

Proceedings From a National Heart, Lung, and Blood Institute and the Centers for Disease Control and Prevention Workshop to Control Hypertension

Yvonne Commodore-Mensah,^{1,2} Fleetwood Loustalot,³ Cheryl Dennison Himmelfarb,^{1,2} Patrice Desvigne-Nickens,⁴ Vandana Sachdev,⁴ Kirsten Bibbins-Domingo,⁵ Steven B. Clauser,⁶ Deborah J. Cohen,⁷ Brent M. Egan,⁸ A. Mark Fendrick,⁹ Keith C. Ferdinand,¹⁰ Cliff Goodman,¹¹ Garth N. Graham,¹² Marc G. Jaffe,¹³ Harlan M. Krumholz,¹⁴ Phillip D. Levy,¹⁵ Glen P. Mays,¹⁶ Robert McNellis,¹⁷ Paul Muntner,¹⁸ Gbenga Ogedegbe,¹⁹ Richard V. Milani,²⁰ Linnea A. Polgreen,²¹ Lonny Reisman,²² Eduardo J. Sanchez,²³ Laurence S. Sperling,^{3,24} Hilary K. Wall,³ Lori Whitten,²⁵ Jackson T. Wright Jr.,²⁶ Janet S. Wright,³ and Lawrence J. Fine⁴

Hypertension treatment and control prevent more cardiovascular events than management of other modifiable risk factors. Although the age-adjusted proportion of US adults with controlled blood pressure (BP) defined as <140/90 mm Hg, improved from 31.8% in 1999–2000 to 48.5% in 2007–2008, it remained stable through 2013–2014 and declined to 43.7% in

2017–2018. To address the rapid decline in hypertension control, the National Heart, Lung, and Blood Institute and the Division for Heart Disease and Stroke Prevention of the Centers for Disease Control and Prevention convened a virtual workshop with multi-disciplinary national experts. Also, the group sought to identify opportunities to reverse the adverse trend and further improve

Correspondence: Yvonne Commodore-Mensah (ycommod1@jhu.edu).

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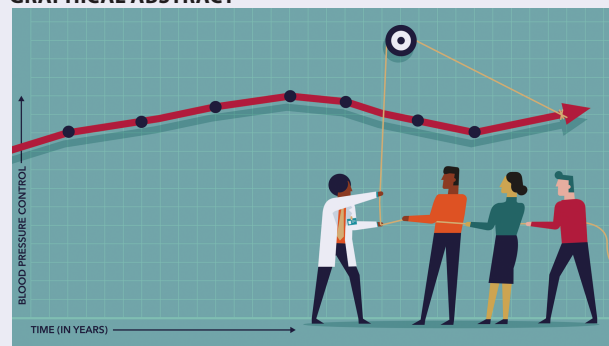
¹Johns Hopkins School of Nursing, Baltimore, Maryland, USA; ²Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA; ³Division for Heart Disease and Stroke Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ⁴Division of Cardiovascular Sciences, National Heart, Lung, and Blood Institute, Bethesda, Maryland, USA; ⁵Department of Epidemiology and Biostatistics, University of California, San Francisco School of Medicine, San Francisco, California, USA; ⁶Patient Centered Outcomes Research Institute, Washington, District of Columbia, USA; ⁷Department of Family Medicine, Oregon Health & Science University, Portland, Oregon, USA; ⁸American Medical Association, Greenville, South Carolina, USA; ⁹Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan, USA; ¹⁰Tulane Heart and Vascular Institute, Tulane University School of Medicine, New Orleans, Louisiana, USA; ¹¹The Lewin Group, Falls Church, Virginia, USA; ¹²Google Health and Youtube, Playa Vista, California, USA; ¹³Kaiser Permanente San Francisco Medical Center, San Francisco, California, USA; ¹⁴Section of Cardiovascular Medicine, Department of Internal Medicine, Yale School of Medicine, New Haven, Connecticut, USA; ¹⁵Department of Emergency Medicine, Wayne State University School of Medicine, Detroit, Michigan, USA; ¹⁶Department of Health Systems, Management and Policy, Colorado School of Public Health, Aurora, Colorado, USA; ¹⁷Agency for Healthcare Research and Quality, Rockville, Maryland, USA; ¹⁸Department of Epidemiology, University of Alabama at Birmingham School of Public Health, Birmingham, Alabama, USA; ¹⁹New York University Grossman School of Medicine, New York, New York, USA; ²⁰Department of Cardiology, Ochsner Health System, New Orleans, Louisiana, USA; ²¹Department of Pharmacy Practice and Science, University of Iowa College of Pharmacy, Iowa City, USA; ²²HealthReveal, Glen Head, New York, USA; ²³American Heart Association, Dallas, Texas, USA; ²⁴Department of Medicine, Emory University School of Medicine, Atlanta, Georgia, USA; ²⁵Synergy Enterprises, Inc, Silver Spring, Maryland, USA; ²⁶University Hospitals Cleveland Medical Center, Cleveland, Ohio, USA

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hypertension control. The workshop immediately preceded the Surgeon General's Call to Action to Control Hypertension, which recognized a stagnation in progress with hypertension control. The presentations and discussions included potential reasons for the decline and challenges in hypertension control, possible "big ideas," and multisector approaches that could reverse the current trend while addressing knowledge gaps and research priorities. The broad set of "big ideas" was comprised of various activities that may improve hypertension control, including: interventions to engage patients, promotion of self-measured BP monitoring with clinical support, supporting team-based care, implementing telehealth, enhancing community-clinical linkages, advancing precision population health, developing tailored public health messaging, simplifying hypertension treatment, using process and outcomes quality metrics to foster accountability and efficiency, improving access to high-quality health care, addressing social determinants of health, supporting cardiovascular public health and research, and lowering financial barriers to hypertension control.

