SMBP refers to blood pressure measurements taken outside of the clinical setting, usually at home. SMBP helps with both diagnosis and management of hypertension and increases patient participation in their own care. SMBP, when combined with other clinical supports, improves hypertension control.

A complete cycle of SMBP = 2 measurements, 1 minute apart, in the morning and evening for a 7-day period. At least 3 days (12 measurements) are the minimum needed for SMBP. Average all SMBP measurements from the 7-day period into one systolic BP average and one diastolic BP average. Use the SMBP average for diagnosis or treatment decisions.

SMBP IMPLEMENTATION TOOLKIT

PURPOSE:
This toolkit is designed to help organizations implement self-measured blood pressure monitoring (SMBP) successfully into their care processes and workflows.

ORGANIZATION:
It is comprised of four parts that will help organizations determine their goals and priority populations, align their SMBP patient training approach to their practice environment, consider SMBP tasks by role—and particularly how many can be accomplished by a non-clinician, review key features and functionalities to consider in choosing a SMBP data management software solution/technology partner, and ultimately develop a protocol that will help organizations implement SMBP using a comprehensive, practical, step-by-step approach based on the experiences and lessons learned of other implementing organizations and in accordance with the June 2020 Self-measured Blood Pressure Monitoring at Home: A Joint Policy Statement from the American Heart Association and American Medical Association.

INSTRUCTIONS:
1. Complete Determining Your SMBP Goals and Priority Populations
2. Work through the SMBP Protocol Design Checklist
3. Use the SMBP Tasks by Role and Aligning your SMBP Patient Training Approach to your Practice Environment diagrams to adapt your SMBP care model to your patients’ preferences, staffing capacity, other clinical initiatives or priorities, and local environment
4. Review the important decision criteria for Optimizing Management of Patient-Generated Health Data for SMBP Programs
How big do you go? Ideally and ultimately, everybody with hypertension should have their own home blood pressure monitor, but in a resource-constrained healthcare environment, that may not always be feasible...at least in the near-term. How do you best align your self-measured blood pressure monitoring (SMBP) goals with your current environment and where it will do the most good? The following diagram is designed to assist with this first important step in planning for SMBP. The ideas below do not represent an exhaustive list of possible SMBP goals and priority populations, but rather are intended to serve as a launchpad to help you think about ways to get the most out of SMBP in your practice. There may be overlap in the populations and you may choose to focus on multiple populations/goals.

