Improving the Screening, Prevention, and Management of Hypertension

An Implementation Tool
for Clinic Practice Teams

Washington State Department of Health

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An Implementation Tool for Clinic Practice Teams

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This Implementation Tool is a compilation of research, best practices, and resources for the management of hypertension. A special thank you is extended to the many groups and individuals whose work and expertise is provided or sourced within these pages. Every attempt has been made to provide accurate source information. Our sincere apologies to any person or group that we may have referenced incorrectly or inadvertently left out.

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Section 1: Foreword

Elevated blood pressure or hypertension is the most significant contributor to complications such as heart disease, stroke, peripheral vascular disease, and kidney failure. The consequences of these complications are devastating and deadly. Hypertension is almost epidemic, afflicting a third or more of the adult population globally. It is important to remember that hypertension is the most significant, preventable cause of cardiovascular and renal complications and premature death. Unfortunately, a large proportion of hypertensive individuals have poor control of their blood pressure and so are not protected from the devastation it causes.

The failure to control hypertension is mostly a result of ineffective education of society, of those at risk, and of the health care team. It is the duty of the healthcare provider to make the patient a partner in improving their health and quality of life and to clearly explain to the patient the disease, its consequences, and, more importantly, how to improve their health by lowering their blood pressure. These discussions need to be clear, in easy-to-understand language, and non-judgmental. The next step for success is a systematic, collaborative approach that includes important lifestyle changes, diagnostic steps to delineate causative or contributory factors combined with a logical use of antihypertensive agents based on individual pathophysiology, and support and coaching from members of the team.

This informative booklet, produced by the Washington Department of Health, provides critically important information to the healthcare team. It has been shown that by using the information and steps described in this booklet, blood pressure can be effectively controlled even in very difficult cases. The results of Washington State Collaborative to Improve Health and our own experience at the University of Washington Hypertension Clinic show that education and a systematic approach, as described in this booklet, are very successful in improving outcomes.

All the contributors deserve our grateful thanks for their hard work and time taken to produce this much-needed tool. I am certain that the information contained in these pages will help many thousands of people.

Suhail Ahmad, MD
Professor of Medicine, University of Washington
Chief Medical Officer, Northwest Kidney Centers

Section 2: READ THIS FIRST
How to Use This Implementation Tool

This Implementation Tool has been prepared to guide clinical practices in evaluating your current systems of care and making changes that support accurate blood pressure measurement and to improve the screening, prevention and management of hypertension. There is a lot of information contained in this document. Read the following to help guide you through the material.

Step 1: **Prepare. Refer to Section 3: Preparing for a Quality Improvement Initiative.**
Form a quality improvement team to focus on hypertension. Set your goals, identify your patients, select and define the measures you will use to evaluate your progress, and evaluate your blood pressure equipment and exam rooms.

Step 2: **Review Section 4: Hypertension Change Package.**
A change package is a list of evidence-based change concepts for a particular subject that can serve as a guide for doing quality improvement work. Review the Hypertension Change Package in some detail.

Step 3: **Identify system gaps and select the changes you want to test and implement.**
Initially, select two to four hypertension-specific change ideas from across the components of the change package. Select and add additional changes over time. Every organization is unique, so select the change ideas and a pace that is right for you.

Step 4: **Refer to the resources, tools, or links referenced in the Change Package.**
The many resources included in this document are referenced next to the change ideas in the Change Package with page numbers or links provided. The last two sections of this Implementation Tool include many of the resources.

Note: Underlined text indicates a web link. Refer to page 127 for the full set of web addresses used in this toolkit.

Step 5: **Test your changes and evaluate your progress – refer to The Model for Improvement, page 33, and refer back to the measures you selected for evaluation in Step 1.**
Use The Model for Improvement to guide you. The model will help you approach making change in a systematic, efficient way. Use the Plan-Do-Study-Act tool to run many small, rapid tests of change.

Track the progress for each of the measures you selected and defined in Step 1. Tracking these measures over time will assist you in knowing whether the changes you are making are actually resulting in improvement.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Section 3: Preparing for a Quality Improvement Initiative

SECTION OVERVIEW

Form a Team
Develop an AIM Statement
Define the Pilot Population
Select and Define Measures
Evaluate Equipment and Exam Rooms
Appendix 1: Hypertension AIM Statement Example
Appendix 2: AIM Statement Worksheet
Appendix 3: Measurement Worksheet
Appendix 4: Blood Pressure Measurement: Equipment/Room Assessment Sheets

Form a Team

A strong core improvement team is crucial to the success of your improvement efforts. Choose your team members based on their knowledge, current involvement, and enthusiasm for the systems and processes that you will work to improve. A good size team for a core improvement team is three to six members.

- **Identify a clinical champion** who will fully participate in the initiatives and who will be a leader in spreading what is learned.
- **Identify a team leader** who will drive the day-to-day work and who will complete reports.
- **Identify other key team members**.

Develop an AIM Statement

Refer to Appendix 1: Hypertension AIM Statement Example on page 9.
Use Appendix 2: AIM Statement Worksheet on page 10.

An AIM statement is a concise, written statement describing what the team expects to accomplish through its Quality Improvement Initiative. It provides guidance for your team's specific improvement efforts and is time-specific and measurable. When setting your aim, and to ensure support for your team's work, be sure to:

- **Align.** It is important to align your AIM Statement with your organization's strategic goals.
- **Involve senior leaders.** Senior leaders must provide personnel and resources from departments such as information systems, finance and reimbursement, medical affairs, and operations.

- **Review your baseline data for the required measures.** Focus on making changes that matter in your clinic and personalize the AIM to fit your clinic.
- **State the AIM clearly, specifically, and include goals with numerical targets.** Setting numerical targets clarifies the AIM statement, helps create tension for change, and directs measurement. Teams typically set goals that are 5-15 percent above their current baseline numbers. As these goals are accomplished, new goals are set. This process is called "stretching" goals.

Refer to Appendix 1: Hypertension AIM Statement Example on page 9.
Use Appendix 2: AIM Statement Worksheet on page 10.

Define the Pilot Population

The pilot population should be defined by the clinic team before starting the Quality Improvement Initiative.

- **Providers**
  Identify who will participate in the Quality Improvement Initiative.
- **Identify "Active" Patients**
  Define the population of patients that are considered "active" patients for these providers
- **Identify Hypertension Patients (Pilot Population)**
  From the active patients, identify:
  Patients over the age of 18 with primary (essential) hypertension (systolic greater or equal to 140 mmHg and/or diastolic greater or equal to 90 mmHg). Sources can include one or more of the following:
  - Claims data (ICD-9 diagnosis codes)
  - Diagnosis or ICD-9 codes for hypertension on electronic health record (EHR) problem lists
  - Current use of medications for blood pressure control (determined through electronic health records or medical chart review)
  - Blood pressure readings for patients (clinic will need to define the number of high readings for inclusion in the hypertensive patient population)
- **Patient number**
  Decide on the number of active patients that will be considered "the pilot population." Ideally this will include at least 50–150 patients. However, the final number will vary depending on the practice.

Note: *If a patient is entered into the patient population, and it is later found that the high blood pressure is due to secondary causes (secondary hypertension), the clinic should decide whether that patient remains in the pilot.*

Select and Define Measures

Use Appendix 3: Measurement Worksheet on page 12.

It is critical that you select and track key process and outcome measures to determine whether the changes you make result in improvement in the management of hypertension. However, it is not feasible or effective to track data on everything you do for your population of patients with hypertension. Be sure to include:

- **Core measures:** Select a core set of measures to evaluate the effects of the changes you make.
- **Baseline data:** Collect and review baseline data before you begin.
- **Monthly data:** Collect monthly data to track changes.
- **Registry data:** Pull measurement data from information that has been entered into a registry or EHR for each patient. You may use any registry or system that will allow you to report on the selected measures for your pilot population.

Evaluate Equipment and Exam Rooms

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
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)*

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.
- Three organizations validate monitors to these standards:
  - **Association for the Advancement of Medical Instrumentation (AAMI)**
  - **The European Society of Hypertension's International Protocol (ESH-IP)**
  - **British Hypertension Society**
- Lists of approved monitors can be found at Dabl Educational Trust: http://www.dableducational.org/sphygmomanometers.html

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Other equipment/materials

- **Chair** in which someone can sit with their back supported and feet flat on the floor.
- **Table or counter** with space on which someone can rest their arm level with their heart, or a chair with adjustable arm rests. (Upper arm should be at level of heart – mid-sternum.)
- **Four sized cuffs** (minimum adult and large adult cuffs in room; small adult and thigh quickly available). Refer to the listed measurements for cuff and bladder.
  Note: *Manufacturers may have different names for their various sized cuffs.*

Size Name	Cuff Size	Bladder Circumference
Small Adult size	22–26 cm	12–24 cm
Adult (regular or standard size)	27–34 cm	16–30 cm
Large Adult size	34–44 cm	16–36 cm
Thigh size	45–52 cm	20–42 cm

- **Cloth tape measure** to measure distance around upper arm to determine the correct size of cuff to use.
- **Pen, paper, and calculator** for averaging multiple readings.
- **Health messaging materials**.
- **Wallet card** for documenting blood pressure and arm used.

Room assessment

Use Appendix 4: Blood Pressure Measurement: Equipment/Room Assessment Sheets on page 16.

- **Blood pressure equipment:** Does it work? Can it be calibrated? Is it in good shape (no obvious damage and/or not too old)?
- **Can the chair be positioned** next to the Sphygmomanometer?
- **Is the Sphygmomanometer mounted** where it can be read at eye level while taking the patient's blood pressure?
- **Can either arm be supported at heart level**, because blood pressure should be taken on the arm with the highest reading, as determined at the first visit?
- **At a minimum is there an adult and a large adult cuff** in the room and other cuffs readily available?
- **Is there a tape measure, calculator, and hypertension health messaging** materials available in the room?

A word about the calibration of monitors

The purchase or sale of a mercury sphygmomanometer is now illegal in Washington State and clinics are replacing them with aneroid sphygmomanometers. However, aneroid sphygmomanometers do not maintain their stability over time, particularly if handled roughly, and require a check for calibration at regular intervals. Wall-mounted aneroid sphygmomanometers are more accurate than hand-held monitors because of less susceptibility to trauma.

Aneroid devices or other non-mercury monitors should be checked by connecting the manometer to a mercury column or an electronic testing device with a Y-tube. The needle should rest at the zero point before the cuff is inflated and should register a reading that is within four mmHg of the mercury column reading when inflated to pressures of 100–200 mmHg. The needle should return to zero after deflation. If a mercury monitor is not available for checking calibration, a non-mercury pressureometer could be used.

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.

Protocol

- 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.
- A digital pressure and 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.

- A Y-tube should be used to connect the inflation bulb to the reference and aneroid devices. The tube is then inflated to 240 mmHg on the reference device and the corresponding value on the aneroid device is recorded. The system is then deflated in increments of 20 mmHg to a lower limit of 60 mmHg with the corresponding values from the aneroid device taken at each interval.
- 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.

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

Appendices 1 and 2

Hypertension AIM Statement Example

Three month AIM Statement:

By July 2011, Neighborhood Health Clinic will implement practice changes to improve the management of hypertension, based on the hypertension Change Package. This will provide measurably improved care for our patients with hypertension.

Our population is defined as:

Patients of participating health care providers who have a diagnosis of essential (primary) hypertension as defined by the clinic, over 18 years of age, and who have been seen at the clinic at least two times in the last year.

We expect that:

- The percentage of patients with a most recent blood pressure of less than 140/90 will be **five percent** above baseline within three months.
- The percentage of patients with diabetes or CKD with blood pressure of less than 130/80 will be five percent above baseline within three months.
- The percentage of patients with documentation of self-management goals will be **20 percent above baseline within three months**.
- The percentage of patients who use tobacco—who have been offered tobacco-cessation counseling in the past 12 months—will be 20 percent above baseline **within three months.**

realistic goals

clear numerical target, measurable

time-specific

We will achieve this by:

Starting with small steps of change in two areas of the Change Package and progressing to performing small steps of change in all eight components of the Change Package. Changes that have been shown to be effective will then be implemented.

