



Self-Measured Blood Pressure Monitoring (SMBP) Implementation Toolkit

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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](#)



PLANNING FOR SMBP—DETERMINING YOUR GOALS AND PRIORITY POPULATION

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.

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

¹ Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive Validity of A Medication Adherence Measure in an Outpatient Setting. *Journal of Clinical Hypertension (Greenwich, Conn)*. 2008;10(5):348-354.

² Crowe M. Do you know the difference between these measures? *Pharmacy Times*, July 5, 2015. <https://www.pharmacytimes.com/contributor/michael-crowe-pharmd-mba-csp-fmpa/2015/07/do-you-know-the-difference-between-these-adherence-measures>. Accessed June 28, 2018.



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

<input type="checkbox"/> Determine organizational goals for using SMBP	SMBP Goals:
<input type="checkbox"/> Determine priority population(s)*	Priority Population(s):

*See SMBP Model Design: [Determining your Goals and Target Population](#)

HOME BP MONITORS

<input type="checkbox"/> Determine which home BP monitors to use. 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	Selected Home BP Monitor:
<input type="checkbox"/> Determine which "patient-facing" app you will use (see Optimizing Management of Patient-Generated Health Data for SMBP Programs).	Selected app:
<input type="checkbox"/> Determine how patients will obtain home BP monitors	<input type="checkbox"/> Loaned <input type="checkbox"/> Purchased by health center (for patient to keep) <input type="checkbox"/> Purchased by patient <input type="checkbox"/> Purchased by supporting organization (for patient to keep) <input type="checkbox"/> Purchased through insurer
<input type="checkbox"/> Determine how patients will physically receive their home BP monitor, if loaned or purchased by other than the patient	<input type="checkbox"/> Full face-to-face visit <input type="checkbox"/> Mailed to patient <input type="checkbox"/> Quick stop by health center <input type="checkbox"/> Staff delivers to patient
<input type="checkbox"/> Determine number of home BP monitors to purchase (if loaned, plan on 3 devices per care team)	<input type="checkbox"/> Number of home BP monitors to purchase: _____ <input type="checkbox"/> Patient Keeps: _____ <input type="checkbox"/> To Loan: _____

<input type="checkbox"/> 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. <u>Recommendation:</u> choose a validated home BP monitor that has cuff options that fit arms up to 21.21" in circumference.	<input type="checkbox"/> Number of Standard/Large Cuffs (fits arm sizes 8.75" – 16.5"): _____ <input type="checkbox"/> Patient Keeps: _____ <input type="checkbox"/> To Loan: _____ <input type="checkbox"/> Number of Extra-Large Cuffs (fits arm sizes 15.75" – 21.25"): _____ <input type="checkbox"/> Patient Keeps: _____ <input type="checkbox"/> To Loan: _____
<input type="checkbox"/> 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.
<input type="checkbox"/> Determine how patients will return monitors	Our protocol:
<input type="checkbox"/> Determine what controls to put in place if patients do not return home BP monitors (e.g., # of phone calls, # letters, etc.)	Our protocol:
<input type="checkbox"/> Determine where home BP monitors will be physically stored (consider separate locations for "clean" vs. "dirty")	Our protocol:
<input type="checkbox"/> Determine how home BP monitors are tracked, inventoried, cleaned, and managed	Our protocol:

KEY SMBP STAFF

<input type="checkbox"/> SMBP Coordinator (has authority, time, and skills to coordinate all aspects SMBP implementation)	SMBP Coordinator:		
<input type="checkbox"/> 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)	Site	SMBP Trainer	Available Daily for Warm Handoff
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> SMBP Device Manager (tracks, inventories, cleans, calibrates, stores home BP monitors)	Site	SMBP Device Manager	
<input type="checkbox"/> SMBP Clinical Champion (has time to facilitate implementation success, key influencer)	Site	SMBP Clinical Champion	
<input type="checkbox"/> SMBP Outreach Coordinator (coordinates contacting patients to recommend SMBP and after they initiate SMBP to ensure understanding of proper measurement technique, etc.)	Site	SMBP Outreach Coordinator	
<input type="checkbox"/> SMBP Data Manager (receives, possibly enters, prepares, and manages SMBP data)			

