A Message from Jim Glauber, MD

The mission of the San Francisco Health Plan (SFHP) is to provide exemplary service and support to our members, participants, purchasers, physicians, and other health care providers, and each other.

We are strategic in targeting health conditions and social determinants of health that may impact our members. We have compiled a practical, evidence-based toolkit to test one carve-out of the American Heart Association (AHA) and the American Medical Association (AMA) national initiative, Target: BP™. The AHA and AMA Initiative focuses on three critical areas—measuring blood pressure (BP) accurately; acting rapidly with a clear treatment plan; and partnering with patients to enable ongoing self-management—to help healthcare organizations address this prevalent health care risk factor. We are prioritizing the accurate measurement of blood pressure because this is the foundation of both the diagnosis and management of hypertension. Hypertension is one of the most common chronic diseases of SFHP adult members and for which over 28% did not have adequate control in 2018.

Relying on the proven models developed by the AHA and AMA, SFHP is offering a Blood Pressure Measurement Toolkit focused on one of the critical areas, Accurate Blood Pressure Measurement. This Toolkit has been prepared to guide clinical practices with a simplified concept for improving blood pressure measurement with a 5-step toolkit, as follows:

1. **Blood Pressure Measurement Training**
   - Checklist for Medical Assistants

2. **Protocol for Validating Blood Pressure Measurement Devices**
   - and/or Regular Calibrating

3. **Protocol for Choosing Appropriately Sized Cuffs**

4. **Protocol for Accuracy Adult Blood Pressure (Technique and Conditions)**

5. **Protocol for Documentation Blood Pressure Measurement**

The Blood Pressure Measurement Toolkit is accessible at sfhp.org/bptoolkit along with an informational video. The Toolkit includes resources for the Target: BP™ Initiative and Blood Pressure Measurement tools created by SFHP to help you implement a performance improvement program at your practice.

Please find with this introduction letter, a one-page project improvement template using this Blood Pressure Measurement Toolkit. In partnership and support, we look forward to helping you implement these procedures.

If you have questions about implementing components of this toolkit, please contact:

Jackie Hägg, RN, MSN, DCHS-MT, Senior Nurse Specialist
Provider Quality and Outreach at 1(415) 615-5637 or jhagg@sfhp.org
OBJECTIVE
The trainee will successfully demonstrate without error the performance aspects of measuring Blood Pressure by the manual method.

Note: AMA Blood Pressure Toolkit Initiative focuses on skills to perform manual blood pressure reading, which continues to be a best practice if an automated blood pressure device provides a reading requiring verification.

Check Satisfactory or Unsatisfactory for each one:

Each step/action must be numbered sequentially throughout the document and be followed by outcome.

1. Satisfactory  Unsatisfactory
   Greet patient and/or family member
   Explain procedure/treatment/task to patient and/or family member
   Ensure the patient is positioned correctly

2. Satisfactory  Unsatisfactory
   Select appropriate size cuff
   Inspect cuff for serviceability

3. Satisfactory  Unsatisfactory
   Palpate artery before applying cuff
   Attach cuff to appropriate body location with arrow pointing towards artery

4. Satisfactory  Unsatisfactory
   Place stethoscope ear piece in ears and bell directly over artery
   Ensure blood pressure cuff valve stem is in closed position
   Inflate cuff until beats cannot be heard
   Open valve stem slowly to release pressure from cuff

5. Satisfactory  Unsatisfactory
   Listen for systolic beat (the first pulse sound heard)
   Listen until diastolic beat heard (the last rhythmic sound stops)
   Open wide blood pressure cuff valve stem to release air pressure from cuff

6. Satisfactory  Unsatisfactory
   Repeat blood pressure measurement, if unable to ascertain systolic/diastolic beats
   Ensure cuff has been completely deflated and there has been at least a 10-second delay before redoing above steps

7. Satisfactory  Unsatisfactory
   Remove blood pressure cuff from patient

8. Satisfactory  Unsatisfactory
   Document appropriate forms or medical records

9. Satisfactory  Unsatisfactory
   Inform nurse/patient care provider, if blood pressure is abnormal
The following protocol was developed for the Mayo Clinic in conjunction with the Division of Hypertension and in accordance with the standards published by the Association for Advancement of Medical Instrumentation.

Aneroid devices should be visually inspected for damage to the instrument case, wall mount, bracket, and extension hose.