### PLANNING FOR SMBP—DETERMINING YOUR GOALS AND PRIORITY POPULATION

<table>
<thead>
<tr>
<th>POSSIBLE PRIORITY POPULATION</th>
<th>POSSIBLE GOALS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Align SMBP with Existing Chronic Disease Efforts or Programs</strong></td>
<td>Use SMBP to enhance services for existing chronic disease programs/populations</td>
</tr>
<tr>
<td>For example, perhaps your organization has an initiative for diabetics, many of whom have</td>
<td></td>
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<tr>
<td>hypertension OR a program in place to assist patients with adopting healthy lifestyle</td>
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<tr>
<td>behaviors that could serve as a natural pilot group to implement SMBP on a smaller scale</td>
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</tr>
<tr>
<td><strong>Leverage SMBP to Accelerate Use of Digital Patient-Generated Data</strong></td>
<td>Use SMBP to enhance services for existing chronic disease programs/populations</td>
</tr>
<tr>
<td>Focus on hypertension patients who would be good candidates for testing Bluetooth monitors</td>
<td></td>
</tr>
<tr>
<td>with apps or other electronic modes of patient data transmission</td>
<td></td>
</tr>
<tr>
<td><strong>Patients with Uncontrolled Hypertension</strong></td>
<td>Use SMBP to help the highest risk patients achieve BP control</td>
</tr>
<tr>
<td>Consider further risk stratification using factors like whether the most recent office BP</td>
<td></td>
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<tr>
<td>was Stage 2: ( \geq 140 ) or ( \geq 90 ) mm Hg and/or patients have multiple</td>
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</tr>
<tr>
<td>co-morbidities, such as diabetes or hypercholesterolemia</td>
<td></td>
</tr>
<tr>
<td><strong>Patients with Newly Diagnosed Hypertension</strong></td>
<td>Use SMBP to engage and help titrate medications for newly diagnosed hypertension patients</td>
</tr>
<tr>
<td>Focus on patients who received a hypertension diagnosis in the last 6 months</td>
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</tr>
<tr>
<td><strong>Patients with Potential Undiagnosed Hypertension</strong></td>
<td>Use SMBP to improve timely and accurate hypertension diagnosis, including ruling out white coat effect</td>
</tr>
<tr>
<td>Focus on patients who have multiple elevated BP readings in the past 12 months without a</td>
<td></td>
</tr>
<tr>
<td>diagnosis of hypertension AND/OR patients coded with elevated BP without a diagnosis of</td>
<td></td>
</tr>
<tr>
<td>hypertension (ICD-9 786.3 or ICD-10 R03.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Patients with Medication Adherence Challenges</strong></td>
<td>Use SMBP to engage and help titrate medications for patients with hypertension who have medication adherence barriers</td>
</tr>
<tr>
<td>Use a tool like the Morisky scale(^1) to assess medication adherence among patients with</td>
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<tr>
<td>diagnosed hypertension or work with pharmacists/payers to obtain prescription fill data</td>
<td></td>
</tr>
<tr>
<td>that can help with calculating measures like the medication possession ratio or proportion</td>
<td></td>
</tr>
<tr>
<td>of days covered(^2)</td>
<td></td>
</tr>
<tr>
<td><strong>Patients who Have Office Visit Barriers</strong></td>
<td>Use SMBP to engage hypertension patients who are better served out of the clinic</td>
</tr>
<tr>
<td>Certain patients with hypertension may benefit from less frequent in-office visits (i.e.,</td>
<td></td>
</tr>
<tr>
<td>have restricted numbers of visits from their payer, have work conflicts, transportation</td>
<td></td>
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<tr>
<td>barriers, OR prefer a virtual visit due to COVID-19)</td>
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</tbody>
</table>


**SMBP PROTOCOL DESIGN CHECKLIST**

**PURPOSE:**
After determining your organizational goals for implementing SMBP and your priority population(s), you are ready to develop a SMBP protocol. This protocol will help care teams operationalize SMBP successfully into care processes and workflows. The SMBP Protocol Design Checklist is based on the experiences and lessons learned of 10 health centers that implemented SMBP in a diversity of environments with a variety of staffing models and patient mixes.

**INSTRUCTIONS:**
Read the items in the left column and add your own notes/decisions in the right column. In some cases, the right side is pre-populated with options to check off as they apply.

| SMBP SCOPE |
|-----------------|--------------------------------------------------------|
| Determine organizational goals for using SMBP | SMBP Goals: |
| Determine priority population(s)* | Priority Population(s): |
| *See SMBP Model Design: Determining your Goals and Target Population |

| HOME BP MONITORS |
|-----------------|--------------------------------------------------------|
| Determine which home BP monitors to use. | Selected Home BP Monitor: |
| Choose a validated upper arm device. | |
| Consider: whether it comes with an XL cuff, Bluetooth capability, memory storage capacity, multiple users, ease of use, insurance coverage, cost |
| Determine which “patient-facing” app you will use | Selected app: |
| (see Optimizing Management of Patient-Generated Health Data for SMBP Programs) |
| Determine how patients will obtain home BP monitors | |
| □ Loaned | |
| □ Purchased by health center (for patient to keep) | |
| □ Purchased by patient | |
| □ Purchased by supporting organization (for patient to keep) | |
| □ Purchased through insurer | |
| Determine how patients will physically receive their home BP monitor, if loaned or purchased by other than the patient | |
| □ Full face-to-face visit | |
| □ Mailed to patient | |
| □ Quick stop by health center | |
| □ Staff delivers to patient | |
| Determine number of home BP monitors to purchase (if loaned, plan on 3 devices per care team) | |
| □ Number of home BP monitors to purchase: ________ | |
| □ Patient Keeps: ____________ | |
| □ To Loan: ________________ | |
Determine number of cuff sizes to purchase

Note: 50% of health center patients required XL cuff sizes among the 10 health centers that participated in the NACHC Accelerating SMBP Project.
Recommendation: choose a validated home BP monitor that has cuff options that fit arms up to 21.21” in circumference.

