

Self-Measure Blood Pressure Monitoring (SMBP) Interventions: Resources for Planning and Implementation

AREB 2022 Coffee Break Presentation

Hilary K. Wall, MPH

Sharada S. Shantharam, MPH

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Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
Division for Heart Disease and Stroke Prevention



MODERATOR:

Hello and welcome to today's Coffee Break presented by the Applied Research and Evaluation Branch in the Division for Heart Disease and Stroke Prevention at the Centers for Disease Control and Prevention.

My name is Cindy Huang, and I am an ORISE Fellow and I will be acting as today's moderator. Our presenters are Hilary Wall, Lead Scientist for Million Hearts, and Sharada Shantharam, a health scientist in the Applied Research and Evaluation Branch on the Applied Research and Translation Team.

Next slide, please.

Before we begin...

- All phones have been placed in SILENT mode.
- Any issues or questions?
 - Use Q & A box on your screen
 - Email AREBheartinfo@cdc.gov



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MODERATOR:

Before we begin, there are some housekeeping items. If you are having issues with audio or seeing the presentation, please message us using the chat box or send us an email at AREBheartinfo@cdc.gov. Please hold your questions until we reach the end of the presentation. Since this is a training series on applied research and evaluation, we hope you will complete the poll at the end of the presentation and provide us with your feedback.

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Disclaimer

The information presented here is for training purposes and reflects the views of the presenters. It does not necessarily represent the official position of the Centers for Disease Control and Prevention.

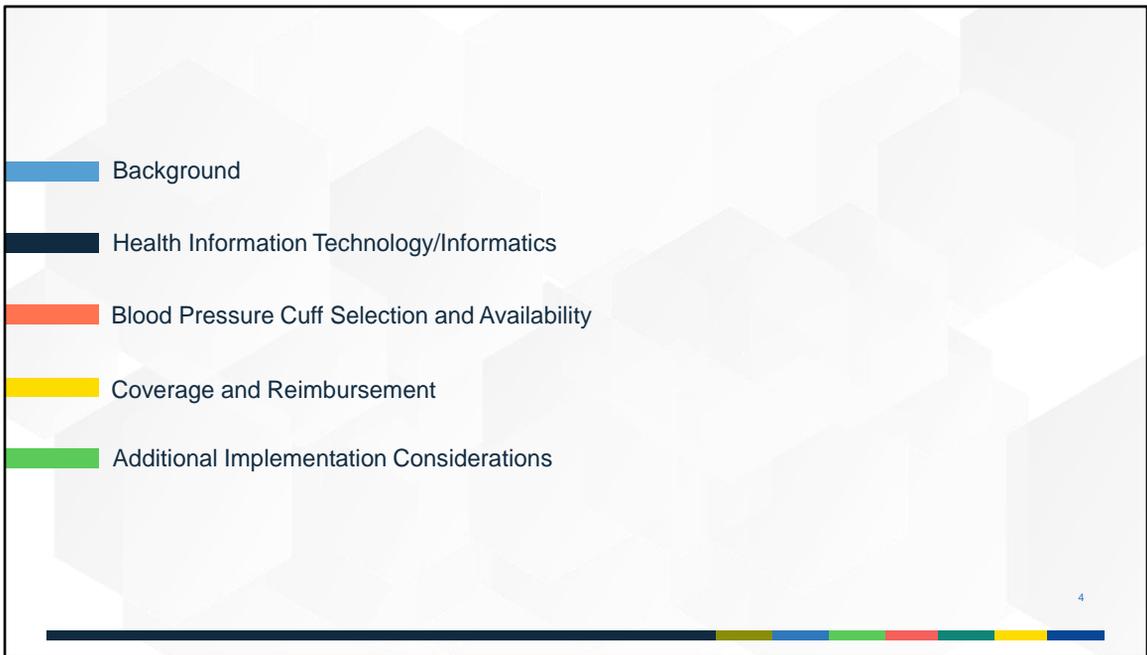
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MODERATOR:

As a disclaimer, the information presented here is for training purposes and reflects the views of the presenters. It does not necessarily represent the official position of the Centers for Disease Control and Prevention.

So, without further delay. Let's get started. **Hilary** and **Sharada**, the floor is yours.

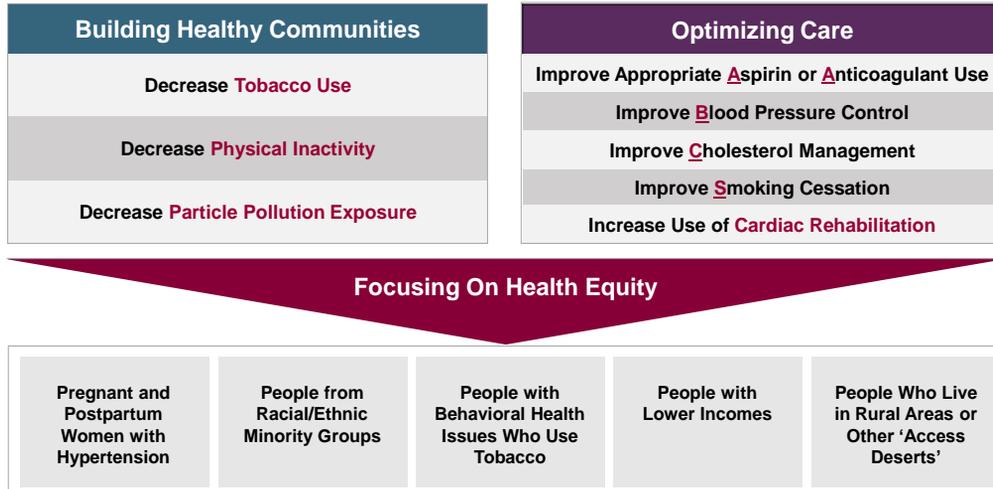
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Thank you, Cindy.

In today's presentation, we will start with some background on self measured blood pressure (SMBP) monitoring and then hone in on the various aspects worth considering when for planning and implementing SMBP, including, some tangible resources that you can use starting today.

