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Ohio Cardiovascular Health Collaborative

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Cardi-OH ECHO Reducing the Burden of Hypertension

Thursday, January 16, 2020

Disclosure Statements

The following planners, speakers, moderators, and/or panelists of the CME activity have financial relationships with commercial interests to disclose:

- Adam T. Perzynski, PhD reports being co-founder of Global Health Metrics LLC, a Cleveland-based software company and royalty agreements for forthcoming books with Springer publishing and Taylor Francis publishing.
- Brian Bachelder, MD received funds for his role as Physician Advisor at VaxCare.
- SiranM. Koroukian, PhD received grant funds for her role as a subcontractor on a study funded by Celgene.
- Christopher A. Taylor, PhD, RDN, LD, FAND reports grant funding and travel support for his role as a consultant, researcher, and presenter for Abbott Nutrition, and is also a member of the Scientific Advisory Council of Viocare, Inc.
- Jackson T. Wright, Jr., MD, PhD reports research support from the NIH and Ohio Department of Medicaid and consulting with NIH, AHA, and ACC.
- These financial relationships are outside the presented work.

All other planners, speakers, moderators, and/or panelists of the CME activity have no financial relationships with commercial interests to disclose.

Uncontrolled hypertension: Scope and impact of the problem

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Objectives

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- Provide an overview of the prevalence and impact of hypertension in the United States.
- Summarize the prevalence of diagnosed, but uncontrolled hypertension and its impact on cardiovascular outcomes.
- List and explain 3 reasons why hypertension in an individual patient may be uncontrolled.

Clinical Significance of Hypertension

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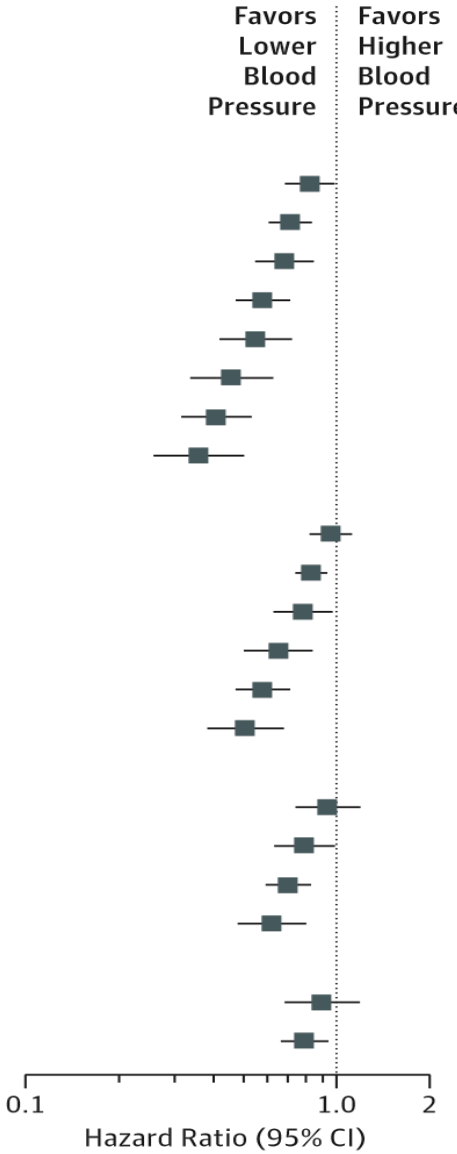
- In the US, hypertension accounts for more CVD deaths than any other modifiable CVD risk factor
- It is second only to cigarette smoking as a preventable cause of death for any reason
- In the follow-up study of 23,272 U.S. NHANES (National Health and Nutrition Examination Survey) participants, >50% of deaths from coronary heart disease and stroke occurred among individuals with hypertension
- It is the leading cause of heart failure, the leading DRG for hospitalizations and the most common reason for primary care visits
- The above data are exaggerated in minorities and in lower SES populations

Hazard Ratios (95% CI) for Major Cardiovascular Disease at Different Levels of Achieved Systolic BP