GRAPHICAL ABSTRACT



Keywords: blood pressure; cardiovascular disease; hypertension; prevention; screening.

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Hypertension is the predominant risk factor for cardiovascular disease (CVD) and kidney disease.^{1,2} Controlling blood pressure (BP) significantly reduces mortality and CVD risk among adults diagnosed with hypertension.³ In the United States, hypertension awareness, treatment, and control remain persistent challenges.⁴ Among adults with a hypertension diagnosis, control (<140/90 mm Hg) of this condition worsened from 53.8% in 2013–2014 to 43.7% in 2017–2018.⁵

The National Heart, Lung, and Blood Institute (NHLBI) and the Centers for Disease Control and Prevention (CDC) provide leadership in research and public health efforts to improve hypertension control. Building on the work of the Million Hearts initiative,⁶ CDC launched the National Hypertension Control Roundtable in 2020, a multisector group of public, private, and nonprofit organizations unified to improve national hypertension control, to reach the goal of at least 80% by 2025.⁷

On 5–6 October 2020, the NHLBI and CDC convened a workshop to discuss the decline in hypertension control and possible multilevel solutions, including research priorities and potential policies to address this public health problem. This manuscript summarizes the workshop and complements the Surgeon General's Call to Action to Control Hypertension,²⁶ published days after the workshop, which provides targeted strategies for multiple sectors to improve hypertension control in the United States.

THE DECLINE IN HYPERTENSION CONTROL AMONG US ADULTS

Data from the National Health and Nutrition Examination Survey (NHANES) indicate that hypertension control (<140/90 mm Hg) increased from 31.8% in 1999–2000 to 53.7% in 2009–2010, remained stable at 53.8% in 2013–2014, then fell to 43.7% in 2017–2018 (Figure 1).⁵ Using the 2017 American College of Cardiology (ACC)/American Heart Association (AHA) BP guideline definition of hypertension control (<130/80 mm Hg), only 19% have controlled BP.⁵ The rapid fall in control was broad based and roughly

comparable across age and race-ethnicity groups. In 2017–2018, younger (18–44 years), non-Hispanic (NH) Black adults, and adults without health insurance, a usual health care facility, or health care visits in the past year were less likely to have controlled BP.⁵ In 2003–2014, total medical care for adults with hypertension was nearly \$2,000 more annually than adults without hypertension, equaling \$131 billion in adjusted national expenditure.⁹ Furthermore, their inpatient costs were 2.5 times that of adults without hypertension. These data highlight opportunities for prompt and decisive action to avert the burdensome and costly personal, social, and economic complications of uncontrolled hypertension.

POTENTIAL REASONS FOR THE DECLINE IN HYPERTENSION CONTROL

As illustrated in Figure 2, the decline in hypertension control was relatively comparable across age and race-ethnicity groups. Moreover, the decline in hypertension control reflected reductions in awareness and treatment of hypertension and treatment effectiveness or the proportion of treated adults controlled.⁸ However, access to care, defined as having health care insurance, a regular source of health care, and at least 1 health care visit in the past year, was unchanged in nearly every group. These recent data may suggest that health care quality for diagnosing, reflected in decreased awareness, and managing, reflected in lower rates of treatment and treatment effectiveness, may have fallen. In addition to a lower proportion of adults with hypertension taking antihypertensive medications, the proportion taking a single medication or monotherapy rose.⁸ The declining treatment and treatment intensity for hypertension was concurrent with a rise in diabetes and obesity, which require more and not less intensive treatment to achieve control.¹⁰ While disparities were not exacerbated in the recent fall in hypertension control during the 2015–2018 timeframe, neither did disparities significantly improve.⁸ The AHA has recently acknowledged structural racism as a root cause