Million Hearts[®] 2027 Priorities



This slide shows Million Hearts 2027 priorities – we just kicked off a new iteration of Million Hearts so this is a summary of our new platform. Blood pressure (BP) control continues to be of utmost importance for Million Hearts. And one of our primary strategies for BP control is, of course SMBP monitoring.

Goals and Strategies to Improve Hypertension Control

The infographic is titled "Goals and Strategies to Improve Hypertension Control" and is divided into three main columns, each with a goal and a list of strategies. A red circle highlights the "Empower and Equip Patients" strategy in the "Optimize Patient Care" column, with a line pointing to the label "SMBP".

Goal	Strategies
Prioritize Control Nationally	<ul style="list-style-type: none"> ✓ Increase Awareness of Health Risks ✓ Recognize Economic Burden ✓ Eliminate Disparities
Cultivate Community Supports	<ul style="list-style-type: none"> ✓ Promote Physical Activity Opportunities ✓ Promote Healthy Food Opportunities ✓ Connect to Lifestyle Change Resources
Optimize Patient Care	<ul style="list-style-type: none"> ✓ Use Standardized Treatment Approaches ✓ Promote Team-Based Care ✓ Empower and Equip Patients (SMBP) ✓ Recognize and Reward Clinicians

Promoting Health Equity

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

U.S. Department of Health and Human Services

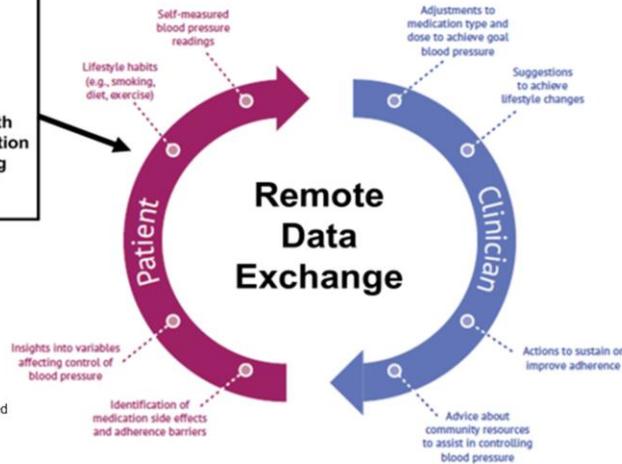
EDC

I'd like to remind you that SMBP monitoring was also featured in the 2020 Surgeon General's Call to Action to Control Hypertension as an evidence-based strategy to empower and equip patients for BP control.

Optimal SMBP

Patients receive guidance on:

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



Wall HK, et al. How Do We Jump-Start Self-Measured Blood Pressure Monitoring in the U.S.? Addressing Barriers Beyond the Published Literature. Am. J of HTN. In press.

Throughout my presentation today, I'll use the term “**optimal SMBP**” and this is my depiction of that – where a patient with hypertension (HTN) works with their clinical team to learn how to select a validated device with a properly sized cuff, they're taught proper preparation and positioning to yield accurate readings, and they are given a clinical protocol with frequency and duration for gathering readings as well as a method for, ideally, remotely returning patient-generated blood pressure values. The clinical team receives those readings, interprets them, and sends back titration or lifestyle

modification advice.

It's this remote data exchange via a patient clinician feedback loop that is key.

2019 BRFSS SMBP Analysis

- 20 states + DC
- 61% of those with self-reported HTN reported checking BP “outside of the office”
 - >80% shared readings with healthcare professionals
 - 7% via internet/email



Fang J, Luncheon C, Wall HK, Wozniak G, Loustalot F. Self-measured blood pressure monitoring among adults with self-reported hypertension in 20 US states and the District of Columbia, 2019. *Am J Hypertens*. 2021 Jun 7:hpab091. doi: 10.1093/ajh/hpab091. Epub ahead of print. PMID: 34097724.

But unfortunately, we know this optimal SMBP scenario is not happening often – YET. These are some data from the 2019 BRFSS that showed quite a few people with self-reported HTN report checking their BP outside of the office. Most who do, claim to share readings with their clinical team BUT only 7% do so via remote means.

New Publication – March 2022

Wall HK, Wright J Jackson S, Dussaut L, Ramkissoon N, Schieb L, Tong X, Stolp H, Loustalot F. How Do We Jump-Start Self-Measured Blood Pressure Monitoring in the U.S.? Addressing Barriers Beyond the Published Literature. Am. J of HTN. In press.

- Simplified, Standards-Based, and Interoperable Health Information Technology to Support Remote Exchange of Patient-Generated BP Readings
- Ready Access to High-Speed Broadband
- Accessible Technical Assistance to Overcome the Digital Divide
- Ample Supply of Validated Blood Pressure Devices and Appropriately Sized Cuffs
- Improved Coverage and Reimbursement
- Creative Solutions to Overcome Barriers of Trust, Time, and Distance



I've been working in SMBP monitoring for over a decade within CDC and with numerous external partners trying to get widespread adoption and implementation. But we have encountered many barriers – a few that you'll find in the published literature like clinicians thinking SMBP monitoring is not accurate or lack of device coverage. But we've also encountered implementation barriers that randomized control trials (RCTs) or qualitative studies would not likely uncover.