***Network Meta-analysis** (42 RCTs: N = 144,220)*

Mean Achieved Systolic Blood Pressure, mm Hg	Hazard Ratio (95% CI)
120-124 mm Hg vs. higher SBPs	
Reduction to 120-124	
120-124 vs 125-129	0.82 (0.67-0.97)
120-124 vs 130-134	0.71 (0.60-0.83)
120-124 vs 135-139	0.68 (0.55-0.85)
120-124 vs 140-144	0.58 (0.48-0.72)
120-124 vs 145-149	0.55 (0.42-0.72)
120-124 vs 150-154	0.46 (0.34-0.63)
120-124 vs 155-159	0.41 (0.32-0.54)
120-124 vs ≥160	0.36 (0.26-0.51)
130-134 mm Hg vs. higher SBPs	
Reduction to 130-134	
130-134 vs 135-139	0.96 (0.83-1.14)
130-134 vs 140-144	0.83 (0.74-0.94)
130-134 vs 145-149	0.78 (0.63-0.98)
130-134 vs 150-154	0.65 (0.51-0.85)
130-134 vs 155-159	0.58 (0.48-0.72)
130-134 vs ≥160	0.51 (0.39-0.69)
140-144 mm Hg vs. higher SBPs	
Reduction to 140-144	
140-144 vs 145-149	0.94 (0.74-1.20)
140-144 vs 150-154	0.79 (0.63-0.99)
140-144 vs 155-159	0.70 (0.60-0.84)
140-144 vs ≥160	0.62 (0.48-0.80)
150-154 mm Hg vs. higher SBPs	
Reduction to 150-154	
150-154 vs 155-159	0.90 (0.68-1.19)
150-154 vs ≥160	0.79 (0.66-0.94)



Key Findings

- Progressive reduction in risk of CVD at lower levels of achieved SBP down to levels below current European & US recommendations
- Similar findings for stroke, CHD and all-cause mortality
- Similar pattern in a sensitivity analyses where
  - SPRINT results excluded
  - Results from four trials with risk or lack of clarity for bias
- No inconsistency between direct or network (indirect) comparisons
- No inconsistency for CVD benefit in several other meta-analyses (including Xie et al., Verdecchia et al., and Bangalore et al.)

Bundy JD et al. JAMA Cardiol. 2017;2:775-781.

RECENT HYPERTENSION GUIDELINE RECOMMENDATIONS

Guideline	Evidence Review Methodology	BP Target in General Adult Population	BP Target in High CVD Risk Grps	BP Target in CKD and DM
NICE (2011, amended 2019)[1]	Systematic Review	Age < 80: <140/90 Age ≥ 80: <150/90	Age < 80: <140/90 Age ≥ 80: <150/90	<140/90
JAMA 2014 HTN Guideline[2]	Systematic Review	Age <60: <140/90 Age ≥60: <150/90	Age < 60: <140/90 Age ≥ 60: <150/90	<140/90
CHEP (2016)[3]	Consensus (Graded)	Age <80: SBP <120 Age ≥80: SBP<150 (if < 120 target inappropriate)	Age <80: SBP <120 Age ≥80: SBP<150 (if < 120 target inappropriate)	< 130/80
Australian (2016)[4]	Consensus (Graded)	<140/90	<120/80 if thought safe	N/A
ACC/AHA (2017)[5]	Consensus (Graded)	< 130/80	< 130/80	< 130/80
AAFP/ACP (2017)[6]	Consensus	Age <60: <140/90 Age ≥60: <150/90	Age < 60: <140/90 Age ≥ 60: <150/90	<140/90
ESH/ESC (2018)[7]	Consensus (Graded)	<140/90; < 130/80 if tolerated Age ≥ 65: SBP 130- 140	Age < 65: <130/80 Age ≥ 65: SBP 130-140	CKD: SBP 130-140 DM: <130/80
ADA BP Targets (2018)[8] (diabetic patients)	Consensus	<140/90	<130/80	<130/80
KDIGO 2019[9]	Consensus	< 130/80	< 130/80	<130/80