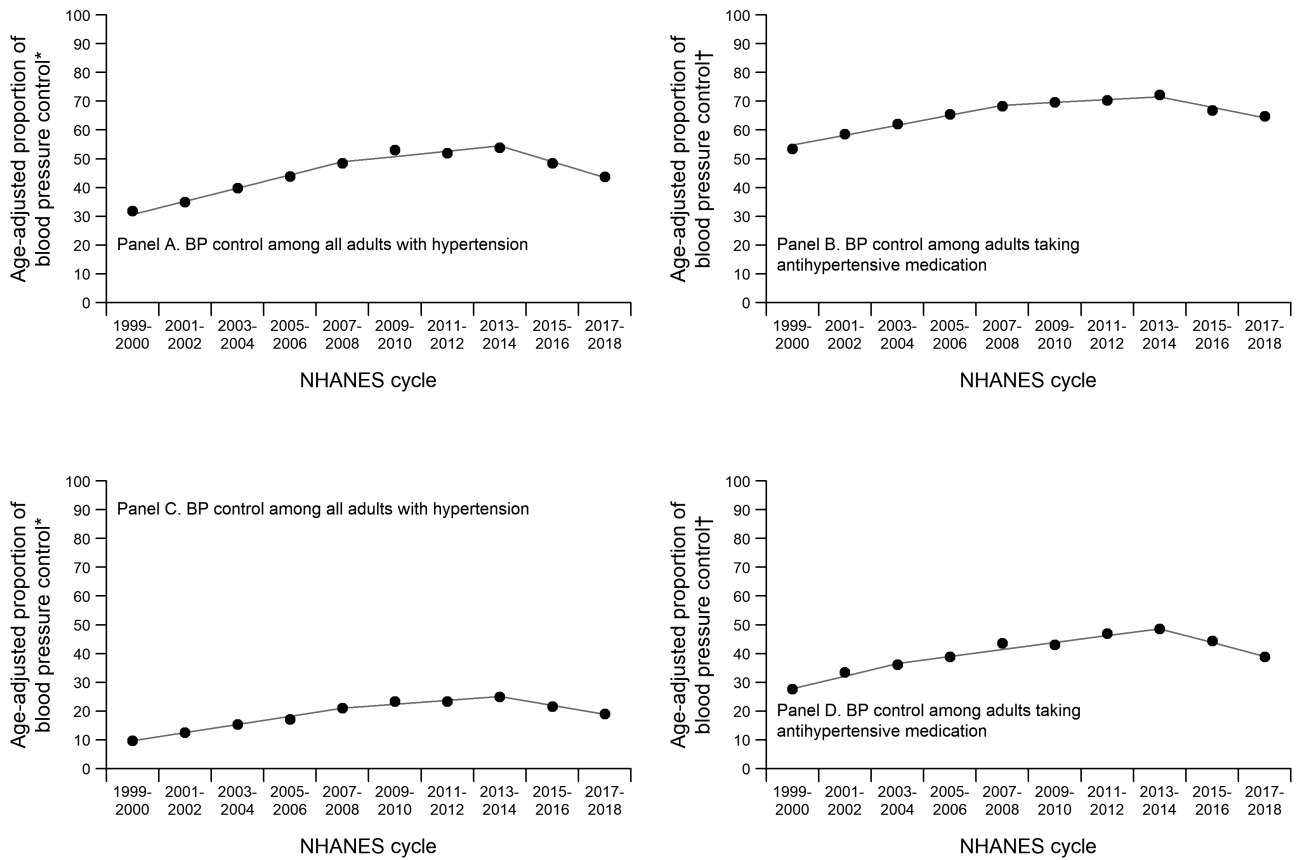


Figure 1. Trends in blood pressure control among US adults with hypertension, 1999–2000 to 2017–2018.⁵ Age-adjusted estimated proportion of adults with hypertension and controlled blood pressure. NHANES indicates National Health and Nutrition Examination Survey. Hypertension was defined as systolic blood pressure (SBP) level of 140 mm Hg or higher, diastolic blood pressure (DBP) level of 90 mm Hg or higher, and antihypertensive medication use. Controlled blood pressure was defined as SBP level lower than 140 mm Hg and DBP level lower than 90 mm Hg in panels (a) and (b) and SBP level lower than 130 mm Hg and DBP level lower than 80 mm Hg in panels (c) and (d). Treatment was defined by self-reported antihypertensive medication use. Among all adults with hypertension, blood pressure control from 1999–2000 through 2007–2008 yielded $P < 0.001$ for trend; from 2007–2008 through 2013–2014, $P = 0.14$ for trend; and from 2013–2014 through 2017–2018, $P = 0.003$ for trend. Among adults taking antihypertensive medication, blood pressure control from 1999–2000 through 2007–2008 yielded $P < 0.001$ for trend; from 2007–2008 through 2013–2014, $P = 0.12$ for trend; and from 2013–2014 through 2017–2018, $P = 0.005$ for trend. Age adjustment was performed using direct standardization with the standard being all adults across the entire period (1999–2018); the age categories used for standardization were 18–44 years (15.5%), 45–64 years (45.4%), 65–74 years (21.5%), and 75 years or older (17.7%). The line segments were generated using Joinpoint (National Cancer Institute). * Among all adults with hypertension. † Among adults who self-reported taking antihypertensive medication.