We wrote a journal article that was slated to be

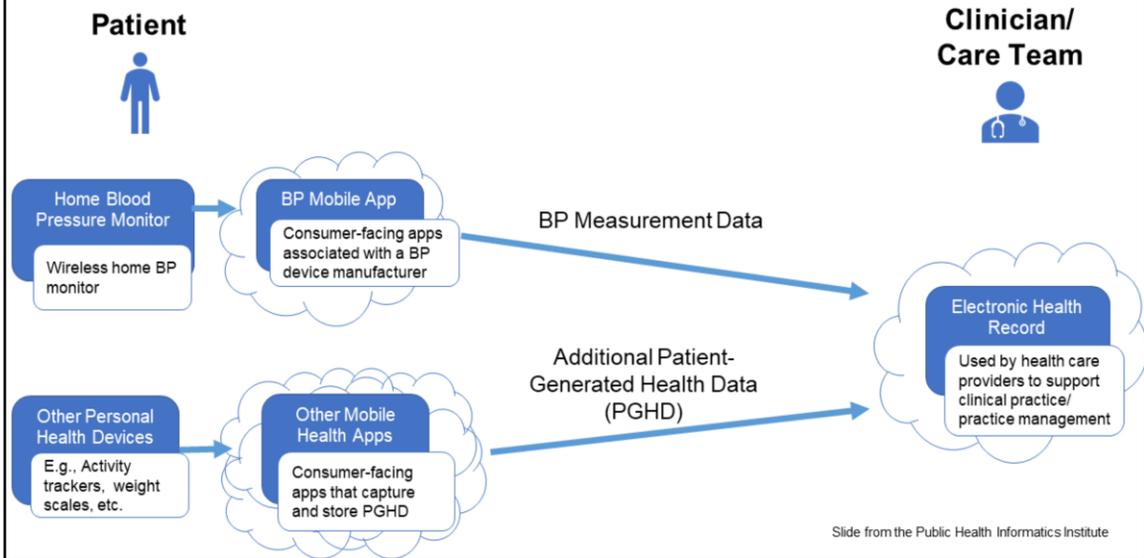
published March 1st but I'm hopeful it will drop any day now, entitled **How Do We Jump-Start Self-Measured Blood Pressure Monitoring in the U.S.? Addressing Barriers Beyond the Published Literature.** In this article we touch on a number of issues including health IT, internet access, providing technical assistance to patients, supply of properly sized, validated cuffs, and coverage and reimbursement.

Simplified, Standards-Based, and Interoperable Health Information Technology



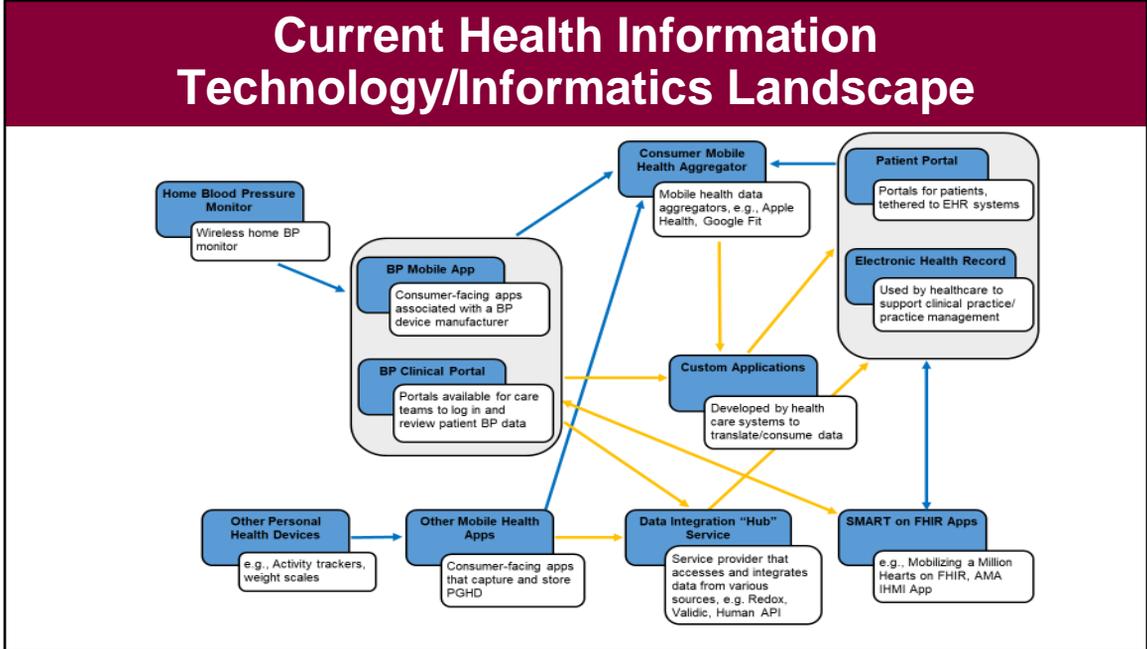
Let's start with simplified, standards-based,
interoperable health IT.

Perceived SMBP Health IT Landscape



This is the common perception for how patient-generated data, like SMBP monitoring, move from patient to clinician. The patient takes their BP at home, those readings go into some app, and the app sends them directly to your doctor's electronic health record (EHR).

Current Health Information Technology/Informatics Landscape



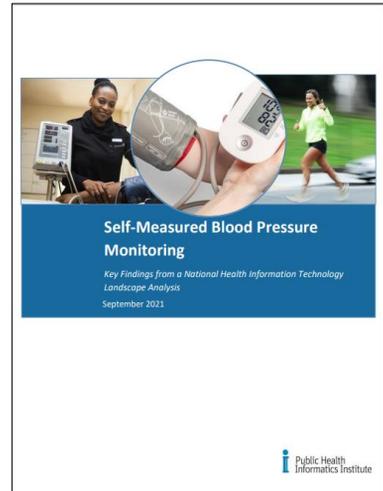
But in reality, THIS is actually what the health IT and informatics landscape looks like for SMBP monitoring. There are a number of intermediaries through which patient data must currently travel and often clinical entities must pay for customized solutions that can receive patient data and interface with their EHR.

New Report

Objectives

1. Document the informatics landscape for SMBP
2. Identify recommendations to achieve more widespread implementation of a common standards-based solution to share data between patient BP devices and EHRs

<https://phii.org/resources/self-measured-blood-pressure-monitoring/>



A few years ago, I knew health IT for SMBP monitoring was a problem that we needed to address, so, we collaborated with the Public Health Informatics Institute to do a national assessment of the SMBP monitoring health IT landscape and make recommendations for streamlining it. If you are interested in the technical details of that work, you can find the report using the URL on this slide but it is fairly technical. There were 12 recommendations made in the report. I'll address a few.

High-Level Challenges

- Data ownership, privacy, and security concerns as data flow from patients to non-HIPAA covered entities to HIPAA-covered clinical entities
- How best to incorporate data into clinical workflow
- Technical standards and specifications to enhance and simplify SMBP data exchange regarding what data elements are being exchanged, in what format, and how



Trying to address at the federal level

What we found was that there are concerns about data ownership, privacy, and security because all the intermediaries between patients and clinicians are not HIPAA-covered entities.