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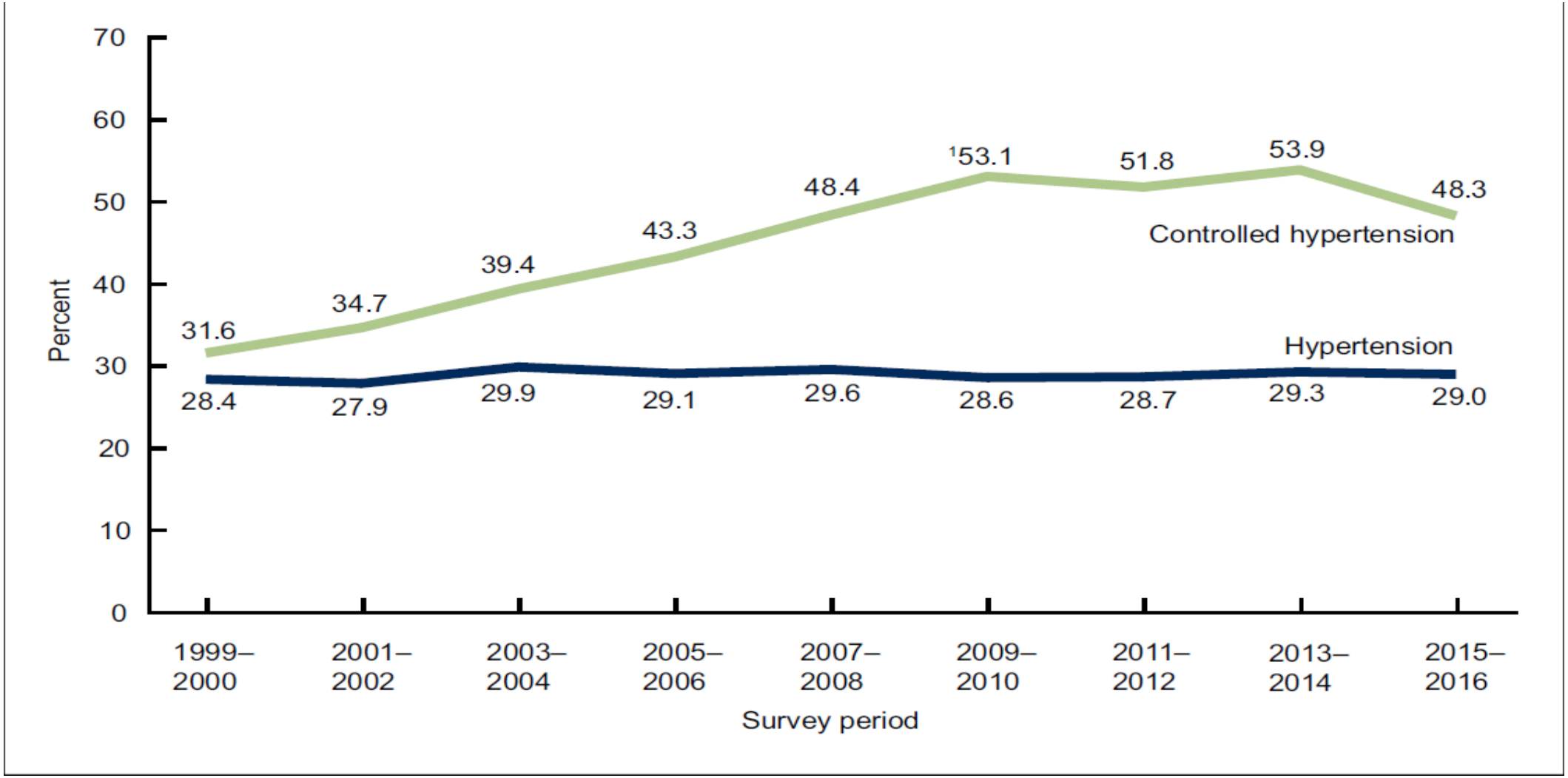
Annals of Internal Medicine | SPECIAL ARTICLE

Evidence Supporting a Systolic Blood Pressure Goal of Less Than 150 mm Hg in Patients Aged 60 Years or Older: The Minority View