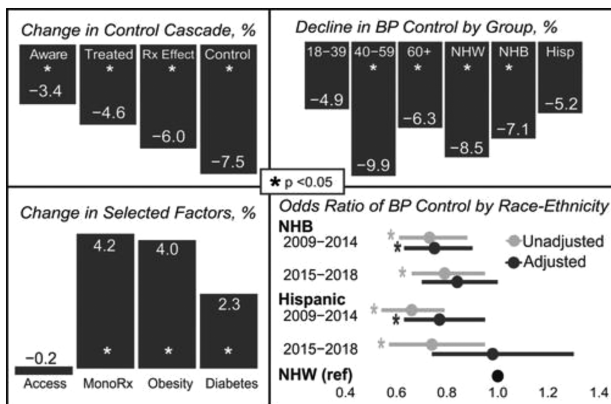


Figure 2. Hypertension control cascade and change in selected factors, NHANES 2009–2018.¹⁰ Abbreviation: NHANES, National Health and Nutrition Examination Survey.

of health disparities in the United States that needs to be addressed.¹¹ Although the factors that caused the decline in hypertension control are uncertain, potential contributing factors discussed at the workshop are presented below.

SOCIAL DETERMINANTS OF HEALTH

Social determinants of health (SDoH), the conditions in which people are born, grow, work, live, and age, and the broader forces and systems which shape daily life,¹² contribute to hypertension outcomes. Economic inequality continues to widen in the United States. The median net wealth increased by 33% among upper-income families between 2001 and 2016, while the median net worth of middle-income families and lower-income families declined by 20% and 45%, respectively.¹³ Widening wealth disparities are associated with poorer BP management, with adults with

lower incomes having a higher likelihood of hypertension and a lower likelihood of achieving BP control.¹⁴ Evidence for this is found in a recent NHANES analysis; SDoH were associated with hypertension, stage 2 hypertension, and controlled BP.¹⁵ Hypertension prevalence was higher in NH Black and NH Asian adults than NH White adults. Lack of routine place for health care and being uninsured was associated with uncontrolled hypertension.¹⁵

One-third of the geographic variation in nonadherence to antihypertensive medications is associated with SDoH, such as poverty, food insecurity, weak social support systems, and unhealthy built environments¹⁶ that make self-care and self-management more challenging.¹⁴ Furthermore, recent data from NHANES have shown a higher prevalence of stage 2 hypertension in urban areas than rural areas.¹⁷ All 10 states with the highest prevalence of hypertension, which are located in the South, also have the highest rates of overweight and obesity.¹⁸ Notably, most of these states have not adopted Medicaid expansion,¹⁹ which improves access and affordability of care among low-income persons.²⁰ Federally qualified health centers in Medicaid expansion states have experienced an improvement in hypertension and diabetes control compared with nonexpansion states, particularly among Black and Hispanic populations.²¹

THE OBESITY EPIDEMIC

Obesity, particularly visceral adiposity, is a significant risk factor for hypertension and contributes to uncontrolled BP.²² Obesity and diabetes are associated with uncontrolled treatment-resistant hypertension or the failure to control BP on 3 or more different antihypertensive medications.²³ Recent NHANES data²⁴ show worsening of the obesity epidemic in the United States. The prevalence of obesity among men increased from 27.5% in 1999–2000 to 43.0% in 2017–2018, and severe obesity doubled from 3.1% to 6.9% in the same period.²⁴ Likewise, among women, the prevalence of obesity increased from 33.4% to 41.9%, and severe obesity increased from 6.2% to 11.5%.

HYPERTENSION GUIDELINE AND TREATMENT CONTROVERSIES

Hypertension care is complex. Multiple guidelines with different treatment thresholds, diagnostic criteria, and target goals introduce potential program, communication, and management complexity may have contributed to the decline in controlled BP.²⁵ The 2017 AHA/ACC BP guideline²⁷ and the report from members initially appointed to the Joint National Committee (JNC-8)²⁸ have been the subject of debate and inconsistent implementation by some professional organizations and clinicians.^{29,30} For example, the American College of Physicians (ACP) and the American Academy of Family Physicians (AAFP) recommended that patients with hypertension who are 60 years and older should be treated to a systolic BP target of <150 mm Hg,³¹ aligning with the JNC-8 writing group recommendation, but conflicting with JNC-7 and the 2017 ACC/AHA BP guideline.²⁷ It is unclear whether these inconsistencies contribute to reduced BP control. Of note, hypertension control to <140/<90 mm Hg

declined more in adults 40–59 years than in those 60 years and older.⁸ This finding suggests that factors other than the JNC-8 report and ACP/AAFP recommendations for a higher systolic BP target may contribute to the broad-based decline in hypertension control.

LACK OF HYPERTENSION AWARENESS

While initiatives such as Million Hearts³² and Target: BP³³ sought to improve hypertension awareness nationally, people living with hypertension are too often undiagnosed; they are “hiding in plain sight.”³⁴ Data from NHANES reported that hypertension awareness increased from 69.9% in 1999 to 84.7% in 2013–2014, it declined to 77% in 2017–2018.⁵ This suggests that almost 23% of adults with hypertension are not aware of it and are therefore not being treated.⁵ Increasing overall awareness is needed, alongside tailored interventions to increase awareness among subgroups. For example, young adults (18–44 years old) may be prioritized, as awareness among this age group (62.0%) is lower than estimates among older age groups (45–64 years, 79.3%; 65–74 years, 85.4%; ≥75 years, 82.1%).^{5,35}