The team will meet weekly to track what is being learned and to monitor progress.

WORK SHEET

AIM Statement Worksheet

Clinic Name: _____

Three month AIM Statement:

By the end of _____, we aim to:

_____

_____

_____

Our population is defined as:

We expect that:

_____

_____

_____

_____

_____

_____

We will achieve this by:

_____

_____

_____

WORK SHEET

Appendices 3 and 4

Measurement Worksheet

Select the measures that make sense for your practice.
The first four measures have been carefully selected using specific criteria and align with the major national measure stewards, such as NCQA, HEDIS, etc.

Measure Title and Description	Measure Definition	Source/ Alignment	Other Considerations	Enter Baseline
Preventive Care and Screening: High Blood Pressure Percentage of patients aged 18 years and older who are screened for high blood pressure **AND** a recommended follow-up plan is documented based on the current blood pressure reading as indicated.	**Numerator Statement:** Patients who were screened for high blood pressure at least once during the measurement year and a follow-up plan is documented based on the current blood pressure reading as indicated. **Denominator Statement:** Patients aged 18 years and older.	PQRS[2] – 317	Aligns with goals of the Million Hearts® Initiative by improving the quality of care for the ABCs (appropriate aspirin therapy for those who need it, blood pressure control, cholesterol management, and smoking cessation).	
Hypertension: Controlling High Blood Pressure The percentage of patients 18–85 years of age who had a diagnosis of hyper–tension (HTN) and whose blood pressure (BP) was adequately controlled (<140/90) during the measure–ment year.	**Numerator Statement:** The number of patients in the denominator whose most recent BP is adequately controlled during the measurement year. For a patient's BP to be controlled, both the systolic and diastolic BP must be <140/90 mmHg (adequate control). To determine if a patient's BP is adequately controlled, the representative BP must be identified. **Denominator Statement:** Patients 18–85 with hypertension. A patient is considered hypertensive if there is at least one outpatient encounter with a diagnosis of HTN during the first six months of the measurement year.	NQF – 0018 MU[1] – (Alt set of 0061) PQRS[2] – 236 NCQA-HEDIS[3] UDS[4]	Aligns with goals of the Million Hearts® Initiative by improving the quality of care for the ABCs (appropriate aspirin therapy for those who need it, blood pressure control, cholesterol management, and smoking cessation). **CDC National Priority Measure**	

continued

[1] Meaningful Use
[2] Physician Quality Reporting System
[3] National Committee for Quality Assurance – Healthcare Effectiveness Data and Information Set
[4] Uniform Data System

WORK SHEET

Measurement Worksheet continued

Comprehensive Diabetes Care: Blood Pressure Control (<140/80 mmHg) The percentage of members 18–75 years of age with diabetes (type 1 and type 2) whose most recent blood pressure (BP) reading is <140/80 mmHg during the measurement year.	**Numerator Statement:** Members whose most recent BP reading is <140/90 mmHg during the measurement year. **Denominator Statement:** Members 18–75 years of age by the end of the measurement year who had a diagnosis of diabetes (type 1 or type 2) during the measurement year or the year prior to the measurement year.	NQF – 0061 MU[1] PQRS[2] – 3 NCQA-HEDIS[3] UDS[4]	American Diabetes Association Standards of Medical Care in Diabetes – 2013 Table 10: Summary of recommendations for glycemic, blood pressure, and lipid control for most adults with diabetes.	
Adult Weight Screening and Follow-Up Percentage of patients aged 18 years and older with a calculated body mass index (BMI) documented in the medical record **AND** if the most recent BMI is outside the parameters, a follow-up plan is documented.	**Numerator Statement:** Patients with BMI calculated in the past six months and a follow-up plan documented if the BMI is outside of parameters. **Denominator Statement:** Patients 18 years and older.	NQF – 0421 MU[1] – (Alt set of 0421) PQRS[2] – 128 NCQA-HEDIS[3] NCMC-7055 UDS[4]	US Preventive Services Task Force Recommendation Follow up recommendations: American Diabetes Association Standards of Medical Care in Diabetes – 2013 Testing for diabetes in asymptomatic patients section.	
Tobacco Use: Screening and Cessation Intervention Percentage of patients aged 18 years and older who were screened for tobacco use at least once during the two-year measurement period **AND** who received cessation counseling intervention if identified as a tobacco user.	**Numerator Statement:** Patients who were screened for tobacco use* at least once during the two-year measurement period **AND** who received tobacco cessation counseling intervention** if identified as a tobacco user. **Denominator Statement:** All patients aged 18 years and older who were seen twice for any visits or who had at least one preventative care visit during the two-year measurement period.	NQF – 0028 MU[1] – (Alt NQF 0027) PQRS[2] – 226 UDS[4]	Aligns with goals of the Million Hearts® Initiative by improving the quality of care for the ABCs.	

continued

[1] Meaningful Use
[2] Physician Quality Reporting System
[3] National Committee for Quality Assurance – Healthcare Effectiveness Data and Information Set
[4] Uniform Data System

* Includes use of any type of tobacco
** Cessation counseling intervention includes brief counseling (3 times or less) and/or pharmacotherapy

Other Measure Considerations			
Measure Title and Description	**Definition**	**Other Considerations**	**Enter Baseline**
Sodium Reduction Counseling	**Numerator:** The number of patients with documented sodium reduction counseling in the past 12 months. **Denominator:** Number of patients in the pilot population.	According to the CDC's Morbidity and Mortality Weekly Report of February 11, 2011/ 60(04);103-108, "If average sodium intake in the United States was reduced from the current level of >3,400 mg/day to no more than 2,300 mg/day, an estimated 11 million fewer adults would be hypertensive." **Note on lower sodium levels:** According to the May 14, 2013 Institute of Medicine Consensus Report titled *Sodium Intake in Populations: Assessment of Evidence*, recent studies that examine links between sodium consumption and health outcomes do not support reduction in sodium intake to below 2,300 mg per day. www.iom.edu/Reports/2013/Sodium-Intake-in-Populations-Assessment-of-Evidence.aspx	
Controlling High Blood Pressure in Specific Populations The percentage of members 18-75 years of age with Chronic Kidney Disease (CKD) whose most recent blood pressure (BP) reading is <130/80 mmHg during the measurement year.	**Numerator Statement:** Members whose most recent BP reading is <130/80 mmHg during the measurement year. **Denominator Statement:** Members 18-75 years of age by the end of the measurement year who had a diagnosis of chronic kidney disease (CKD) during the measurement year or the year prior to the measurement year.	According to the July 1, 2010 Journal of the American Society of Nephrology (JASN) article *Blood Pressure Control in Chronic Disease: Is Less Really More?* Recommend a BP goal of <130/80 mmHg." JASN July 1, 2010, vol. 21, no. 7, 1086-1092 National Kidney Foundation Kidney Disease Outcomes Quality Initiative™ (NKF KDOQI) has provided evidence-based clinical practice guidelines for all stages of CKD and related complications.	
Medication Management in Specific Populations Appropriate antihypertensive medication for patients with Chronic Kidney Disease (CKD) Appropriate antihypertensive medication for patients with diabetes	**Numerator:** Number of patients with a diagnosis of CKD or diabetes prescribed an ACE and/or ARB and/or DRI in the past 12 months. **Denominator:** Number of patients 18-75 years of age by the end of the measurement year who had a diagnosis of chronic kidney disease (CKD) or diabetes during the measurement year or the year prior to the measurement year.	KDOQI Clinical Practice Guidelines on Hypertension and Antihypertensive Agents in Chronic Kidney Disease American Diabetes Association Standards of Medical Care in Diabetes – 2013 p.S29 Hypertension/blood pressure control treatment recommendations	

WORK SHEET

Measures to Assess Practice Behavior Change

Collect these measures through practice team or patient surveys. Gather baseline data and additional data twice per year.

Measure	Type of Survey
Accurate blood pressure measurement (per approved protocol) is successfully integrated into practice.	Practice Team
Practice demonstrates regular planned visits for hypertensive patients with increased frequency until at goal.	Clinician *(could be pulled from EHR)*
Practice demonstrates a team approach to care.	Practice Team
Practice demonstrates a patient-centered approach to care.	Practice Team/Patient
Practice demonstrates organized arrangements with specialists and/or community resources.	Practice Team
Practice demonstrates coordination of care activities for patients.	Practice Team
Patient satisfaction in hypertension care.	Patient
Staff/Clinician satisfaction in caring for hypertensive patients.	Practice Team

WORK SHEET

Blood Pressure Measurement: Equipment/Room Assessment Sheets

Make copies of this form as needed.

Clinician Name:	
Room Number:	
Item	**Description**
What are the blood pressure and other equipment and material needs?	
Can the chair be positioned correctly?	
Is the Sphygmomanometer mounted in an appropriate place?	
What is needed to ensure that both arms be supported at heart level?	
Are there the appropriate cuffs in the room?	
Equipment that will stay in room: Is it working and in good condition?	

Additional Comments:

_____

_____

_____

_____

_____

WORK SHEET

Section 4: Hypertension Change Package:
Possible changes a team or organization can make to improve the management of hypertension

SECTION OVERVIEW

Change Concepts and Change Ideas to Drive Improvement
A Change Package
The Eight Components of the Patient Centered Medical Home Model (PCMH)
Key Change Ideas for the Management of Hypertension
The Model for Improvement
PDSAs
Appendix 1: PDSA Worksheet
Appendix 2: PDSA Tracking Sheet

Change Concepts and Change Ideas to Drive Improvement

Improvement comes from testing and implementing key change ideas that come from proven, evidence-based change concepts or principles about a particular subject.

The change ideas that an organization decides to test are based on an organization's strengths and challenges, goals, and even culture. Changes that are tested can impact simple processes up to more complex practice structures and systems—with the goal of greater efficiency, higher quality, lower cost, and/or improvements in patient or staff satisfaction and, in this case, for the management of hypertension.

The key changes should be testable, action-oriented ideas that lead to transformation and improvement. The Model for Improvement is a model that can help you approach making these changes in a systematic, efficient, effective way, and is discussed on page 33.

A Change Package

A Change Package is the list of evidence-based change concepts for a particular subject that can serve as a guide for doing quality improvement work. It includes both **high-level**, evidence-based **change concepts**, and also includes many possible **change ideas** that an organization can test and implement. An organization will often come up with new change ideas under each major change concept.