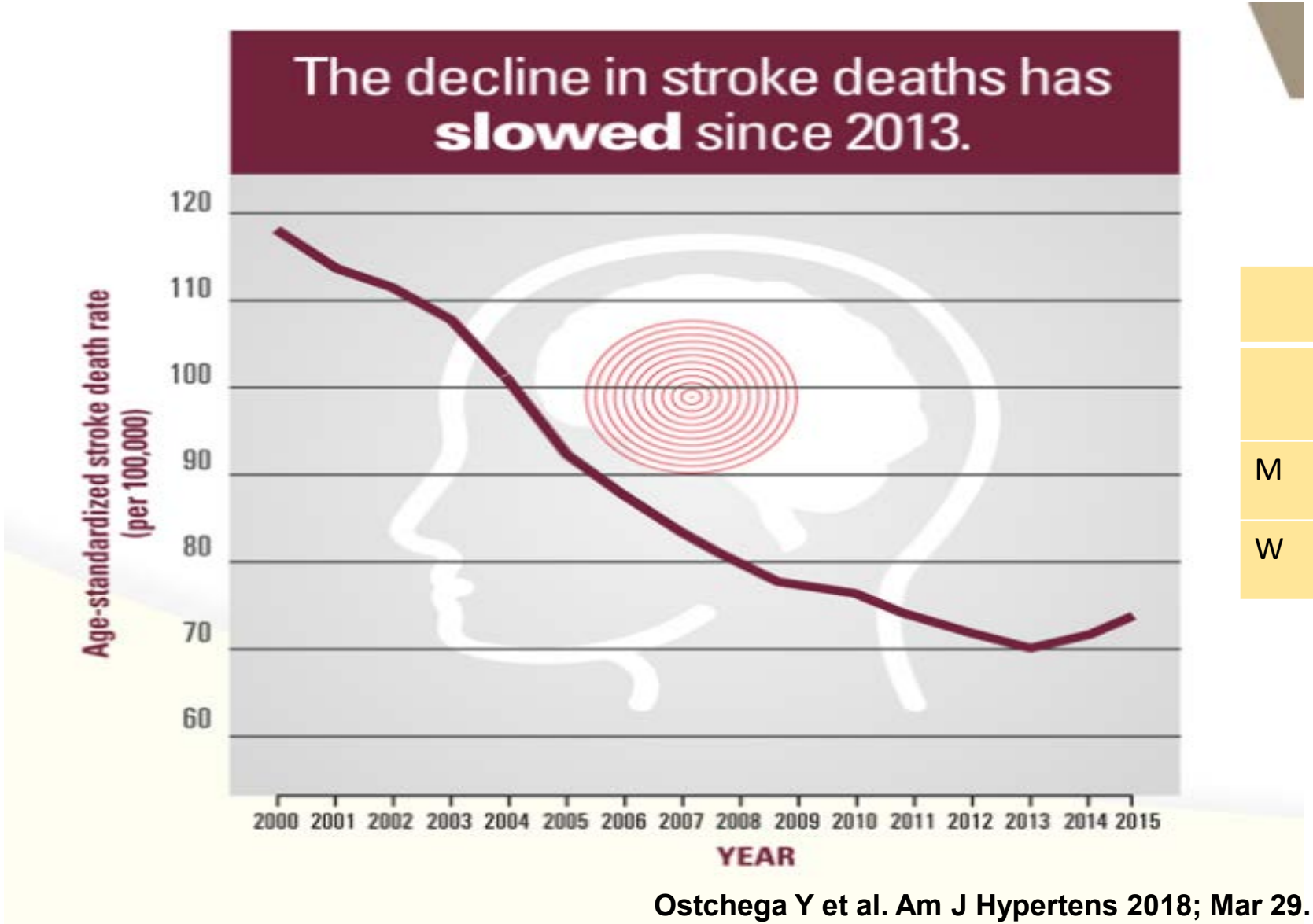
Jackson T. Wright Jr., MD, PhD; Lawrence J. Fine, MD, DrPH; Daniel T. Lackland, PhD; Gbenga Ogedegbe, MD, MPH, MS; and Cheryl R. Dennison Himmelfarb, PhD, RN, ANP

Ann Intern Med 2014;160: 499-504

Age-adjusted trends in hypertension and controlled hypertension (< 140/90 mmHg) among adults aged 18 and over: United States, 1999–2016 (NCHS)



