

Blood Pressure Control in the U.S. – It Takes a Village

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Getting to the Heart via Oral Health: A Medical and Dental Collaboration Summit

June 10, 2022



Overview

- Burden of CVD and hypertension in U.S.
- Million Hearts initiative
- Strategies to address hypertension
- Finding patients with potentially undiagnosed hypertension



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Heart Disease and Stroke Burden

- More than **1.6 million** people in the U.S. suffer from heart attacks and strokes per year
- More than **870,000** deaths per year from cardiovascular disease (CVD)
- Annual CVD costs in the U.S. averaged **\$378.0 billion** in 2017-2018
- Uncontrolled blood pressure is the primary contributor to the morbidity and mortality rate disparities in CVD between Black and White people.



Virani SS, et al. Heart disease and stroke statistics-2020 update: a report from the American Heart Association. *Circulation*. 2020;141(9):e139-596.2.

Tsao CW, et al. Heart Disease and Stroke Statistics-2022 Update: A Report From the American Heart Association. *Circulation*. 2022 Feb 22;145(8):e153-e639.

Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999–2017 on CDC WONDER Online Database website. <http://wonder.cdc.gov/ucd-icd10.html>. Accessed March 12 7, 2020.

Kochanek KD, Arias E, Anderson RN. How did cause of death contribute to racial differences in life expectancy in the United States in 2010? NCHS data brief, no 125. Hyattsville, MD: National Center for Health Statistics. 2013

Cardiovascular Disease Mortality 1999-2018

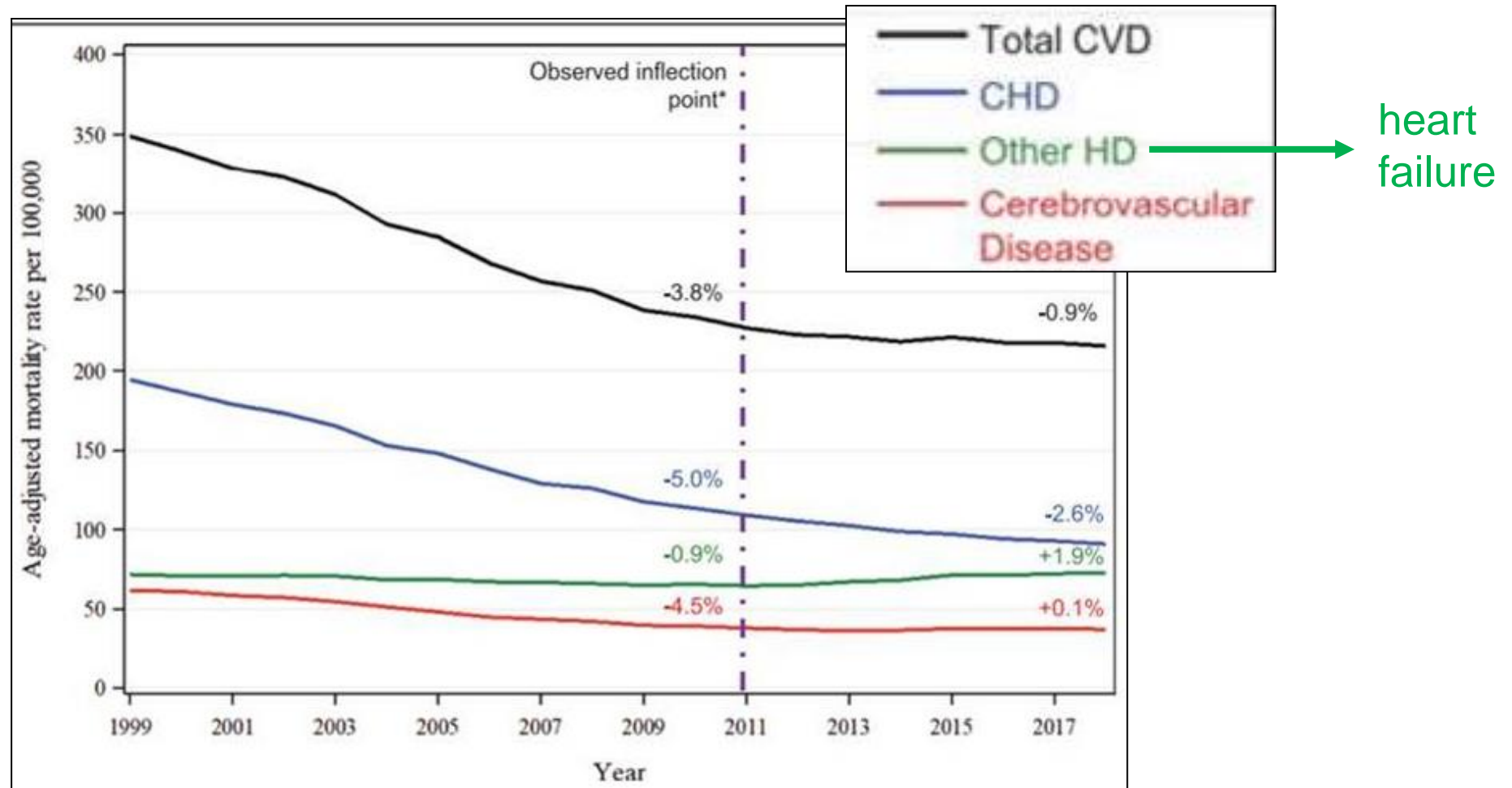


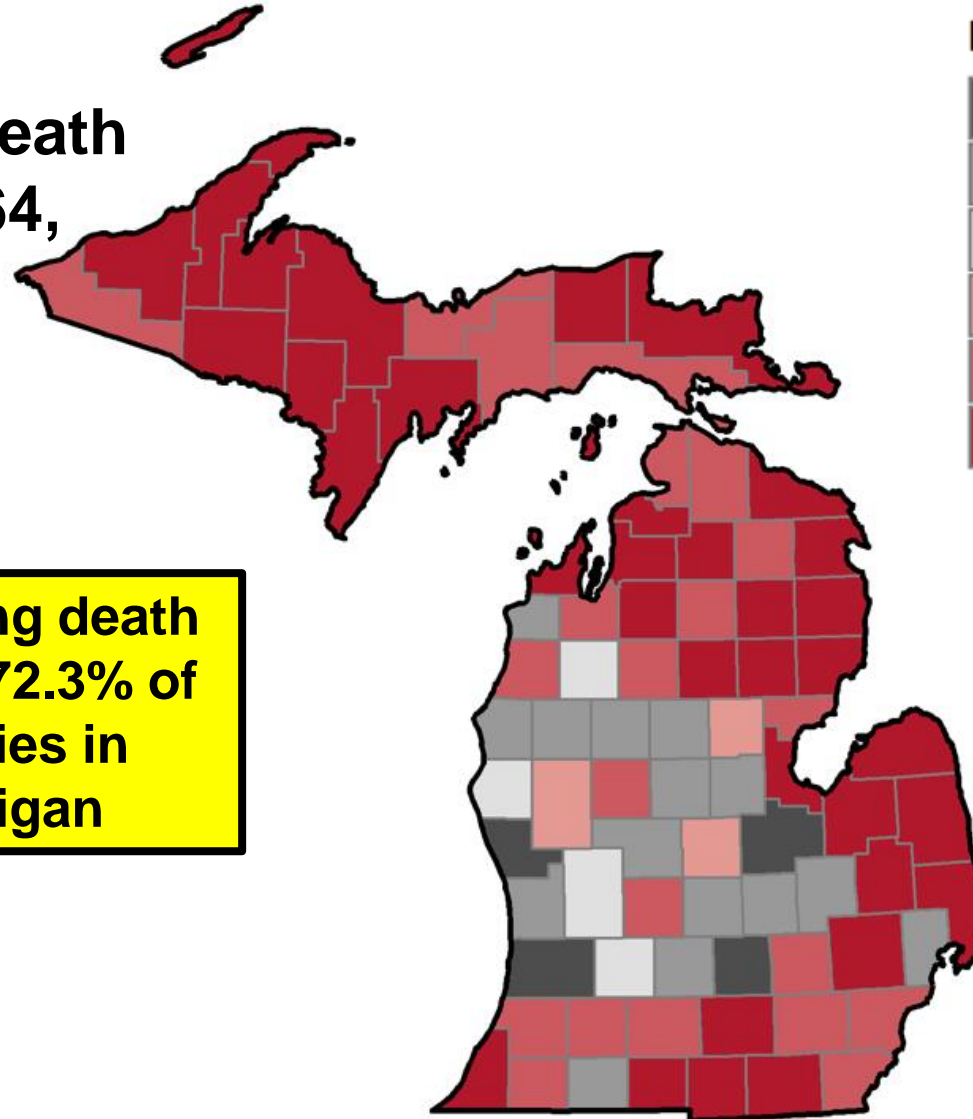
Figure 2. Trends in age-adjusted mortality rates per 100 000 population attributable to total cardiovascular disease and to leading subtypes of cardiovascular disease as underlying causes of death in the United States with the average annual percentage change before and after the inflection point* between 1999 to 2011 and 2011 to 2018.

Declines in age-adjusted mortality rates per 100 000 population attributable to total cardiovascular disease and to leading subtypes of cardiovascular disease as underlying causes of death in the United States with average annual percentage change before and after the inflection point* between 1999 to 2011 and 2011 to 2018. CHD indicates coronary heart disease; CVD, cardiovascular disease; and HD, heart disease.

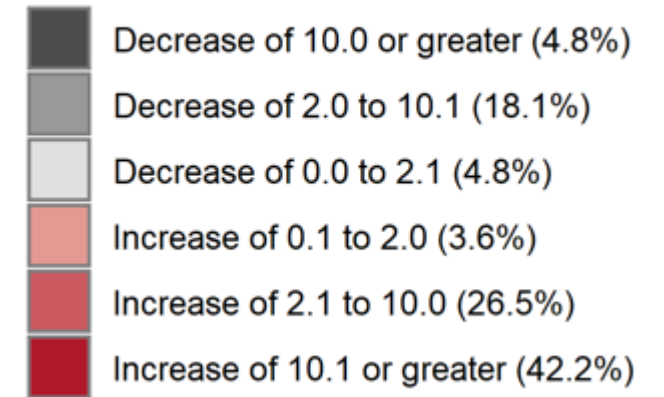
Alarming Mortality Trends

County-level total percent change in heart disease death rates, Michigan, ages 35-64, 2010-2017