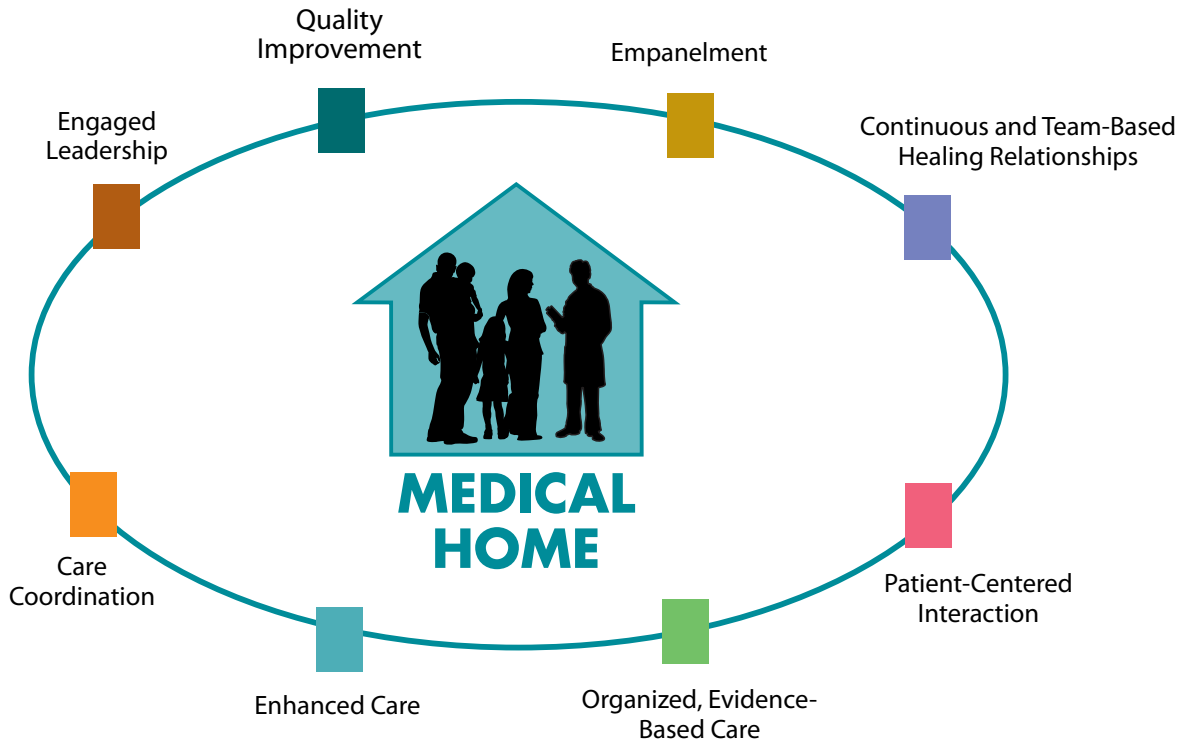
The terms "change concept" and "change package" can be attributed to the Institute for Healthcare Improvement (IHI) at www.ihi.org.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

The Eight Components of the Patient Centered Medical Home Model (PCMH)

The change package presented here—for the management of hypertension—is based on the Patient Centered Medical Home (PCMH) Care Model. The PCMH model, comprised of eight major components and their respective change concepts, represents the best evidence available for changes that can be made in a health care system to drive improvement. We have elected to use the PCMH as the guiding model and the lens through which we consider the changes to make in improving the management of hypertension. The model is attributed to the Safety Net Medical Home Initiative.[1]

> ***Note:*** *For those practices and organizations that are working toward becoming a PCMH, focusing on a chronic condition such as hypertension could assist in refining the PCMH at your clinic and in preparing to receive NCQA recognition.*



CHANGE PACKAGE

Key Change Ideas for the Management of Hypertension

The following table is a list of change ideas for the management of hypertension that are organized under the major change concepts for each of the components of the PCMH model. Implementing changes across a healthcare system (across components of the PCMH model) is the most effective way to improve the management of hypertension.

Start with testing two to four change ideas from at least one of the major PCMH Change Concepts. Over time, select and test additional change ideas from all components of the PCMH model.

Refer to the the Model for Improvement (page 33) to guide you in how to make changes, which can be daunting in a busy practice. For example, these change ideas will usually need to be broken down into smaller change bits in order to be tested. Running many small, rapid tests of change using the Plan-Do-Study-Act tool has been shown to be an effective way to test and implement promising practice changes.

Engaged Leadership

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Provide visible and sustained leadership to lead overall cultural change, as well as specific strategies to improve quality and spread and sustain change.	Leadership provides a culture for change and builds and sustains "the will" to change – they see the importance of improving the management of hypertension.	Refer to the Engaged Leadership Implementation Guide, a resource developed by the Safety Net Medical Home Initiative.

continued

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Engaged Leadership continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Ensure that the PCMH transformation effort has the time and resources needed to be successful.	Leaders support changes that improve the management of hypertension, such as: • Support the development of a team approach for providing care for patients and delineating roles and responsibilities of each team member in the management of hypertension. • Train and provide technology for population management – look at trends and improvements in the population of patients with hypertension. • Facilitate regular team meetings and new communication processes. • Train and assign care teams for supporting patients in self-management and behavior change. • Support changes to workflow that support new blood pressure measurement process. • Provide tools, such as new equipment or room updates, to support accurate measurement. • Approve programs to loan home monitors to patients who can't purchase them.	
Ensure that providers and other care team members have protected time to conduct activities beyond direct patient care that are consistent with the medical home model.	Leadership supports and provides resources for quality improvement initiatives to improve the management of hypertension.	
Build the practice's values on creating a medical home for patients into staff hiring and training processes.	Develop policy and procedures and tools that embed evidence-based practices and protocols for the management of hypertension into the system of care at the organization. Include in staff orientations and evaluations.	

Quality Improvement (QI) Strategy

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Choose and use a formal model for quality improvement.	• Set up a quality improvement team. • Identify your patient population. • Look at aggregate blood pressure values for the population (baseline data). • Create system-wide targets for improving the management of hypertension. • Consider using *Healthy People 2020* for setting organizational targets or set your own. • Identify gaps or areas to be improved. • Select change ideas to test and implement to improve outcomes. • Use the "Improvement Model" and its Plan-Do-Study-Act (Rapid tests [cycles] of change) to test, change, and test again until an idea is fail safe. Then implement and embed in system.	• Page 33 – Model for Improvement • Page 36 – Appendix 1: PDSA Worksheet • Page 37 – Appendix 2: PDSA Tracking Sheet • Refer to Healthy People 2020 Heart Disease and Stroke Objectives
Establish and monitor metrics to evaluate routine improvement efforts and outcomes; ensure all staff members understand the metrics for success.	• Select and track quality measures to know whether the changes you are making are resulting in improvement. • Identify and track evidence-based practice behavior changes that can improve the management of hypertension. • Share goals and ongoing metrics with every team member.	Pages 12–15: Refer to Measurement Worksheet and Measures to Assess Practice Behavior Change
Ensure that patients, families, providers, and care team members are involved in quality improvement activities.	Include patients who have hypertension in building a quality improvement project for improving the management of hypertension at your organization.	

continued

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Quality Improvement (QI) Strategy continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Optimize use of health information technology to meet Meaningful Use criteria.	• Use a registry (part of your EHR or as a stand alone) to manage the population. • Identify patients who have not been in for a while or who need more intensive management (those not at clinical goal). • Flag and monitor patients with high blood pressure or who are at-risk. • Report progress on patients using National Quality Forum measure (NQF) 0018.	Refer to National Quality Forum: Controlling High Blood Pressure

Empanelment: Establish Patient-Provider Relationships

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Assign all patients to a provider panel and confirm assignments with providers and patients; review and update panel assignments on a regular basis.	• Assign hypertensive patients to a practice team that can follow their care. • Identify all patients with hypertension on a clinician's panel.	For general information on empanelment, refer to Safety Net Medical Home Initiative on Empanelment
Assess practice supply and demand, and balance patient load accordingly.	Have clinician/practice team review the list of patients with hypertension on their panel for correctness.	
Use panel data and registries to proactively contact and track patients by disease status, risk status, self-management status, community and family need.	• Consider subsets of patients on the panel with hypertension who need additional support. Examples: health coaching, care management services, self-management support, care coordination, if patient is in/out of hospital/ER, or sees many specialists. • Proactively contact patients to make appointments and build relationships. Track that they receive care.	

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Continuous and Team-based Healing Relationships

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Establish and provide organizational support for care delivery teams that are accountable for the patient population/panel.	• Work as a team with the patient to address their hypertension. • Enhance systems for communication between team members. • Create a structure for warm handoffs between team members. This ensures patient is supported, there is clear communication between team members, and nothing is lost in the handoffs. • Consider "team huddles." • Consider use of the Teamlet Model (one clinician and two health coaches). The health coach is the medical assistant or other team members used in an expanded role with additional training to be a health coach.[2]	• Page 45 – Resource 3: Expanding Roles for Primary Care Team Members in Working with Patients with Hypertension – Team-Based Care. • Refer to Safety Net Medical Home Initiative on Continuous and Team-Based Healing • Refer to huddle design video: Planned Care Huddle **Other Huddle Resources** • Briefs and Huddles Toolkit • Improving Patient Safety Through Provider Communication Strategy • Institute for Healthcare Improvement: Huddles • Bodenheimer T., Laing B., The Teamlet Model of Primary Care, The Annuals of Family Medicine, vol 5, No5, 457-461, 2007.
Link patients to a provider and care team so both patients and provider/care teams recognize each other as partners in care.	• Make sure all patients with hypertension are assigned to a practice team who work in partnership with the patient to manage their hypertension. • Build strong patient-provider relationships to foster improved communication.	• Page 48 – Resource 3: Key Messages for Health Coaches Working with Patients . . . • Refer to Safety Net Medical Home Initiative on Continous and Team-Based Healing Relationships

continued

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Continuous and Team-based Healing Relationships continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Assure that patients are able to see their provider or care team whenever possible.	Ensure that patients can be seen quickly for follow-up, or if experiencing side effects, or if they have other concerns about hypertension or treatment. This can decrease ED visits and ensure continued adherence to medications and treatment.	
Define roles and distribute tasks among care team members to reflect the skills, abilities, and credentials of team members.	• Define staff roles and responsibilities to ensure accountability and that tasks are completed for the management of hypertension. • Expand the roles of medical assistants and nurses in the management of hypertension and consider working in collaboration with a pharmacist. *For example: Medical assistants trained to provide health coaching and to work with patient on self-management goals; nurses providing intensive care management services; and pharmacists conducting medication reconciliation and intensive medication management.*	• Page 45 – Resource 3 • Page 63 – Resource 4 • Refer to The Guide to Community Preventive Services – The Community Guide: Cardiovascular Disease Prevention and Control: Team-Based Care to Improve Blood Pressure Control • Refer to Team Up – Pressure Down website, part of Million Hearts® Initiative • Refer to Safety Net Medical Home Initiative on Continuous & Team-Based Healing Relationships – Elevating the Role of the Medical/Clinical Assistant: Maximizing Team-Based Care in the PCMH

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Patient-Centered Interactions

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Respect patient and family values and expressed needs.		
Encourage patients to expand their role in decision-making, health-related behaviors, and self-management.	• Schedule and document a visit with patients—at least annually—and screen for hypertension. If a patient has hypertension that is controlled, see every 3–6 months or as determined by clinician. If hypertension is not controlled, see every 3–4 weeks to titrate treatment and help them identify their self-management goals.	• Page 63 – Resource 4: Patient Self-Management Tools
	Use carefully selected, culturally and literacy appropriate educational tools. *For example: Place bilingual educational posters in exam rooms to help educate patients about self-management.*	Page 113 – Appendix 6: Posters
	• Ensure that staff and clinicians have information on patient home monitoring. Ensure a process is in place for checking the accuracy of patients' home monitors and the patients' ability to take an accurate blood pressure at home. • Develop system for providing additional clinical and health coaching support for home monitoring as a feedback loop between patient and practice team.	• Page 114 – Appendix 7: Home Monitoring Book • Page 115 – Appendix 8: Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide • Refer to the CDC's Million Hearts® Action Guide on Self-Measured Blood Pressure Monitoring: http://millionhearts.hhs.gov/Docs/MH_SMBP.pdf

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Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Patient-Centered Interactions continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Communicate with patients in a culturally appropriate manner, in a language and at a level that the patient understands.	Provide patient with a blood pressure tracking tool for patient self-monitoring.	• Page 114– Appendix 7: Home Monitoring Book • Page 115 – Appendix 8: Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide
	Evaluate the patient's learning style as part of the self-management program and as part of a health literacy program.	Page 58 – Key Message #7
	Implement health literacy concepts.	Page 58 – Key Message #7
Provide self-management support at every visit through goal setting and action planning.	• Encourage the use of home blood pressure monitoring. • Develop system for providing additional clinical and health coaching support for home monitoring as a feedback loop between patient and practice team.	• Page 57 – Key Message #6 • Page 114 – Appendix 7: Home Monitoring Book • Page 115 – Appendix 8: Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide • Refer to the CDC's Million Hearts® Action Guide on Self-Measured Blood Pressure Monitoring: http://millionhearts.hhs.gov/Docs/MH_SMBP.pdf
	Support patients in adopting healthy lifestyle changes and create a system for connecting patients with physical activity, weight loss, nutrition, and tobacco cessation programs in the community.	Page 60 – Key Message #8
	Develop or strengthen processes for supporting patient in medication concordance (that they understand) and adherence (that they take drugs as directed).	• Page 53 – Key Message #5 • Refer to Script Your Future, a national campaign to raise awareness about medication adherence: www.scriptyourfuture.org/hcp/
	Develop protocols for supporting patients when the cost and number of medications are barriers to patient compliance.	Page 53 – Key Message #5

continued

Patient-Centered Interactions continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Obtain feedback from patients/families about their healthcare experience and use this information for quality improvement.		