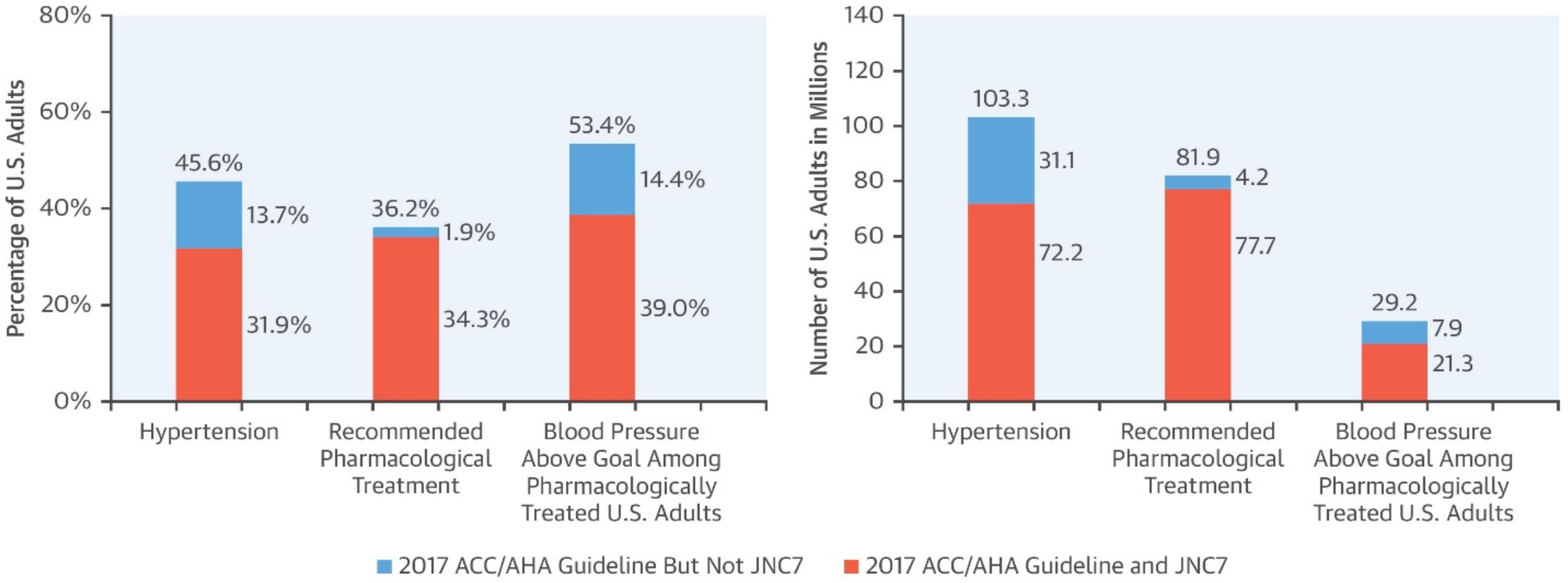
Scary Result Post JNC-8 from CDC



Change in SBP			
	1999-2000	2011-2012	2015-2016
M	135.7	132.8	135.3
W	139.7	131.9	134.4

Ostchega Y et al. Am J Hypertens 2018; Mar 29. doi: 10.1093/ajh/hpy047.

CENTRAL ILLUSTRATION: Prevalence of Hypertension, Recommendation for Pharmacological Antihypertensive Treatment, and Blood Pressure Above Goal Among U.S. Adults According to the 2017 ACC/AHA and the JNC7 Guidelines



Muntner, P. et al. J Am Coll Cardiol. 2018;71(2):109-18.

Age-adjusted prevalence of controlled hypertension among adults with hypertension aged 18 and over, by sex and race and Hispanic origin: United States, NHANES 2015–2016