There are also challenges related to incorporating data into the clinical workflow in a way that doesn't over-burden clinicians.

We identified that there really aren't standards being imposed or voluntarily used in this space and that is likely how we can streamline this process. So, this

last one we are actively pursuing at the federal level.

Broadband Access Issues



Let's move on to broadband access, which is a very important social determinant of health. There are issues related to both affordability and physical availability of broadband where people live.

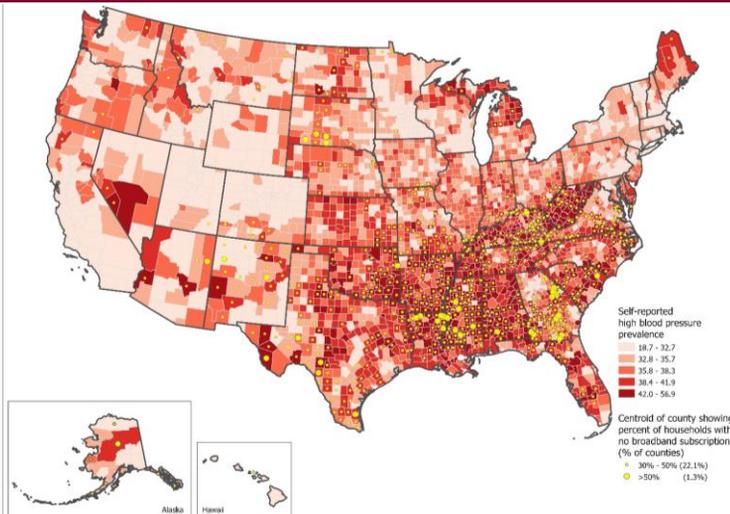
County-level self-reported high blood pressure prevalence among adults aged $\geq 18^a$ and % of households with no broadband internet subscription service^b

^a PLACES - Local Data for Better Health (2017). Modelled estimates from Behavioral Risk Factor Surveillance System (BRFSS).

<https://www.cdc.gov/places>

^b U.S. Census American Community Survey 5-year (2015-2019).

<https://www.census.gov/content/dam/Census/library/publications/2021/acs/acs-49.pdf>



This is one of the maps from our publication I mentioned. It looks at county level-self reported HTN data overlaid by the % of households that do not purchase a broadband subscription (the yellow circles). You can see that there is a correlation between those two with much of the yellow appearing in the Stroke Belt.

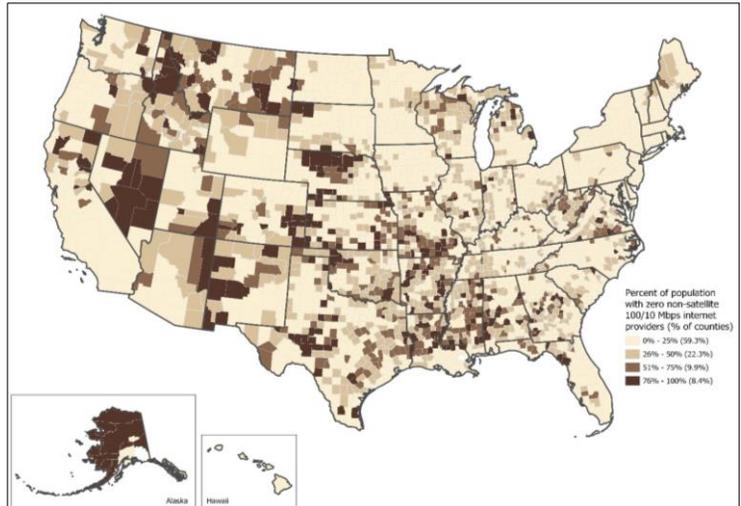
County-level percentage of population with zero non-satellite^a broadband (100/10 Mbps^b) internet service providers.^c

^a Non-satellite includes ADSL, cable modem, FTTP, and fixed wireless.

^b 100/10 Mbps = 100 Megabits per second download speed, 10 Megabits per second upload speed.

^c FCC summary data of fixed broadband coverage by geographic area (2020).

<https://opendata.fcc.gov/Wireline/Area-Table-June-2020-V1/ktav-pdj7>



Regarding the physical availability of broadband, this map shows the counties by the % of the population where only satellite broadband is available. Almost 20% of counties have more than 50% of their populations living where only satellite internet is available.

Technical Assistance to Overcome the Digital Divide



In our quest to explore this SMBP monitoring health IT landscape, we heard from numerous stakeholders who have managed to implement SMBP monitoring with their patients that technical assistance must be provided to overcome the digital divide.

Technical Assistance

- Patients need help:
 - Downloading apps
 - Connecting to Wi-Fi
 - Correctly transmitting BP values
- Potential (non-scalable) solutions:
 - In-house 'Genius Bar-type' help
 - Sending medical informaticists, nurses, and others on home visits



Trying to address at the federal level

This was something that wasn't even on my radar after working in SMBP monitoring for over a decade. This came up with clinician after clinician: patients need help with basic things like downloading apps, connecting to their home WiFi, and correctly transmitting their SMBP values.

Some larger health systems have created in-house technical assistance centers like Ochsner Health in Louisiana. Others have had to send out medical informaticists, nurses, and other staff directly to patients' homes to help them get set up.

We are attempting to address this in a widespread fashion at the federal level.

Ample Supply of Validated Blood Pressure Devices and Appropriately Sized Cuffs



Let's talk about BP devices and cuffs.

SMBP Device Issues

- U.S. Validated Device Listing – <https://www.validatebp.org/>
 - As of 3/1/22 – 29 home devices, 11 manufacturers
- NACHC Choosing A Home Blood Pressure Monitor For Your Practice At-a-glance Comparison – https://www.nachc.org/wp-content/uploads/2021/05/Choosing-a-Home-BP-Monitor_At-a-Glance-Comparison.pdf
 - As of 12/1/21, updated quarterly
- 2007-2010 NHANES data – 50% of men and 38% of women with hypertension require size large or greater blood pressure cuffs



Not all SMBP devices are created equally. In the quest for getting clinicians to trust SMBP readings, the American Medical Association (AMA) created the U.S. Validated Device Listing (VDL). This would be my first choice for finding devices because they require independent clinical validation of devices, which goes above and beyond FDA approval for devices to be sold in the U.S. Currently, there are 29 devices from 11 manufacturers on the VDL.

