



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:



STEP 1

Blood Pressure Measurement Training
Checklist for Medical Assistants



STEP 2

Protocol for Validating
Blood Pressure Measurement Devices and/or Regular Calibrating



STEP 3

Protocol for Choosing
Appropriately Sized Cuffs



STEP 4

Protocol for Accuracy
Adult Blood Pressure (Technique and Conditions)



STEP 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



STEP

1

Checklist for Medical Assistants

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.

DATE
MM/DD/YYYY

TRAINEE NAME

TRAINER NAME

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



STEP

2

Blood Pressure Measurement Devices and/or Regular Calibrating

OBJECTIVE

Ensure each staff member is trained and competent in proper maintenance and calibration of equipment.

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.



The sphygmomanometer needle should be at zero prior to inflation.



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.



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.

Purchase equipment and make room adjustments as needed

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.

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>



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.



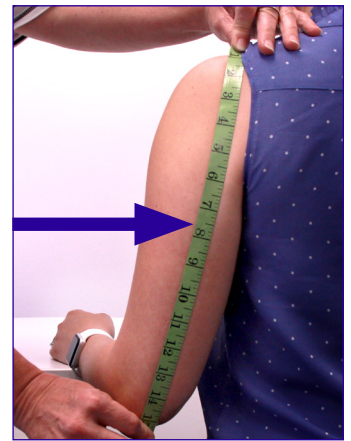
Mark spine extending from the shoulder (acromion process).



Correct tape placement for upper arm length.



Incorrect tape placement for upper arm length.



Mark upper arm length midpoint.

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°86,95,96) should be obtained for an accurate determination of the correct cuff size.







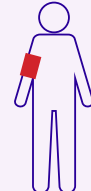



STEP

3

Appropriately Sized Cuffs

Cuff Size

INFANT	CHILD	SMALL ADULT	ADULT	LARGE ADULT	ADULT THIGH
					
12 cm – 18 cm 4.7 in – 7.1 in	18 cm - 22 cm 7.0 in – 8.7 in	22 cm – 26 cm 8.6 in – 10.2 in	27 cm – 34 cm 10.6 in – 13.4 in	34 cm – 44 cm 13.4 in – 17.3 in	45 cm – 52 cm 17.7 in – 20.5 in

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

The cuff is too small

Systolic Effect: +10-40 mmHg

The cuff is too large

Systolic Effect: -5-25 mmHg

Cuff too loose or uneven, inflated or deflated too slowly, overinflated

Systolic Effect: Other False High Effects

- AMA, Measure Up Pressure Down, Provider Toolkit, page 23, <http://measureuppressuredown.com/HCProf/toolkit.pdf>
- Recommended Dimensions for Blood Pressure Cuff Bladders; https://downloads.aap.org/DOCCSA/New%20folder/BP_Attachments/Attach10_BladderCuffSize.pdf <https://aap.org/en-us/professional-resources/quality-improvement/Project-RedDE/Pages/Blood-Pressure.aspx>
- AMA, Measure Up Pressure Down, Provider Toolkit, page 13, <http://measureuppressuredown.com/HCProf/toolkit.pdf> <https://targetbp.org/blood-pressure-improvement-program/patient-measured-bp/implementing/smbp-selecting-the-right-cuff-size/>
- Arafat, M., & Mattoo, T. K. (1999). Measurement of blood pressure in children: recommendations and perceptions on cuff selection. *Pediatrics*, 104(3), e30.
- Flynn JT, Kaelber DC, Baker-Smith CM, et al; Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics*. 2017;140(3):e20171904 - September 01, 2018 <https://pediatrics.aappublications.org/content/140/3/e20171904> https://downloads.aap.org/DOCCSA/New%20folder/BP_Attachments/Attach10_BladderCuffSize.pdf



STEP 4

Adult Blood Pressure (Technique and Conditions)

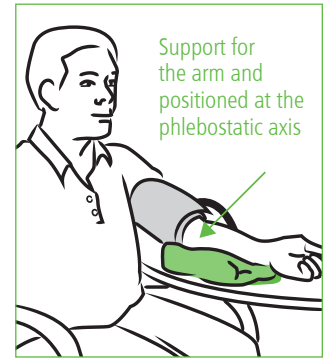
OBJECTIVE

The trainee will successfully demonstrate without error the performance aspects of measuring Blood Pressure by the manual method.