CLINICIAN-LEVEL CHALLENGES

Interrelated clinician-level challenges may contribute to the decline in hypertension control. Primary care clinicians (henceforth, clinicians) are at the frontline for diagnosing and treating hypertension. However, clinical or therapeutic inertia, the failure to initiate or intensify therapy during visits, contributes to suboptimal hypertension control.³⁶ Clinicians are not optimally titrating or otherwise managing patient-specific combination therapy for hypertension due to uncertainty about the patient’s true BP, concerns about side effects, optimism that control will be eventually achieved, time constraints, patient nonadherence, and competing patient demands.³⁷ The number of adults who could gain control of their hypertension and prevent avoidable CVD through such systematic care is substantial: 57.8 million adults through initiation or intensification of treatment and 50.5 million through lifestyle modification.³⁸

Increasing burnout among clinicians and clinician teams also contributes to clinical inertia.^{39,40} Leading causes of burnout include long hours on computerized work, bureaucratic tasks, loss of autonomy, and payer requirements. The high burden of chronic disease and lack of integrated guidelines for efficiently managing multiple chronic conditions also imposes a major load on clinicians. Estimates indicate that primary care clinicians would need nearly 22 hours daily to implement evidence-based guidelines.⁴¹ Ten hours are required to implement guidelines for the 10 most common chronic conditions, including hypertension. Clinicians are responsible for high performance on other quality metrics in addition to hypertension control.⁴² Furthermore, clinicians burdened with excessive workloads and insufficient resources are more likely to burnout, and expanding expectations to address SDoH and lifestyle issues, without training, resources, and system improvements, may worsen rather than aid the situation.⁴³

Available tools to prevent and mitigate uncontrolled hypertension (e.g., Million Hearts Hypertension Control Change

Package, 2nd edition⁴⁴) can be further implemented to expand impact. Also, team-based care, which is recommended in BP and CVD prevention guidelines, is not consistently implemented in primary care.⁴⁵ These facts highlight potential opportunities to integrate guidelines and redesign elements of chronic condition management to improve efficiency and effectiveness.

“BIG IDEAS” TO IMPROVE HYPERTENSION CONTROL IN THE UNITED STATES

The following “big ideas” summarize potential solutions to reversing the worsening trend in hypertension control. Best practices and promising options that may be used to overcome barriers to hypertension control across diverse communities are also summarized in [Table 1](#). Some options may depend upon new partnerships inside and outside the traditional clinical environment, and new partners may need to be engaged to maximize impact.

PATIENT-CENTERED HYPERTENSION CARE

A patient-centered approach to care considers a patient’s perspective, psychosocial context, values, and goals.⁴⁶ Designing hypertension care around the patient and adopting the patient-centered medical home approach has been shown to improve BP control, self-efficacy, and medication adherence.^{47,48} Flexible care models and delivery mechanisms (i.e., mobile health units, telehealth, pharmacist extenders) may be needed to meet the needs of diverse patients. Furthermore, well-functioning patient-centered medical homes are associated with higher rates of hypertension control than other primary care settings.⁴⁹

Motivating and engaging patients in self-management are crucial to hypertension control, which requires an informed and activated patient.⁵⁰ Patient activation interventions, such as those that include engagement and self-management education to enhance problem-solving skills and self-efficacy, can improve hypertension control compared with education alone.⁵¹

Shared decision-making, an approach where clinicians and patients make decisions together using the best available

evidence and in alignment with patients’ preferences and values, may promote health equity and improve clinical outcomes.^{8,52} Shared decision-making related to hypertension management is particularly challenging due to the diverse treatment regimens available and lifestyle changes recommended.²⁷ Barriers to consistent engagement in hypertension management are persistent and many times cannot be overcome without support outside of the clinical environment.⁸ For example, some patients sometimes must choose between paying for food or medications, while others may weigh the benefits of walking outside vs. risks to their safety in a high-crime neighborhood. Almost 4 million Americans forgo medical care due to transportation barriers every year.⁵³

SIMPLIFY HYPERTENSION TREATMENT

Hypertension control can be achieved. Examples of effective initiatives include large insurance-based managed care (e.g., Kaiser Permanente⁵⁴), national CDC-based initiatives (e.g., Million Hearts), community-based partnerships (e.g., Barbershop Study,⁵⁵ community pharmacist engagement), Medicaid-directed programs, the Ochsner Hypertension Digital Medicine Program,⁵⁶ and replications of the Kaiser model in federally qualified health systems.⁵⁷ Additionally, Target:BP, an AHA—American Medical Association (AMA) collaborative based on the MAP (*Measure accurately, Act rapidly, Partner with patients/families/communities*) Quality Improvement (QI) framework,⁵⁸ provides guidance on simplifying hypertension treatment.