The National Association of Community Health Centers (NACHC) has created a companion “At a

Glance” tool that gives useful contextual information like cost, availability of XL cuffs, and technical aspects about devices on the VDL. CDC is helping to update this tool quarterly.

Lastly, it’s important to note that in the latest analysis available, 50% of men and 38% of women with HTN require size large or greater BP cuffs. In projects we’ve done with NACHC and health centers to implement SMBP monitoring, more than 50% of participants needed XL cuffs. So, we need device manufacturers to have appropriately sized cuffs readily available to match the needs of people with HTN.

Coverage and Reimbursement



Coverage and reimbursement are huge issues.

Medicaid Analysis

(as of July 2021)

Coverage Aspect	States that Provide Some Level of Coverage and/or Reimbursement
Automatic BP Device <u>and</u> SMBP Services (HCPCS A4670 AND (CPT 99473 and/or 99474)), n=13	Delaware, Hawaii, Idaho, Indiana, Michigan, North Carolina ^b , North Dakota, Ohio, Oregon ^b , Texas, Virginia, Wisconsin, Wyoming
Automatic BP Device Only (HCPCS A4670), n=20	Alaska, Arkansas, California, Colorado, Connecticut, D.C., Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New York, Utah, Washington
SMBP Services Only (CPT 99473 and/or 99474), n=8	Arizona, Florida ^b , Georgia, Kansas, Kentucky, Montana, New Jersey, New Mexico
Separate SMBP Cuff (HCPCS A4663), n=26	Alaska, California, Colorado, Connecticut, Delaware, D.C., Illinois, Indiana, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New York, North Dakota, Ohio, Texas, Utah, Virginia, Washington, Wisconsin, Wyoming
No SMBP-related coverage or reimbursement n=8 ^c	Alabama, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, West Virginia

BP = blood pressure, SMBP = self-measured blood pressure monitoring, HCPCS = Healthcare Common Procedure Coding System, CPT = Current Procedural Terminology, DC = District of Columbia

^a Results based on the most recent publicly available fee schedule data. ^b Likely linked to the Public Health Emergency. ^c Mississippi only provides coverage for separate SMBP cuffs but does not cover the automatic devices or related services.

CDC collaborated with AMA to do an analysis of Medicaid coverage for SMBP devices, related clinical services, and separate BP cuffs (important for larger arms). These data are true as of July 2021, but I will let you know a few updates have been made since then and AMA is going to post the revised results on the website in the near future.

- Overall, 33 states provide some level of coverage for home BP devices.
- 28 provide some level of reimbursement for SMBP-related services (e.g., training and education).

- 26 states provide some level of coverage for separate SMBP cuffs.

What you don't see here is that coverage and reimbursement levels vary GREATLY and many of these states do not provide adequate coverage or reimbursement but at least it's a starting place.

SMBP CPT Code Utilization

Prevalence of use of Current Procedural Terminology® (CPT) codes 99473 and 99474 among Medicare Fee-For-Service beneficiaries^a, aged 65+ with hypertension^b, January 2020 – May 2021

Year	Total beneficiaries aged 65+, N	Hypertension Prevalence, n (%)	CPT 99473	CPT 99474	
			Training, device setup and calibration received, n (%)	SMBP for ongoing treatment decisions, total ≥1 session, n (%)	Among beneficiaries with ≥1 use of CPT code, mean number of uses of the code
2020	29,958,986	22,285,241 (74.4)	1815 (0.01)	1,353 (0.01)	1.41
2021	27,661,406	19,669,335 (71.1)	1158 (0.01)	474 (<0.01)	1.27

^a Included Medicare fee-for-service (FFS) beneficiaries aged 65+ with at least one month of continuous enrollment in Medicare Part A (hospitalization) and Part B (outpatient care), using CMS real-time data.
^b Hypertension prevalence defined as a diagnosis code based on ICD-10-CM from Part A or Part B claims, or a diagnosis code of hypertension based on the Chronic Conditions Warehouse definition.

The SMBP services I mentioned on the previous slide come with the advent of two new CPT codes starting in 2020. These data are from an analysis of claims among Medicare Part B FFS beneficiaries. As you can see, only 0.01% of those beneficiaries had a claim for these codes through May 2021. So, they are incredibly underutilized, and we have a collective opportunity to spread the word on their availability.

Resources



That's the article in a nutshell, but I would encourage you to read it when it is finally published. I want to quickly go through a few additional resources.

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

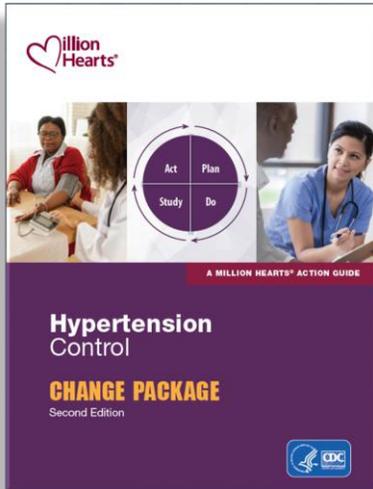
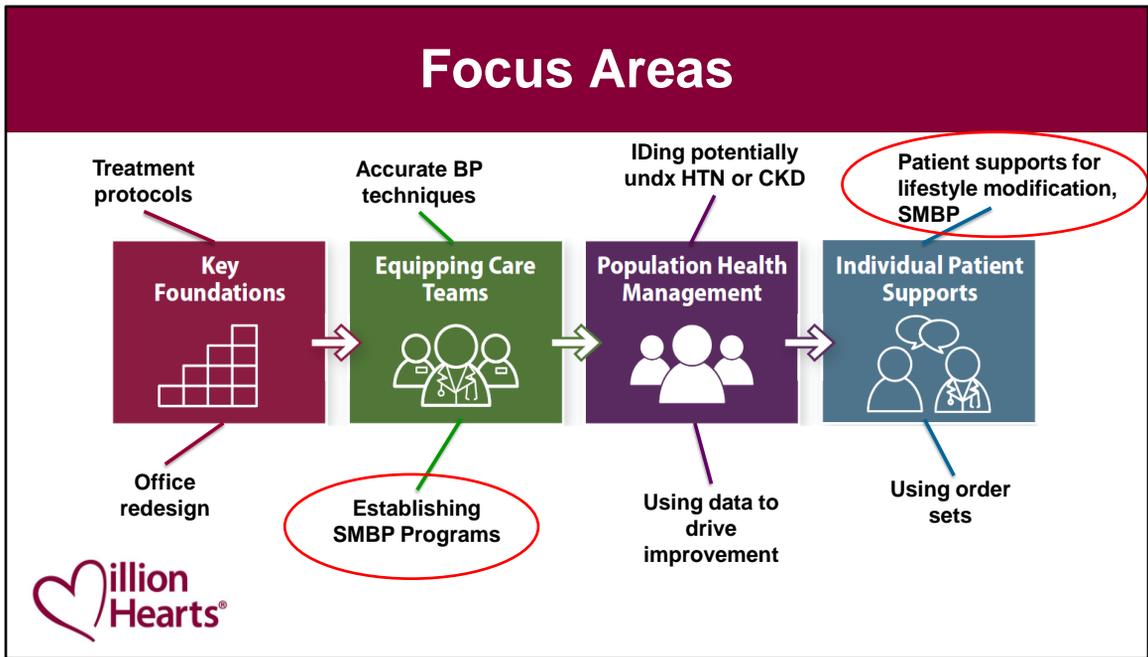


