Self-Measured Blood Pressure Monitoring With Clinical Support

Self-measured blood pressure monitoring (SMBP) involves a patient's regular use of personal blood pressure monitoring devices to assess and record blood pressure across different points in time outside of a clinical or community or public setting, typically at home.[1,2] When combined with clinical support (e.g., one-on-one counseling, web-based or telephonic support tools, education), SMBP can enhance the quality and accessibility of care for people with high blood pressure and improve blood pressure control.[3]

Summary

SMBP with clinical support involves training patients to regularly monitor and record their own blood pressure at home with a personal device and rely on clinical support as needed. SMBP is a cost-effective strategy for lowering blood pressure and increasing medication adherence.

Stories From the Field:
Millgrove Medical Center (Norristown, Pennsylvania).

Evidence of Effectiveness

Effect	Implementation Guidance	Research Design
Internal Validity	Independent Replication	External & Ecological Validity

Legend: Well supported/ Supported | Promising/ Emerging | Unsupported/ Harmful

Evidence of Impact

Health Impact	Health Disparity Impact	Economic Impact

Legend: Supported | Moderate | Insufficient

Evidence of Effectiveness

The evidence base for implementing SMBP in health care systems and practices is very strong. Studies demonstrate internal and external validity, and there has been independent replication with positive results. Several studies show the positive effect of SMBP in improving blood pressure control. Comprehensive implementation guidance is available to facilitate the adoption of this strategy by health care systems and practices.

Evidence of Impact

Health Impact

SMBP has proven useful in reducing the risk of death and disability associated with hypertension.[4,5] The research literature has shown that, when combined with additional clinical support, SMBP is effective in reducing hypertension, improving patient knowledge, improving the health system process, and enhancing medication adherence.[2] SMBP has also been associated with patient empowerment, autonomy, self-efficacy, and lifestyle modification.

Health Disparity Impact

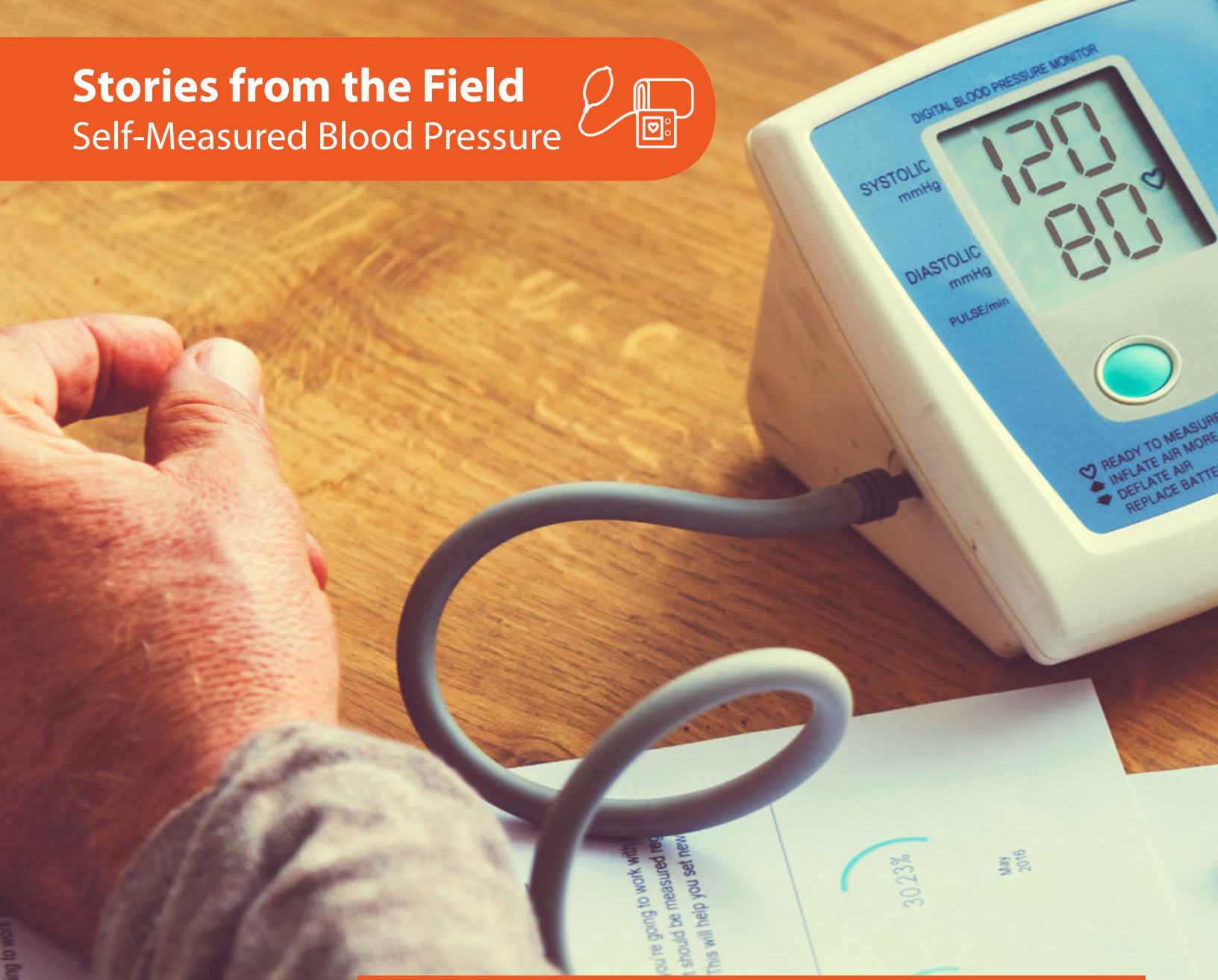
Evidence is insufficient to show that SMBP affects health disparities. Some of this lack of evidence is related to minorities being underrepresented in comparative studies.[2] In current studies, some findings show that SMBP failed to improve blood pressure control for a largely minority, urban population of Hispanics and people without insurance, a population which is largely understudied.[6] A statistically significant difference in systolic blood pressure was found for white participants who used SMBP, but not for African Americans or Hispanics. Studies note the potential negative effect of barriers to SMBP for low-income and minority groups. For example, while validated blood pressure monitors for home use are generally considered affordable, the lack of reimbursement for these devices and additional out-of-pocket costs can be barriers for low-income populations.