SMBP PATIENT IDENTIFICATION

<input type="checkbox"/> 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:
<input type="checkbox"/> Determine patient identification methods	<input type="checkbox"/> At the point of care: <ul style="list-style-type: none"> <input type="checkbox"/> Clinical decision support in EHR <input type="checkbox"/> Clinician recommends <input type="checkbox"/> Patient screening/preference survey <input type="checkbox"/> Pre-visit planning <input type="checkbox"/> Patient requests to do SMBP <input type="checkbox"/> Registry queries and targeted outreach
<input type="checkbox"/> Determine how to assess if appropriate patients are being identified and offered SMBP	Our protocol:

SMBP RECOMMENDATION

<input type="checkbox"/> Determine who recommends SMBP to the patient at the point of care	<input type="checkbox"/> Clinician <input type="checkbox"/> MA <input type="checkbox"/> Nurse <input type="checkbox"/> Pharmacist <input type="checkbox"/> Other
<input type="checkbox"/> (If applicable) determine who conducts outreach calls to recommend SMBP to the patient	<input type="checkbox"/> Clinician <input type="checkbox"/> MA <input type="checkbox"/> Nurse <input type="checkbox"/> Pharmacist <input type="checkbox"/> Other

SMBP TRAINING

<input type="checkbox"/> Determine who trains the patient on SMBP <i>See SMBP Task by Role</i>	<input type="checkbox"/> Clinician <input type="checkbox"/> MA <input type="checkbox"/> Nurse <input type="checkbox"/> Pharmacist <input type="checkbox"/> Other
<input type="checkbox"/> Determine how the patient will connect with the SMBP Trainer (e.g., warm hand-off, follow-up visit, etc.)	Our protocol:
<input type="checkbox"/> 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

<input type="checkbox"/> Determine how outreach support will be provided to patients	<input type="checkbox"/> Electronic patient communication (text or email programs) <input type="checkbox"/> Home visit <input type="checkbox"/> Scheduled telehealth check-in <input type="checkbox"/> Unscheduled telephone call
<input type="checkbox"/> Determine encounter type for initial follow-up appointment	<input type="checkbox"/> Face-to-face visit with: <ul style="list-style-type: none"> <input type="checkbox"/> Nurse <input type="checkbox"/> Pharmacist <input type="checkbox"/> Physician/PA/NP <input type="checkbox"/> Telehealth visit with: <ul style="list-style-type: none"> <input type="checkbox"/> Nurse <input type="checkbox"/> Pharmacist <input type="checkbox"/> Physician/PA/NP <input type="checkbox"/> Home visits <input type="checkbox"/> Other <input type="checkbox"/> Other
<input type="checkbox"/> Develop any collaborative practice agreements needed	<input type="checkbox"/> Nurse visits <input type="checkbox"/> Pharmacists: <ul style="list-style-type: none"> <input type="checkbox"/> Medication titration <input type="checkbox"/> Refill authorization

SMBP DATA MANAGEMENT

<input type="checkbox"/> Determine how patients will record/share data with the care team	Our protocol:
<input type="checkbox"/> Determine what types of SMBP measurements clinicians want to see	<input type="checkbox"/> 7-day SMBP averages <input type="checkbox"/> All individual home BP readings <input type="checkbox"/> Outlier BP readings (very high or very low)
<input type="checkbox"/> 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:
<input type="checkbox"/> Determine where SMBP data will be documented (may require custom HIT configuration) see Optimizing Management of Patient-Generated Health Data for SMBP Programs	<input type="checkbox"/> Direct to EHR from Home BP Monitor <input type="checkbox"/> Manually document in EHR <input type="checkbox"/> Population Health Management system <input type="checkbox"/> Spreadsheet <input type="checkbox"/> Vendor Portal <input type="checkbox"/> Other
<input type="checkbox"/> 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:
<input type="checkbox"/> 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

<input type="checkbox"/> Determine what role community partners could play to support or optimize the efficiency/capacity of your SMBP efforts <i>See SMBP Tasks by Role</i>	<input type="checkbox"/> Conduct outreach <input type="checkbox"/> Provide lifestyle support programs/education <input type="checkbox"/> Provide SMBP trainers <input type="checkbox"/> Supply funds to purchase home blood pressure monitors <input type="checkbox"/> Other
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OPTIMIZING MANAGEMENT OF PATIENT-GENERATED HEALTH DATA FOR SELF-MEASURED BLOOD PRESSURE MONITORING (SMBP) PROGRAMS