Increasing death rates in 72.3% of counties in Michigan



Percent change



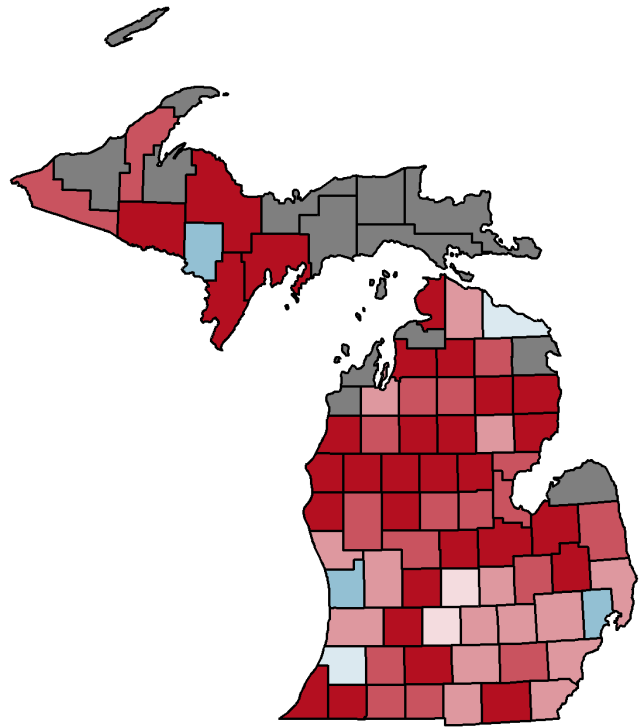
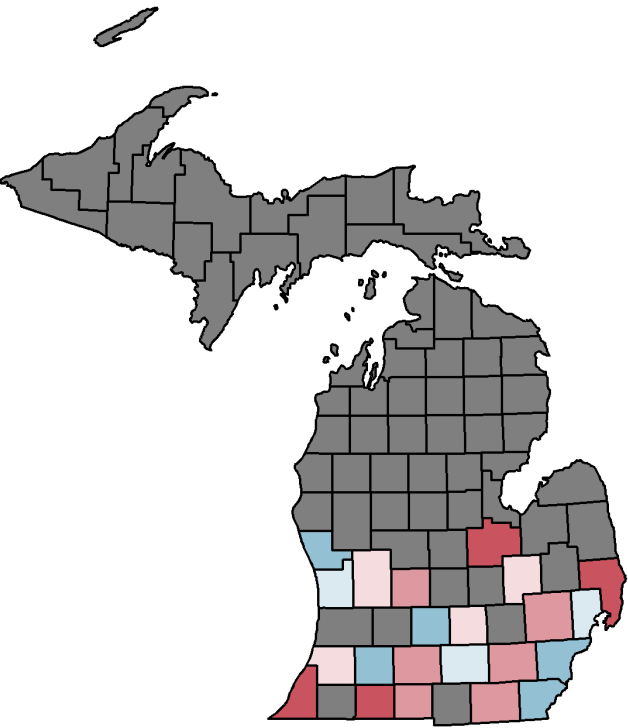
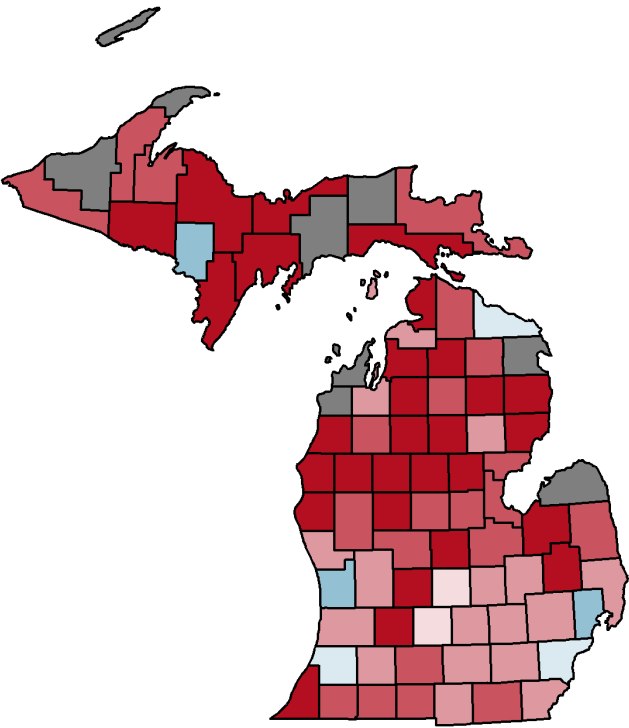
Trends in HTN-Related CVD Death Rates

Percent change in hypertension-related CVD death rates, ages 35-64 y, 2010-2019

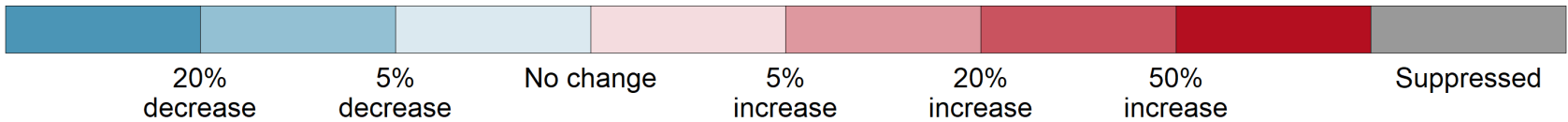
All adults

Black adults

White adults



Total Percent Change



U.S. Burden of Hypertension

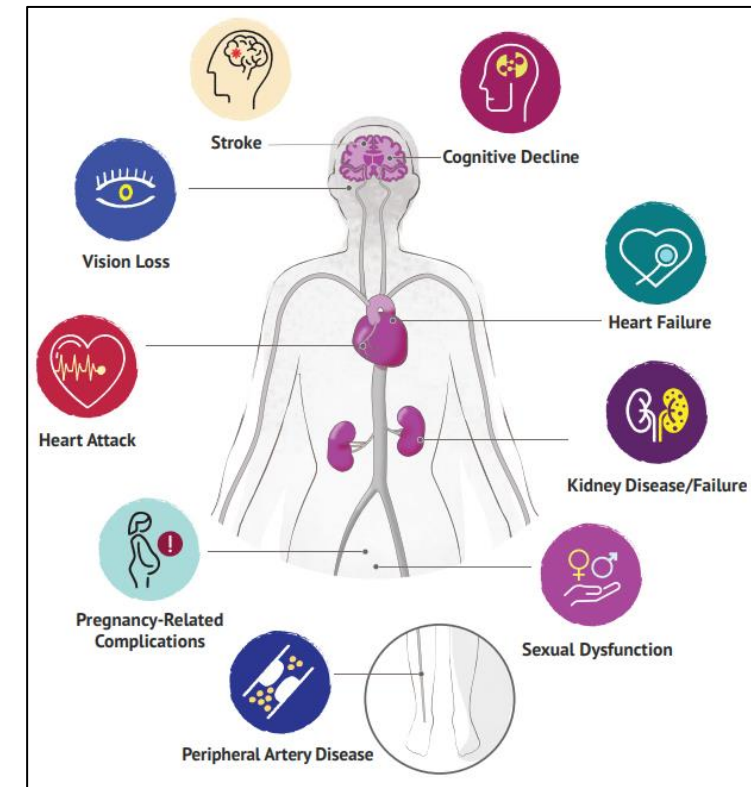
Using $\geq 130/80$ mmHg:

- ~44% prevalence among US adults → ~108M adults
 - 56% among adults 45-64
 - 78% among adults 65+
 - 53% among non-Hispanic blacks

Of the 87M recommended to be on medications and LMs:

- ~71% are uncontrolled → ~61M adults

Health Problems Caused by Hypertension



Are these people in care?

Among people with hypertension (NHANES 2017-18):

- 90.8% – had usual healthcare provider
- 93.2% – had a visit in the last year



Million Hearts[®] 2027

Aim: Prevent 1 million—or more—heart attacks and strokes in the next 5 years by:

- Promoting evidence-based strategies for cardiovascular disease prevention
- Convening like-minded health care and public health champions
- Facilitating meaningful collaboration and resource sharing
- Addressing health equity through specific policies, processes, and practices



Million Hearts[®] 2027 Priorities

Building Healthy Communities

Decrease **Tobacco Use**

Decrease **Physical Inactivity**

Decrease **Particle Pollution Exposure**

Optimizing Care

Improve Appropriate **A**spirin or **A**nticoagulant Use

Improve **B**lood Pressure Control

Improve **C**holesterol Management

Improve **S**moking Cessation

Increase Use of **Cardiac Rehabilitation**

Focusing On Health Equity

Pregnant and Postpartum Women with Hypertension

People from Racial/Ethnic Minority Groups

People with Behavioral Health Issues Who Use Tobacco

People with Lower Incomes

People Who Live in Rural Areas or Other 'Access Deserts'

Hypertension Control Change Package (HCCP) 2nd Edition, 2020

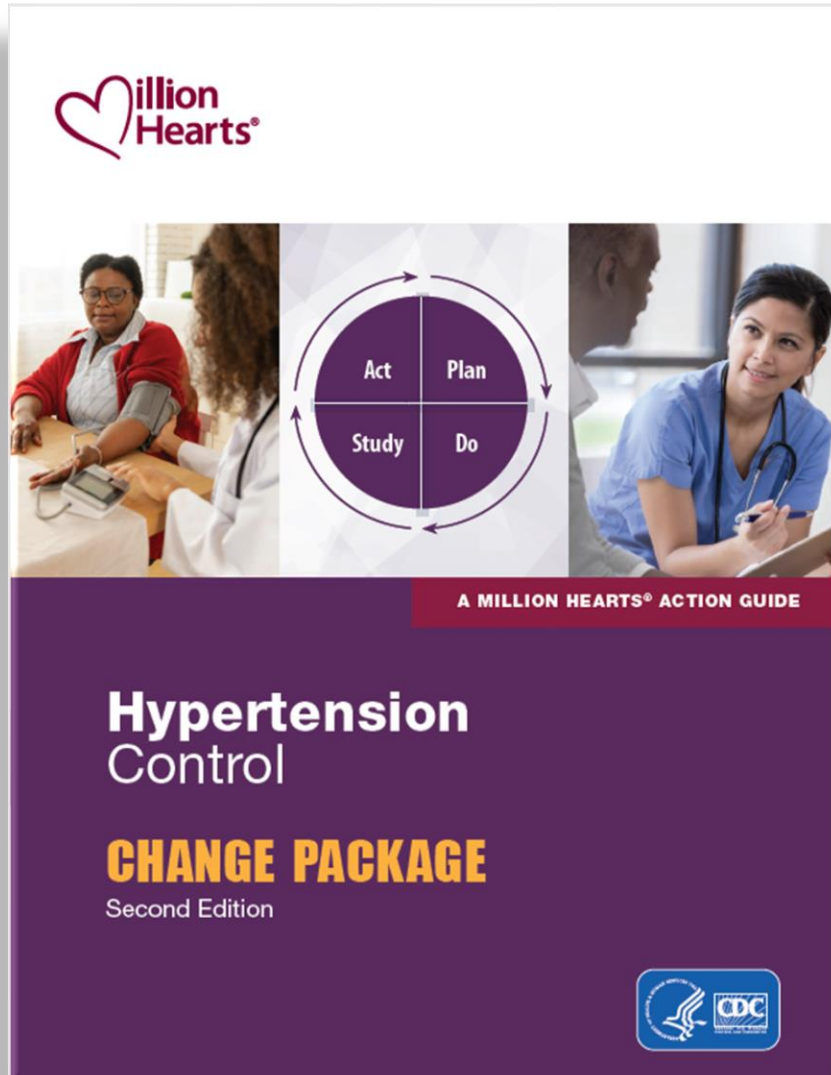


Table 1. Key Foundations (continued)