Organized, Evidence-Based Care

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Use planned care according to patient need.	• Routinely review your population of patients with hypertension. Identify those who have not been seen in the last six months and schedule them for a planned-care hypertension visit. • Use a visit summary generated from an Electronic Health Record or Patient Registry to quickly identify patient needs.	• Page 65 – Resource 5: Planned Visit Tools
	Consider using group visits to see patients for hypertension care, education, and peer sharing/ networking.	• Page 66 – Resource 5: Group Visit Starter Kit • Refer to a video showing a group visit: Medical Visits video
Identify high risk patients and ensure they are receiving appropriate care and case management services.	Define call-back criteria and schedule a follow-up "hypertension" visit (according to criteria set by practice) to get the patient's blood pressure to goal. Suggested follow-up visit schedule: 1. Blood pressure controlled: Three to six month recall visit. 2. Blood pressure not controlled: Every three to four weeks until BP to goal.	

continued

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Organized, Evidence-Based Care continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Identify high risk patients and ensure they are receiving appropriate care and case management services.	Consider a nurse pre-visit or post-visit for a subset of patients: • Conduct pre-visits for new patients to review medications, to take serial blood pressure readings on both arms to determine the arm with highest reading, etc. • Conduct post-visits to ensure that patients understand how to take their medication(s) and side effects; if they understand information/ directions provided by clinician; to discuss lifestyle changes and self-management goals; and to discuss who to call for support, etc. • Consider the use of internal and external community-based pharmacists (COPs) to assist with medication management for: o Safety o Optimize drug/dose o Counseling and Treat to Target • Develop business agreements with COPs.	Refer to Team Up – Pressure Down website, part of Million Hearts® Initiative
	Educate staff and providers on the importance of blood pressure control for hypertension and pre hypertension; using evidenced-based treatment guidelines per JNC-7 (JNC-8 to be released soon).	• Refer to Resource 2 (page 41) for brief summary of guidelines • Refer to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-7) for detailed review of the guidelines • Refer to CDC's Vital Signs.

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Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Organized, Evidence-Based Care continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Identify high risk patients and ensure they are receiving appropriate care and case management services.	• Provide care management for those at highest risk, including those with multiple conditions or those with depression. • Use "Treat to Target" methodologies and provide health coaching.	• Page 45 – Resource 3 • Refer to the Safety Net Medical Home Initiative's Organized, evidence-based care: Improving Care for Complex Patients: The Role of the RN Care Manager
	• Define roles for clinical and non-clinical team members. • Use standing orders for services. • Train and assign care teams to coordinate care for patients as needed.	Page 45 – Resource 3
	Use a point of care patient visit form. Examples include electronic health record templates or paper patient visit summaries.	Refer to page 64 – Resource 5 for an example of a patient visit form
Enable planned interactions with patients by making up-to-date information available to providers and the care team prior to the visit.	• Use patient visit summaries to quickly review last visit compared to current visit to identify improvement or need for treatment titration or health coaching. • Develop protocols for having labs available at time of visit. • Consider using huddles for quick exchange of information about patients among team members.	• Refer to page 64 – Resource 5 for an example of a patient visit form • Refer to huddle design video: Planned Care Huddle **Other Huddle Resources** • Briefs and Huddles Toolkit • Institute for Healthcare Improvement: Huddles

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Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Organized, Evidence-Based Care continued

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Enable planned interactions with patients by making up-to-date information available to providers and the care team prior to the visit.	Implement a system to document and track hypertension management protocols. Confirm that information is documented in a consistent place by the practice teams and that this information can be pulled for population-based reporting as needed. Examples include: • Serial blood pressure readings • The arm with the highest reading • The lifestyle counseling that was given • Referrals to specialists • Home monitor readings • BMI • eGFR (estimated Glomerular Filtration Rate)	
	Embed evidence-based guidelines by using patient-management tools or electronic health record templates and reviewing data and best practices with practice teams.	Page 41 – Resource 2: Key JNC-7 Messages for Clinicians Managing Hypertension in Adults
	Provide training, evaluate workflow, and create policies and procedures to ensure accurate measurement of blood pressure by all staff.	Page 68 – Appendix 1: Blood Pressure Measurement Training Guide (for Adults)
	Train clinical staff to be able to discuss the stages of pre-hypertension and hypertension. Train staff to reinforce health messaging.	Page 51 – Resource 3, Key Message #2: Have a Discussion
Integrate behavioral health and specialty care into care delivery through co-location or referral agreements.	• Address and track depression and hypertension management together – depression could be contributing to hypertension. • Use a PHQ-9 or other validated depression screening tool to diagnose depression and to monitor results of treatment.	Refer to IMPACT: Evidence-based depression care: http://impact-uw.org/tools/phq9.html

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Enhanced Access

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Promote and expand access by ensuring that established patients have 24/7 continuous access to their care teams via phone, e-mail, or in-person visits.	• Ensure all patients have access to their practice team within 24 hours by phone/e-mail and can get into the clinic on the same day if urgent. • Ensure patient can see own practice team for follow-up concerns and questions within a couple of days.	
Provide scheduling options that are patient and family-centered and accessible to all patients.	Patient will need to be seen more often by clinician, health coach, or care manager until BP is at goal, so will need to have access to team on a more frequent basis.	Page 53 – Resource 3, Key Message #4: Follow Up
	Ensure patients have access to someone to call if not feeling well from medications to ensure adherence.	
Help patients attain and understand health insurance coverage.	Ensure patients receive the information they need to get their medications.	Page 53 – Resource 3, Key Message #5: Discuss and Reinforce Medication Adherence

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Care Coordination

PCMH Key Change Concepts	Change Ideas for Management of Hypertension	Resources
Link patients with community resources to facilitate referrals and respond to social service needs.	Identify those community resources that could support the patient in the control of their blood pressure, including: • Weight loss programs • Places to walk and gyms • Specialists such as nutritionists • Social service needs such as transportation, meals, and assisting patient with accessing these services.	For more information about care coordination, refer to the Safety Net Medical Home Initiative's Care Coordination
Track and support patients when they obtain services outside the practice.	Develop protocols for tracking referrals to specialists and ensuring that reports come back to primary care.	
Follow up with patients within a few days of an emergency room visit or hospital discharge.	• Coordinate with hospital to find out when patient has been in ER or admitted to hospital. • Follow-up call within 48 hours (or as determined by practice) and follow-up visit within the week to ensure understanding of medications, treatment, etc.	
Communicate test results and care plans to patients.	Ensure that patient is fully aware of the results of their biometrics, test results, and are fully involved in developing their care plan.	

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

The Model for Improvement

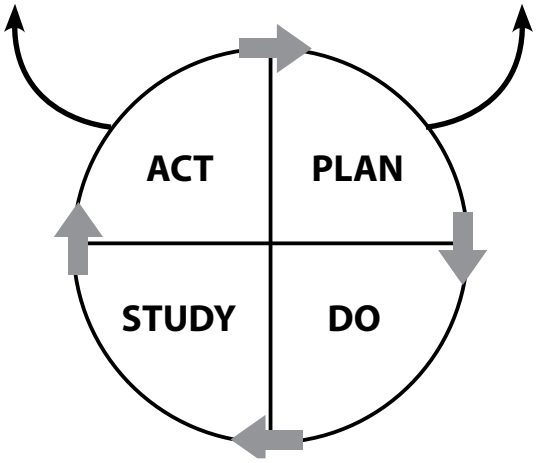
How Do Practices Go About Making Change?

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?



Use Appendix 1: PDSA Worksheet and Appendix 2: PDSA Tracking Sheet on pages 36 and 37.

Use the Model for Improvement as a tool to help you approach change in a systematic, efficient way.

Select testable, action-oriented ideas that will lead to improvement.

1. **What are you trying to accomplish? What is the overall AIM or goal you are working towards?**
   Example: *Improving the percent of patients in my practice who have blood pressure to goal.*

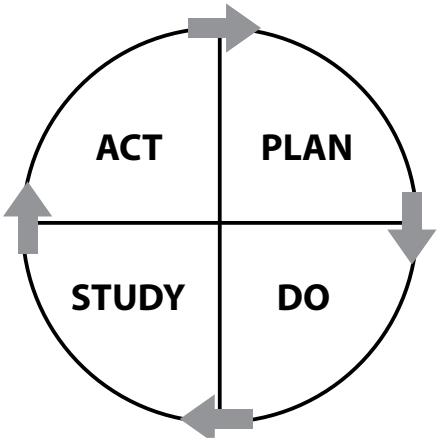
2. **How will you know that the changes you are making towards your goal actually result in improvement?**
   By defining how to measure the results of the change and tracking progress over time. (For ideas, see the Measurement Worksheet on page 12.)

3. **What changes do you want to test that you think will result in improvement?**
   Look at your practice data, review your processes, and then review The Change Package on page 17. Create a list of changes the team wants to test.

4. **After generating ideas of the changes you want to test, start running small, rapid tests of change using the "Plan-Do-Study-Act" tool** (PDSA worksheet, page 36)**.**
   If they fail, tweak the process and retest. If they succeed, expand the tests and gradually incorporate larger and larger samples until you are confident that the changes should be adopted more widely.

Example:

PDSAs



PLAN **Figure out the questions you want to ask, plan a way to answer the questions, and predict results. Figure out what to measure to know if you are successful.**
EXAMPLE:
The Question: *How can we get patients to bring all medications, herbals, over-the-counter medications, and vitamins to each visit?*
The Plan: *For the next five patients >65 years scheduled for a hypertension visit, send the letter that has been created asking patients to bring with them all medications, herbals, over-the-counter medications, and vitamins in the original bottles.*
Measurement: *Number of patients who brought all items in the original bottles.*

DO **Carry out the plan. Document problems and unexpected observations.**

STUDY **What did you learn? Was the test successful or are does the plan need to be modified and tested again?**
Example: *Was the letter successful in getting patients to bring in their medications? How many patients were scheduled and how many brought them in? Were there issues with the process itself? Would the process be sustainable over time? Ask the patient.*

ACT **What will you do with the knowledge you learned?**
- Is it ready to expand to a larger sample?
- Should the letter or process be modified and retested?
- Is the change ready for full implementation?

The Plan-Do-Study-Act (PDSA) cycle is shorthand for testing a change in the real work setting. This is done by planning it, trying it, observing the results, and acting on what is learned. This is the scientific method used for action–oriented learning.

For more information, go to the Model for Improvement on the IHI website.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendices 1 and 2

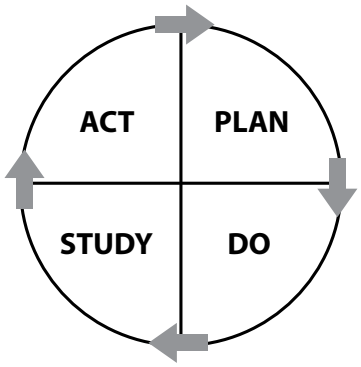
PDSA Worksheet

Model for Improvement

Team Name: _____

Date begun: _____ Date finished: _____

PLAN



Objective for this PDSA Cycle:

Questions:

Predictions:

Plan for change or test: Who, what, when, where?

Plan for collection of data: Who, what, when, where?

DO	**Carry out the change or test, collect data, document problems and unexpected observations, and begin data analysis.**
STUDY	**Complete analysis of data, compare the data to predictions, summarize what was learned.**
ACT	**What changes are to be made? Plan for the next cycle.**

WORK SHEET

PDSA Tracking Sheet

Make copies of this form as needed.