Any aneroid sphygmomanometer that appears physically damaged, does not read zero prior to inflation, or whose reading differed from that of the reference device by greater than 4 mmHg should be replaced with a new, properly functioning device.

The sphygmomanometer needle should be at zero prior to inflation.

A digital pressure vacuum meter (i.e., Digimano, Netech Corp, Hicksville, New York) can be used as the reference standard. This device should be checked for accuracy against a mercury sphygmomanometer twice yearly by a biomedical equipment maintenance technician, and also checked by the manufacturer once yearly.

Evaluate Equipment and Exam Rooms

Blood pressure cuffs, monitors, and other related equipment must be maintained per specified manufacturer’s guidelines for the equipment with documented evidence that standard operating procedures have been followed for routine inspection/maintenance, calibration, repair of failure or malfunction, and testing and cleaning, as indicated.

Equipment validation: Before purchasing a monitor, check for documentation of equipment validations by an independent institution to ensure accurate measurement over a wide range of blood pressures, ages, and clinical conditions.

Purchase equipment and make room adjustments as needed

Sphygmomanometers

Recommended | Because | Not Recommended for Practice Use
---|---|---
Aneroid sphygmomanometers | They can be used for a wider range of patients. | Electronic automatic digital Monitors (oscillometric technique)
Wall-mounted aneroid sphygmomanometers | They will stay in better calibration because they cannot be dropped. | Hand-held sphygmomanometers
Brachial cuff | They are more accurate. | Wrist monitor
Soft cuff | They are more accurate. | Comfit (rigid cuffs that one slips arm into)

Three organizations validate monitors to these standards:

- Association for the Advancement of Medical Instrumentation (AAMI)
  - Grading according to the AAMI; Overall pass or fail
- The European Society of Hypertension’s International Protocol (ESH-IP)
  - Grading according to the ESH; Overall pass or fail
- British Hypertension Society
  - Grading according to the BHS; Individual A, B, C, D grades for both SBP and DBP

Lists of approved monitors can be found at Dabl Educational Trust: [http://dableducational.org/sphygmomanometers.html](http://dableducational.org/sphygmomanometers.html)
Protocol for Choosing

STEP 3

 Appropriately Sized Cuffs

OBJECTIVE
The trainee will successfully demonstrate without error the skills necessary to determine the correct cuff size for pediatric and adult patients.

Measuring Arm Circumference
One half the distance between the acromion and the olecranon processes determines the midpoint of the arm.

Measure Your Patient’s Arm
The arm circumference should be printed on the inside of each cuff to eliminate confusion created by size variance among manufacturers.

ADULT
Wrap a tape measure around the patient's bicep at mid-arm to determine the arm circumference (typically measured in cm).

PEDIATRIC
For children in whom the appropriate cuff size is difficult to determine, the mid-arm circumference (measured as the midpoint between the acromion of the scapula and olecranon of the elbow, with the shoulder in a neutral position and the elbow flexed to 90°) should be obtained for an accurate determination of the correct cuff size.
**STEP 3**

** Appropriately Sized Cuffs **

### Cuff Size

<table>
<thead>
<tr>
<th>INFANT</th>
<th>ADULT</th>
<th>LARGE ADULT</th>
<th>ADULT THIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 cm – 18 cm</td>
<td>22 cm – 34 cm</td>
<td>34 cm – 44 cm</td>
<td>45 cm – 52 cm</td>
</tr>
<tr>
<td>4.7 in – 7.1 in</td>
<td>10.6 in – 13.4 in</td>
<td>13.4 in – 17.3 in</td>
<td>17.7 in – 20.5 in</td>
</tr>
</tbody>
</table>

**Select a Cuff Size Based on Arm Circumference**

**ADULT**

The ideal cuff bladder length is ≥ 80 percent of the patient’s arm circumference. The ideal cuff bladder width is ≥ 40 percent of the patient’s arm circumference (ex., 6” wide cuff for a 15” arm, 12” length).

**PEDIATRIC**

A cuff that fits properly will have an inflatable bladder width that is at least 40 percent of the arm circumference at a point midway between the acromion and the olecranon, and a bladder length that is 80 to 100 percent of the arm circumference (covers approximately 2/3 upper arm).