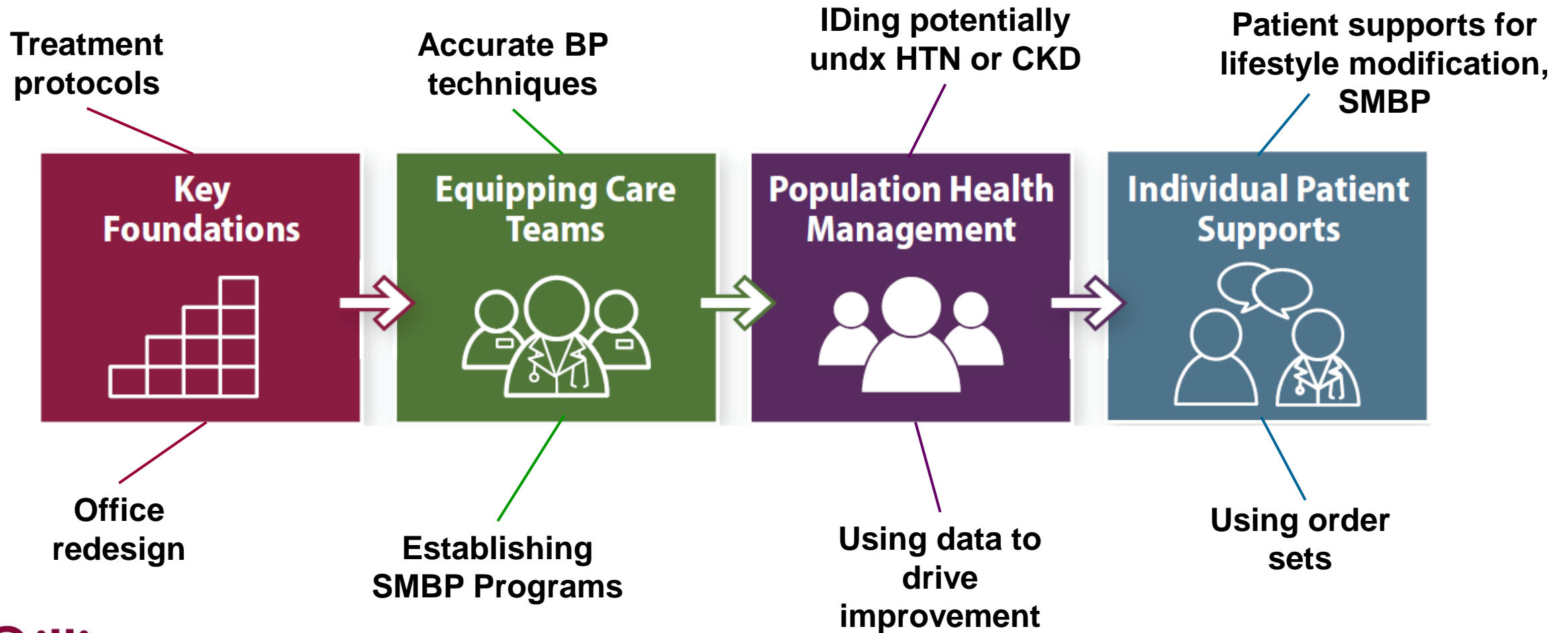
Change Concept	Change Idea	Tools and Resources
Implement a Policy or Process to Address BP for Every Patient with HTN at Every Visit	Manage resi	<ul style="list-style-type: none"> • NYC Health & Hospitals — Adult Hypertension Clinical Practice Guidelines: Treatment of Resistant Hypertension • Zufall Health — Guidelines for Screening, Diagnosis and Management of Hypertension (pp. 12–13) • Resistant Hypertension: Detection, Evaluation, and Management: A
	Evaluate all with HTN for diagnose an if appropriat	

Table 2. Equipping Care Teams

Change Concept	Change Idea	Tools and Resources
Provide guidance on measuring BP accurately	Adopt a clinician/staff training policy to train and retrain staff	<ul style="list-style-type: none"> • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 9: Blood Pressure Champion and CDS Education and Auditing Process for New Staff, HealthPartners
	Train and Evaluate Direct Care Staff on Accurate BP Measurement and Documenting	<ul style="list-style-type: none"> • Cheshire Medical Center/Dartmouth-Hitchcock — Obtaining Accurate Blood Pressure Measurements in the Ambulatory Setting: How Do You Size a Blood Pressure Cuff? (pp. 14–19) • Target: BP — Blood Pressure Measurement: Measure Accurately • Target: BP — 7 Simple Tips to Get an Accurate Blood Pressure Reading • AHA — The Importance of Measuring Blood Pressure Accurately Webinar [video] (CE credits) • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 11: Blood Pressure Accuracy and Variability Quick Reference, HealthPartners • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1: Tool 7: How to Take Blood Pressure Properly [video] <ul style="list-style-type: none"> – How to Take Blood Pressure Properly: The Wrong Way, Cornerstone Health Care (now Wake Forest Baptist Health) [video] – How to Take Blood Pressure Properly: The Right Way, Cornerstone Health Care (now Wake Forest Baptist Health) [video] • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1: Tool 14: Accurate Blood Pressure Measurement, Premier Medical Associates [video] • Table 8. Checklist for Accurate Measurement of BP. 2017 ACC/AHA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/

Access the Change Package at:
<https://millionhearts.hhs.gov/tools-protocols/action-guides/htn-change-package/index.html>

Focus Areas



**Change
Concept**

Use Practice Data to Drive Improvement



**Change
Concept**

Use Practice Data to Drive Improvement



**Change
Ideas**

**Determine HTN control
and related process
metrics for the practice**

**Regularly provide a
dashboard with BP goals,
metrics, and performance**

Change
Concept

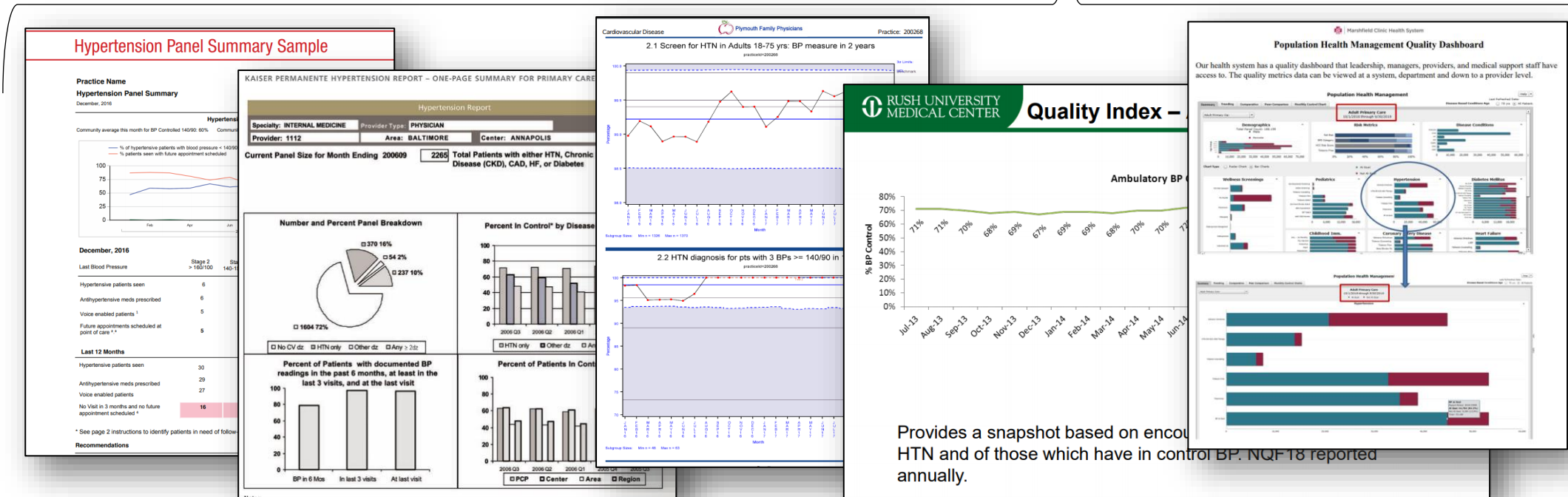
Use Practice Data to Drive Improvement

Change
Ideas

Determine HTN control
and related process
metrics for the practice

Regularly provide a
dashboard with BP goals,
metrics, and performance

Tools &
Resources



Provides a snapshot based on encounter data for HTN and of those which have in control BP. NQF 18 reported annually.

Hypertension Treatment Protocols



An Effective Approach to High Blood Pressure Control

A Science Advisory From the American Heart Association, the American College of Cardiology, and the Centers for Disease Control and Prevention

Alan S. Go, MD; Mary Ann Bauman, MD; Sallyann M. Coleman King, MD, MSc;
Gregg C. Fonarow, MD, FAHA, FACC; Willie Lawrence, MD, FAHA, FACC;
Kim A. Williams, MD, FAHA, FACC; Eduardo Sanchez, MD, MPH

Cardiovascular diseases, including heart disease, hypertension, and heart failure, along with stroke, continue to be leading causes of death in the United States.^{1,2} Hypertension currently affects nearly 78 million* adults in the United States and is also a major modifiable risk factor for other cardiovascular diseases and stroke.¹ According to data from the National Health and Nutrition Evaluation Survey (NHANES) in 2007 to 2010, 81.5% of those with hypertension are aware they have it, and 74.9% are being treated, but only 52.5% are under control, with significant variation across different patient subgroups.^{3,4,7} Of those with uncontrolled hypertension, 89.4% reported having a usual source of health care, and 85.2% reported having health insurance.³ This is the current status, despite the fact that therapies to lower blood pressure and associated risks of cardiovascular events and death have been available for decades, and various education and quality improvement efforts have been targeted at patients and healthcare providers.

The direct and indirect costs of hypertension are enormous, considering the number of patients and their families impacted, and the healthcare dollars spent on treatment and blood pressure-related complications.⁸ Currently, hypertension affects 46% of patients with known cardiovascular disease and 72% of those who have had a stroke, and it is listed as a primary or contributing cause in ≈15% of the 2.4

million deaths in 2009.¹ In 2008, the total estimated direct and indirect cost of hypertension was estimated at \$69.9 billion.⁸ Thus, it is imperative to identify, disseminate, and implement more effective approaches to achieve optimal control of this condition.