These programs include practice facilitation, supporting tools and resources, evidence-based strategies and action steps, performance metrics, peer-to-peer learning, and may be adapted to suit diverse clinical settings. To maximize effectiveness, hypertension treatment protocols should be implemented to ensure that patients receive recommended treatment, reduce nonclinical variations, reinforce the benefits of control, the importance of medications, and healthy lifestyle practices.²⁷

Single-pill combinations (SPCs) of antihypertensive medications should be considered in treatment simplification

Table 1. Best practices and promising options for overcoming barriers to hypertension control

1. Create a patient registry to reach high-risk and undiagnosed patients (e.g., elevated blood pressure readings without diagnosis).
2. Improve trust and provide support via community engagement based on shared decision-making and understanding of community needs and challenges, including SDoH.
3. Identify method(s) for SMBP monitoring, including digital home monitoring for rapid feedback and action. Promote data sharing between patient and clinical team by facilitating rapid, appropriate treatment response, as needed timely exchange of readings and clinical advice.
4. Develop or tailor existing toolkits to provide health care teams with resources to provide lifestyle counseling, address social needs and health literacy, and customize communications with patients.
5. Coordinate community and health care services to build trust and effective deployment of community health care worker assets within a team.
6. Drive adoption of treatment protocols with specific goal ranges and parameters for medication intensification and timely follow-up, referral pathways for patients who do not achieve hypertension control, and healthy lifestyle recommendations.
7. Coordinate treatment of comorbidities such as obesity, hyperlipidemia, and diabetes that may often underlie resistance to pharmacotherapy.

Abbreviations: SDoH, social determinants of health; SMBP, self-measured blood pressure.

because it improves hypertension control and cardiovascular outcomes.^{27,59} Numerous studies and reports document that patients who initiate therapy on 2- and 3-drug SPCs of antihypertensive therapy are more likely to take their medications, achieve lower BP values, have higher rates of hypertension control, and experience lower rates of CVD and death.^{60,61} Thus, 1 simple strategy for reducing therapeutic inertia is to begin antihypertensive therapy with a SPC.^{60,61} Further progress on optimization of initial SPCs may require a multilateral effort that includes education of clinicians, patients, further guideline recommendations, i.e., more aligned with the current European guideline,⁶² ready availability of affordable, effective, and well-tolerated SPCs may facilitate uptake of this treatment course.

SUPPORT SELF-MEASURED BP MONITORING WITH CLINICAL SUPPORT

A recent AHA/AMA Policy Statement⁶³ emphasizes the clinical and cost-effectiveness of self-measured blood pressure (SMBP) monitoring. Other scientific statements, guidelines, and meta-analyses have stressed the value of SMBP monitoring,^{27,64–66} and the CDC established SMBP monitoring with clinical support as a best practice.⁶⁷ The wider use of SMBP monitoring with clinical support may help reverse the worsening trend in hypertension control and link clinical care and communities. SMBP monitoring engages patients in their care and can improve hypertension control when accompanied by patient education, support by community health workers, case management, or pharmacy support.⁶⁷ SMBP readings have been shown to be more prognostic of stroke, CVD, and other target organ damage than office-based readings.^{63,68} Evidence on SMBP monitoring comes predominantly from studies with research personnel interacting with patients. Research has focused on relative risks of hypertension phenotypes (white coat hypertension and masked hypertension) and less on adherence to hypertension treatment.⁶⁶ While there are extensive outcome studies correlating SMBP monitoring with clinical outcomes in White and Asian populations, there are fewer on Black and Hispanic adults.⁶⁷

Wider use of SMBP monitoring may occur because of inclusion in quality measures. The clinical quality measures (e.g., Healthcare Effectiveness Data and Information Set [HEDIS] Controlling High BP and Centers for Medicare and Medicaid Services [CMS] Controlling High BP) recently began including patient-generated BP readings, but health information technology solutions that can seamlessly import BP readings into electronic health records are still needed.⁶⁹ Readings from SMBP, when fully integrated into electronic health records, can inform timely shared decision-making and reduce patient burden associated with recording and transmitting BP data.⁷⁰ Wide effective use of this approach may be enhanced by validated and affordable devices, insurance coverage of devices, and internet access for patients.⁶³

Federal guidance^{71,72} allows for high deductible health plans to cover SMBP devices and antihypertensive medications on a predeductible basis. Recently, Medicare expanded reimbursement for the instruction of proper

SMBP measurement techniques and the collection of data connected to clinical decision-making and use of SMBP devices via the use of Current Procedural Terminology (CPT) codes, which provides a sustainable funding stream for clinical systems.⁶³ However, uptake of CPT codes for SMBP has been slow,⁷³ and health system-based billing and coding software changes may be needed to accompany the policy intervention.

IMPLEMENT TELEHEALTH FOR HYPERTENSION MANAGEMENT

Telehealth has been increasingly adopted since the COVID-19 pandemic and presents a unique opportunity to improve hypertension control. A recent International Expert Position Paper noted that “telemedicine in hypertension management should include remote monitoring and transmission of vital signs (notably BP) and medication adherence plus education on lifestyle and risk factors, with video consultation as an option.”⁷⁴

The position paper describes studies that find telehealth also facilitates team-based care and shifts hypertension care from the traditional “brick-and-mortar” BP care approach.⁷⁴ Telehealth for hypertension control may benefit patients, clinicians, and health care systems, but the impact on hypertension control and racial-ethnic disparities needs additional study.⁷⁴ Telehealth reduces patient-level barriers to hypertension control such as transportation challenges, childcare, and taking time off work for appointments⁷⁴; this reduction in barriers suggests that telehealth may be cost-saving for patients.

