%)	18.9
140 mm Hg (%)	71.5
> 140 mm Hg (%)	7.5
No answer (%)	2.1
(b) Diastolic	
< 90 mm Hg (%)	34.7
90 mm Hg (%)	60.0
> 90 mm Hg (%)	3.1
No answer (%)	2.2
(c) Systolic/diastolic	
140/90 mm Hg (%)	54.7

(2) Hypertension for home BP

(a) Systolic	
< 135 mm Hg (%)	45.0
135 mm Hg (%)	36.4
> 135 mm Hg (%)	15.4
No answer (%)	3.2
(b) Diastolic	
< 85 mm Hg (%)	41.7
85 mm Hg (%)	43.4
> 85 mm Hg (%)	11.4
No answer (%)	3.5
(c) Systolic/diastolic	
135/85 mm Hg (%)	30.5

(3) Optimal BP levels for office BP

(a) Systolic	
< 120 mm Hg (%)	1.0
120 mm Hg (%)	26.4
> 120 mm Hg (%)	70.3
No answer (%)	2.3
(b) Diastolic	
< 80 mm Hg (%)	13.2
80 mm Hg (%)	49.1
> 80 mm Hg (%)	35.2
No answer (%)	2.6
(c) Systolic/diastolic	
120/80 mm Hg (%)	16.2

Abbreviation: BP, blood pressure.

Table 1 Characteristics of physicians (*n* = 5795)

Sex	
Men (%)	89.2
Age	
< 40 years (%)	15.8
40–49 years (%)	24.5
50–59 years (%)	31.2
60–69 years (%)	16.4
≥ 70 years (%)	12.2
Specialty	
Internal medicine (%)	80.8
Workplace	
Hospital (%)	42.1
Clinic (%)	57.9

Table 3 Target BP values used for patient disease groups (n=5795)*(1) Patients with diabetes or kidney disease*

(a) Systolic	
< 130 mm Hg (%)	18.5
130 mm Hg (%)	68.0
> 130 mm Hg (%)	9.0
No answer (%)	4.5
(b) Diastolic	
< 80 mm Hg (%)	19.2
80 mm Hg (%)	62.0
> 80 mm Hg (%)	14.2
No answer (%)	4.6
(c) Systolic/diastolic	
130/80 mm Hg (%)	51.9

(2) Elderly patients with diabetes or kidney disease

(a) Systolic	
< 130 mm Hg (%)	20.1
130 mm Hg (%)	60.5
> 130 mm Hg (%)	14.7
No answer (%)	4.6
(b) Diastolic	
< 80 mm Hg (%)	21.7
80 mm Hg (%)	56.6
> 80 mm Hg (%)	17.0
No answer (%)	4.8
(c) Systolic/diastolic	
130/80 mm Hg (%)	44.5

(3) Elderly patients with low CVD risk

(a) Systolic	
< 140 mm Hg (%)	18.5
140 mm Hg (%)	67.1
> 140 mm Hg (%)	9.6
No answer (%)	4.9
(b) Diastolic	
< 90 mm Hg (%)	42.6
90 mm Hg (%)	50.8
> 90 mm Hg (%)	1.5
No answer (%)	5.1
(c) Systolic/diastolic	
140/90 mm Hg (%)	44.2

(4) Patients with chronic-phase stroke

(a) Systolic	
< 140 mm Hg (%)	48.3
140 mm Hg (%)	44.4
> 140 mm Hg (%)	2.6
No answer (%)	4.8
(b) Diastolic	
< 90 mm Hg (%)	66.2
90 mm Hg (%)	28.6
> 90 mm Hg (%)	0.3
No answer (%)	4.9
(c) Systolic/diastolic	
140/90 mm Hg (%)	26.9

Abbreviations: BP, blood pressure; CVD, cardiovascular disease.

were more likely to be aware of the JSH2009 publication, to have used JSH2004 in their practice and to have followed the hypertension and target BP reference value levels recommended by the guidelines (Table 4).

