

## **Self-Measured Blood Pressure Monitoring with Clinical Support Among Adults with Hypertension: A Pilot Project in South Carolina**

### ***Background***

Hypertension (high blood pressure) is among the leading risk factors for cardiovascular disease, stroke, and kidney failure, and is directly associated with more than 10 million annual deaths globally.<sup>1,2</sup> Hypertension is often referred to as a “silent killer,” since people with hypertension typically do not display symptoms.<sup>2</sup> Hypertension and its related comorbidities pose a significant health burden for South Carolina, a state in the southern United States (U.S.) with persistent socioeconomic, geographic, and racial inequities in heart disease.<sup>3</sup> In 2021, 37.8% of South Carolina adults reported being told by a health care professional that they had hypertension, as compared to the U.S. average of 32.4%. South Carolina adults who have lower educational attainment, lower income, are Black or American Indian/Alaska Native, and live in rural areas are among the populations disproportionately diagnosed with hypertension.<sup>4</sup>

Outreach strategies, feedback to providers, and electronic health record (EHR) prompts of elevated blood pressure have been used to identify and treat patients with uncontrolled hypertension. Evidence supports the use self-measured blood pressure monitoring (SBPM) with clinical support to improve blood pressure control among people with hypertension.<sup>5</sup> The 2017 American College of Cardiology/American Heart Association Guidelines recommend that the entire medical team be knowledgeable of skills and effectively informed on hypertension control to reduce disparities and achieve blood pressure control in patients.<sup>6</sup>

Considering the current evidence, the South Carolina Department of Health and Environmental Control (SC DHEC), using funding from the Centers for Disease Control and Prevention, formed a collaboration and worked with the American Society of Hypertension (ASH) Carolinas-Georgia-Florida Chapter to develop initiatives that focused on clinical and patient approaches to managing hypertension. These efforts build on more than two decades of work by the Hypertension Initiative of South Carolina.<sup>7,8</sup> Since the Initiative began in 1999, new technologies for health care delivery and guidelines for the management of hypertension have been developed. SC DHEC and ASH seeks to further the Hypertension Initiative’s work and reduce the high prevalence of high blood pressure in South Carolina using new and innovative technology.

### ***Methods***

The first of two initiative focused on providing resources to staff participating in the Chronic Conditions Care Collaborative (4C Collaborative), a quality improvement learning collaborative. SC DHEC developed the 4C Collaborative to provide a space for healthcare teams to work together to improve hypertension detection, treatment, and control, for their patient population. As a part of the 4C Collaborative, ASH developed a section of the Quality Improvement Change Package to provide access to different resources associated with testing and adopting hypertension-focused change concepts. In further support of the effort, ASH developed educational modules to address various aspects of blood pressure control.

The second initiative involved developing a demonstration project with a local Rural Health Center (RHC) to explore the feasibility of implementing an SMBP program within their practice. The participating RHC was equipped with remote patient monitoring blood pressure devices using Bluetooth technology to integrate SMBP recordings into the EHR as an additional tool for blood pressure control. This intervention was supported by a well-trained interprofessional team led by a clinical champion.

### ***Results***

Subject matter experts provided technical assistance, guidance, and resources to teams participating in the 4C Collaborative to assist in testing and adopting change concepts through the Quality Improvement Change Package. Further, the subject matter experts developed education modules that addressed blood pressure measurement, hypertension treatment, management, control, and prevention strategies. With the help of a faculty that includes national and international experts, over 100 modules are available at <https://www.scahec.net/learn/HTN> and can be accessed at no cost for all healthcare providers.

The demonstration project reached 19 patients, of which six indicated using home devices and three of the patients reached either changed or started a medication regimen due to their blood pressure readings. Staff implementing the demonstration project indicated various barriers associated with the SMBP device and its ease of use. First, the recruited RHC reported a significant number of technological barriers that impacted the patient such as, not owning a smartphone, not having an email, and lack of familiarity and comfort with using technology. Secondly, the RHC noted that the amount of time spent helping a patient acclimate to the new device was a challenge. There were also concerns regarding the accuracy of readings and whether cuffs were appropriately fitted for the participants.

### ***Conclusions***

Moving forward, healthcare teams can use the Quality Improvement Change Package to adopt processes and systems to sustain the use of SMBP with clinical support. Given the challenges of the demonstration project, digital literacy among the patient population and increased access to a greater variety of blood pressure cuff sizes must be addressed to support the future implementation of SMBP programs in South Carolina.

#### References

1. Fuchs FD, Whelton PK. High Blood Pressure and Cardiovascular Disease. *Hypertension*. Feb 2020;75(2):285-292. doi:10.1161/hypertensionaha.119.14240
2. Centers for Disease Control and Prevention. Cardiovascular Diseases. 2023. <https://www.cdc.gov/globalhealth/healthprotection/ncd/cardiovascular-diseases.html>
3. Mandelbaum J, Myers KG, Brightharp CL, Hicks SP. Assessment of Chronic Disease Management Strategies Among Health Care Practices in Medically Underserved South Carolina Counties. *Health Education & Behavior*. 0(0):10901981211057538. doi:10.1177/10901981211057538
4. America's Health Rankings. America's Health Rankings analysis of Behavioral Risk Factor Surveillance System. UnitedHealth Foundation. 2023. <https://www.americashealthrankings.org/explore/annual/measure/Hypertension/state/SC>
5. Jo, S. H., Kim, S. A., Park, K. H., Kim, H. S., Han, S. J., & Park, W. J. (2019). Self-blood pressure monitoring is associated with improved awareness, adherence, and attainment of target blood pressure goals: Prospective observational study of 7751 patients. *Journal of clinical hypertension (Greenwich, Conn.)*, 21(9), 1298–1304. <https://doi.org/10.1111/jch.13647>
6. Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension*. Jun 2018;71(6):1269-1324. doi:10.1161/hyp.0000000000000066
7. Giese M, Lackland DT, Egan BM. The hypertension initiative of South Carolina. Promoting cardiovascular health through better blood pressure control. *J S C Med Assoc*. Feb 2001;97(2):57-62.

8. Giese M, Lackland D, Basile J, Egan B. 2003 update on the Hypertension Initiative of South Carolina. Bringing South Carolina from "worst to first" in cardiovascular health. *J S C Med Assoc.* Jun 2003;99(6):157-61.