High-quality blood pressure management is multifactorial and requires the engagement of patients, families, providers, and healthcare delivery systems and communities. This includes expanding patient and healthcare provider awareness, appropriate lifestyle modifications, access to care, evidence-based treatment, a high level of medication adherence, and adequate follow-up.⁹ Recognizing the urgent need to address inadequate control, the American Heart Association (AHA) has made hypertension a primary focus area of its 2014 to 2017 strategic plan, because it seeks to improve the cardiovascular health of all Americans by 20% and reduce the death rate from cardiovascular disease and stroke by 20% by 2020.¹⁰ Similarly, Million Hearts, a US Department of Health and Human Services initiative spearheaded by the Centers for Disease Control and Prevention (CDC) and the Centers for Medicare & Medicaid Services to prevent a million heart attacks and strokes by 2017, has focused its first 2 years on actions to improve and achieve control of hypertension.¹¹

We believe that the identification of best practice, evidence-based management algorithms leading to standardization of treatment is a critical element in helping to achieve these

*The estimate is based on the hypertension definition of blood pressure reading $\geq 140/90$ mm Hg, current use of antihypertensive medications, or being told about having hypertension on 2 occasions by a healthcare provider. When the third component of the definition is excluded, the estimated number of prevalence cases among US adults would be 67 million.³

The American Heart Association and the American College of Cardiology make every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

The online-only Data Supplement is available with this article at <http://hyper.ahajournals.org/lookup/suppl/doi:10.1161/HYP.000000000000003/DC1>. This document was approved by the American Heart Association Science Advisory and Coordinating Committee, the American College of Cardiology Board of Trustees, and the Centers for Disease Control and Prevention in November 2013.

The American Heart Association requests that this document be cited as follows: Go AS, Bauman MA, Coleman King SM, Fonarow GC, Lawrence W, Williams KA, Sanchez E. An effective approach to high blood pressure control: a science advisory from the American Heart Association, the American College of Cardiology, and the Centers for Disease Control and Prevention. *Hypertension*. 2014;63:878-885.

This article has been published in the *Journal of the American College of Cardiology*.

Copies: This document is available on the World Wide Web sites of the American Heart Association (my.americanheart.org) and the American College of Cardiology (<http://www.cardiosource.org>). A copy of the document is available at <http://my.americanheart.org/statements> by selecting either the "By Topic" link or the "By Publication Date" link. To purchase additional reprints, call 843-216-2533 or e-mail kelle.ramsay@wolterskluwer.com.

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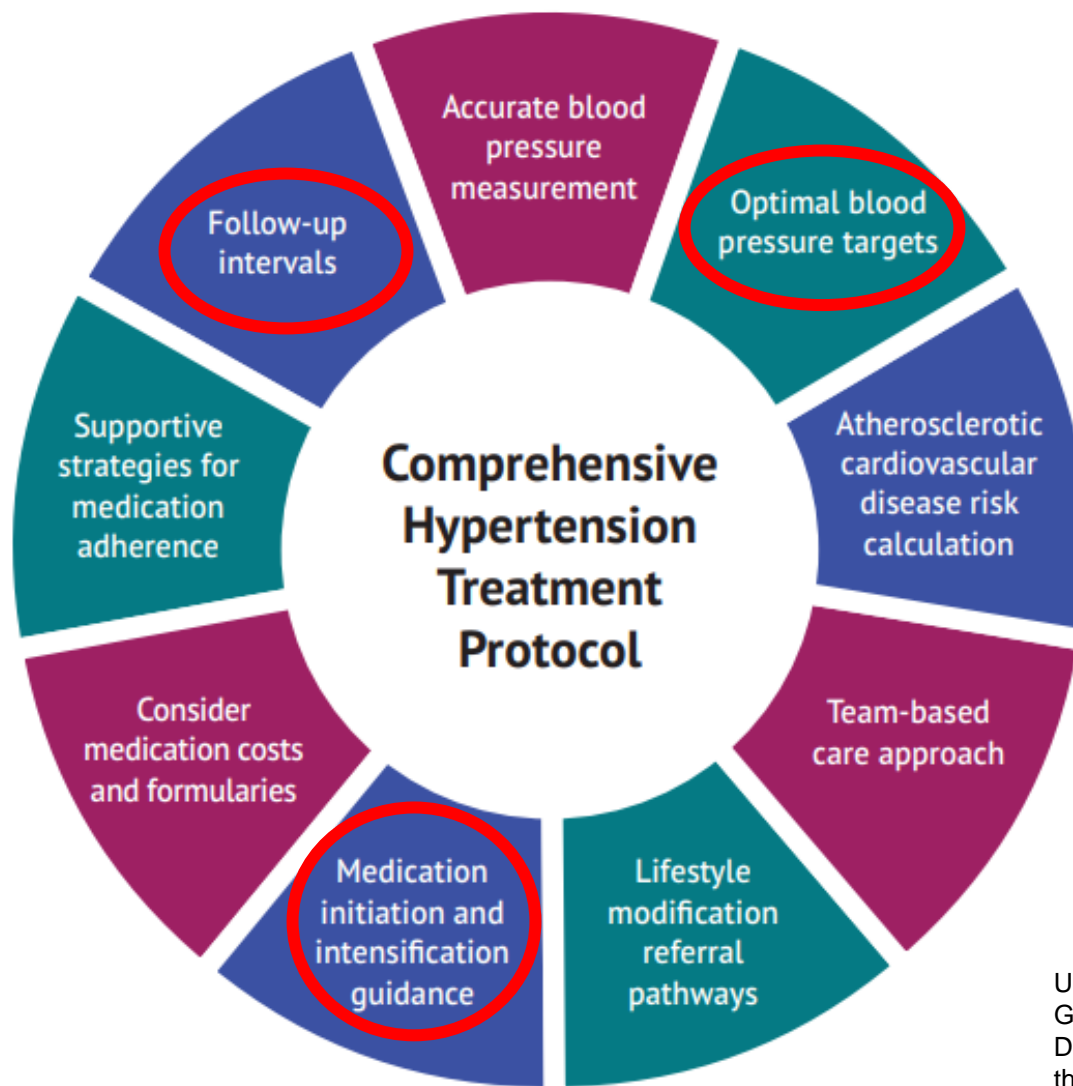
(*Hypertension*. 2014;63:878-885.)

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Value of Protocols

- Identifying all patients eligible for management
- Monitoring at the practice level
- Increasing patient and provider awareness
- Providing an effective diagnosis and treatment guideline
- Systematic follow-up of patients for the initiation and intensification of therapy
- Clarifying roles of healthcare providers to implement a team approach
- Reducing barriers for patients to receive and adhere to medications and to implement lifestyle modifications

Characteristics of Comprehensive HTN Protocols



U.S. Department of Health and Human Services. The Surgeon General's Call to Action to Control Hypertension. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General; 2020

Protocol Resources

- Evidence-based protocols examples:
 - American Medical Association
 - U.S. Department of Veterans Affairs
 - Kaiser Permanente
- Key protocol components, implementation guidance, customizable template
- Cholesterol management, tobacco cessation
- <https://millionhearts.hhs.gov/tools-protocols/protocols.html#http>



AMA | MAPBP

Hypertension medication treatment protocol¹

For adults without CHF, CAD, pregnancy, CKD stage 3 or albuminuria ≥ 300 mg/d or ≥ 300 mg/g albumin-to-creatinine ratio*

This document is not intended as a substitute for the medical advice of a physician; it offers no diagnosis or prescription. No endorsement is implied or intended by the American Medical Association of any third-party organization, product, drug or service.

Check labs at clinician's discretion.

Not on antihypertensive medication

- Prescribe dihydropyridine CCB plus ACEI or ARB in a single-pill combination (SPC).^{1a,d}
- If concerned about hypotension, frailty in the very old, increased risk of medication intolerance or other factors, consider a low dose SPC or monotherapy with a CCB.^{1a,1b}

Already on antihypertensive medication

- Prescribe one additional medication from a different class (ACEI or ARB, CCB, or thiazide or thiazide-like diuretic) preferably as a single-pill combination (SPC), if available.^{1a}

If CCB not tolerated (e.g., edema), consider replacing with thiazide-like diuretic.^{1b}
If diabetes with albuminuria and monotherapy desired, use an ACEI or ARB.^{1a}

Reassess BP in 2-4 weeks^{1c}
Use self-measured BP (SMBP) if available.^{1c}

Yes
BP at goal?

Reassess BP in 3-6 months^{1c}
Use SMBP, if available.

No
BP at goal?

Assess treatment adherence^{1c}
Use strategies to optimize, if needed.

Intensify medication if benefits outweigh risks

1. If on SPC, increase SPC dose or add thiazide-like or thiazide diuretic.^{1a}
2. If on CCB monotherapy, add ACEI or ARB^{1a} preferably as SPC^{1a}
3. If on ACEI or ARB monotherapy, add CCB preferably as SPC^{1a}
4. If on thiazide-like or thiazide monotherapy, add ACEI or ARB^{1a}
5. If on three medication classes, consider referral to specialist and/or adding spironolactone.^{1d}

Generic medication summary

Antihypertensive medication	Sample generic options	Dose once daily (Initial) ^a	Dose once daily (Intensified) ^a	Estimated Cost (30-day supply) ^b
CCB and ACEI (SPC) (if ACEI not tolerated due to cough, go to next row)	amlodipine/benazepril	(a) 2.5/10 mg (b) 5/10 mg (c) 5/20 mg	(a) 5/10 mg or 5/20 mg (b) 5/20 mg or 10/20 mg (c) 10/20 mg or 10/40 mg	\$15-20
CCB and ARB (SPC) (if cost an issue, use CCB monotherapy (amlodipine) and go to next row)	(a) amlodipine/olmesartan (b) amlodipine/telmisartan	(a) 5/20 mg (b) 5/40 mg or 5/80 mg	(a) 5/40 mg or 10/20 mg or 10/40 mg (b) 5/80 mg or 10/80 mg	(a) \$29-40 (b) \$50-60
Add thiazide-like or thiazide diuretic	(a) indapamide (preferred) (b) chlorthalidone (preferred) (c) hydrochlorothiazide	(a) 1.25 mg (b) 12.5 mg = ½ 25 mg tab (c) 12.5 mg	(a) 2.5 mg (b) 25 mg (c) 25 mg	(a) \$4 (b) \$8-16 (c) \$4
Add spironolactone (optional)	spironolactone	12.5 mg = ½ 25 mg tab	25 mg	\$3-\$12

^aThis protocol should not be used in patients with CHF, CAD, pregnancy, CKD stage 3 or albuminuria or ≥ 300 mg/g albumin-to-creatinine ratio or the equivalent in first morning void. Simultaneous use of an ACEI, ARB, and/or renin inhibitor is not recommended.^{1a}

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1/2

Self-Measured Blood Pressure Monitoring (SMBP)



Self-Measured Blood Pressure Monitoring (SMBP)

- Self-Measured Blood Pressure monitoring (SMBP) – the measurement of BP **by an individual outside of a clinic setting including at home** – with a validated automatic upper arm device
- AKA “home blood pressure monitoring”
- SMBP is **NOT** – BP taken at a pharmacy kiosk, or by a smart phone device, wearable sensor, cuffless BP monitor, or finger cuff
- Evidence-based strategy for lowering BP when combined with clinical support



Strong Evidence Base

SMBP with additional clinical support:

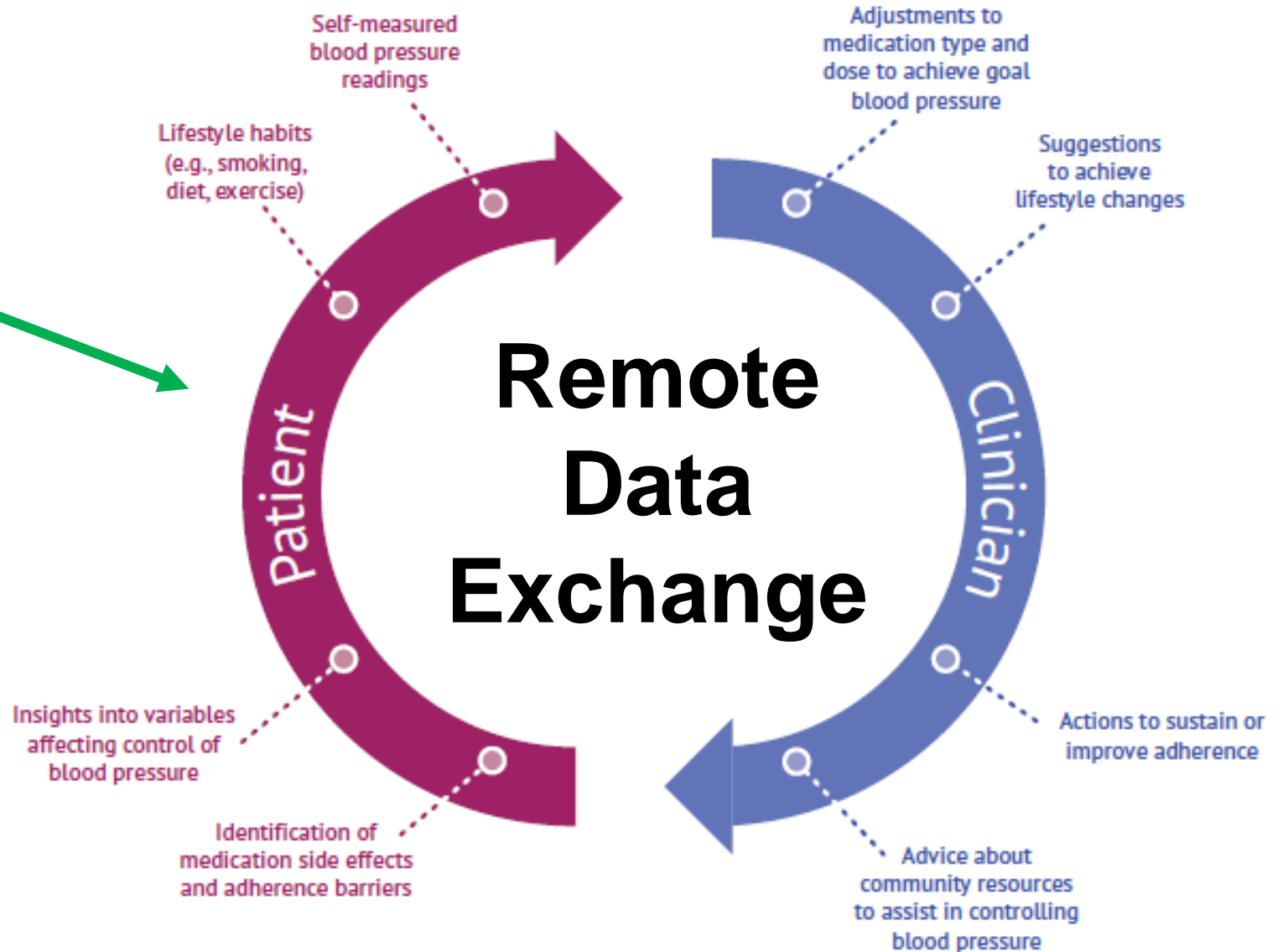
- Supported by numerous meta-analyses and systematic reviews
- Included in Task Force Recommendations
 - USPSTF – HTN screening
 - CPSTF – HTN management; cost effective
- Included in numerous domestic and international clinical guidelines
 - 2017 ACC/AHA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults
- Highlighted in the US Surgeon General's *2020 Call to Action to Control Hypertension*

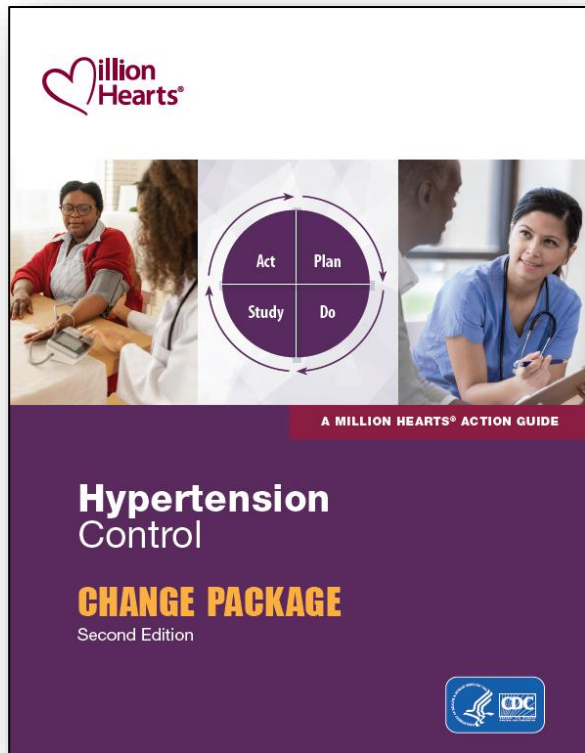


Optimal SMBP

Clinician guidance on:

- Selecting a device
- Proper cuff sizing
- Preparation and positioning
- Clinical protocol with frequency and duration
- Method for returning patient-generated values





<p>Establish a Self-Measured BP (SMBP) Monitor Program</p>	<p>Assign care team roles for an SMBP monitoring program and adapt the workflow accordingly</p>	<ul style="list-style-type: none"> • NACHC — Self-Measured Blood Pressure Monitoring Implementation Guide for Health Care Delivery Organizations: Diagram 2: SMBP Model Design Checklist and Key Questions • Target: BP — CME Course: Using SMBP to Diagnose and Manage HBP • NYC DOHMH — Patient Self-Monitoring of Blood Pressure: A Provider’s Guide • NACHC — Self-Measurement: How patients and care teams are bringing blood pressure to control [video] • Million Hearts® — Self-Measured Blood Pressure Monitoring: Action Steps for Clinicians
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Table 2. Equipping Care Teams (continued)		
Change Concept	Change Idea	Tools and Resources
	<p>Develop a home BP monitor loaner program</p>	<ul style="list-style-type: none"> • Target: BP — SMBP Loaner Device Agreement • Open Door Family Medical Centers — Blood Pressure Monitor Loan Agreement (English and Spanish) • Target: BP — Inventory Management • Target: BP — SMBP Patient Training Checklist – Loaner Device • NACHC — Self-Measured Blood Pressure Monitoring Implementation Guide for Health Care Delivery Organizations: Appendix Y: SMBP Loaner Program Policy & Procedure – Cleaning and Care of Home BP Monitors, Whitney M. Young, Jr. Health Center • AMA — Cleaning and disinfection procedure • Kaiser Permanente — PHASE SMBP Community of Practice: SMBP Loaner Pilot Model Design (pp. 15–22)

Table 4. Individual Patient Supports (continued)		
Change Concept	Change Idea	Tools and Resources
<p>Establish a Self-Measured BP (SMBP) Monitor Program</p> <p>Support Patients in HTN Self-Management During Their Routine Daily Activities (i.e., outside of the clinical encounter)</p>	<p>Provide patient supports for SMBP monitoring</p>	<ul style="list-style-type: none"> • Target: BP — SMBP Infographic: How to measure your blood pressure at home • Target: BP — 7 Day Recording Sheet SMBP • Washington State Department of Health — How to Check Your Blood Pressure – English – Spanish; Chinese, Russian, and Vietnamese also available • NYC DOHMH — Blood Pressure Tracking Card & Action Plan • New West Physicians — Home BP EMR Entry • Target: BP — SMBP Using a Wrist Cuff to Measure Blood Pressure (Not recommended for most patients)

https://millionhearts.hhs.gov/files/HTN_Change_Package.pdf#page=16

SMBP Coverage Insights: Medicaid

Michigan Coverage

- SMBP devices – \$62.30
- SMBP extra BP cuff – \$20.58
- Education/training – \$6.14 (1x)
- Interpretation/care plan inclusion – \$8.32 (monthly)

SMBP Coverage Insights: Medicaid

As of 2/28/2022



Self-measured blood pressure (SMBP) is an evidence-based strategy that can improve blood pressure control for individuals with hypertension. SMBP is most effective when an individual has access to a validated blood pressure device for home use coupled with ongoing clinical support. Refer to the US Blood Pressure Validated Device Listing (VDL™) for a list of validated devices.

The chart below shows the status of coverage by state for 1) SMBP clinical services and 2) automated blood pressure devices and standalone cuff. It is intended to highlight which states offer provider reimbursement to perform SMBP services and allow Medicaid patients to obtain an automated blood pressure device.

CPT® and HCPCS Code Description

99473	SMBP using a device validated for clinical accuracy and patient education/training and device calibration
99474	Separate self-measurements, collection of daily reports by the patient or caregiver to the healthcare provider; communication of BP readings and treatment plans
A4670	Automated blood pressure device
A4663	Blood pressure cuff only

	SMBP Service Codes					BP Device Codes						
	Provider Reimbursement				Source	Durable Medical Equipment (DME) Fee Schedule						
	99473	99474	99473	99474		A4670	A4663	Source				
	Covered	Amount Covered	Covered	Amount covered		Covered	Amount Covered	Prior Authorization Required	Covered	Amount covered	Prior Authorization Required	
Alabama					⓪							⓪
Alaska					⓪	•	\$110.00		•	Varies		⓪
Arizona	•	\$11.27	•	\$15.40	⓪	•	Varies		•	Varies		⓪
Arkansas					⓪	•	\$8.22					⓪
California					⓪	•	Varies		•	Varies		⓪
Colorado		\$9.57		\$12.26	⓪	•	\$72.45	⓪	•	\$21.49	⓪	⓪
Connecticut					⓪	•	\$65.00		•	\$28.53		⓪
Delaware	•	\$15.84	•	\$12.76	⓪	•	\$43.09		•	\$16.76		⓪
D.C.					⓪	•	\$103.93		•	\$19.95		⓪
Florida					⓪							⓪

Medicaid program administrators are encouraged to contact ih-info@ama-assn.org with any updates or corrections to the information contained in this table. Additional pricing or medical review required for states where reimbursement is "VARIES".