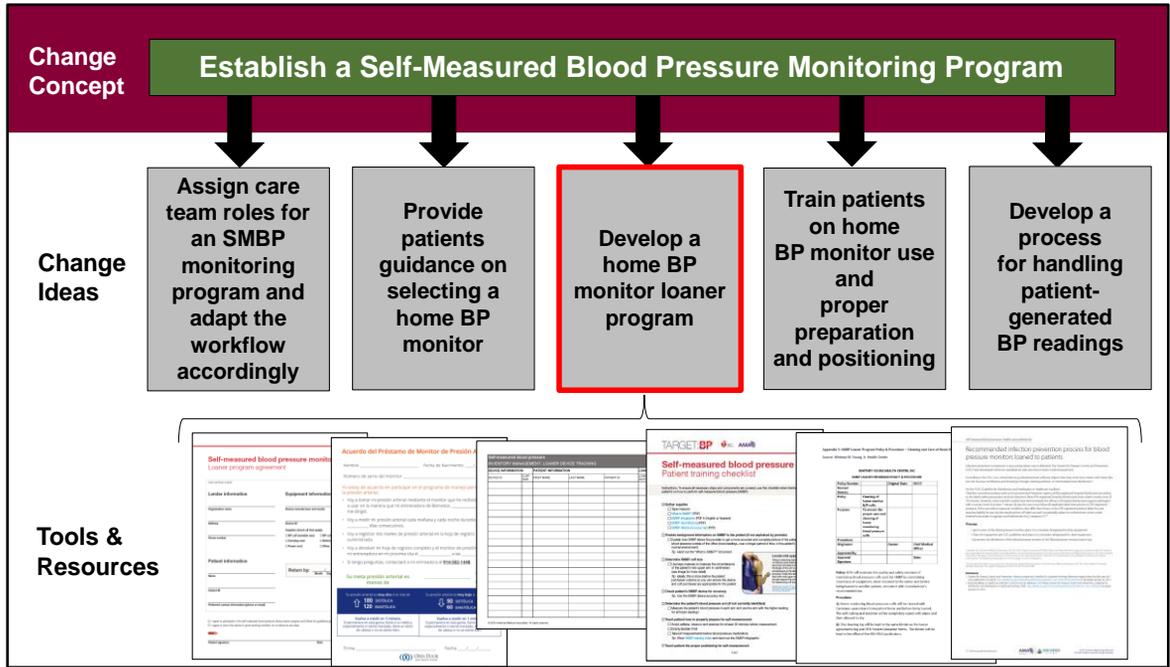
Table 1. Key Foundations (continued)		
Change Concept	Change Idea	Tools and Resources
		<ul style="list-style-type: none"> NYC Health & Hospitals — Adult Hypertension Clinical Practice Guidelines: Treatment of Resistant Hypertension Zuffall Health — Guidelines for Screening, Diagnosis and Management of Hypertension (pgs. 12, 13) Resistant Hypertension: Detection, Evaluation, and Management: A
	Manage risk	
	Implement a Policy or Process to Address BP for Every Patient with HTN at Every Visit	
	Evaluate all with HTN for diagnosis as if appropriate	
	Train and Evaluate Direct Care Staff on Accurate BP Measurement and Documenting	
Table 2. Equipping Care Teams		
Change Concept	Change Idea	Tools and Resources
	Adopt a clinician/staff training policy to train and retain staff	<ul style="list-style-type: none"> AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plan 1, Tool 9: Blood Pressure Champion and CDS Education and Auditing Process for Non Staff HealthPartners Cheshire Medical Center/Dartmouth-Hitchcock — Obtaining Accurate Blood Pressure Measurements in the Ambulatory Setting: How Do You Size a Blood Pressure Cuff (pgs. 1, 8, 12) 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) (CC credit) AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plan 1, Tool 11: Blood Pressure Accuracy and Variability Quick Reference HealthPartners AMGF — Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control: Plan 1, Tool 7: How to Take Blood Pressure Properly (video) 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: Plan 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
	Provide guidance on measuring BP accurately	

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

Hopefully, you are aware of the Million Hearts Hypertension Control Change Package – this is a comprehensive quality improvement tool.



There are SMBP-related tools and resources in both the Equipping Care Teams and Individual Patient Supports sections of the change package.



Here's an example of what you would find in the Equipping Care Teams section. Each of these change ideas have a wide array of tools and resources that can help make changes to care processes in each area.

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 2021 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



We have a Million Hearts SMBP Forum we host with NACHC. This is like a community of practice on SMBP, and I find these calls to be very informative. So, please register for the forums if you haven't already done so.