Cycle No.	PDSA Plan Date	PDSA: What are we trying to find out (what do we need to test)? What is our plan for finding out? What will we measure to determine if our plan is working?	Person Responsible	Completed by (date)	Results: 1) Modify and test again; 2) Didn't work and no further testing; 3) Looks like it works. Continue bigger testing; 4) It works. Implement to all
		Goal: What to test: How will we do it: How measured:			
		Goal: What to test: How will we do it: How measured:			
		Goal: What to test: How will we do it: How measured:			

WORK SHEET

Section 5: Resources and Tools

SECTION OVERVIEW

Resource 1: Blood Pressure Measurement – The Personal and Financial Costs of Inaccurate Measurement

Resource 2: Key JNC-7 Messages for Clinicians Managing Hypertension in Adults

Resource 3: Expanding Roles for Primary Care Team Members in Working with Patients with Hypertension – Team-Based Care

Resource 4: Patient Self-Management Tools

Resource 5: Planned Visit Tools

RESOURCE 1: Blood Pressure Measurement – The Personal and Financial Costs of Inaccurate Measurement

See page 68 – Appendix 1: Blood Pressure Measurement Training Guide (for Adults)

Many outside forces contribute to blood pressure measurement variability. The following is a list of common actions that result in inaccurate blood pressure readings that can be easily controlled.[3, 4]

Cause	Systolic Effect
The cuff is too small (Most common cause of error in clinical practice!)	+10-40 mmHg
The cuff is too large (Most common cause of error in clinical practice!)	-5-25 mmHg
The artery line is not centered	+4-6 mmHg
The arm is above heart level	+2 mmHg per inch
The arm is below heart level	- 2 mmHg per inch
Patient's feet are not flat on the floor	+5-15 mmHg
Patient's back is not supported	+5-15 mmHg
Legs crossed	+ 5-8 mmHg
Patient in pain	+10-30 mmHg
Patient talking	+10-15 mmHg
Patient has full bladder	+10-15 mmHg
Patient has difficulty breathing	+5-8 mmHg

continued

Cause	Systolic Effect
Patient doesn't rest 3-5 minutes	+10-20 mmHg
White Coat Syndrome	+11-20 mmHg
Tobacco or Caffeine use	+6-11 mmHg
The cuff is placed over clothing	+/-10-40 mmHg
Aneroid devices that are out of calibration most often read too low.	

Errors as small as minus 2–5 mmHg can have astounding health impacts to the patient and costs to the health care system.[5]

- An error of "only" minus 5 mmHg at the 90–95 mmHg range will miss the 21 million hypertensive patients in the United States in this range. (In 2002, this was 42 percent of all patients with hypertension.)
- Over six years, those 21 million patients with untreated hypertension experience 125,000 Coronary Artery Disease (CAD) deaths. Of those, at least 20 percent could be prevented by treatment.
- About the same number of fatal strokes could have also been prevented. Thus, a minus 5 mmHg error will cause about 50,000 preventable deaths and potentially twice this many non-fatal CADs and Cardiovascular Accidents (CVAs).

Measuring blood pressure falsely high increases costs by treating those who do not truly have high blood pressure.[5]

- An error of plus 5 mmHg would move 27 million people from 85–89 mmHg range into the high blood pressure range. Since the estimated cost of treating one person with high blood pressure is $1,000 per year, this would cost $27 billion per year to treat a "non-disease."
- In those with hypertension, a false high reading will result in more medications being used to get the blood pressure "to goal." Even a 2 mmHg error will misclassify about six million people into the 90–95 mmHg range.

RESOURCE 2: Key JNC-7 Messages for Clinicians Managing Hypertension in Adults

Guidelines from the "Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7)"

JNC-8 is projected to be released soon.

JNC-7 Express: www.nhlbi.nih.gov/guidelines/hypertension/express.pdf

Key Messages from JNC-7

- In people older than 50 years, systolic blood pressure greater than 140 mmHg is a much more important cardiovascular disease (CVD) risk factor than diastolic blood pressure.
- Risk of CVD begins at 115/75 mmHg and doubles with each increment of 20/10 mmHg.
- Individuals with a systolic blood pressure of 120–139 mmHg or a diastolic blood pressure of 80–89 mmHg should be considered as pre-hypertensive and require health-promoting lifestyle modification to prevent CVD.
- If blood pressure is more than 20/10 mmHg above the blood pressure goal, consideration should be given to initiating therapy with two agents, one of which usually should be a thiazide diuretic.
- The most effective treatment prescribed by the most careful clinician will control hypertension only if patients are motivated. Motivation improves when patients have positive experiences with and trust in the clinician. Empathy builds trust and is a powerful motivator.
- In presenting these guidelines, the committee recognizes that the responsible physician's judgment remains paramount.[6]

Clinical Evaluation of Patients with High Blood Pressure (from JNC-7)

1. Screen for lifestyle behaviors that contribute to elevated blood pressure

- Alcohol use
- Physical inactivity
- Use of cocaine, amphetamines, or other illicit drugs
- Diet high in sodium, saturated fat, and trans fat. Diet low in fruits, vegetables, and whole grains.

2. Review for medications and other agents that can elevate blood pressure

- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Some anti-depressants (e.g. venlafexine)
- Sibutramine

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

- Oral contraceptives
- Cortisone and other adrenal steroid hormones
- Cyclosporine and tacrolimus
- Licorice, some chewing tobacco
- Cyclooxygenase 2 (COX-2) inhibitors
- Smypathomimetics (e.g. decongestants and some non-prescription weight loss drugs
- Erythropoietin
- Over-the-counter dietary supplements such as ephedra, ma huang, and bitter orange

3. Conduct physical examination

- Body mass index
- Optic fundi
- Auscultation for carotid, abdominal, and femoral bruits
- Thyroid gland
- Heart and lungs
- Abdomen for enlarged kidneys, masses, abnormal aortic pulsation
- Lower extremity edema and pulses
- Neurologic assessment

4. Perform laboratory tests and routine studies

- Electrocardiogram
- Fasting blood glucose
- Serum potassium
- Fasting lipid profile: total cholesterol, HDL, LDL, and triglycerides
- Urinalysis
- Hematocrit
- Serum creatinine and or eGFR

5. Assess for secondary causes of hypertension that may need to be addressed to bring blood pressure to goal

Causes of Secondary Hypertension*

Causes	Diagnostic Tests
Medication associated with hypertension	If possible, trial discontinuation or alternative agent
Polycystic kidney disease	Abdominal ultrasound
Glomerulonephritis	Bun/creatinine; urinalysis; imaging studies
Obstructive uropathy	Ultrasound; CT; cystoscoy
Renovascular disease	Doppler flow study; magnetic resonance angiography
Pheochromocytoma	History; 24-hour urinary metanephrines or normetaephrines, and plasma metanephrines
Cushing's syndrome	History; desamethasone suppression test
Primary aldosteronism	24-hour urinary aldosterone level; plasma rennin
Thyroid disease	Thyroid stimulating hormone
Parathyroid disease	Serum Parathyroid hormone (PTH)/calcium level
Coarctation of aorta	Computed Tomography (CT) angiography
Drug induced	History; drug screen
Sleep Apnea	Sleep study

*Adapted from: JNC-7, National Heart, Lung, and Blood Institute[7]

Factors Contributing to Uncontrolled Hypertension and Suggested Actions[8]

Contributing Factor	Description	Suggested Action
Clinical Management	Physicians miss many opportunities to improve blood pressure control by not adjusting medications at office visits.[9]	Monitor patients closely and adjust medication as needed to reach treatment goals. Bring patient in every three to four weeks to adjust medication, or more frequently if Stage Two or if they have complex co-morbidities.
Patient Adherence	**Complexity of Regimens** Patient adherence drops as the number of prescribed medications (and daily doses) rises.[10]	Simplify regimens. Use once-daily dosing whenever possible.
	Drug Cost Some patients skip doses because they can't afford the medication and most won't talk about it unless the doctor asks. Non-white patients are only half as likely as white patients to talk to their provider about their plans to under-use a medication because of drug cost.[11]	Ask patients about cost concerns. Prescribe generics when possible and offer information on drug discount programs. (See page 54 for discount program information)
	Adverse Effects Almost one third of patients stop taking anti-hypertensive medication because of adverse effects.[12]	Discuss common effects and encourage patients to report symptoms. (See page 55 – discussing medications)

RESOURCE 3: Expanding Roles for Primary Care Team Members in Working with Patients with Hypertension – Team-Based Care

Making the Case

High blood pressure was listed as a primary or contributing cause of death for approximately 336,000 Americans in 2007 by the Task Force on Community Preventive Services.[13]

- Nearly one in three adults (67 million) has high blood pressure.
- 36 million have uncontrolled high blood pressure.
- About 22 million know they have it, but don't have it under control.
- 16 million take medicine, yet still don't have their blood pressure controlled.
- Total annual costs associated with hypertension are $156 billion, including medical costs of $131 billion and lost productivity costs of $25 billion.
- A review of 77 studies of team-based care showed that patients' control of blood pressure improved when their care was provided by a team of health professionals.[14]

Why Does Team-Based Care Work?

Team members work together by providing support and sharing responsibility for hypertension care.

Nearly 80 percent of primary care patient visits are for elevated blood pressure, but patients typically have multiple health concerns. With competing health priorities and short 15-minute visits, high blood pressure is rarely or minimally addressed. Also, given the focus on evidenced-based guidelines, clinicians may tend to tell the patient what to do rather than asking them what they can or are willing to do, especially in a busy 15-minute visit.[15]

Health goals selected and planned by the patient have been shown to be very successful in helping to manage chronic conditions. In contrast, those selected by clinicians telling patients what they should work on have not been as effective.

It is clear that it takes a team to get the job done!

Who Is the Team?

A team is a complement of staff members that could include a primary care provider, medical assistant, nurse, dietitian, social worker, pharmacist, community health worker, and others all working to address the different functions required to effectively manage hypertension. They are a team with well-defined roles developed to the fullest extent of each person's scope and skill and who each contribute equally.

Core Functions of a Core Team:

- Providing patient education
- Employing medication management protocols
- Ensuring/supporting patient understanding of their hypertension management plan
- Assisting patient with self-management goal setting
- Supporting patient in monitoring BP at home
- Encouraging and supporting patient in adopting healthy lifestyle changes
- Employing Treat to Target approaches
- Coordinating patient visits to specialists and follow-up after hospitalization/ED visit
- Facilitating in making linkages to community resources

Special Focus on Health Coaching

A health coach can be one person or multiple members of a team working together to address the core functions, depending on the team member's individual expertise, training, and licensure. This can include clinicians, nurses, pharmacists, health educators, nutritionists, medical assistants, or even community health workers/promoters. This set of services, provided by one or more team member(s), is often called "health coaching."

> ***Thomas Bodenheimer states, "Everyone should be trained and function as a health coach part of the time, even if not their usual job! If not, serious differences in patient care can occur with non-trained team members*** *telling* ***patients what to do while trained coaches work*** *collaboratively* ***with patients."*** [16]

Health coaching works to improve the patients' diet, exercise, medication effectiveness and adherence, and overall engagement with their disease.[17]

Studies show that the use of patient health coaches significantly improves blood pressure control while decreasing time or visits with a clinician.[16]

Additional Compelling Reasons for a Different Approach

- Only 50 percent of patients understand physician instructions following a visit.
- Only 9 percent of patients actively participate in decision making about their care, even though patients have better outcomes when actively engaged in their care.
- 70 percent of patients with chronic conditions have poor adherence in taking their medications.
- Clinicians often fail to intensify medications at visits when readings are high (clinical inertia).
- Controlling hypertension could avoid an estimated 46,000 deaths per year among persons younger than age 80 years, making it the single most effective clinical service for reduction of mortality.[15]

What Can be Done?