<https://www.ama-assn.org/system/files/smbp-coverage-medicaid-april-2022.pdf>



SMBP Resources

- Wall HK, et al. **How Do We Jump-Start Self-measured Blood Pressure Monitoring in the United States? Addressing Barriers Beyond the Published Literature.** Am J Hypertens. 2022 Mar 8;35(3):244-255.
- **Million Hearts SMBP Webpage** – <https://millionhearts.hhs.gov/tools-protocols/smbp.html>
- **Million Hearts Hypertension Control Change Package, Establish an SMBP Program** – https://millionhearts.hhs.gov/files/HTN_Change_Package.pdf#page=16
- **NACHC SMBP Implementation Toolkit** – https://www.nachc.org/wp-content/uploads/2020/12/SMBP-Toolkit_FINAL.pdf
- **AMA SMBP CPT Coding** – <https://www.ama-assn.org/system/files/2020-06/smbp-cpt-coding.pdf>
- **AMA/AHA Target:BP Tools and Downloads** – <https://targetbp.org/tools-downloads/?sort=topic&>



Million Hearts[®] SMBP Forum

- Quarterly webinar to facilitate the exchange of SMBP best practices, tools, and resources

Registration instructions:

1. Go to the SMBP Forum Registration Page: http://bit.ly/SMBP_Registration
2. Select the meeting(s) you want to attend in 2022 and click 'Register'
3. Complete the registration questions
4. Look for the calendar invite(s) from WebEx (be sure to check your spam folder!!)

- Past SMBP Forum recordings/materials can be accessed at <https://confluence.nachc.org/display/SMBP/Quarterly+Meeting+Materials>
- Questions can be sent to MillionHeartsSMBP@nachc.org



Accurate BP Measurement



Taking Office Blood Pressure Readings

- Empty bladder
- No caffeine
- Rest for 5 minutes
- Seated, back supported
- Legs uncrossed, feet on floor
- Cuff on bare arm (no clothing), arm supported
- Avoid talking, reading, or using electronics during readings
- Properly sized cuff



Adds 2-10 mmHg

Adds 5-50 mmHg

Adds 10 mmHg

7 SIMPLE TIPS TO GET AN ACCURATE BLOOD PRESSURE READING

The common positioning errors can result in inaccurate blood pressure measurement. Figures shown are estimates of how improper positioning can potentially impact blood pressure readings.

Sources:

1. Pickering, et al. Recommendations for Blood Pressure Measurement in Humans and Experimental Animals Part 1: Blood Pressure Measurement in Humans. *Circulation*. 2005;111: 697-716.
2. Handler J. The importance of accurate blood pressure measurement. *The Permanente Journal*/Summer 2009/Volume 13 No. 3 51

This 7 simple tips to get an accurate blood pressure reading was adapted with permission of the American Medical Association and The Johns Hopkins University. The original copyrighted content can be found at www.ama-assn.org/ama-johns-hopkins-blood-pressure-resources.

https://targetbp.org/tools_downloads/mbp/

Adds 10 mmHg

Adds 2-8 mmHg

Adds 10 mmHg

Adds 6 mmHg

USE CORRECT CUFF SIZE

Cuff too small adds 2-10 mm Hg

PUT CUFF ON BARE ARM

Cuff over clothing adds 5-50 mm hg

DON'T HAVE A CONVERSATION

Talking or active listening adds 10 mm Hg

EMPTY BLADDER FIRST

Full bladder adds 10 mm Hg

SUPPORT ARM AT HEART LEVEL

Unsupported arm adds 10 mm Hg

SUPPORT BACK/FEET

Unsupported back and feet adds 6 mm Hg

KEEP LEGS UNCROSSED

Crossed legs add 2-8 mm Hg

Training Office Staff



Table 2. Equipping Care Teams

Change Concept	Change Idea	Tools and Resources
<p>Train and Evaluate Direct Care Staff on Accurate BP Measurement and Documenting</p>	<p>Provide guidance on measuring BP accurately</p>	<ul style="list-style-type: none"> • Cheshire Medical Center/Dartmouth-Hitchcock — Obtaining Accurate Blood Pressure Measurements in the Ambulatory Setting: How Do You Size a Blood Pressure Cuff? (pp. 14–19) • Target: BP — Blood Pressure Measurement: Measure Accurately • Target: BP — 7 Simple Tips to Get an Accurate Blood Pressure Reading • AHA — The Importance of Measuring Blood Pressure Accurately Webinar [video] (CE credits) • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 11: Blood Pressure Accuracy and Variability Quick Reference, HealthPartners • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1: Tool 7: How to Take Blood Pressure Properly [video] <ul style="list-style-type: none"> – How to Take Blood Pressure Properly: The Wrong Way, Cornerstone Health Care (now Wake Forest Baptist Health) [video] – How to Take Blood Pressure Properly: The Right Way, Cornerstone Health Care (now Wake Forest Baptist Health) [video] • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1: Tool 14: Accurate Blood Pressure Measurement, Premier Medical Associates [video] • Table 8. Checklist for Accurate Measurement of BP. 2017 ACC/AHA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/ American Heart Association Task Force on Clinical Practice Guidelines. Whelton PK, et al., 2017.⁴ • Heart Health Now! North Carolina Cooperative — Office BP Measurement: Current Challenges and Best Practices
	<p>Assess adherence to proper BP measurement technique</p>	<ul style="list-style-type: none"> • Target: BP — Technique quick-check • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 8: New Employee Blood Pressure Measurement Initial Competency Checklist, HealthPartners • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 9: Blood Pressure Champion and CDS Education and Auditing Process for New Staff, HealthPartners • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 1, Tool 10: Quarterly Blood Pressure Auditing Tool, HealthPartners • AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plank 4, Tool 4: Blood Pressure Spot Check, Kaiser Permanente







Table 4. Body Position and BP Measurement

SBP has been reported to be 3–10 mm Hg higher in the supine than the seated position.²⁰

DBP is \approx 1–5 mm Hg higher when measured supine vs seated.²⁰

Office Redesign – “BP Lounge”



- Quiet room connected to the waiting room
- True resting blood pressure
- Receptionist asks the person to expose their arm and sit comfortably for 5 minutes and starts timer
- After timer goes off, a medical assistant is called to take the BP



Devices

- Automatic, upper-arm devices are preferred
- Wrist cuffs may be more convenient in dental settings, when clothing is a problem

→ Potential user error; use proper technique –

https://targetbp.org/tools_downloads/using-a-wrist-cuff-to-measure-blood-pressure/



TARGET:BP | AMA

Using a wrist cuff to measure blood pressure*

Self-measured blood pressure

* When an upper arm cuff cannot be used, validated wrist devices can be used for blood pressure estimation.¹



Correct forearm position
for wrist blood pressure measurement

1. Apply the wrist device
2. Keep elbow on table or desk with forearm bent
3. Place the wrist at heart level
4. Keep arm relaxed and hand resting against your body
5. Measure wrist blood pressure without moving arm from seated position

Incorrect forearm position¹



Wrist higher than heart level Forearm in horizontal position Forearm vertical and close to the body

1. Nenehng K et al. Hypertension Canada's 2018 guidelines for diagnosis, risk, assessment, prevention, and treatment of hypertension in adults and children. www.ccmh.ca/sites/default/files/2020/10/01/180183-1-fulltext. Accessed April 24, 2018.

2. Castells et al. Poor reliability of wrist blood pressure self-measurement at home: A population-based study. *Hypertension*. <https://pubs.ascp.net/doi/10.1161/HYPERTENSIONAHA.116.07961>. Accessed April 24, 2018.

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Clinically Validated Devices

Browser address bar: <https://www.validatebp.org>

Navigation links: e-clearance, PubMed, CDC Library, EASI, Book Space Reserv..., CDC Return to the Work...

U.S. Validated Device Listing


– www.validateBP.org

Brands: All Brands


Device Types: Wrist

- All Device Types
- Ambulatory
- Home
- Kiosk
- Office
- Office Automated
- Wrist

Brand/Device Type	Validation Protocol	Cuff Sizes	Populations Served
Omron Wrist	ANSI/AAMI/ISO 81060-2: 2013	Wrist (13.5-21.5 cm)	Special Considerations- see note
Omron Wrist	ANSI/AAMI/ISO 81060-2: 2013	Wrist (13.5-21.5 cm)	Special Considerations- see note



BP6100
HEM-6181



Finding Potentially Undiagnosed Hypertensives

**“Hiding in Plain Sight”
(HIPS)**



Hypertension Prevalence

≥140/90 mmHg

- 31% prevalence among US adults
 - 40% among adults 45-64
 - 67% among adults 65+
 - 39% among non-Hispanic blacks
- ~78M adults have HTN

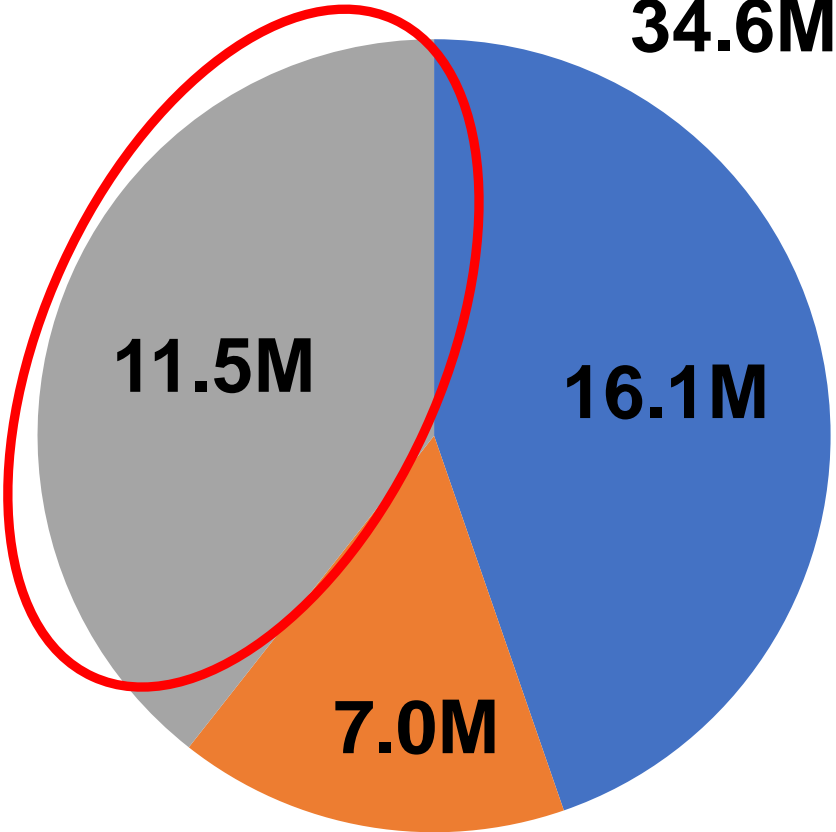
≥130/80 mmHg

- 44% prevalence among US adults
 - 56% among adults 45-64
 - 78% among adults 65+
 - 53% among non-Hispanic blacks
- ~108M adults have HTN



Uncontrolled HTN ($\geq 140/90$)

34.6M US Adults with uncontrolled HTN



- Aware and treated
- Aware and untreated
- "Unaware"



Source: 2013-2014 National Health and Nutrition Examination Survey

“Unaware” – A Closer Look

- 80.9% have health insurance
- 82.7% report having a usual source of care
- 63.3% have received care two or more times in the past year