INCENTIVIZE TEAM-BASED CARE

Team-based care, a health system intervention to enhance patient care by having 2 or more health care professionals work together, is another best practice.^{45,75} In a prior meta-analysis, team-based care with medication titration by physicians and clinicians other than physicians resulted in pooled mean systolic BP reductions of 5.7 and 6.6 mm Hg, respectively.⁷⁶ Team-based care with treatment protocols has a robust empirical foundation and can advance hypertension control.^{76,77}

These studies suggest that most patients can be successfully managed with team-based care. Expanding team-based care may require addressing professional “turf” issues, which often involve debates regarding who can and who should provide health care services independently.⁷⁸

Team-based care involving pharmacists is an effective strategy to improve hypertension control.^{79,80} Trials involving pharmacists result in mean systolic BP reductions of 6.1 mm Hg.⁸¹ Prior researchers have suggested that wider use of pharmacists may be enhanced if they could independently prescribe antihypertensive therapy, without collaborative practice agreements, with reimbursement at levels that covers the costs of their services.^{82,83}

Team-based care involving nurses improves hypertension outcomes.⁸³ Nurse-led team-based care results in a mean

SBP reduction of 5.84 mm Hg.⁸³ Nurses measure BP, provide patient education, conduct community-based screenings, and implement community-based hypertension control programs^{84,85} and nurse practitioners diagnose and manage hypertension. In the United Kingdom, nurse prescribers who are registered nurses undergo specific training, which allows them to prescribe medications from a specified list without physician supervision.⁸⁶ Findings from global studies suggest that expanding the role of the nurse in team-based care to include nurse-prescribing or titrating of hypertension medications may be a promising way to improve hypertension control^{85,87} and presents an opportunity for future study.

Community health workers are frontline health workers who are essential allies in improving hypertension control and advancing health equity.^{88,89} Because community health workers often come from the communities they serve, they are more likely to be culturally sensitive and adept at overcoming socioeconomic and other barriers to hypertension control.⁹⁰ In the United States, community health workers are effective team members in managing hypertension and other chronic conditions and serve as a link between the community and clinic.⁹¹

Since payers often determine reimbursement models, efforts engaging them in more effectively supporting team-based care is worthwhile.⁹² Payers may also support value-based care to reimburse health care teams based on the quality of hypertension care rather than the current fee-for-service model.⁹³

ENHANCE COMMUNITY–CLINICAL LINKAGES

Strong linkages and synergies between the clinic and community can improve the management of chronic conditions.⁹⁴ The continuum of community–clinical linkage ranges from networking (e.g., information exchange between the community and clinic) to merging (e.g., both entities operate as 1 entity and roles and culture are blended).⁹⁴

When staffing and funding permit, local public health departments can help link community members with local primary care practices. One recent example, the Accountable Health Communities initiative established by CMS, funds bridge organizations to build linkages between clinicians and community organizations to support robust screening, referral, and navigation services for patients with unmet health and social needs.⁹⁵ Early results of the Accountable Health Communities initiative suggest a need for enhanced navigation, patient tracking, and community resources—roles that state and local health departments may provide.

An assessment of projected costs and integrated data systems needs may be used to inform future decisions regarding community–clinic linkages infrastructure. Since financial resources vary by community, some may not have sufficient resources to support these linkages. Since the workshop, the Office of Minority Health and Health Resources and Services Administration (HRSA) have announced the National Hypertension Control Initiative—a cooperative agreement with AHA focusing on hypertension control improvement using MAP, SMBP monitoring, and community–clinic linkages in HRSA health centers serving approximately 9 million patients.⁹⁶

USE PERFORMANCE AND QUALITY METRICS TO ENHANCE ACCOUNTABILITY

The 2019 AHA/ACC Clinical Performance and Quality Measures for Adults with High Blood Pressure inform the assessment of adherence to hypertension guidelines in clinical practice.⁴² Effective data systems may need to include electronic health records with QI feedback and community information. Data systems aligned with hypertension control incentives may be more helpful. Treatment standardization can be achieved by providing rapidly disseminated QI metrics that demonstrate clinician performance compared with team-based performance.⁹⁷ There is an opportunity to design simpler and more constructive QI metrics that may further accountability and align with incentives. QI metrics may also be measured at the community level and can be reported publicly. Enhanced electronic health record standards for meaningful use, which incorporate actionable decision-making to identify people with uncontrolled hypertension and an integrated approach to support data collection for patient care, population, QI, and research, should be helpful.⁹⁷ Stratifying performance measures and QI metrics by SDoH may uncover health and health care disparities, data which may be used to advance efforts to address these issues.