### Common Causes of Error in Clinical Practice

<table>
<thead>
<tr>
<th>The cuff is too small</th>
<th>The cuff is too large</th>
<th>Cuff too loose or uneven, inflated or deflated too slowly, overinflated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic Effect:</strong> +10-40 mmHg</td>
<td><strong>Systolic Effect:</strong> -5-25 mmHg</td>
<td><strong>Systolic Effect:</strong> Other False High Effects</td>
</tr>
</tbody>
</table>

**Recommended Resources**

- Recommended Dimensions for Blood Pressure Cuff Bladders; [https://downloads.aap.org/DCCSA/New%20folder/BP_Attachments/Attach10_BladderCuffSize.pdf](https://downloads.aap.org/DCCSA/New%20folder/BP_Attachments/Attach10_BladderCuffSize.pdf)
- [https://aap.org/en-us/professional-resources/quality-improvement/Project-RedDE/Pages/Blood-Pressure.aspx](https://aap.org/en-us/professional-resources/quality-improvement/Project-RedDE/Pages/Blood-Pressure.aspx)
Perform hand hygiene.

2 Identify patient using at least two unique identifiers.

3 Introduce yourself and explain the procedure for blood pressure measurement.

4 Identify any special needs, medical conditions, or situations that would require additional consideration.

5 Use a properly calibrated and validated sphygmomanometer or automated blood pressure device.

6 Have the patient sit quietly for 5 minutes in a chair with feet on the floor and arm supported at heart level.

7 Use an appropriate-sized cuff with the cuff bladder encircling at least 80% of the arm and long enough to be fastened securely.

8 Place the cuff on a bare arm, approximately 2 cm above the elbow crease with midline of the bladder directly over the brachial artery; fit should be snug but still allow two fingers under the cuff.

9 Support the patient’s selected arm and positioned at the phlebostatic axis.

10 Patient’s with irregular heart rhythm’s should have a manual blood pressure reading. (If automated blood pressure device, skip #11)

11 Place the bell or the diaphragm of the stethoscope over the brachial artery, using sufficient pressure to provide good sound transmission without over-compressing the artery.

12 Take at least two measurements using same arm allowing time between measurements (one minute apart).

**Techniques**

**Conditions**

Blood pressure measurement should be postponed if the patient has:
- Engaged in recent physical activity or alcohol consumption
- Used tobacco within the past 30 minutes
- Ingested caffeine within the past 30 minutes
- Eaten within the past 30 minutes

Situations in which blood pressure should be assessed in opposite arm:
- Arm affected by a stroke
- Presence of arterial-venous shunt (dialysis shunt)
- Arm on same side as a mastectomy
- Any deformity or surgical history that interferes, e.g. mastectomy

Pre-existing conditions that can interfere with the accuracy or interpretation of readings:
- Aortic coarctation
- Arterial-venous malformation
- Occlusive arterial disease
- Presence of antecubital bruit
**OBJECTIVE**

Blood Pressure measurement information must be documented so that it can be used to:

1. Assess the patient’s condition
2. Inform the care which is appropriate for that patient. Documentation must be complete, accurate, concise, legible and free from bias.

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**Knowledge Check**

**Blood Pressure Measurement = Two Pressures**

**SYSTOLIC BLOOD PRESSURE**

SBP Pressure in the arteries while heart is pumping

Systolic blood pressure (SBP) is heard first = the heart contracts

**DIASTOLIC BLOOD PRESSURE**

DBP Pressure in the arteries while heart is resting between beats

Diastolic blood pressure (DBP) is heard second at which the sounds disappear = the heart rests.

In some patients the diastolic pressure never completely disappears and may be noted as a muffled sound.

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**Document Factors That Can Influence Accuracy of Blood Pressure**

**CONDITION (EXAMPLES)**

- 5 minute rest period before blood pressure check
- Any medical reason procedure cannot be done on either arm
- Any observation or patient report of having had food, alcohol, coffee, nicotine within 30 minutes of blood pressure check
- Any parameters to report in an urgent fashion?
  - If so, reported to whom?