Number of Standard/Large Cuffs (fits arm sizes 8.75” – 16.5”): _________
- Patient Keeps: __________
- To Loan: ________________

Number of Extra-Large Cuffs (fits arm sizes 15.75” – 21.25”): _________
- Patient Keeps: __________
- To Loan: ________________

Determine how long patients will keep monitors (if loaned) (e.g., 2 weeks, 1 month, etc.)

Our protocol: Complete this section only if you intend to loan home BP monitors to patients.

Determine how patients will return monitors

Our protocol:

Determine what controls to put in place if patients do not return home BP monitors (e.g., # of phone calls, # letters, etc.)

Our protocol:

Determine where home BP monitors will be physically stored (consider separate locations for “clean” vs. “dirty”)

Our protocol:

Determine how home BP monitors are tracked, inventoried, cleaned, and managed

Our protocol:

KEY SMBP STAFF

- SMBP Coordinator (has authority, time, and skills to coordinate all aspects SMBP implementation)

- SMBP Trainers (at least one per site; educates patient on how to use the home BP monitor, how to get home BP readings back to the care team, how often to do measurements, and proper technique)

- SMBP Device Manager (tracks, inventories, cleans, calibrates, stores home BP monitors)

- SMBP Clinical Champion (has time to facilitate implementation success, key influencer)

- SMBP Outreach Coordinator (coordinates contacting patients to recommend SMBP and after they initiate SMBP to ensure understanding of proper measurement technique, etc.)

- SMBP Data Manager (receives, possibly enters, prepares, and manages SMBP data)
### SMBP Patient Identification

- **Determine any selection criteria beyond eligibility for population of focus** (e.g., consider availability of interpreters, physical or mental capacity to use a home blood pressure monitor, safe place to store a home blood pressure monitor, no show history, patient interest, etc.)

  - **Our protocol:**

- **Determine patient identification methods**

  - **At the point of care:**
    - Clinical decision support in EHR
    - Clinician recommends
    - Patient screening/preference survey
    - Pre-visit planning
    - Patient requests to do SMBP
    - Registry queries and targeted outreach

- **Determine how to assess if appropriate patients are being identified and offered SMBP**

  - **Our protocol:**

### SMBP Recommendation

- **Determine who recommends SMBP to the patient at the point of care**

  - Clinician
  - MA
  - Nurse
  - Pharmacist
  - Other

- **(If applicable) determine who conducts outreach calls to recommend SMBP to the patient**

  - Clinician
  - MA
  - Nurse
  - Pharmacist
  - Other

### SMBP Training

- **Determine who trains the patient on SMBP**

  - See SMBP Task by Role

  - Clinician
  - MA
  - Nurse
  - Pharmacist
  - Other

- **Determine how the patient will connect with the SMBP Trainer (e.g., warm hand-off, follow-up visit, etc.)**

  - **Our protocol:**

- **Determine SMBP training curriculum/resources** (e.g., What is SMBP?; protocol (2 measurements AM and PM for 7 days) how to use the device; how to take BP at home properly (technique); how to communicate measurements to care team; what to do for an out-of-range BP; loaner agreement)

  - **Our protocol:**
### SMBP Outreach Support and Follow-up

- **Determine how outreach support will be provided to patients**
  - Electronic patient communication (text or email programs)
  - Home visit
  - Scheduled telehealth check-in
  - Unscheduled telephone call

- **Determine encounter type for initial follow-up appointment**
  - Face-to-face visit with:
    - Nurse
    - Pharmacist
    - Physician/PA/NP
  - Telehealth visit with:
    - Nurse
    - Pharmacist
    - Physician/PA/NP
    - Home visits
    - Other
  - Other

- **Develop any collaborative practice agreements needed**
  - Nurse visits
  - Pharmacists:
    - Medication titration
    - Refill authorization

### SMBP Data Management

- **Determine how patients will record/share data with the care team**
  - Our protocol:

- **Determine what types of SMBP measurements clinicians want to see**
  - 7-day SMBP averages
  - All individual home BP readings
  - Outlier BP readings (very high or very low)

- **Determine what additional SMBP-related data elements are important to capture** (e.g., flagging patients for SMBP, date started/completed SMBP, number of measurements/days, reason for SMBP, treatment decisions, etc.)
  - Our protocol:

- **Determine where SMBP data will be documented** (may require custom HIT configuration) see Optimizing Management of Patient-Generated Health Data for SMBP Programs
  - Direct to EHR from Home BP Monitor
  - Manually document in EHR
  - Population Health Management system
  - Spreadsheet
  - Vendor Portal
  - Other

- **Determine when and at what frequency clinicians want to review SMBP data** (i.e., where and in what format does it fit in the workflow)
  - Our protocol:

- **Determine if SMBP is having desired effect** (e.g., number of patients enrolled, starting BP, Average BP on graduation, number of treatment intensifications, days/weeks between treatment intensification)
  - Our protocol:

### Community Linkages

- **Determine what role community partners could play to support or optimize the efficiency/capacity of your SMBP efforts**
  - See SMBP Tasks by Role

- **Conduct outreach**
- **Provide lifestyle support programs/education**
- **Provide SMBP trainers**
- **Supply funds to purchase home blood pressure monitors**
- **Other**
A key part of setting up SMBP is deciding how to manage patient-generated health data. To ensure your organization is choosing an optimal data management solution/technology partner for use with your home blood pressure devices, it is important to consider the features and functionalities available in various BP telemonitoring software options.

Many home blood pressure devices enable digital data storage and transfer of SMBP data through a cellular or Wi-Fi network to a cloud-based web portal for use by the care team.

Some home blood pressure devices can connect via Bluetooth technology to a patient-facing smart phone app and then transfer the data to a cloud-based web portal via a cellular or Wi-Fi network.

NOTE: Some apps are manufacturer specific and others are not specific to a certain brand of home blood pressure device and can be purchased separately.

BP telemonitoring software vendors may offer an array of integration capabilities with electronic health records (EHRs) or population health management systems.
**DECISION CRITERIA:**

The criteria below indicate features of SMBP patient-facing applications, clinical team web portals, and EHR integration capabilities that organizations can consider when deciding which BP telemonitoring software solution/vendor to choose.

### Clinical Team-facing Application/Web Portal

- Configurable dashboard view (e.g., the ability to sort patients by BP reading, status, clinical site, etc.)
- Supports basic analytics
  - Number of patients enrolled
  - Baseline BP on enrollment
  - Ability to identify a cohort of patients based on date of enrollment
  - BP at graduation
  - Number of days from enrollment to graduation
  - Exportable structured data capability (specify format(s), e.g., PDF, .csv)
  - Number of active patients, inactive, graduated, re-enrolled patients
- Ability to designate status (Active, Newly enrolled, Inactive, Graduated, Re-enrolled)
- Ability to configure average systolic, diastolic, or combined BP across a specified amount of days
- Ability to indicate BPs that fall outside a specified range (outlier values)
- Allows for flexible/tailorable patient BP goal setting
- Allows the practice to purchase active user “seats” as opposed to imposing a cost per patient
- Vendor supports having a data use agreement governing how patient level data can be used by the vendor
- Vendor is willing to sign a Business Associate Agreement with the practice for privacy protections

**NOTE:** Many software vendors see themselves as engaging in a privacy agreement with the patient when the patient downloads and signs up for the patient-facing app; however, most health care organizations see themselves as the prescriber of SMBP and using the app is a component of their SMBP program, which makes a BAA desirable.

### Patient-facing Application

**Essential**
- HIPAA compliant
- Supports Android and iOS
- Free to the patient

**Nice to Have**
- Device-manufacturer agnostic
- Supports reasonable literacy level to enhance patient understanding
- Available in multiple languages with the possibility of adding languages as needed
- Supports patient education on the proper way to take a BP
- Prompts patient to take a second BP after 1 minute
- Supports text messaging communication – individual and text message blasts
- Provides technical support for patients as needed
- Allows for patient registration via cell phone number vs. email only (some patients only have a cell phone number, not an email address)
- Integrates with other health apps
Integration of BP Telemonitoring Software with EHRs (and/or Population Health Management Systems)

- Potential for EHR integration that includes:
  - Seamless enrollment from the EHR (receives demographic data from the EHR and recognizes if the patient has already been enrolled through this practice or through another practice; creates the clinical portal enrollment automatically and as indicated)
  - The ability to send structured data available (average BP as well as individual values)
  - The ability to receive critical information from the EHR (e.g., problem list information, medications)
  - Customizable clinician notification cadence/content
  - Configurable trigger for sending BP values