Techniques

- 1 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
If the arm is not supported properly the muscle contraction can result in inaccurately high DBP measurement
 - If the arm is elevated above the heart level the blood pressure reading could be inaccurately low
 - If the arm is below the heart level the blood pressure reading could be inaccurately high



- 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.
 - Systolic blood pressure is the point at which the first of two or more sounds is heard
 - Diastolic blood pressure is the point before the disappearance of sounds
- 12 Take at least two measurements using same arm allowing time between measurements (one minute apart).

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

• Boonyasai, R. T., Carson, K. A., Marsteller, J. A., Dietz, K. B., Noronha, G. J., Hsu, Y. J., ... & Cooper, L. A. (2018). A bundled quality improvement program to standardize clinical blood pressure measurement in primary care. *The Journal of Clinical Hypertension*, 20(2), 324-333

• Canzanello V., et al. Are Aneroid Sphygmomanometers Accurate in Hospital and Clinic Settings? *Arch Intern Med*. 2001; 161(5): 729-731.

• DHCS, Site Review Survey Policy Letter 14-004 Site Review Survey Tool, Access and Safety, Section (I.E.) Provider Toolkit, pages 17-19

• Improving the Screening, Prevention, and Management of Hypertension; An Implementation Tool for Clinic Practice Teams, page 5. https://healthit.gov/sites/default/files/13_bptoolkit_e131.pdf

• Vidt, D. G., Lang, R. S., Seballos, R. J., Misra-Hebert, A., Campbell, J., & Bena, J. F. (2010). Taking blood pressure: too important to trust to humans. *Cleve Clin J Med*, 77(10), 683-688.



STEP
5

Blood Pressure Measurement

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.

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.

Remember it is the Korotkoff sounds that indicate SBP and DBP. Read the pressure on the manometer at the point these sounds occur not the needle bumps on the sphygmomanometer.

Blood pressure is measured in millimeters of mercury (abbreviated mmHg)

- Do not round up the blood pressure reading to a digit, such as 5 or zero
- Record the numbers precisely to what is auscultated

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

• Best Practice Intervention Package (2018)., Quality Insights, the Medicare Quality Innovation Network-Quality Improvement Organization supporting the Home Health Quality Improvement National Campaign, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. Retrieved from <http://homehealthquality.org/CMSPages/GetFile.aspx?guid=e3bd68af-3da8-4896-a384-3f99513ca18c>

• Must be registered to see this: Whelton, et. al, 2017; Liu, Griffiths, Murray, & Zheng, 2016; Williams, Brown, & Conlin, 2009; & Chobanian, et al., 2003

• Williams, J. S., Brown, S. M., & Conlin, P. R. (2009). Blood-pressure measurement. N Engl J Med, 360(5), e6.

• Read and watch the New England Journal of Medicine free article and video: <https://nejm.org/doi/full/10.1056/NEJMc0800157>

• How to measure blood pressure accurately <https://youtube.com/watch?v=gUHALsLeeoM>



PDSA WORKSHEET Blood Pressure Measurement Improvement Project

TEAM NAME	DATE OF TEST MM/DD/YYYY	TEST COMPLETION DATE MM/DD/YYYY
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

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?

LIST THE TASKS NECESSARY TO COMPLETE THIS TEST (WHAT)	PERSON RESPONSIBLE	WHEN	WHERE
PCP/Trainer(s) Review Cover Letter			
PCP/Trainer(s) Review SFHP Medical Director Video			
Blood Pressure Measurement Poster			
STEP 1 Medical Assistant Training Checklist			
STEP 2 Protocol for Validating Medical Devices and Calibration			
STEP 3 Protocol for Choosing Appropriately Sized Blood Pressure Cuffs			
STEP 4 Protocol for Describing Measurement (Technique and Conditions)			
STEP 5 Protocol for Documentation of Blood Pressure Measurement			

What do you predict will happen?

ACT Decide to Adopt, Adapt, or Abandon

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

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)

This service is covered for SFHP Medi-Cal and Healthy Worker member. However, not every clinic may this service this service available.

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.

See the SFHP Medi-Cal and Medicare/Medi-Cal (dual eligible) formularies for more detailed information.

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)
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.

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:

DEVICE	NDC
Omron-3 Series	73796-0271-04
Omron-5 Series	73796-0271-04
Omron-7 Series	73796-0276-04, 73796-0267-61
Omron-10 Series	73796-0278-54, 73796-0267-86
CVS Series 100	50428-0535-60
Walgreens Auto Arm	11917-0144-84
Walgreens Deluxe Arm	11917-0144-85
Walgreens-Premium Arm	11917-0144-87

What, if any, are prior authorization criteria recommendations?

AMBULATORY BLOOD PRESSURE MONITORS (ABPM)

Prior authorization is required.

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.**