DISCUSSION

We found that almost all physicians were familiar with JSH2004, with the majority of these physicians aware of the new guidelines within just a few months of its publication. Ikeda *et al.*⁶ performed a survey in 2004 that examined JSH2000, and showed that 94.4% (1321/1400) of the respondents were aware of its publication. This previous study was based on an internet survey of 1400 physicians, whereas our results are based on 5795 physicians. However, as there are > 300 000 physicians and 60 000 internists in Japan, the number of physicians analyzed in the current and previous studies is quite small in comparison. As a result, we cannot definitively conclude that our results indicate that Japanese physicians maintain a high interest in the JSH guidelines. Therefore, continuous dissemination of the JSH guidelines needs to be undertaken to ensure that all physicians are aware of the changes made to the guidelines.

In our previous studies that used the same methodology, we examined physicians' practices and their awareness of hypertension reference values for office and home BPs.^{7,8} An overall improvement was seen in the proportion of physicians who used the hypertension reference values listed in the JSH guidelines for office BP evaluations in the 2009 survey results, with an increase to 71% for the systolic BP compared with the 63% observed in the 2004–2005 survey and the 58.8% observed in the 2007–2008 survey. In addition, a slight increase to 59.6% was seen for the diastolic BP compared with the 58% in the 2004–2005 survey and 55.9% in the 2007–2008 survey. Furthermore, a slight increase to 55.2% was apparent for both the systolic and diastolic office BP as compared with the 52.1% in the 2004–2005 survey and the 49.9% in the 2007–2008 survey.⁷

There was also an improvement observed in the proportion of physicians using the hypertension reference values listed in the JSH guidelines for home BP evaluations in the 2009 survey results, with a slight increase to 35.9% for systolic BP as compared with the 29.6% observed in the 2004–2005 survey and the 30.4% observed in the 2007–2008 survey. A slight increase to 42.8% was also seen for the diastolic BP as compared with the 39.2% in the 2004–2005 survey and the 40.4% in the 2007–2008 survey. Furthermore, an increase to 30.8% was seen for both the systolic and diastolic home BP as compared with the 21.6% in the 2004–2005 survey and the 23.9% in the 2007–2008 survey.⁸

Overall, these results suggest that because the JSH group was the first to recommend hypertension reference values for home BP evaluations in the JSH2004 publication,³ the guideline recommendations were gradually accepted among physicians. The current survey also demonstrated that many physicians believe that the optimal BP levels need to be higher or lower than the JSH recommendations. The reason for this might be based on the current lack of any evidence for an optimal BP level. Therefore, in order to increase the level of standardization, further studies that investigate optimal BP levels will need to be conducted.

Physicians provided a variety of responses to the questions concerning the target BP levels used in different situations. The reason for this might be due to differences between the international guidelines for the target BP levels recommended in different situations (for example, different versions of the same guidelines are used by the Joint National Committee on Hypertension, JNC;⁹ European Society of Hypertension and the European Society of Cardiology, ESH–ESC¹⁰ and JSH^{2,3}). In patients with diabetes or kidney disease, the target BP levels now recommended in the ESH–ESC 2013¹¹ vs. the older ESH–ESC 2007¹⁰ guidelines have increased from <130/80 mm Hg for both groups to <140/85 mm Hg in diabetes and <140/90 mm Hg in kidney disease. Comparisons of the JNC-8¹² with JNC-7⁹ levels show