- Employ "Treat to Target" approaches. "Treat to Target" is a three-element approach to assist patients in blood pressure control.
- Realign team roles and assign team members to work as patient health coaches to employ "Treat to Target."[15]

What are the "Treat to Target" Elements?

- **Home monitoring with additional clinical and health coaching support:** Patients are asked to use home blood pressure monitors and to document readings (refer to Appendix 8. Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide, page 115).
- **Health coach visits and follow-up calls:** Patients see the health coach in the office and will set up and plan regular phone calls from the coach who reinforces blood pressure goals and provides coaching on home monitoring, diet, physical activity, and medication adherence (refer to Resource 3: Key Messages for Health Coaches Working with Patients at Visits, page 48).
- **Use of individualized, stepped treatment protocols or standing orders for the titration of medications:** The coach working with the patient uses physician-approved treatment protocols or standing orders to jointly decide on changes to anti-hypertensive medications based on blood pressure readings.[15]

A Word about the Titration of Medications

Research shows the tremendous success in using non-clinician and even non-licensed staff – such as medical assistants who have been specially trained – to titrate medications following specific standing orders defined by the clinician for an individual patient. Nurses, pharmacists, or medical assistants follow physician-approved stepped treatment protocols and standing orders, and keep close communication with the clinician about changes made and any symptoms the patient is experiencing.

This is the third critical leg in "Treat to Target's" success. However, it requires team readiness and preparation. Teams need to specifically prepare by building stepped protocols and standing orders that can be individualized for each patient, and to identify and train staff. Confidence in this team model and the ability for the clinician to trust that it will effectively and safely support their patients are built over time.

In studies, the greatest improvement in blood pressure was seen when the team members could change medications per stepped protocols, or with the approval of the primary care provider.[13]

Source: Task Force on Community Preventive Services.

> ***Note:*** *Intensive care management and medication management services, provided by a nurse or pharmacist, may be necessary for those patients with multiple chronic medical and behavioral health conditions. Care management services use the three "Treat to Target" elements listed above and additional specialized approaches to assist patients with psychosocial barriers and complex multiple conditions. Intensive care management is not specifically addressed in this document.*

Key Messages for Health Coaches Working with Patients at Visits and in Follow-up Calls

- **Key Message #1: Building Trust is Critical**
  Begin building a meaningful coaching relationship with patients through pre-visit phone contact and an effective first visit.

- **Key Message #2: Have a Discussion**
  Have a two-way conversation with your patient. Make sure their needs are heard and your explanations are understood.

- **Key Message #3: Support Self-Management**
  Give your patients the knowledge and tools they need to take charge of their own care. Provide clinical and health coaching through a feedback loop between patient and practice team.

- **Key Message #4: Follow-Up**
  Maintain phone contact with patients.

- **Key Message #5: Discuss and Reinforce Medication Adherence**
  Conduct a Medication Reconciliation with your patient. Make sure they are taking their medication, without passing judgment. Address their concerns about side effects.

- **Key Message #6: Encourage Patients to "Know Their Numbers"**
  Patients should be aware of their blood pressure.

- **Key Message #7: Utilize Health Literacy Concepts**
  Patients may have trouble reading or understanding health information. Use interpreters and communication techniques to bridge the gap.

- **Key Message #8: Encourage Patients to Adopt Healthy Lifestyle Changes to Lower Their Blood Pressure**
  Help the patient develop their own plan for healthy eating and physical activity.

KEY MESSAGES

Key Message #1: Building Trust is Critical

Hypertension is a complex condition which requires significant behavior change and frequently requires multiple medications with the possible risk of side effects. The patient should hear the information from someone they trust, and the information should be geared specifically to that individual's level of understanding and need. Build a relationship with your patient. To be an effective coach the patient needs to trust you.

Call before visits – start building the relationship early.

Have them bring:

- All medications in their original bottles, including over-the-counter, naturopathic and homeopathic medicine, and vitamins
- A list of their blood pressure readings in the last months and years, if possible
- Blood pressure home monitor, if one is used

Have them prepare by:

- Wearing a short sleeve or tank top for taking blood pressure
- Not smoking or having caffeine 30 minutes before the visit
- Emptying their bladder just before the visit

Additional:

- Provide directions
- Ask them to bring completed forms that were mailed to them

Scheduling Visits

The first visit should be long enough to be able to effectively prepare the patient for managing their condition. Building trust and understanding in the first visit can result in improved adherence to taking medication and better self-management.

Patient compliance increases when blood pressure control is achieved within weeks rather than months (patient is convinced of the efficacy and the importance of taking medications). The patient spends less time in a high risk state and there is less opportunity for patient and physician to accept inadequate control.

First Visit

The Role of the Clinician	The Role of the Health Coach	The Role of the Patient
General assessment	Teach patient how to take medications as ordered, if ordered.	To take medications as prescribed, to understand usual side effects and to know to call if they feel poorly but not to stop taking medication.
Rule out secondary causes	Teach patient how to take their own blood pressure and encourage them to purchase an approved monitor.	To know how to accurately take their own blood pressure.
Educate patient about their blood pressure and why they are at risk	Teach patient what their role is in managing their blood pressure.	To begin to be aware of the amount of sodium in their diet.
Introduce lifestyle changes and review medications if ordered	Let the patient know phone numbers and who to call for support between visits. Make sure the patient knows that calling back or calling for support is part of working as a team.	To call if they have questions, feel unsure, or feel "funny."
Reinforce the support the patient will receive by their health coach (providing a warm handoff)	Provide parameters for when to call 911, when to call the office, and when to call the coach, etc.	

KEY MESSAGES

Key Message #2: Have a Discussion

- **Provide the information but also get to know your patient.** This will provide greater insight into what they need and build trust. This is a critical element in assisting your patient in improving the control of blood pressure.
- **Have a conversation with your patient about their condition** in order to better understand their needs. Don't rely on just giving out educational materials or handouts.
- **Educational materials can reinforce what you have discussed** with the patient, but you should review the material with the patient and be selective. Too much information can be overwhelming; many patients have limited health literacy and do not read patient education materials.
- **Try drawing and use pictures as you talk** about high blood pressure and its effects on the body. This also helps with low health literacy. See Resource 3: Key Message #7 (page 58) about health literacy.
- **Be sure that all team members are providing the same messages**, even though you may be saying it differently.

Examples of how to discuss blood pressure and hypertension.

Find and practice using other ways of explaining the concepts.

In addition to talking, draw or find pictures to illustrate these concepts.

EXAMPLE 1: What is blood pressure?

- "When the heart beats, blood flows out of the heart through the arteries. In between heart beats, the heart is resting and there isn't as much blood flowing out into our arteries.
- This is more or less like a hose and nozzle. Right after turning on the nozzle, there is a lot of water that flows into the hose and pressure builds in the hose. When you close the nozzle, there isn't any more flow of water and the pressure in the hose decreases.
- The numbers we get when we take blood pressure, for example 120/80, correspond to two events in the body. The top number (120), also called the systolic BP, is the maximum pressure that the arteries feel right after the heart beats, or just after opening the nozzle on the hose. The bottom number (80), also called the diastolic BP, is the minimum pressure in the arteries between beats when the heart is resting.
- In a healthy body, the heart and blood vessels react to each other like two sides of a scale and create a balance so that we get a normal blood pressure.
- If we get sick or develop a chronic condition, our bodies may not be able to maintain that balance and it may require lifestyle changes and/or medication(s) to help the body return to that balance.
- Different medications have different effects on that balance.
- It is the doctor's job to figure out which medicines are best for you."

EXAMPLE 2: What is high blood pressure and why should we care about it?

- "Your blood vessels carry the blood throughout your body, like pipes. We need blood pressure so that our blood can reach all the way to our fingers and toes.
- The pipes start to narrow with increased blood pressure. Think of a large and small diameter pipe with the same amount of water trying to go through at the same time. Which one will have the water come through with more force? The same happens with our blood vessels. As pressure in the pipes builds and is sustained over a certain amount of time, the pipes are damaged.
- As the pipes are damaged, they thicken and narrow. As they narrow, there is more pressure building up and therefore more damage. A vicious cycle takes place and if the blood pressure is not treated there is an increased risk for stroke, kidney failure, and heart attacks.
- There are things you can do to stop this vicious cycle. You and your doctor will choose the best treatment for your situation and condition."

Refer to the American Heart Association's website that provides additional explanations and visuals for explaining blood pressure and hypertension with patients.

Key Message #3: Support Self-Management

Support the patient in their own self-management by using five proven strategies:

1. Collaborative decision making in establishing an agenda for the visit by using **Agenda-Setting Dialogue techniques**
2. Giving patient information that they want in the doses they can absorb using the **Ask- Tell-Ask Dialogue techniques**
3. Assessing a patient's understanding by using **Closing-the Loop Dialogue techniques**
4. Assessing patient's readiness to change and tailoring discussion to that degree of readiness by using **Readiness-to-Change Dialogue techniques**
5. Collaborative decision making in goal setting and developing an action plan using **Goal-Setting Dialogue techniques**[18]

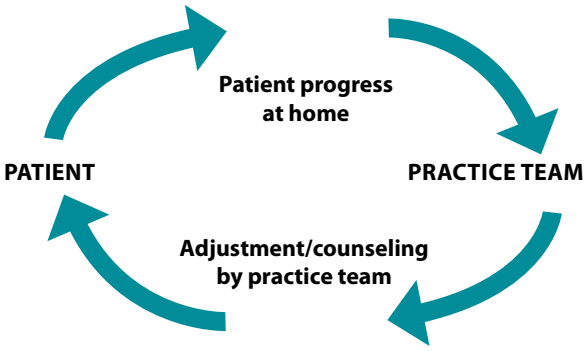
Refer to "Helping Patients Manage Their Chronic Conditions," prepared by the California HealthCare Foundation, 2005.

Also refer to Appendix 12. Self-Management Support – Patient Planning Worksheet (page 123).

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Key Message #4: Follow Up

"The more telephone calls between a health coach and a patient, the better the patient's blood pressure. It's almost like a medicine – if you increase the dose of coaching, you get a better result." [15]



Key Message #5: Discuss and Reinforce Medication Adherence

1. Conduct a medication reconciliation at each visit

Call the patient and ask them to bring all of their medications, including over-the-counter, naturopathic, homeopathic, and vitamins and herbs in their original containers into the office at each visit. Refer to "Brown Bag Medication Review" procedure.

- Print out the pre-visit medication list.
- Go over each medication on the medication list (or use the bottles if patient brought them in), and ask the patient the following questions for each medication:
  - Do you know the name of this pill?
  - Do you know what this pill is for?
  - Do you know how many milligrams it is?
  - How often should you be taking it?
  - Are you taking it?
  - If you aren't taking it as the doctor prescribed, why not?
- For the first four questions, educate the patient if needed and close the loop by asking them to state back what they understand.
- For the question "Are you taking it?" write down next to each medication on the medication list "Yes", "No", or "Sometimes."
- If a twice-a-day pill is taken only once a day, write down "Once a Day."
- If the patient doesn't take the medication as prescribed, ask the patient "Why Not?" Write down their answer on the medication list.
- Also write down whether the patient needs refills. Provide your notes to the clinician.
- Coaches should not advise the patient about what to do regarding a medication that the patient is not taking. The coach should just gather the information.
- If there are a lot of medications or there seems to be particular confusion, the patient may need to come in for a separate visit to sort out the list.[19]

The nurse or medical assistant should discuss common side effects when coaching the patient about taking medications, and be prepared to field questions and collect information to give to the clinician.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

2. Ensure that the patient understands the medication instructions from the clinician

- After the visit, ask the patient, "Just to make sure the clinician was clear, can you tell me how you will be taking this medication?" Or in subsequent visits or follow-up phone calls, ask "How did the clinician tell you to take this medication?" If what the patient says is different than the clinician's description on the medication list, the patient does not understand.
- If the patient does not understand, close the loop. Tell the patient how the doctor has prescribed the medication. Then ask the patient to repeat back the instructions so that "I can make sure I have explained it clearly."
- Use a health interpreter for patients for whom English is not their first language. Do not use a family member to interpret how to take medications.