ENHANCE ACCESS TO HIGH-QUALITY HEALTH CARE AND EXPLORE NEW HEALTH CARE DELIVERY OPTIONS

Healthy People 2030, the nation's health and well-being objectives for the coming decade, prioritizes improved access to high-quality health care and control of hypertension as central factors in promoting the nation's health.⁹⁸ The lack of access to high-quality health care may be driven by limited insurance coverage. Muntner *et al.*⁵ observed that controlled BP was more likely among the insured (43.2%–53.4%) (than the uninsured (24.2%). Having health insurance does not equate to uniform coverage, benefits, or access, and people who are “underinsured” may face similar barriers as those without insurance. High-quality hypertension management may consider removing barriers to achieving control and may be supported by focused insurance coverage of essential elements.⁹⁹

While broad-scale interventions to improve hypertension control have been documented,⁴⁴ the approach to coverage of these activities may be fragmented or limited in reimbursement. Patient barriers to optimal hypertension management include lack of coverage of validated BP devices, copayments for antihypertensive medications, or transportation challenges, all of which might be addressed through expanded insurance coverage, value-based payments, or use of mail-order pharmacies.^{26,100} The CMS have recognized the benefit of value-based insurance design in addressing SDOH, and recently provided a roadmap for states in further exploring these models. In addition, the CMS Innovation Center has plans to fund value-based insurance design models throughout the United States aiming to evaluate their effectiveness in reducing expenditures, improving quality of care and enhancing the coordination and efficiency of health care delivery.¹⁰¹ Prior research assessing the benefit of implementing key components of value-based

insurance design have noted differences in outcomes by race/ethnic group, potentially highlighting the value of these interventions in promoting health equity.¹⁰²

DEVELOP TAILORED PUBLIC HEALTH MESSAGING ON IMPORTANCE OF HYPERTENSION CONTROL

Effective messaging, led by the National High Blood Pressure Education Program (NHBPEP), contributed to the public health successes of the 1960s and 1970s.¹⁰³ The current trend in hypertension control may warrant additional programs. Public health messaging may be adapted to reach all demographics of the US population. As the United States continues to diversify,¹⁰⁴ public health messaging may be tailored to diverse populations.

Additional mass social media strategies to improve behaviors contributing to hypertension control may be warranted. Celebrities could be engaged in motivating the public to be screened (“Katie Couric effect”), increasing public awareness of the connection between uncontrolled hypertension and CVD.¹⁰⁵

RESEARCH OPPORTUNITIES

The workshop developed a list of research opportunities based on review of the possible causes of the decline in hypertension control and further study of the big ideas discussed at the workshop (Table 2). Some research opportunities have a growing evidence base, while others are more limited, each may require substantial commitment and investment to assess its importance in improving hypertension control.

OPPORTUNITIES FOR ACTION

The US Surgeon General’s Call to Action to Control Hypertension has brought the importance of controlling

hypertension to the forefront of the public health agenda.²⁶ The day prior to the release of the Call to Action, workshop participants discussed the potential benefits of making hypertension control a community-level and national vital sign. To foster guideline-based care improvements in hypertension control, leaders from different sectors, including federal and state governments, major integrated health systems, payers, the medical device industry, pharmaceutical industry, and other sectors, can consider partnering to provide relevant expertise.¹⁰⁶

Uncontrolled hypertension leads to largely preventable death and unnecessary suffering.^{2,107} Now is an opportune time to eliminate disparities in hypertension control.²⁶ Disparities in SDoH between racial and ethnic minority groups may constitute an injustice, and the workshop participants support the efforts of the CDC, NIH, and nonfederal partners to address these issues.^{11,108–110} Consequently, national strategies to reduce the health and economic burden of uncontrolled hypertension may necessitate examining the adverse impact of structural racism and promoting health equity. Improving hypertension control would have a significant population health impact in a short period.²⁶ We need all hands on deck to steer the nation back on track to improving hypertension control to the national goal of at least 80% by 2025.⁷

DISCLOSURE

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute (NHLBI), the National Institutes of Health, or the Centers for Disease Control and Prevention.

Table 2. Research gaps and opportunities

Effective multisector approaches to improve hypertension control.
How to achieve team-based approaches with clinicians other than physicians, particularly on adjusting medications.
Effectiveness of self-measured blood pressure monitoring in diverse populations, diverse clinical settings, and relationship to cardiovascular disease outcomes in diverse populations.
Role of community health workers in community–clinical linkages to improve hypertension control.
Effectiveness of community-primary care linkages to mitigate social determinants of health that prevent patients from achieving hypertension control.
Incentive models and identify drivers of implementation among diverse populations.
Effective strategies for small independent practices to achieve superior control.
Interventions (i.e., toolkits, change packages, etc.) that are scalable and sustainable and part of quality care in diverse settings.
Mechanisms of feedback at the point of care that help clinicians engage patients in informed, shared decision-making regarding blood pressure control.
Alignment of incentives and drivers to improve access to high-quality care and reduce inequities and variation in outcomes.
Payment and benefit designs which are the most effective in achieving better hypertension control.
Strategies to overcome behavioral change challenges of lifestyle change at individual, community, and societal levels.
Effective messaging around blood pressure control and health for clinicians and patients and the general public.
How social determinants of health cause hypertension and reduce the effectiveness of hypertension control.
Integrated guidelines and other strategies that improve health care efficiency and improve hypertension control.
How telehealth may improve hypertension control by reducing health disparities and enhance team-based care.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest. The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute (NHLBI), the National Institutes of Health, or the Centers for Disease Control and Prevention.

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