Table 4 Physician responses according to sex, age, workplace and specialty

	Age (years)					Sex		Workplace			Specialty	
	<40 (n = 913)	40-49 (n = 1420)	50-59 (n = 1808)	60-69 (n = 948)	≥ 70 (n = 706)	Men (n = 5171)	Women (n = 624)	Clinic (n = 3268)	Hospital (n = 2375)	P	Internist (n = 4680)	Other (n = 1115)
	P	P	P	P	P	P	P	P	P	P	P	P
Awareness of the JSH2009 publication (%)	82.2	93.4	91.4	88.8	78.8	89.2	82.7	89.7	87.8	0.02	90.9	78.4
Awareness of JSH2004 (%)	94.3	96.6	96.4	96.0	92.1	95.6	94.7	95.8	95.4	0.47	96.8	90.2
<i>Use of JSH2004 in the physician's practice</i>												
Partly (%)	30.6	27.3	30.4	27.5	28.6	28.9	29.7	29.6	28.6	0.72	28.1	32.5
Mostly (%)	53.3	63.9	60.1	60.9	55.2	60.2	53.7	60.7	59.3		62.8	45.5
Faithfully (%)	3.6	3.7	3.9	5.2	6.5	4.5	3.0	4.6	4.0		4.9	2.2
<i>Hypertension reference values used</i>												
140/90 mm Hg for office BP (%)	61.7	61.1	58.6	48.2	31.6	55.3	49.5	52.2	58.6	<0.0001	56.9	45.6
135/85 mm Hg for home BP (%)	26.9	35.5	33.4	29.5	18.8	31.1	25.0	31.3	29.9	0.002	32.1	23.9
Optimal BP reference level used for office BP (120/80 mm Hg; %)	13.7	17.6	19.0	13.6	12.5	16.7	12.0	15.4	17.5	0.04	16.3	15.5
<i>Target BP reference levels used</i>												
130/80 mm Hg for patients with diabetes or kidney disease (%)	47.0	53.8	56.5	52.6	41.4	52.4	47.8	53.3	51.2	0.11	54.2	41.9
130/80 mm Hg for elderly patients with diabetes or kidney disease (%)	39.1	45.9	50.1	46.5	31.4	44.9	41.4	45.7	44.0	0.20	46.7	35.3
140/90 mm Hg for elderly patients with low CVD risk (%)	45.7	50.1	48.8	39.5	24.8	44.6	40.7	43.3	46.4	0.02	46.9	32.7
140/90 mm Hg for patients with chronic-phase stroke (%)	25.5	32.3	30.0	24.2	13.7	27.3	24.2	25.2	30.0	<0.0001	28.9	18.7

Abbreviations: BP, blood pressure; CVD, cardiovascular disease; JSH2004, Japanese Society of Hypertension Guidelines for the Management of Hypertension 2004; JSH2009, Japanese Society of Hypertension Guidelines for the Management of Hypertension 2009.

that there has been an increase from <130/80 mm Hg to <140/90 mm Hg in both types of patients. However, in the last three versions of the JSH guidelines (JSH2004, JSH2009 and JSH2014),^{2,4,5} there were no changes in the levels for either of the groups. Therefore, physicians who try to follow the recommended target BP levels in their medical practice might find the guidelines to be too complex when attempting to care for a large number of patients with various types of diseases.

We found little variation in the awareness of the JSH guidelines and their use in clinical practices in relation to the physicians' workplace, for internists and for middle-aged (40–69 years old) physicians, as these physicians have a greater knowledge of hypertension evaluation and treatments. Internists frequently examine hypertensive patients in their clinical practice, and middle-aged physicians tend to have fairly extensive clinical experience with the recent guidelines. As a result, these physicians are more likely to be aware of the JSH guidelines, the reference values for hypertension and the target BP levels.

In the current study, there is the possibility of a selection bias for the physicians that were included in our analysis. As the subjects examined in this study included only physicians who attended hypertension educational seminars, this group might have a much greater interest in the management of hypertension than those who did not attend. It should be noted that the number of responders was smaller than the total number of physicians and internists currently practicing in Japan. Furthermore, the response rate for the questionnaire in this study was only 56%. Therefore, the results of this study could have overestimated the awareness and knowledge of the guidelines by current Japanese physicians. To confirm our findings, further information on physicians who do not normally attend such seminars will need to be evaluated.

To increase compliance to the guidelines, it might be helpful to provide supportive mechanisms, such as visual or portable memory aids, in order to easily remind physicians of the multiple variations that exist for the target BP levels. Within the new guidelines that were recently published by JSH (JSH2014),⁵ it has been suggested that continuous surveys that assess the awareness and practice of physicians on updated versions of the guidelines be performed. In line with this, the format of the guidelines will also need to be re-evaluated to ensure that physicians are able to easily use these new recommendations in their clinical practice.

In conclusion, most Japanese physicians who participated in this study are aware of the presence of JSH2004, with many using the recommendations in their own clinical practices. However, this study also found that the hypertension reference values and target BP levels currently being used do vary among physicians. Therefore, physicians' adherence to the recommended JSH guidelines will need to be regularly examined to help guarantee that patients receive treatments in line with the most up-to-date scientific findings.