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^a

- 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

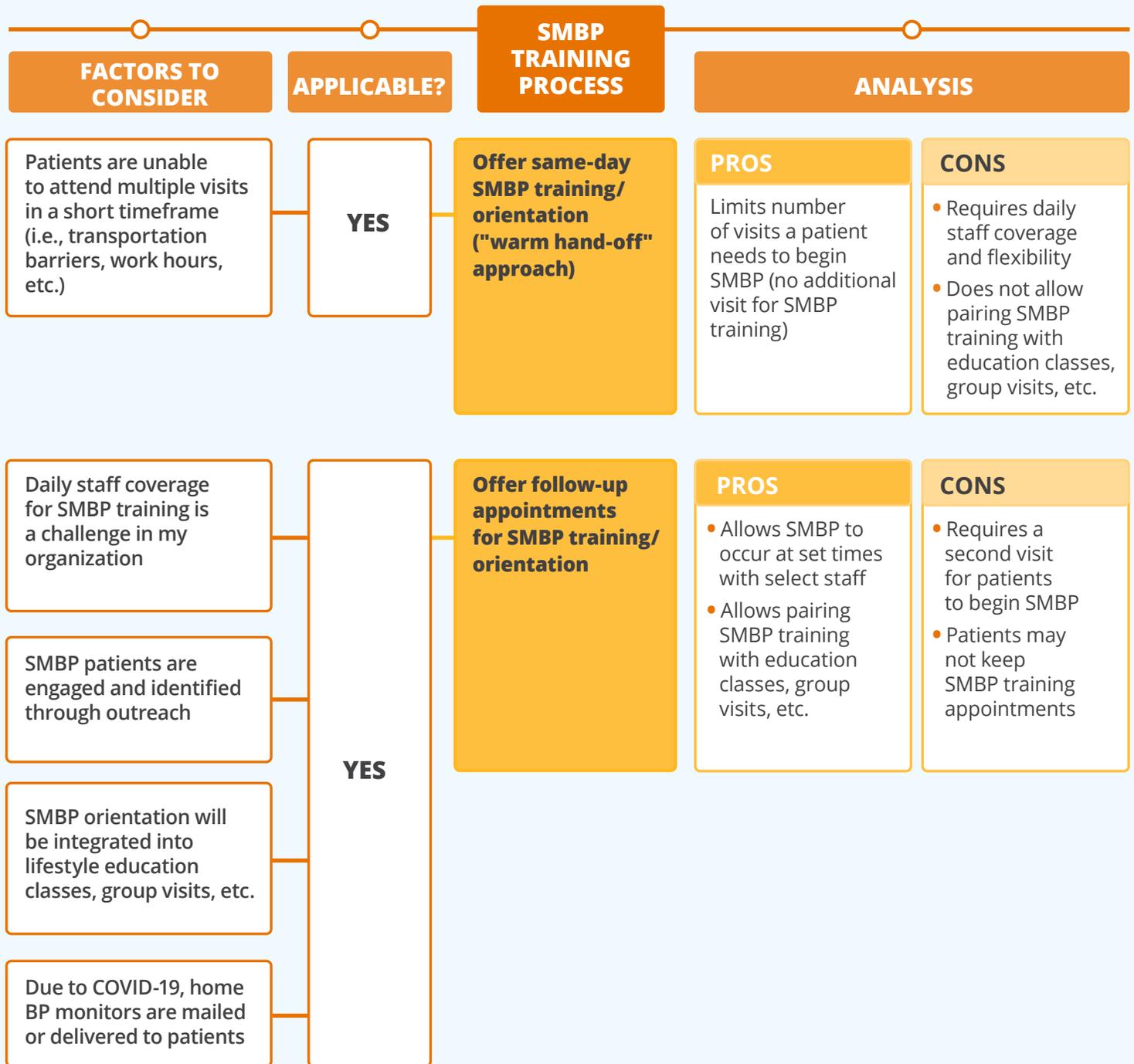
OPTIONAL SMBP SUPPORTER TASKS

- 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

^aMedical assistant, community health worker, local public health department/community organization representative, etc.



ALIGNING YOUR SMBP PATIENT TRAINING APPROACH TO YOUR PRACTICE ENVIRONMENT





ADDITIONAL RESOURCES

[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](#)

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