Reinforce what the patient is doing well, rather than what they are not doing. Give a lot of positive reinforcement each step of the way.

3. Discuss over-the-counter drugs

Remind the patient that certain over-the-counter drugs can make their anti-hypertensive medications less effective, or may be high in sodium. These include antacids, laxatives, diet pills, cold remedies, and allergy medications.

4. Provide support for the reasons patients do not take their medications, even though they understand how to take them.

Common reasons for non-adherence include:

- **Patient has no insurance and can't afford the medication.** Provide them information about drug assistance programs.
  - **RxOutreach:** 1-800-769-3880. $20 for a 180-day supply for over 150 drugs. Lower prices for over 400 drugs via mail order. Application can be accessed at their website.
  - **NeedyMeds:** The NeedyMeds drug discount card saves the patient up to 80 percent or more off the cost of prescription medicines, over-the-counter drugs, and pet prescription drugs.
  - **Mental health resources:** Free or low-cost drugs for mental health – National Alliance on Mental Illness.
- **Medication is not on the patient's insurance formulary.**
  Clinician may need to consider giving a different drug that is on the formulary. Be aware of insurance plans regarding first line drugs. The office may need to obtain preauthorization for the use of the drug.
- **Medication regimen is too complicated.**
  Patients may feel they have to keep track of too many medications, forget to take some or all, or have trouble taking medication several times a day. Set up a medi-set. The clinician may need to consider simplifying the regimen.

- **Patient is worried that medication may cause side effects or hurt them.**
  Discuss side effects and taking their medications.
  - Discuss the usual side effects of medications that lower blood pressure. Let them know that these should subside in six to eight weeks.
  - Tell the patient that it is important that they are aware of the usual side effects so that they will not stop taking the medication if they experience them.
  - Provide the patient information about serious and unusual side effects and what they should do. (See FDA publication on information on classifications of medications and usual and serious side effects, page 102, Appendix 5.)
  - Tell the patient it is important to take their blood pressure medicines every day.
    For example: "Take your medicines even if you feel good or even when your blood pressure comes down. Do not stop taking your medicine until your doctor says that it is okay."
  - Let the patient know who they should contact for support if there are any concerns or questions about their medications, or if they are "feeling funny." [20]

5. **Refer to Script Your Future.org for tools for assisting patients to take medications as directed.**
6. **Discuss with your patients** how the medications might make them feel:
   - **Example 1:** "Any time you take medicine, you are trying to change something in your body but the changes to your body can make you feel different. Occasionally there are side effects. Your doctor is trying to find the medicine that is best for you."
   - **Example 2:** "Your body is used to having a high blood pressure. You may feel tired or without energy for six to eight weeks. Certain drugs may cause some swelling in your legs or hands, or parts of the body may feel flushed."

In response to certain side effects reported by your patient:

If patient has a concern about:	Your actions
Being tired or not feeling well	• What is your blood pressure? (Usually it will be lower from the medications they are on.) This is very important for your health. You are doing a good job. Remember that your doctor said there would be an adjustment period for six to eight weeks before you start to feel better and have more energy. • Your body is still trying to create a high blood pressure but can't with the new medicine. Keep taking the pills and measuring and recording your blood pressure. • Continue to trust your doctor and give this a try so that the pressures will come down. • Remember to keep reading labels and trying to decrease your sodium intake. • You are doing a great job. I will check with you next week to see how you are doing. • Give information to clinician.

continued

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

If patient has a concern about:	Your actions
Swelling of legs or hands and unwillingness to take the medicine	• What is their blood pressure? Usually it will be lower from the medications they have been on. • Remind them that swelling can be one of the normal side effects of the drug (usually when taking a calcium channel blocker). • Suggest that they get up and move around at least five minutes every hour, that they keep their legs up when they are sitting, that they use support hose or socks, and drink lots of water. • Remind them that this will resolve as their body gets used to a more normal blood pressure, and to continue to take the medicine. • Give information to the clinician who may decide to make a change in medication or an adjustment in dosage.
Leg cramping	• Suggest stretching several times a day, a warm bath, or getting up and moving around. • Give information to clinician who will want to check their last potassium level (this could be a contributing factor).
Cough	Clinician will check if they are on an ACE inhibitor and may change medication.
Having no change in blood pressure or reports a sudden spike in blood pressure	• What is their current blood pressure? • Be assertive about identifying what has changed in their daily routine. Examples: have they recently been eating out (increase in daily sodium), have they been sick, are they taking a decongestant, are they taking medications in the right doses and at the correct times of day? Look for patterns, such as: – When they take their medication – When they check their blood pressure • If they are using a home monitor, review proper blood pressure technique. • Review how they are taking their medications. • Gather the above information for the clinician.
Heart feeling like it is pounding	Collect information: • Ask what the heart rate is. • Ask what their blood pressure is. • Ask them to sit for five minutes and retake their blood pressure.
Always reinforce accurate measurement technique: Review their home technique. Reinforce taking the blood pressure accurately and the same way each time. This allows blood pressure readings to be compared "apples to apples" so that you can determine the medication's effect on the blood pressure.[20]	

KEY MESSAGES

Key Message #6: Encourage Patients to "Know Their Numbers"

The patient's "numbers" are systolic blood pressure over diastolic blood pressure in mmHg

Use any of the tools below to encourage your patients to understand their blood pressure readings.

Posters

Place the two posters "Know Your Numbers" and "What's the Big Deal About Controlling My Blood Pressure?" in exam rooms and use the posters to talk with your patients. (See page 113 – Appendix 6: Posters)

Website

Access the American Heart Association website. It has excellent patient tools on "knowing your numbers."

Blood Pressure Trackers

Provide patient information on resources for tracking their blood pressure readings:

- Use the tracking tool at the end of the "Home Monitoring Book – How to check your blood pressure." (See page 114 – Appendix 7: Home Monitoring Book)
- Refer to the American Heart Association's Blood Pressure Tracker and Instructions.

Home Monitoring

Encourage patients to use a home monitor and assist them in getting one if they can't afford one. Develop a system for providing additional clinical and health coaching support for home monitoring as a feedback loop between patient and practice team.

Key Message #7: Utilize Health Literacy Concepts

About 47 percent of adults have limited literacy skills and 44 percent are functionally illiterate.

Ensure each individual understands health information and is able to make appropriate health decisions.

Red flags for low literacy

- Blood pressure is still high, and there is a question as to whether the patient is still taking their medications
- Frequently missed appointments
- Incomplete registration forms
- Noncompliance with medications
- Unable to name medications, explain purpose, or dosing
- Unable to give clear history or timelines
- Ask fewer questions
- Lack follow-through on tests or referrals

Low health literacy is associated with

- Excess use of Emergency Department
- Excess hospitalizations
- Longer length of stay
- Decreased adherence
- Poorer health outcomes
- Increased medication errors

How to work with patients with low literacy

- Use interpreters as much as possible, rather than family members or friends.

- Provide an environment and culture that invites patients to ask questions:
  - Use "Ask Me 3" with patients: www.npsf.org/askme3/
    This program encourages patients to understand the answers to three questions:
    - What is my main problem?
    - What do I need to do?
    - Why is it important for me to do this?

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

- Patients should be encouraged to ask their providers (doctors, nurses, pharmacists, and therapists) these three simple but essential questions in every health care discussion.
- Likewise, providers should always encourage their patients to understand the answers to these three questions.

Source: National Patient Safety Foundation www.npsf.org/for-healthcare-professionals/programs

- Assess readability of existing tools and educational materials by using a tool such as Smog index, Flesch-Kincaid Formula, or others.
- Create documents at or below the sixth grade reading level.
- Use plain language, breaking content into smaller, easy-to-learn parts.
- Communicate clearly. Examples include:
  - Warm greeting, eye contact, plain non-medical language
  - Slow down
  - Limit content
  - Repeat key points
  - Use pictures
  - If written materials are used, highlight or circle key information
- Use "Teach back," "Return demonstration," or "Show back" concepts to close the loop. For example:
  - "I want to make sure I explained this well. Can you tell me in your words what was said so I know that I explained it correctly?"
  - "Could you demonstrate so I know that I showed and explained it correctly?"
- Refer to the Agency for Healthcare Research and Quality (AHRQ) Health Literacy Universal Precautions Toolkit. It has excellent tools and resources for working on health literacy in your clinic: http://nchealthliteracy.org/toolkit/ [21]

According to the literature, the practice of asking patients to recall and restate what they have been told is one of the 11 top patient safety practices.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Key Message #8: Encourage Patients to Adopt Healthy Lifestyle Changes to Lower Their Blood Pressure

A patient's risk for cardiovascular disease and stroke begins to increase with pre-hypertension, with blood pressures as low as 115/75 mmHg. [22]

Lifestyle changes can help prevent the progression from pre-hypertension to hypertension. For someone with hypertension, reducing the blood pressure through lifestyle changes can frequently result in fewer medications, lower dosages, and a reduced risk for cardiovascular disease and stroke.

Healthy lifestyle changes should be encouraged for all patients with pre-hypertension and hypertension.

Getting started

- Provide patients information on "What's the big deal about controlling my blood pressure?" poster. Use the poster to talk with patient about the importance of lifestyle changes.
- Explain how different lifestyle changes can impact blood pressure. Talk in general terms. Don't personalize to patient.
- Ask, "Do you think you can do some of these? If so, which would you like to try?"
- Explore solutions to barriers if the patient brings them up.
- Develop an action plan with the patient. (See page 63, Resource 4: Patient Self-Management Tools)

Diving into the lifestyle discussion

- The following tables provide suggestions on how to talk about certain lifestyle changes when providing information or education to your patients
- Select the information from the tables that is right for your patient – individualize! Too much information can overwhelm; just enough information can develop interest. Patients will be ready to hear some things and not ready to hear others.
- Talk with your patients about what lifestyle changes they would be interested in working on. Try using the Bubble Diagram (see page 97, Section 6: Appendix 2) or other tools to help your patient decide.
- Assist your patient in setting self-management goals or action plans for themselves. (See page 123, Appendix 12. Self-Management Support – Patient Planning Worksheet)

Key lifestyle change messages – what to talk about

- Use less salt and sodium (about 1 teaspoon or 2,300 mg. daily).
- Aim for a healthy weight.
- Eat a low-fat diet that includes fruits and vegetables.
- Be active at least 30 minutes most days.
- Limit the amount of alcohol you drink (no more than one drink each day for women and two for men).
- Quit smoking.
- Keep your blood sugar under control if you have diabetes or kidney disease.
- Take your prescription medicines as prescribed by your doctor.
- Check your blood pressure as often as your doctor advises and use a home blood pressure monitor if possible.