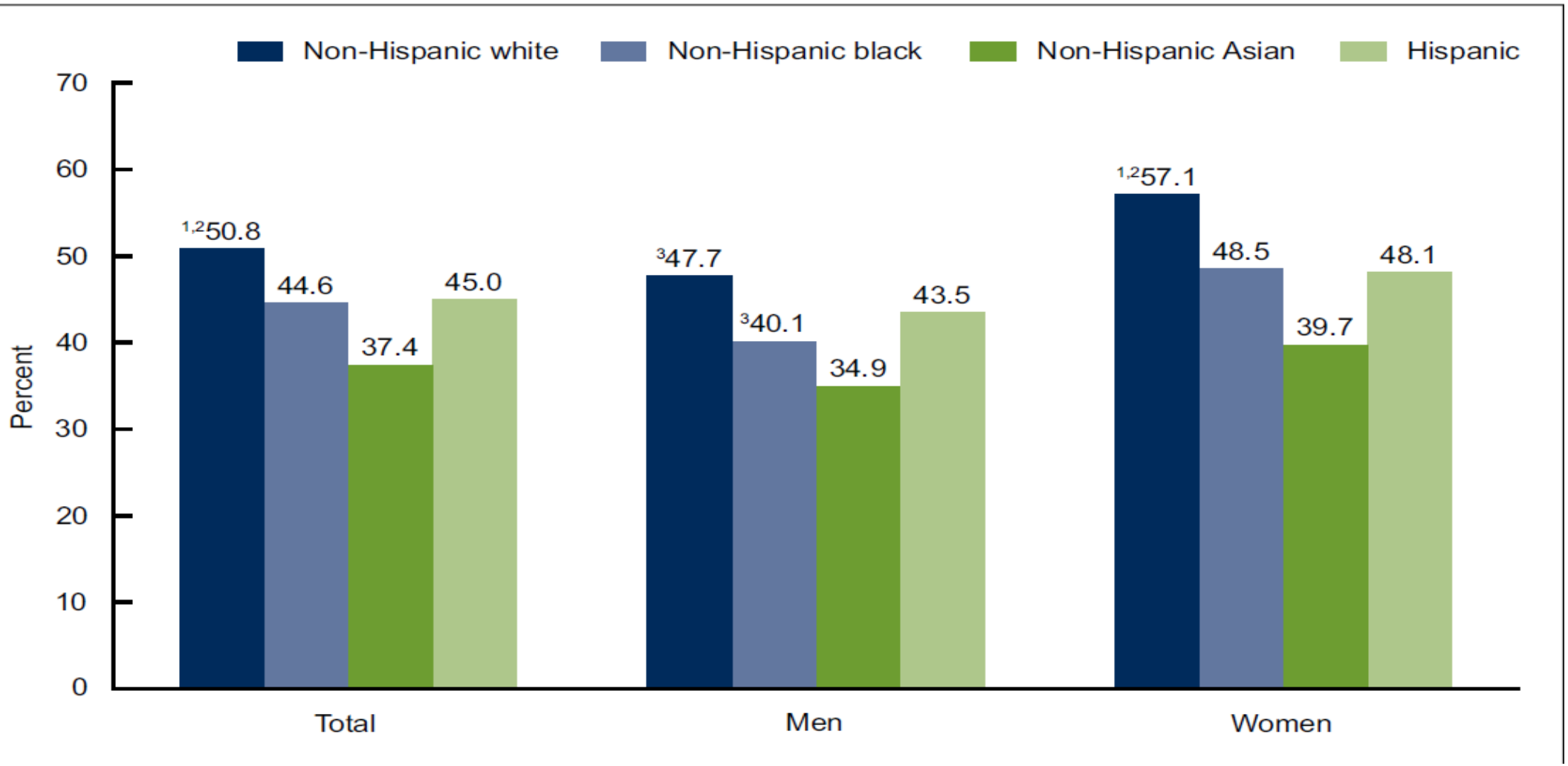
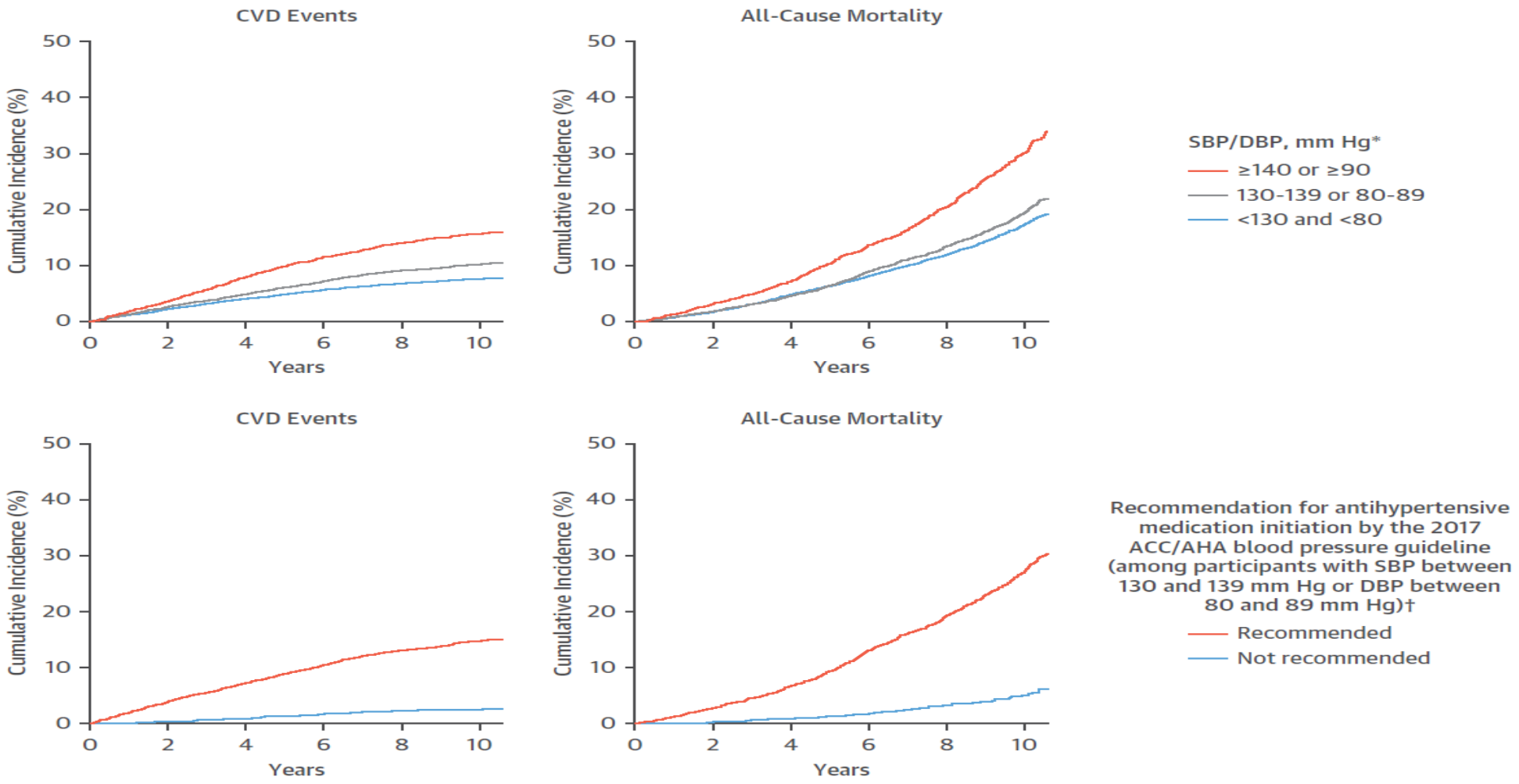