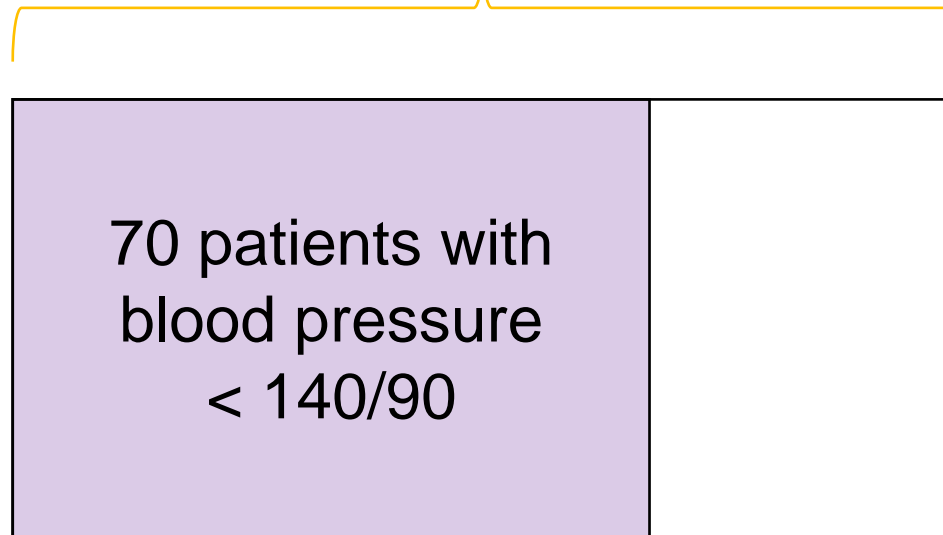
Controlling High Blood Pressure Measures

Measure	Measure Definition	ICD-10-CM
NQF 0018 CMS165	The percentage of patients 18-85 years of age who had a diagnosis of HTN and whose BP was adequately controlled (<140/90) during the measurement year.	I10 (Essential HTN)



Assessing Hypertension Control

100 patients with
diagnosed hypertension



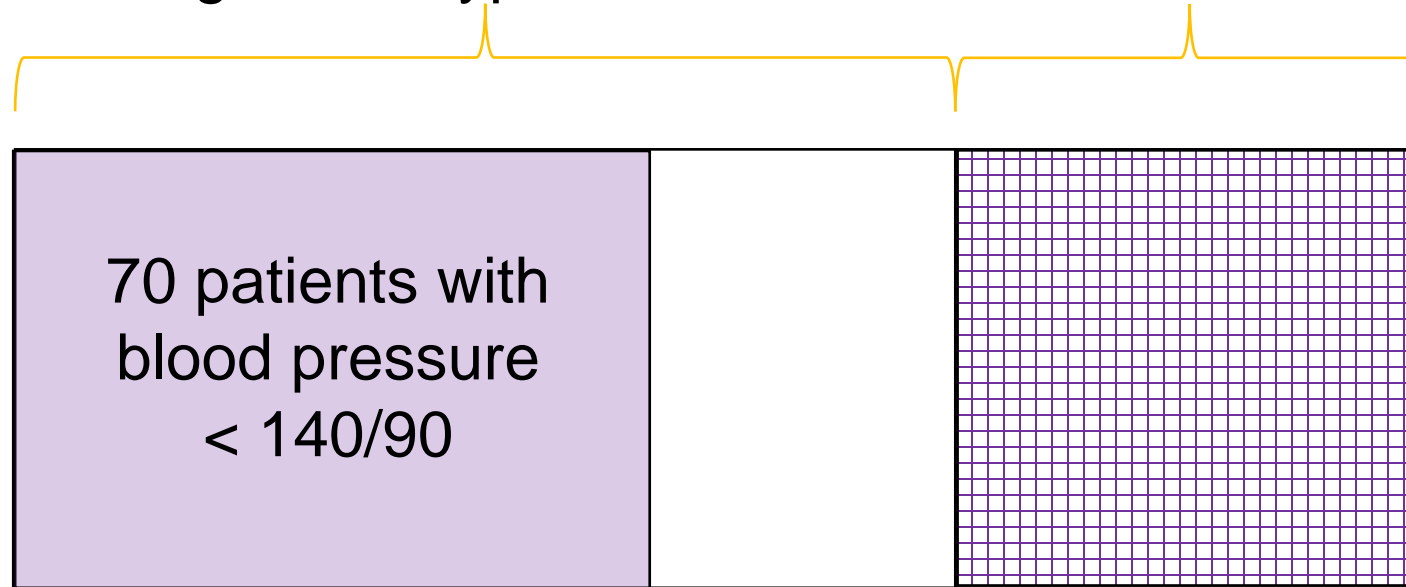
$$(70/100)*100 = 70\% \text{ control}$$

150 patients with hypertension?

100 patients with
diagnosed hypertension

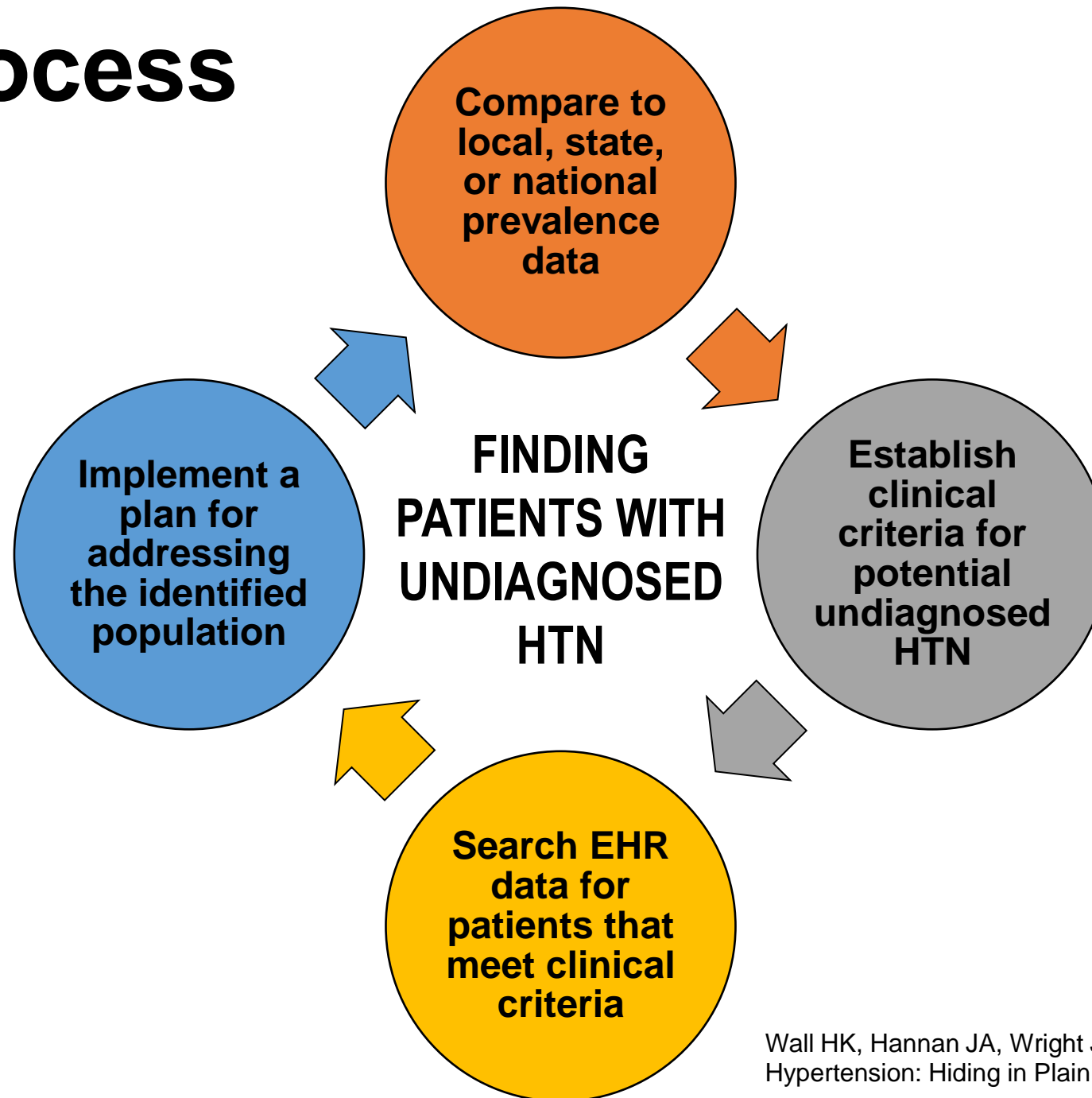
+

50 patients with
abnormal BP values



$$(70/150)*100 = 47\% \text{ control}$$

4-Step Process



Are patients with hypertension being missed?

- Calculate practice prevalence

$$\frac{\text{\# of adult patients with a diagnosis of HTN (e.g. ICD-10 I10)}}{\text{\# of adult patients (18-85, not pregnant, no ESRD)}} \times 100$$

- Compare to 31% (140/90 mmHg) or 44% (130/80 mmHg)
OR

- Use the Million Hearts Hypertension Prevalence Estimator Tool

- <https://nccd.cdc.gov/MillionHearts/Estimator/>



Compare to
local, state,
or national
prevalence
data

Clinical Criteria for Undiagnosed Hypertension

- Use guidelines supported by the practice
- Consider:
 - Stages of hypertension
 - # of abnormal values
 - Time period
- Adults 18-85
- Standard exclusion criteria
 - Patients who have died



Establish
clinical
criteria for
potential
undiagnosed
HTN

Use Electronic Health Record Data

- Population health management software solutions
- EHR registry functionality
- Embed automated algorithms into EHR
 - Requires informatics staff
- Customized reports from EHR vendor



**Search EHR
data for
patients that
meet clinical
criteria**

Plan for Confirmation and Treatment

- 24-hour Ambulatory BP monitoring (ABPM)
- Self-measured BP monitoring (SMBP)
- Automated Office BP machines (AOBP)
- Confirmatory office measures

- USPSTF HTN screening recommendation
- 2017 ACC/AHA HTN Guideline

Implement a plan for addressing the identified population

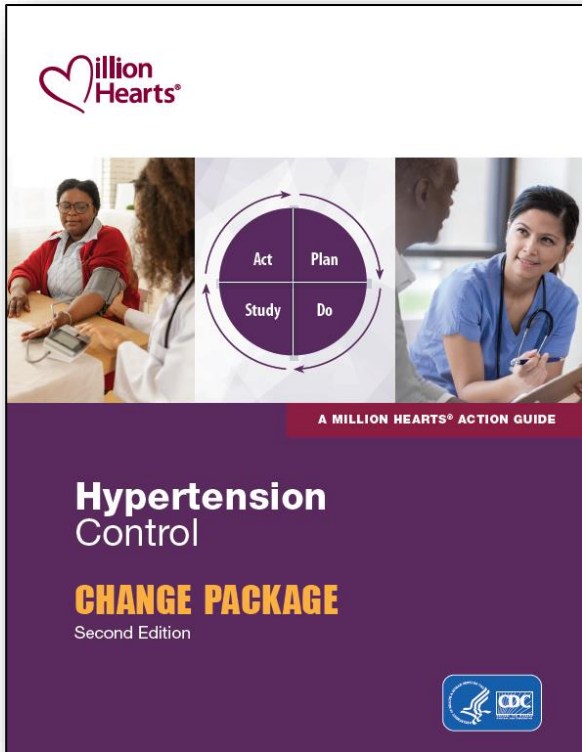


What to do with patients confirmed to not have hypertension?