- Tech support available
- Standards-based (e.g., FHIR/API connection or HL7)

NOTE: often the limitation is with the EHR, not with the SMBP software

EHR Configuration Factors

Another important component of optimizing management of patient-generated health data for SMBP is setting up the EHR to receive data from the clinical team-facing application. Most EHRs today do not have standard places ready to ingest SMBP data, but they can be custom configured either at the practice level or by the EHR vendor. Below are a list of essential and nice-to-have data fields to support SMBP:

Essential:
- Average BP (labeled as such) separate and distinct from a single BP measurement
- Number of BP readings that constitute the average
- The highest and lowest measurement in the set
- Date range for the BP readings that constitute the average

Nice to have:
- Capture the device manufacturer and model
- Capture the device size
- Capture data related to medication adherence
- Capture the team member interacting with the patient (e.g., care manager, pharmacist, provider etc.)
- Automatically capture CPT codes indicating HTN control
## SMBP Monitoring Tasks by Role

From: *Accelerating Use of Self-measured Blood Pressure Monitoring (SMBP) Through Clinical-Community Care Models*

### MUST BE DONE BY LICENSED CLINICIAN

1. Diagnose hypertension  
2. Prescribe medication(s)  
3. Provide SMBP measurement protocol  
4. Interpret patient-generated SMBP Readings  
5. Provide medication titration  
6. Provide lifestyle modification recommendations

### MUST BE DONE BY PATIENT

1. Take SMBP measurements  
2. Take medications as prescribed  
3. Make recommended lifestyle modifications  
4. Convey SMBP measurements to care team  
5. Convey side effects to care team

### CAN BE DONE BY SMBP SUPPORTER

1. Provide guidance on home blood pressure (BP) monitor selection  
2. If needed, provide home BP monitor (free or loaned)  
3. Provide training on using a home BP monitor  
4. Validate home BP monitor against a more robust machine  
5. Provide training on capturing and relaying home BP values to care team (e.g., via device memory, patient portal, app, log)  
6. Reinforce clinician-directed SMBP measurement protocol  
7. Provide outreach support to patients using SMBP  
8. Share medication adherence strategies  
9. Provide healthy lifestyle education

### OPTIONAL SMBP SUPPORTER TASKS

1. Reinforce training on using a home BP monitor  
2. Reinforce training on capturing and relaying home BP values to care team (e.g., via device memory, patient portal, app, log)  
3. Reinforce knowledge of behaviors that can trigger high blood pressure

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*Medical assistant, community health worker, local public health department/community organization representative, etc.*
**FACTORS TO CONSIDER**

| Patients are unable to attend multiple visits in a short timeframe (i.e., transportation barriers, work hours, etc.) |
| Daily staff coverage for SMBP training is a challenge in my organization |
| SMBP patients are engaged and identified through outreach |
| SMBP orientation will be integrated into lifestyle education classes, group visits, etc. |
| Due to COVID-19, home BP monitors are mailed or delivered to patients |

**APPLICABLE?**

| Yes |
| Yes |
| Yes |

**SMBP TRAINING PROCESS**

| Offer same-day SMBP training/orientation ("warm hand-off" approach) |
| Offer follow-up appointments for SMBP training/orientation |

**ANALYSIS**

| **PROS** |
| Limits number of visits a patient needs to begin SMBP (no additional visit for SMBP training) |
| Allows SMBP to occur at set times with select staff |
| Allows pairing SMBP training with education classes, group visits, etc. |

| **CONS** |
| Requires daily staff coverage and flexibility |
| Does not allow pairing SMBP training with education classes, group visits, etc. |
| Requires a second visit for patients to begin SMBP |
| Patients may not keep SMBP training appointments |
NACHC Million Hearts® Initiative
Self-Measured Blood Pressure (SMBP) Monitoring Tools and Resources
Buying Home Blood Pressure Monitors to Support SMBP: How to Get Started
How to Use Your Home Blood Pressure Monitor:  English  |  Spanish
Self-Measurement: How patients and care teams are bringing blood pressure to control
Health IT Checklist for Blood Pressure Telemonitoring Software