FIGURE 2 Cumulative Incidence of CVD Events and All-Cause Mortality Among REGARDS Study Participants Not Taking Antihypertensive Medication



Colantonio LD et al; JACC 2018; 72: 1187-97

Projected Number of CVD Events Averted with the 2017 ACC/AHA and JNC7 Guidelines

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	US Adults (95% CI)	CVD events expected with current SBP levels (95% CI)	Projected CVD events prevented with achieving guideline-recommended SBP goals (UR)		Difference (UR)
			JNC7	2017 ACC/AHA	
Not taking antihypertensive medication	74.3 (59.3-89.4)	7.2 (5.9-8.7)	0.8 (0.2-1.6)	1.0 (0.3-1.9)	0.2 (0.1-0.3)
Taking antihypertensive medication	48.7 (37.9-59.5)	9.8 (8.5-11.3)	1.7 (0.7-2.8)	2.0 (0.8-3.2)	0.2 (0.1-0.4)
Total	123.1 (97.2-148.9)	16.9 (14.3-19.5)	2.5 (0.9-4.4)	3.0 (1.1-5.1)	0.5 (0.2-0.7)

ACC: American College of Cardiology; AHA: American Heart Association; CI: confidence interval; CVD: cardiovascular disease; JNC7: Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; SBP: systolic blood pressure; UR: uncertainty range.
Numbers in the table represent millions.