SMBP has proven useful in reducing the risk of death and disability with hypertension.

Economic Impact

Economic evidence from a review by the Community Preventive Services Task Force indicates that SMBP monitoring strategies are cost-effective when combined with additional clinical support or within a team-based care model.[7] The median cost per quality-adjusted life year (QALY) gained over a 20-year period for SMBP with additional support was $2,832 or $4,046, depending on the QALY conversion method used.[7] The median cost per QALY gained for SMBP as part of team-based care was $7,585 or $10,923.[7] SMBP has been found to be cost-beneficial for insurers, with an estimated net savings associated with the use of home blood pressure monitors ranging from $33 to $168 per member in the first year and from $420 to $1,380 per member over 10 years.[8] The return on investment (ROI) for the insurer ranges from $0.85 to $3.75 per $1 invested in the first year and from $7.50 to $19.34 per $1 invested over 10 years. Because of the clear financial and health benefits of SMBP, experts from the American Heart Association, American Society of Hypertension, and Preventive Cardiovascular Nurses Association recommend that payers cover the costs of home blood pressure monitors, patient training in SMBP techniques, and clinical support.[3]

Stories from the Field
Self-Measured Blood Pressure



SMBP at Millgrove Medical Center

The family practice of Dr. Nilesh V. Patel at Millgrove Medical Center in Norristown, Pennsylvania, serves 5,300 adult patients in eastern Pennsylvania and is a 2013 Million Hearts Hypertension Control Champion. The practice achieved successful outcomes using SMBP by training patients to monitor and record their blood pressure with a blood pressure cuff at home and then transferring these measurements to the patients' electronic health record (EHR). By using SMBP and EHRs and including pharmacists in a team-based care approach, the practice increased the blood pressure control rate for its patients from 83.4% to 94.9% in 1 year. This improvement translates to an additional 49 patients who are reaching their target blood pressure and significantly reducing their risk of cardiovascular disease.