**POSITION**

- Sitting
- Lying
- Standing

**METHOD**

- Manual Blood Pressure Measurement
- Automated Blood Pressure Measurement

**LOCATION**

- Left Arm
- Right Arm
- Thigh

**REPEAT**

- Number of blood pressure attempts; reason for multiple attempts, e.g. high, low, missed reading

**CUFF SIZE**

- Infant
- Child
- Small Adult
- Adult
- Large Adult
- Adult Thigh

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- Must be registered to see this: Whelton, et. al, 2017; Liu, Griffiths, Murray, & Zheng, 2016; Williams, Brown, & Conlin, 2009; & Chobanian, et al., 2003
- How to measure blood pressure accurately https://youtube.com/watch?v=gUHALsLeeoM
## PDSA WORKSHEET

**Blood Pressure Measurement Improvement Project**

<table>
<thead>
<tr>
<th>TEAM NAME</th>
<th>DATE OF TEST</th>
<th>TEST COMPLETION DATE</th>
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<tbody>
<tr>
<td></td>
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<td>MM/DD/YYYY</td>
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**OVERALL TEAM/PROJECT AIM**  Standardize blood pressure management protocol using best practices.

**OBJECTIVE**  Ensure accurate measurement of blood pressure because it is the foundation of both the diagnosis and management of hypertension.

### PLAN

Briefly describe the test:

Improve Blood Pressure Measurement through training and re-training staff, validating and calibrating blood pressure devices, using appropriately sized blood pressure cuffs, standardizing blood pressure measurement practice habits – every patient, every time, and standardizing protocol for documentation of blood pressure procedure. Place poster on how to measure blood pressure appropriately in area(s) used by staff. This Blood Pressure Measurement Toolkit is available at [sfhp.org/bptoolkit](http://sfhp.org/bptoolkit)

How will you know that the change is an improvement? EXAMPLE: Test staff with training checklist before and after toolkit implementation to measure observable improvement.

What driver does the change impact?

What do you predict will happen?

### DO

Test the changes

Was the cycle carried out as planned?  ○ Yes  ○ No

Record data and observations.

What did you observe that was not part of our plan?

### STUDY

Did the results match your predictions?  ○ Yes  ○ No

Compare the result of your test to your previous performance:

What did you learn?

### ACT

Decide to Adopt, Adapt, or Abandon

- **Adapt**  Improve the change and continue testing plan. Plans/changes for next test:

- **Adopt**  Select changes to implement on a larger scale and develop an implementation plan and plan for sustainability

- **Abandon**  Discard this change idea and try a different one

### LIST THE TASKS NECESSARY TO COMPLETE THIS TEST (WHAT)

<table>
<thead>
<tr>
<th>TASK</th>
<th>PERSON RESPONSIBLE</th>
<th>WHEN</th>
<th>WHERE</th>
</tr>
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<tbody>
<tr>
<td>PCP/Trainer(s) Review Cover Letter</td>
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<tr>
<td>PCP/Trainer(s) Review SFHP Medical Director Video</td>
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<tr>
<td>Blood Pressure Measurement Poster</td>
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<tr>
<td><strong>STEP 1</strong> Medical Assistant Training Checklist</td>
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<tr>
<td><strong>STEP 2</strong> Protocol for Validating Medical Devices and Calibration</td>
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<tr>
<td><strong>STEP 3</strong> Protocol for Choosing Appropriately Sized Blood Pressure Cuffs</td>
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<tr>
<td><strong>STEP 4</strong> Protocol for Describing Measurement (Technique and Conditions)</td>
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<td></td>
</tr>
<tr>
<td><strong>STEP 5</strong> Protocol for Documentation of Blood Pressure Measurement</td>
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</tbody>
</table>

What do you predict will happen?
Ambulatory Blood Pressure Monitors (ABPM) & Home Blood Pressure Monitors (HBPM)

What is the difference between ABPM and HBPM?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
Ambulatory blood pressure monitoring allows many blood pressure (BP) readings to be automatically recorded over a 24-hour period, whether the patient is awake or asleep.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
HBPM are durable automated devices used by patients to self-assess blood pressure. They provide a single reading at any given time during the day or night and are reusable over a period of years. HBPM devices should be used while the patient is seated and resting.

Who is covered?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
Currently this service is not a Medi-Cal covered benefit; however, SFHP is advocating to the state to include this service in the Medi-Cal benefit package. Review for case by case coverage based on medical necessity can be requested from SFHP through the prior authorization process.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
SFHP covers select HBPM devices through the pharmacy benefit for all SFHP Medi-Cal and Medicare/Medi-Cal (dual eligible) members, up to a quantity of 1 device per 5 years.