ACKNOWLEDGEMENTS

This work was supported by directors, councilors and members of the Japanese Society of Hypertension.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

- Graham R, Mancher M, Miller Wolman D, Greenfield S, Steinberg E (eds). *Clinical Practice Guidelines We Can Trust*. National Academies Press: Washington, D.C., 2011, pp 1–226.
- Japanese Society of Hypertension Subcommittee for the Management of Hypertension. Guidelines for the management of hypertension for general practitioners. *Hypertens Res* 2001; **24**: 613–634.
- Japanese Society of Hypertension. Japanese Society of Hypertension guidelines for the management of hypertension (JSH 2004). *Hypertens Res* 2006; **29**(Suppl): S1–105.
- Ogihara T, Kikuchi K, Matsuoka H, Fujita T, Higaki J, Horiuchi M, Imai Y, Imaizumi T, Ito S, Iwao H, Kario K, Kawano Y, Kim-Mitsuyama S, Kimura G, Matsubara H, Matsuura H, Naruse M, Saito I, Shimada K, Shimamoto K, Suzuki H, Takishita S, Tanahashi N, Tsuchihashi T, Uchiyama M, Ueda S, Ueshima H, Umemura S, Ishimitsu T, Rakugi H. The Japanese Society of Hypertension Guidelines for the management of hypertension (JSH 2009). *Hypertens Res* 2009; **32**: 3–107.
- Shimamoto K, Ando K, Fujita T, Hasebe N, Higaki J, Horiuchi M, Imai Y, Imaizumi T, Ishimitsu T, Ito M, Ito S, Itoh H, Iwao H, Kai H, Kario K, Kashiwara N, Kawano Y, Kim-Mitsuyama S, Kimura G, Kohara K, Komuro I, Kumagai H, Matsuura H, Miura K, Morishita R, Naruse M, Node K, Ohya Y, Rakugi H, Saito I, Saitoh S, Shimada K, Shimosawa T, Suzuki H, Tamura K, Tanahashi N, Tsuchihashi T, Uchiyama M, Ueda S, Umemura S. Japanese Society of Hypertension Committee for Guidelines for the Management of Hypertension. The Japanese Society of Hypertension Guidelines for the management of hypertension (JSH 2014). *Hypertens Res* 2014; **37**: 253–387.
- Ikeda N, Hasegawa T, Saito I, Saruta T. Awareness of the Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2000) and compliance to its recommendations: surveys in 2000 and 2004. *J Hum Hypertens* 2006; **20**: 263–266.
- Kobayashi M, Obara T, Ohkubo T, Fukunaga H, Satoh M, Metoki H, Asayama K, Inoue R, Kikuya M, Mano N. Practice and awareness of physicians regarding casual-clinic blood pressure measurement in Japan. *Hypertens Res* 2010; **33**: 960–964.
- Obara T, Ohkubo T, Fukunaga H, Kobayashi M, Satoh M, Metoki H, Asayama K, Inoue R, Kikuya M, Mano N, Miyakawa M, Imai Y. Practice and awareness of physicians regarding home blood pressure measurement in Japan. *Hypertens Res* 2010; **33**: 428–434.
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Rocella EJ. National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA* 2003; **289**: 2560–2572.
- Mancia G, De Backer G, Dominiczak A, Cifkova R, Fagard R, Germano G, Grassi G, Heagerty AM, Kjeldsen SE, Laurent S. 2007 ESH-ESC Practice Guidelines for the Management of Arterial Hypertension: ESH-ESC Task Force on the Management of Arterial Hypertension. *J Hypertens* 2007; **25**: 1751–1762.
- Mancia G, Fagard R, Narkiewicz K, Redón J, Zanchetti A, Böhm M, Christiaens T, Cifkova R, De Backer G, Dominiczak A. Task Force Members. 2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *J Hypertens* 2013; **31**: 1281–1357.
- James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, Lackland DT, LeFevre ML, MacKenzie TD, Oggedegbe O, Smith SC Jr, Svetkey LP, Taler SJ, Townsend RR, Wright JT Jr, Narva AS, Ortiz E. 2014 evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the eighth joint national committee (JNC 8). *JAMA* 2014; **311**: 507–520.