- ICD-10-CM – R03.0 – Elevated blood-pressure reading, without diagnosis of hypertension
 - “This category is to be used to record an episode of elevated blood pressure in a patient in whom no formal diagnosis of hypertension has been made, or as an isolated incidental finding.”
 - <http://www.icd10data.com/ICD10CM/Codes/R00-R99/R00-R09/R03-/R03.0>

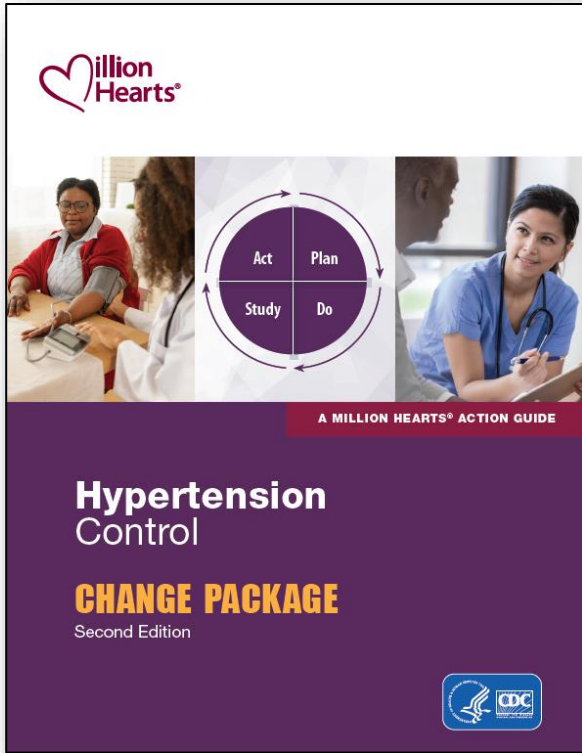


Implement a plan for addressing the identified population



https://millionhearts.hhs.gov/files/HTN_Change_Package.pdf#page=18

Table 3. Population Health Management		
Change Concept	Change Idea	Tools and Resources
<p>Identify Patients with Potentially Undiagnosed HTN</p> <p>For additional resources, please see the NACHC Million Hearts® Hiding in Plain Sight Consolidated Change Package; NYC DOHMH and HealthyHearts NYC — ABCS Toolkit for the Practice Facilitator: Task B6: Respond quickly to control elevated BP by targeting undiagnosed hypertension (HTN)</p>	<p>Compare practice HTN prevalence to national or local estimates to understand if you might be missing patients with undiagnosed HTN</p>	<ul style="list-style-type: none"> • Million Hearts® — Hypertension Prevalence Estimator Tool • Vermont Department of Health and the New England QIN-QIO — From 70 to 80 Percent: The Hypertension Management Toolkit: Task 2: How Does Your Practice Compare to Local and National Benchmarks? • AMGA — Hypertension Prevalence – AMGA Results Using Dx Code, Problem List, and Elevated Blood Pressure Readings¹⁰
	<p>Establish clinical criteria to define potentially undiagnosed HTN</p>	<ul style="list-style-type: none"> • Table 1. Number of At-Risk Patients Identified by Each Hypertension Screening Algorithm. A Technology-Based Quality Innovation to Identify Undiagnosed Hypertension among Active Primary Care Patients. Rakotz MK, et al., 2014.¹¹ • NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix L: Undiagnosed Hypertension Algorithms and Clinical Criteria Decision Points, HIPS Project • Patients with Undiagnosed Hypertension: Hiding in Plain Sight. Wall HK, et al., 2014.¹²
	<p>Search EHR data for patients who meet the established clinical criteria</p>	<ul style="list-style-type: none"> • NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix M: Potentially Undiagnosed Hypertension Algorithm used to Generate Registries and Reports - i2i Tracks, Golden Valley Health Centers and Tulare Community Health Clinic (now Altura Centers for Health) • Identifying Patients with Hypertension: A Case for Auditing Electronic Health Record Data. Baus A, et al., 2012.¹³ • Plymouth Family Physicians — Patient-Level Report
	<p>Implement a plan to confirm HTN status and treat those with HTN</p>	<ul style="list-style-type: none"> • NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix I: Million Hearts® HIPS Recall Report, Golden Valley Health Centers • NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix K: HIPS Recall List – i2i Tracks, La Maestra Community Health Centers • NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix N: Patient Status and Opportunities Alert - eClinicalWorks, Neighborhood Healthcare



https://millionhearts.hhs.gov/files/HTN_Change_Package.pdf#page=18

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	Establish clinical criteria for potential undx HTN	<ul style="list-style-type: none"> Table 1. Number of At-Risk Patients Identified by Each Hypertension Screening Algorithm. A Technology-Based Quality Innovation to Identify Undiagnosed Hypertension among Active Primary Care Patients. Rakotz MK, et al., 2014.¹¹ NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix L: Undiagnosed Hypertension Algorithms and Clinical Criteria Decision Points, HIPS Project Patients with Undiagnosed Hypertension: Hiding in Plain Sight. Wall HK, et al., 2014.¹²
	Search EHR data for patients that meet clinical criteria	<ul style="list-style-type: none"> NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix M: Potentially Undiagnosed Hypertension Algorithm used to Generate Registries and Reports - i2i Tracks, Golden Valley Health Centers and Tulare Community Health Clinic (now Altura Centers for Health) Identifying Patients with Hypertension: A Case for Auditing Electronic Health Record Data. Baus A, et al., 2012.¹³ Plymouth Family Physicians — Patient-Level Report
	Implement a plan for addressing the identified population	<ul style="list-style-type: none"> NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix I: Million Hearts® HIPS Recall Report, Golden Valley Health Centers NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix K: HIPS Recall List – i2i Tracks, La Maestra Community Health Centers NACHC — Million Hearts® Hiding in Plain Sight Consolidated Change Package: Appendix N: Patient Status and Opportunities Alert - eClinicalWorks, Neighborhood Healthcare

National Association of Community Health Centers

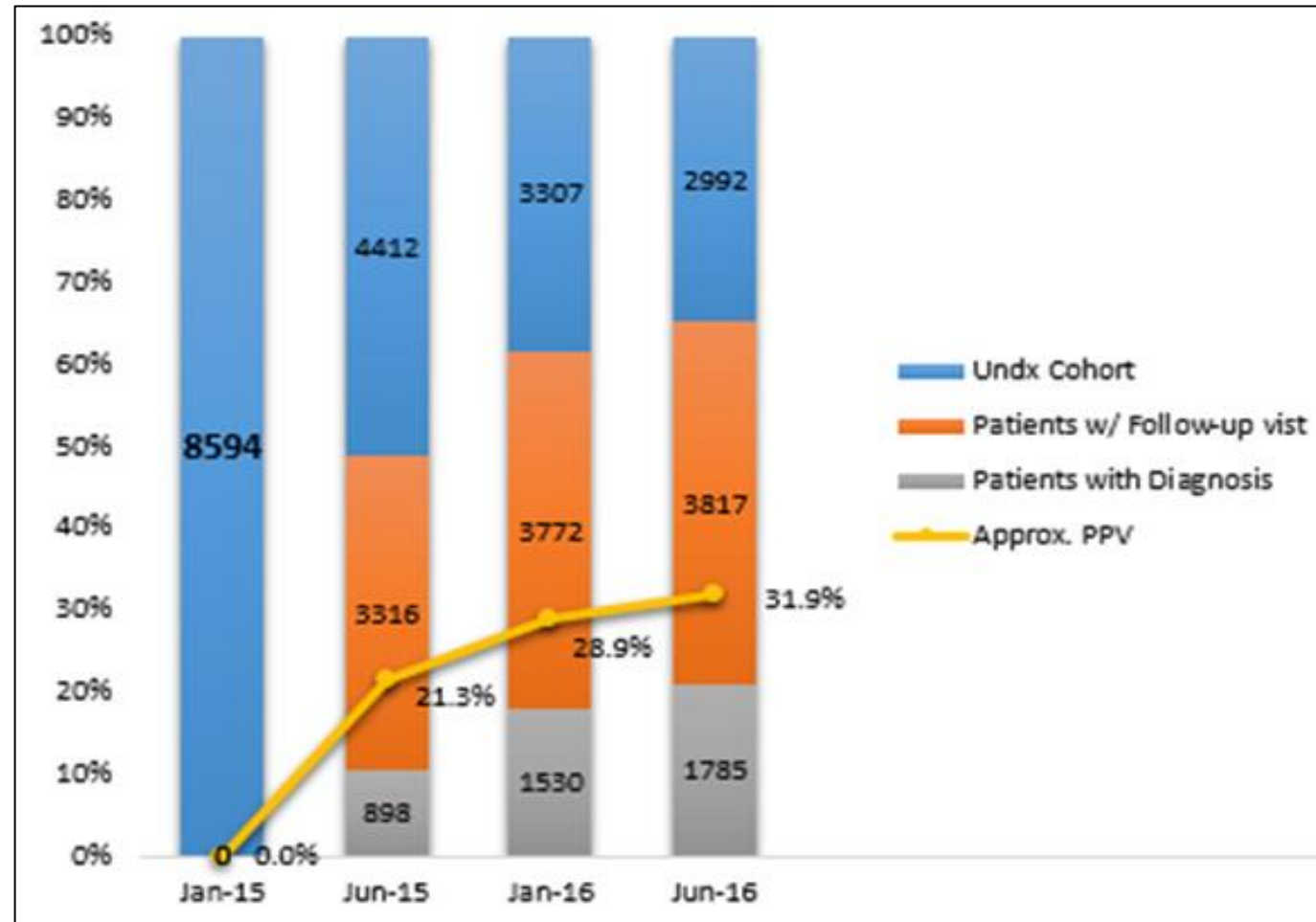
- 100,000K patients from 10 FQHCs from 4 Health Center Controlled Networks – CA, KY, MO
- Clinical criteria:
 - ≥ 2 elevated BP (≥ 140 SBP or ≥ 90 DBP), past 12 months
 - 1 Stage 2 (≥ 160 SBP or ≥ 100 DBP), past 12 months
- **NACHC HIPS Change Package –**
<http://mylearning.nachc.com/diweb/fs/file/id/229350>



Undiagnosed Hypertension Cohort

65.2% had a follow up visit

31.9% were dx w/HTN



Take Home Messages

- It will take an all-hands-on-deck approach to tackle hypertension in the U.S.
- Evidence-based strategies to improve blood pressure control exist
- Accurate BP readings are an essential first step
- Millions of people are 'hiding in plain sight' with potentially undiagnosed hypertension



Questions?

Hilary Wall – hwall@cdc.gov