More Resources

- **Million Hearts SMBP webpage** – <https://millionhearts.hhs.gov/about-million-hearts/optimizing-care/smbp.html>
- **Million Hearts An Economic Case for SMBP** – https://millionhearts.hhs.gov/files/SMBP_economic_case-508.pdf
- **CDC Best Practices Guide on SMBP with Clinical Support** – <https://www.cdc.gov/dhdsp/pubs/guides/best-practices/smbp.htm>
- **NACHC SMBP Implementation Toolkit** – https://www.nachc.org/wp-content/uploads/2020/12/SMBP-Toolkit_FINAL.pdf
- **Target:BP Tools & Downloads** – <https://targetbp.org/tools-downloads/?sort=topic&>



Just a few final resources – we have our Million Hearts SMBP web page where we carefully curate resources. Among other things, you’ll find An Economic Case for SMBP. We also have our Division’s SMBP profile from the Best Practices Guide that has scientific evidence and implementation guidance. The NACHC SMBP Implementation Toolkit is an excellent starting point if you’re starting from scratch related to SMBP and Target BP has many excellent tools and resources available related to SMBP monitoring.



ADDITIONAL IMPLEMENTATION CONSIDERATIONS

So, Hilary provided some great tangible information that folks can use in their work. I encourage everyone on today's webinar to check out those resources and to join the SMBP Forum.

My part of this presentation will take us from the resources and shift us to thinking about the potential impact of **how** an SMBP intervention is implemented. My colleagues and I conducted a systematic review to understand the outcomes for SMBP interventions, but more importantly, what intervention features impacted those outcomes.

Background

- SMBP monitoring is recommended by national and international organizations
- Community Prevention Services Task Force recommend SMBP monitoring with support based on their own systematic review of effectiveness and cost-effectiveness
- Lack of information on the implementation process, particularly from economics perspective

SHANTHARAM, S. S., MAHALINGAM, M., RASOOL, A., REYNOLDS, J. A., BHUIYA, A. R., SATCHELL, T. D., CHAPEL, J. M., HAWKINS, N. A., JONES, C. D., JACOB, V., & HOPKINS, D. P. (2022). SYSTEMATIC REVIEW OF SELF-MEASURED BLOOD PRESSURE MONITORING WITH SUPPORT: INTERVENTION EFFECTIVENESS AND COST. AMERICAN JOURNAL OF PREVENTIVE MEDICINE, 62(2), 285–298. [HTTPS://DOI.ORG/10.1016/J.AMEPRE.2021.06.025](https://doi.org/10.1016/j.amepre.2021.06.025)

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I'll briefly cover the background and methods for this paper, but I have provided the citation at the bottom if you would like to learn more.

To give some context, we know SMBP is important. We know it's effective. There are several national and international organizations that recommend it for controlling high blood pressure. In particular, the Community Preventive Services Task Force, which is a nationally recognized body of public health researchers, recommends the use of SMBP with support to reduce and control blood pressure based on their own reviews for effectiveness and cost-effectiveness.

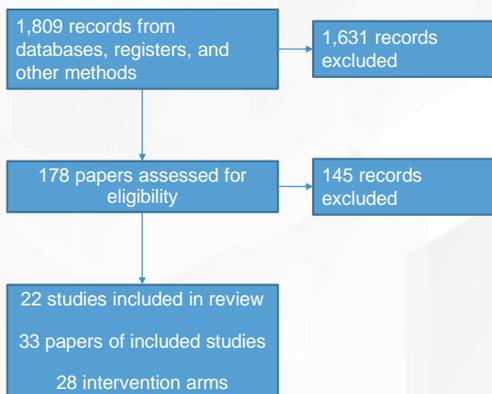
Now, having this information is great, but our Division recognized the need to understand implementation process and which pieces were most likely to impact the results of SMBP programs. And this sort of thinking and research is gaining traction in the public health field but coming at it from an economic perspective is less studied. So, this was an interesting space for us to conduct our own review of the literature.

Methods

Research Questions

1. How effective are the SMBP interventions in reducing SBP?
2. How much do the SMBP interventions cost to implement?
3. How much does the intervention cost to achieve a unit of effectiveness?
- ★ 4. Which patient characteristics and intervention features are associated with effectiveness, intervention cost, and intervention cost per unit of effectiveness?

PRISMA Flow Diagram



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Our intention with this review was to 1) extend and update the Community Preventive Services Task Force's findings, and; 2) understand which aspects of the programs impacted outcomes. So, these were our research questions. I won't be covering all of these, but I'd like to bring your attention to the last one: Which patient characteristics and intervention features are associated with effectiveness, intervention cost, and intervention cost per unit of effectiveness (which was how we analyzed the cost-effectiveness). For today's presentation, I'm going to home in on the intervention features part of the question.

To the right, you will see a streamlined version of our flow chart for how we identified and selected studies and papers for this review. Ultimately, we analyzed content from 33 papers that covered 22 studies that included SMBP monitoring with additional support from a care team, reported BP outcomes and cost, and were not duplicates. And I want to highlight that we had to distinguish papers from studies because we had a handful of economic studies that had multiple papers published on the same program, so we had to do some scouring to ensure we were capturing the most accurate information. In addition, we had a total of 28 intervention arms that addressed SMBP in different manners across these studies, so we ended up comparing arms to arms rather than studies to studies.

Analyses

- Analyzed these groups of intervention arms to find commonalities
- Comparison of 8 arms with the...
 - Greatest vs. least reduction in systolic blood pressure
 - Costliest vs. least costly intervention arms
 - Greatest vs. smallest monthly cost per mmHg



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Regarding our analysis method, we approached the effectiveness, cost, and cost-effectiveness in a similar manner. That is, we compared the least and most effective arms, the costliest and least costly arms, and the intervention arms with the greatest and smallest monthly cost per mmHg to understand what are the similarities that might have contributed to those outcomes.

Another way to think about it is: what are the common factors that improved or worsened these outcomes?