Bress A, et al. Circ 2018;138:00–00. DOI: 10.1161

Association of Hypertension Guidelines with CVD Events and Death in the US

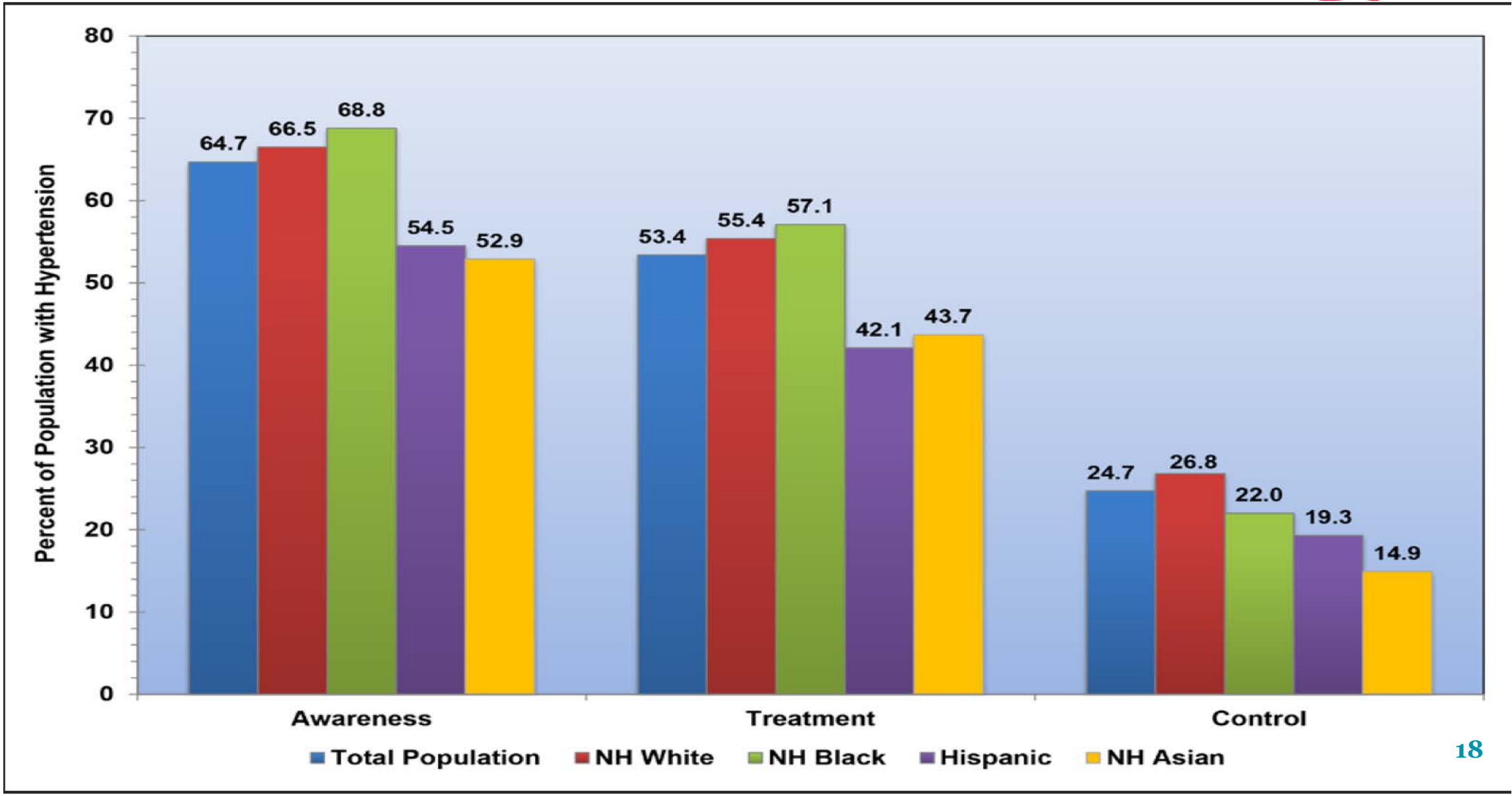
(1) Incidence of major CVD events & all-cause mortality by modeling 4 community-based cohort studies
(2) Network meta-analysis (42 RCTs) to estimate HRs for outcomes and determine population-attributable risks and events reduced.

Characteristic	2014 Evidence-Based Guideline	2017 ACC/AHA Guideline
BP threshold for definition of hypertension	≥140/90	≥130/80
BP threshold for initiation of antihypertensive drugs	≥140/90 (<age 60) ≥150/90 (≥age 60)	≥140/90 (gen. population) ≥130/80 (high CVD risk)
BP goal of treatment	<140/90 (<age 60) <150/90 (≥age 60)	<130/80
Annual CVD event reduction (adults ≥age 40)	270,000	610,000 (NNT=70)
Annual reduction in death (adults ≥age 40)	177,000	334,000 (NNT=129)

Bundy JD *et al*. *JAMA Cardiol*. 2018; doi:10.1001/jamacardio.2018.1240

Hypertension awareness, treatment, and control (BP≥ 130/80) in adults ≥ age 20 of age by race and ethnicity (NHANES 2013-16)

Benjamin EJ et al. Heart and Stroke Statistics 2019, Circ 2019; 130:e56-528



Summary

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- Data support use of a lower BP target <130/80 mm Hg in all ages and subgroups for most individuals and above which defines “uncontrolled BP”
- Nearly all national and international guidelines now recommend BP targets in this range (some recommend even lower). There is ample evidence to support it.
- Control rates to < 130/80mmHg at 24.8 is now < half of the previous control rates to < 140/90
- Note: This project and the latest HEDIS measure use a BP<140/90 target as the performance metric.
  - *However, a performance metric for a given population of patients or a practice differs from a clinical practice guideline for individual patients*.
- We have work to do to achieve the benefits hoped for our patients

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Thank you!

Questions/Discussion