For more information:
Website: www.millgrovemedical.com
Phone: 610-666-1400

Four Considerations for Implementation

1 Settings

SMBP efforts have been implemented in many clinical and community settings, including FQHCs, general practices, YMCAs, and Veterans Affairs medical centers.

2 Policy and Law-Related Considerations

Insurance coverage for SMBP is not universal, but varies by state and individual insurance plans. Coverage can vary by SMBP components (e.g., blood pressure measurement devices, clinical support, training). Traditional fee-for-service models often reimburse only for office-based visits and services. More information on coverage under Medicare and Medicaid can be found online and through Million Hearts resources.[3] When not covered by insurance, health care flexible spending accounts have been recommended to cover the costs of home blood pressure monitors.

3 Implementation Guidance

Through the Million Hearts® initiative, CDC has created a series of translation guides on SMBP for public health practitioners and clinicians. The Million Hearts website also has an SMBP webpage, which has resources, evidence, tools, and information about effective SMBP practices. See these links for more information on implementation:

- Self-Measured Blood Pressure Monitoring: Action Steps for Clinicians.[3]
- Self-Measured Blood Pressure Monitoring: Action Steps for Public Health Practitioners.[9]
- Self-Measured Blood Pressure Monitoring by Million Hearts.[10]

4 Resources

Several federal agencies and initiatives provide resources related to the use of SMBP, including:

- Community Preventive Services Task Force.[11]
- US Preventive Services Task Force.[12]
- Centers for Disease Control and Prevention's 6|18 Initiative.[13]

References

1. Shimbo D, Abdalla M, Falzon L, Townsend RR, Muntner P. Role of ambulatory and home blood pressure monitoring in clinical practice: a narrative review of blood pressure monitoring. *Ann Intern Med*. 2015;163(9):691–700.
2. Uhlig K, Patel K, Ip S, Kitsios GD, Balk EM. Self-measured blood pressure monitoring in the management of hypertension: a systematic review and meta-analysis. *Ann Intern Med*. 2013;159(3):185–194.
3. Centers for Disease Control and Prevention. *Self-Measured Blood Pressure Monitoring: Actions Steps for Clinicians*. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2014.
4. Fletcher BR, Hinton L, Hartmann-Boyce J, Roberts NW, Bobrovitz N, McManus RJ. Self-monitoring blood pressure in hypertension, patient and provider perspectives: a systematic review and thematic synthesis. *Patient Educ Couns*. 2016;99(2):210–219.
5. Stergiou GS, Bliziotis IA. Home blood pressure monitoring in the diagnosis and treatment of hypertension: a systematic review. *Am J Hypertens*. 2010;24(2):123–134.
6. Yi SS, Tabaei BP, Angell SY, et al. Self-blood pressure monitoring in an urban, ethnically diverse population: a randomized clinical trial utilizing the electronic health record. *Circ Cardiovasc Qual Outcomes*. 2015;8(2):138–145.
7. Verughese J, Chattopadhyay SK, Proia KK, et al. Economics of self-measured blood pressure monitoring: a community guide systematic review. *Am J Prev Med*. 2017;53(3):e105-e113.
8. Arrieta A, Woods J, Qiao N, Jay S. Cost-benefit analysis of home blood pressure monitoring in hypertension diagnosis and treatment: an insurer perspective. *Hypertension*. 2014;64:891–896.
9. Centers for Disease Control and Prevention. *Self-Measured Blood Pressure Monitoring: Actions Steps for Public Health Practitioners*. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2013.
10. Million Hearts. Self-Measured Blood Pressure Monitoring website. https://millionhearts.hhs.gov/tools-protocols/smbp.html. Accessed April 17, 2017.
11. Community Preventive Services Task Force. The Guide to Community Preventive Services website. Cardiovascular Disease. https://www.thecommunityguide.org/topic/cardiovascular-disease?field_recommendation_tid=7476&items_per_page=All. Accessed February 14, 2017.
12. US Preventive Services Task Force. Final Recommendation Statement: High Blood Pressure in Adults: Screening website. https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/high-blood-pressure-in-adults-screening. Accessed February 14, 2017.
13. Centers for Disease Control and Prevention. The 6|18 Initiative: Accelerating Evidence into Action website. https://www.cdc.gov/sixeighteen/. Accessed February 1, 2017.