High-Level Results



Greatest reductions were associated with:

- Nurses and pharmacists as implementers
- Used smartphones, interactive phone systems, and telemetry devices



Lower costs were associated with:

- Community health workers as implementers
- Smartphones, websites, and servers
- Patient-provider interactions on an as-needed basis



Smaller monthly cost per mmHg were associated with:

- Smartphones, interactive phone systems, and websites
- Patient-provider interactions on an as-needed basis

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For our high-level results, we found:

- Greater reductions in systolic BP in studies that engaged nurses and pharmacists and utilized smartphones, interactive phone systems, and telemetry devices.
- Lower costs when community health workers were engaged, similar technology was used, and when patients and providers connected with each other on an as-needed basis.
- And finally, once again smartphones and websites and as-needed interactions were associated with smaller, or lower, monthly costs per change in BP.

Summary Findings

- Multidisciplinary approach to implementing SMBP monitoring interventions can increase effectiveness and lower cost
- Accessible technologies can facilitate patient participation and engagement at minimal cost can increase effectiveness
- As-needed patient-provider interactions can increase effectiveness and lower cost

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Ultimately, we found that a multidisciplinary approach that engages nurses, pharmacists, and community health workers can benefit a program in terms of health and costs.

In addition, technology beyond the cuff itself can improve the effectiveness of a program, with minimal costs associated.

Finally, constant and structured engagements between patients and providers may not be necessary. In fact, we saw larger monthly costs per change in BP with frequent and standardized engagements. So, as-needed interactions seems to be the better choice and would place less burden on the patient and care team.

Key Takeaways

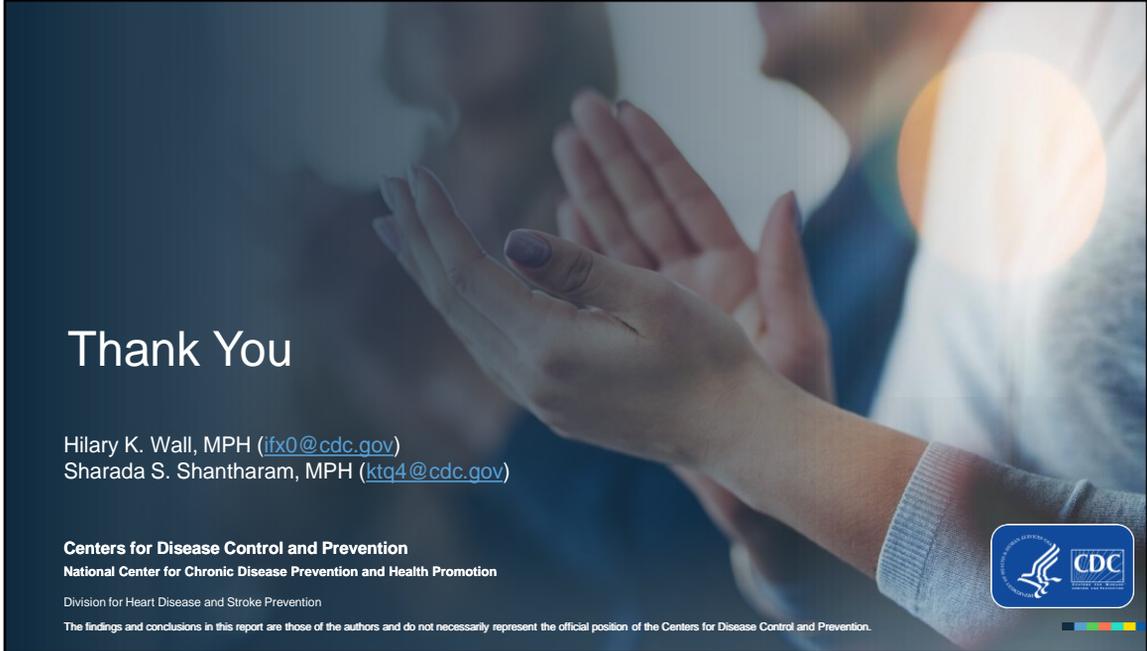
- SMBP is an effective and cost-effective strategy
- Ongoing efforts to address Health IT/Informatics challenges
- Blood pressure cuffs are available to suit your situation and needs
- Medicaid coverage is available in many states. Medicare coverage is available some states.
- Options for optimizing care and reducing burden



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I know Hilary and I shared a lot of information and resources, but we hope that the audience can walk away from this webinar with a starting point when considering implementing SMBP monitoring.

- SMBP monitoring is an effective and cost-effective strategy.
- While the space is complicated, there are resources and ongoing efforts to understand and streamline the process around health IT/informatics infrastructure.
- When it comes to the cuffs themselves, there are resources available to help you find the cuff that meets your needs.
- In terms of reimbursement, Medicaid does have options for covering SMBP devices, trainings, and the services themselves.
- And, finally, there are options for optimizing care and reducing burden, such as having a multidisciplinary team, using not so expensive technology, and reducing the frequency of those patient-provider interactions.



I hope you will find this helpful in your work and we're happy to answer any questions. But I think I'll turn it back over to Cindy at this time.

MODERATOR

This concludes today's Coffee Break presentation. At this time, we will take questions from the audience. Please enter your question into the Q/A feature at the bottom of your screen. As we wait for questions from the audience, I'll ask our presenters a few questions to help start the discussion.

Q to Hilary: Hilary, you shared a lot of considerations around regulations and policy, interoperability, and practice, some of which are trying to be addressed at the federal level. Could you talk more about some of those initiatives?

Q to Sharada: My other question is for Sharada. I was wondering if you could speak a little more about the findings from your review. This is a very complicated space, of course, but I wonder about any contextual factors that might have come into play. For example, I know we couldn't get into it today, but could the patient characteristics

play a part in the impact of these programs?

A: Yea, that's a great question. Short answer is absolutely. Long answer is, just to talk about the complexity, there's always going to be a cost associated with which features and aspects of a program you choose to implement. We did find evidence of younger patients with higher baseline levels associated with greater reductions in systolic blood pressure. But on the flip side, older patients and larger sample sizes were associated with lower costs. It really does depend on the patient population you are working with. Understanding who you are trying to help and what are your goals and then tailoring the program to those needs works best. If you've got an older population and you're trying to reduce implementation costs, maybe consider hiring community health workers to implement the program. If you work with a larger population, consider having providers connect with patients on an as needed basis to reduce burden and increase the cost-effectiveness of the program. Again, it's about tailoring to yours and your patients' needs.