What are the indications for a blood pressure monitoring device?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
1. Suspected “white coat” hypertension
2. Suspected episodic hypertension
3. Hypertension resistant to increasing medications
4. Hypotensive symptoms while taking antihypertensive medications
5. Autonomic dysfunction

US Preventive Services Task Force (USPSTF) recommends it should also be used to confirm new diagnosis of hypertension in outpatients who have elevated office blood pressure.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
HBPM may be appropriate for any patient with hypertension, including those newly starting therapy or undergoing treatment adjustment. In particular, HBPM may help to identify “white coat” hypertension in patients with persistent high readings in the office setting.

What are the benefits of the blood pressure monitoring device?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
Ability to take blood pressure readings continuously throughout the day and night.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
1. Improved assessment of blood pressure control through increased frequency of readings and use in the normal home environment
2. Ability to distinguish “white coat” hypertension
3. Direct patient and family participation in their own care

What guidelines support the medical necessity for patient blood pressure monitoring devices?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
US Preventive Services Task Force (USPSTF)
2017 American College of Cardiology (ACC) Hypertension Guidelines
American Heart Association (AHA) Hypertension Guidelines

**HOME BLOOD PRESSURE MONITORS (HBPM)**
2017 American College of Cardiology (ACC)
American Heart Association (AHA) Hypertension Guidelines

How is a blood pressure monitoring device ordered?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
The device is supplied by the prescribing office. It is used by the patient for the prescribed period (24-48 hours typically) and returned to the provider office by the patient.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
Provider to provide patient with a written prescription for a blood pressure monitor to be filled at a network pharmacy.
**Ambulatory Blood Pressure Monitors (ABPM) & Home Blood Pressure Monitors (HBPM)**

### Does the patient own the blood pressure monitor?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
No, the blood pressure monitor equipment is provided to the patient by the prescribing provider and returned to the supplier (provider or vendor) after the monitoring period.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
Yes, through insurance, the blood pressure monitor is owned by the patient.

### What are the barriers to implementation?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
1. Not all clinics have this service capability due to equipment and price.
2. Currently this service is not a Medi-Cal covered benefit; however, SFHP is advocating to the state to include this service in the Medi-Cal benefit package. Review for case by case coverage based on medical necessity can be requested from SFHP through the prior authorization process.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
1. Reimbursement
2. Validation of devices
3. Variance in education provided to patients regarding HBPM device use
4. Provider and patient acceptance of home blood pressure monitoring as a part of the treatment plan

### What are the Formulary Recommendations for blood pressure monitoring devices?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
Not applicable: This service is done through the provider office and is not associated with the Pharmacy benefit.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
The following HBPM devices are included on SFHP Medi-Cal and Medicare/Medi-Cal (dual eligible) formularies:

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>NDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omron-3 Series</td>
<td>73796-0271-04</td>
</tr>
<tr>
<td>Omron-5 Series</td>
<td>73796-0271-04</td>
</tr>
<tr>
<td>Omron-7 Series</td>
<td>73796-0276-04, 73796-0267-61</td>
</tr>
<tr>
<td>Omron-10 Series</td>
<td>73796-0278-54, 73796-0267-86</td>
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<tr>
<td>CVS Series 100</td>
<td>50428-0535-60</td>
</tr>
<tr>
<td>Walgreens Auto Arm</td>
<td>11917-0144-84</td>
</tr>
<tr>
<td>Walgreens Deluxe Arm</td>
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</tr>
<tr>
<td>Walgreens-Premium Arm</td>
<td>11917-0144-87</td>
</tr>
</tbody>
</table>

### What, if any, are prior authorization criteria recommendations?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
Prior authorization is required for case by case coverage based on medical necessity because this service is outside of the Medi-Cal benefit package; however, SFHP is advocating to the state to include this service in the Medi-Cal benefit package.

**HOME BLOOD PRESSURE MONITORS (HBPM)**
For a non-preferred HBPM device not listed above, prior authorization request is required documenting trial and failure or inability to use a formulary monitor (e.g., member requires HBPM device with extra-large cuff due to upper arm circumference > 17”).

### I have more questions, who do I contact?

**AMBULATORY BLOOD PRESSURE MONITORS (ABPM)**
For authorization information please contact SFHP Utilization Management Department at **1(415) 615-7818 x7080**

**HOME BLOOD PRESSURE MONITORS (HBPM)**
For questions regarding the HBPM benefit or formulary, please contact the SFHP Pharmacy Department at **1(415) 547-7818 x7085 #3**.