Subject	Examples of what to say to your patients
Salt	• One of the most important things you can do if you have high blood pressure is to reduce your salt/sodium intake. • Salty food is an acquired taste. As you decrease your salt intake your taste buds will adjust over several months and the craving will decrease. • Start looking at how much sodium is in food. Try to become familiar with how much sodium is in food, especially processed foods. Start reading labels. (See page 118 – Appendix 9: Reading Food Labels) • Avoid adding salt at the table to food that has been cooked. • Salt at the dinner table is only about six percent of the salt you eat each day. Most is in processed food. • Eating fresh (unprocessed) food is the most important thing to remember. • Buy foods that are marked "sodium-free" or "low-sodium." • Avoid soups, frozen entrees, lunch meats, salad dressing, soy sauce, marinades, and rice and pasta mixes. • Avoid cured foods such as bacon and ham. • Limit condiments such as mustard, horseradish, catsup, barbecue sauce, soy sauce, and teriyaki. • Use spices instead of salt. Flavor foods with spices, lemon, lime, or vinegar. • Rinse canned foods, such as tuna and vegetables, to remove some sodium. • Avoid fast foods that are high in salt and sodium. • Choose low-sodium or unsalted snacks. • Try to eat no more than about one teaspoon (2,300 mg) of sodium each day. • Try to eat as much fresh food, cooked at home as you can. Fresh food that you cook has very little sodium – if you do not add any as you cook. • Patients older than 50 years, who are African American, or who have chronic kidney disease or diabetes may be even more sensitive to the blood pressure raising effects of sodium. • Eating in restaurants is difficult because you do not know how much sodium is in the food.

continued

Subject	Examples of what to say to your patients

Eating foods that are high in potassium, calcium, and magnesium	• To protect against high blood pressure eat foods high in potassium, calcium, and magnesium.
	• **Foods high in potassium are:**
	  * Dried fruits such as raisins, prunes, apricots, and dates.
	  * Fresh fruits such as bananas, strawberries, watermelon, cantaloupe, and oranges.
	  * Fresh vegetables such as beets, greens, spinach, peas, tomatoes, and mushrooms.
	Note: Occasionally your doctor will have to limit your potassium if you are on certain medications or have certain conditions.
	• **Foods high in calcium are:**
	  * Dairy foods such as low fat milk, yogurt, and cheese.
	  * Fresh vegetables such as spinach, turnip greens, kale, and broccoli.
	• **Foods high in magnesium are:**
	  * Brown rice, fish and seafood, bananas, tofu, blackstrap molasses, and avocados.

Being active	• Be active every day. For example, walk briskly at least 30 minutes per day on most days of the week. Start slow and work up to this amount. • Walk instead of drive as much as you can for short distances. • Use the stairs instead of the elevator. • Be active by doing things you enjoy such as gardening, dancing, walking, playing with grandchildren, etc.
Cutting back on alcohol	• Women should have no more than one drink each day. • If pregnant, they should not drink alcohol at all. • Men should have no more than two drinks each day. • One drink equals 12 ounces of beer, five ounces of wine, or one ounce of hard liquor.
Quitting smoking	• Smoking increases your chances of having a stroke and getting heart disease. • Access the Department of Health Quitline for help: 1-800-Quit-Now or www.quitline.com
Taking your medications	• Be sure to take the medicine, prescribed by your doctor, as directed. • If you don't understand or have questions about how to take your medications, or if you have any problems with taking the medicine, call us right away. Talk to _____[name] at _____[phone number].
Checking your blood pressure outside the office	• You can purchase a home blood pressure monitor to check your blood pressure. This is the best way, if possible. • Stop by a fire station to have your blood pressure taken. • Stop by a health clinic to have blood pressure taken.
Taking Over-the-Counter (OTC) medicines	• Some medicines can raise blood pressure and interfere with blood pressure medicine. This is especially seen with decongestants and other cold medicines, anti-inflammatory medicines such as ibuprofen, and diet pills and herbs. • People with high blood pressure should tell their doctor, nurse, and pharmacist about all of the prescribed and over-the-counter medicines they are taking. • Be sure to ask if any medicine (including naturopathic or homeopathic medicines), vitamins, herbs, or supplements affect your blood pressure.

The above is a start. You can provide more detailed information as patients ask for more.[23]

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

RESOURCE 4: Patient Self-Management Tools

"Self-management support is the assistance caregivers give to patients with chronic disease in order to encourage daily decisions to improve health-related behaviors and clinical outcomes. Self-management support may be viewed in two ways: as a portfolio of techniques and tools that help patients choose healthy behaviors; and as a fundamental transformation of the patient-caregiver relationship into a collaborative partnership. The purpose of self-management support is to aid and inspire patients to become informed about their conditions and take an active role in their treatment."

—Tom Bodenheimer, Helping Patients Manage Their Chronic Conditions, California Healthcare Foundation, 2005

Bubble Diagram from the Self-Management Tool Kit

This is a tool for assisting patients in preparing for their visit and talking to their physicians about the questions they have and what they would like to change. (See page 97 – Appendix 2: Bubble Diagram.)

Self-Management Support: Patient Planning Worksheet

The "Patient Planning Worksheet" is a form that may be used by patients, either at home or during their office visit, to plan their self-management goals for managing their chronic illness. It helps people with chronic illnesses develop a personal action plan to learn a new behavior, such as starting a program to increase their physical activity. See Appendix 12: Self-Management Support – Patient Planning Worksheet (page 123).

Partnering in Self-Management Support: A Toolkit for Clinicians (and for practice teams)

This toolkit assists practices in building a comprehensive program for patient self-management support. It includes resources on motivational interviewing, goal setting, action planning, etc.[24]
Clinical Practice Change: Self-Management Support OR Partnering in Self-Management Support: A Toolkit for Clinicians *(requires registration on IHI website – no fee)* [25]

Patient Education Tools

This New York City (NYC) website provides excellent patient materials in English and Spanish. See Appendices 3 and 4 (pages 98–101); Appendix 8 (pages 115–117); Appendices 9 and 10 (pages 118–121).

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Self-Measured Blood Pressure Monitoring (SMBP), with Additional Clinical and Health Coaching Support

Home blood pressure monitoring is the single most important tool for the self-management of hypertension.

AHRQ found strong evidence that SMBP plus additional support was even more effective in lowering blood pressure among patients with hypertension. Teams are encouraged to develop systems for providing additional clinical and health coaching support based on home BP readings and patient progress.

Refer to the CDC's Million Hearts® Action Guide on Self-Measured Blood Pressure Monitoring at http://millionhearts.hhs.gov/Docs/MH_SMBP.pdf, page 5, Figure 2, feedback loop.
Refer to Appendix 8, page 115.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

RESOURCE 5: Planned Visit Tools

EXAMPLE 1: Patient Visit Form for Hypertension/Dyslipidemia (download here)

Hypertension/Dyslipidemia Flow Sheet

Patient Name: **Medical Record #:**

Date of Birth: / /	**Gender:** M / F	**Smoker:** Never / Past / Current	**Nicotine Replacement Therapy** Never / Past / Current	**Height** (inches): **Weight** (lbs):	**BMI:**

CV Risk Factors

Modifiable: ☐ Diabetes ☐ Dyslipidemia ☐ Hypertension ☐ Smoking ☐ BMI > 25 ☐ Lifestyle sedentary

Non-modifiable: ☐ Family history CHD ☐ Personal history CHD ☐ Age: Female > 65 Male > 55

VITAL SIGNS	**ENTER VITAL SIGNS READINGS**							
DATES OF SERVICE	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
BP < 140/90 (diabetes or kidney disease < 130/80)	/ L R	/ L R	/ L R	/ L R	/ L R	/ L R	/ L R	/ L R
Weight (lbs)								
Pulse								

LAB PROFILE/STUDIES	**ENTER TEST DATE and RESULTS**				
Fasting Lipid Profile	/ / TC: LDL: HDL: TGL:	/ / TC: LDL: HDL: TGL:	/ / TC: LDL: HDL: TGL:	/ / TC: LDL: HDL: TGL:	
EKG	/ / :	/ / :	/ / :	/ / :	/ / :
Hematocrit	/ / :	/ / :	/ / :	/ / :	/ / :
Potassium	/ / :	/ / :	/ / :	/ / :	/ / :
Creatinine	/ / :	/ / :	/ / :	/ / :	/ / :
Glucose	/ / :	/ / :	/ / :	/ / :	/ / :
Urinalysis (proteinuria)	/ / :	/ / :	/ / :	/ / :	/ / :
LFTs	/ / :	/ / :	/ / :	/ / :	/ / :

SELF-MANAGEMENT COUNSELING	**GOALS**	**PATIENT GOALS** (Set jointly by clinician & patient)	**Date Goal Set**	**Date Goal Met**
Diet/nutrition	Low sodium, high-fiber diet, including lots of fruits and vegetables, low in saturated and trans fats.		/ /	/ /
Physical activity	Regular, vigorous physical activity, such as a brisk walk, for at least 30 minutes/day, 4 days a week.		/ /	/ /
Weight management	BMI >25 kg/m^2: 10% weight reduction at 1-2 lbs/week (Goal BMI: < 25 kg/m^2).		/ /	/ /
Smoking cessation	For smokers, set a quit date, if ready.		/ /	/ /
Alcohol intake	♂ 24 oz beer or 10 oz wine or 3 oz spirits/day ♀ & lighter wt persons: 12 oz beer or 5 oz wine or 1.5 oz spirits/day		/ /	/ /
Stress management	Assess/advise on recreation, sleep, home safety, and social support. Provide referrals as needed.		/ /	/ /
BP self-monitoring	Take BP at home. Check accuracy of home equipment with that in office.		/ /	/ /
Medication adherence	Medication is taken as prescribed.		/ /	/ /

MEDICATION REVIEW **FILL IN USING MEDICATIONS LISTED BELOW**

Hypertension: ☐ **Thiazide - Type Diuretic** ☐ **Beta Blocker** ☐ **ACE-I/ARB** ☐ **Calcium Channel Blocker** ☐ **Other**

Compelling indications for 1st line treatment other than thiazide

☐ CAD (confirmed or suspected) ☐ Post-MI ☐ Heart Failure ☐ History CVA ☐ Diabetes ☐ Kidney Disease

Dyslipidemia: ☐ **Statin** ☐ **Fibrates** ☐ **Niacin** ☐ **Cholesterol Absorption Inhibitor** ☐ **Bile Acid Sequestrants** ☐ **Other**

Medication	**Start Date**	**Stop Date**	**Adherence/Adverse Effects/Plan**
	/ /	/ /	
	/ /	/ /	
	/ /	/ /	
	/ /	/ /	
	/ /	/ /	
	/ /	/ /	

Source: New York City Department of Health and Mental Hygiene (www.nyc.gov)

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

EXAMPLE 2: Group Visit Starter Kit

The Group Visit Starter Kit is designed for health care teams who want to begin offering group visits for their patients. It contains information on:

- What are group visits
- Why they are useful
- How to plan and implement the visits
  - Task list and timeline
  - Who does what
  - Sample letter for patients
  - Sample agendas
- Information on a "Patient Workbook" for the participants
  - Group visit norms
  - Vitals record for patients
  - Clinic information sheet
- A list of resources to help you get started
  - Sources for patient education materials
  - Tips on facilitating groups
- References

Source: Group Visit Starter Kit, Group Health Cooperative, February 2001

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Section 6: Appendices

SECTION OVERVIEW

Appendix 1	Blood Pressure Measurement Training Guide (for Adults) ***(can be removed and used as a stand-alone blood pressure measurement training tool** – pages 68–94)*
Appendix 2	Bubble Diagram
Appendix 3	How Can I Control My High Blood Pressure? *(English and Spanish)*
Appendix 4	High Blood Pressure Action Plan *(English and Spanish)*
Appendix 5	Medicines to Help You – High Blood Pressure *(FDA document)*
Appendix 6	Posters *(English and Spanish)*
Appendix 7	Home Monitoring Book – How to Check Your Blood Pressure *(English and Spanish)*
Appendix 8	Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide
Appendix 9	Reading Food Labels *(English and Spanish)*
Appendix 10	Eat and Drink to Lower Blood Pressure *(English and Spanish)*
Appendix 11	Hypertension Treatment Chart Stickers
Appendix 12	Self-Management Support – Patient Planning Worksheet

Appendix 1

Blood Pressure Measurement Training Guide (for Adults)

This training guide (pages 69–94) can be removed from the overall manual and used as a stand-alone tool. Use this guide to ensure that blood pressure measurement is accurately performed by all staff – with each patient – each time. This guide can also be found, along with other measurement training tools, at: http://here.doh.wa.gov/materials/bp-measurement-training-kit

Accurate measurement is the first step in the management of hypertension!

Accurate blood pressure measurement will take more time than most practices expect. This has been a challenge for practices. However, in order to ensure for accuracy, many have learned how to integrate this process into the daily work of the practice. Each practice or organization will find it necessary to create a workflow that will allow for this new process.

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Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Blood Pressure Measurement

Introduction

The Importance of Accurate Blood Pressure Measurement

The burden of hypertension

Hypertension is the most common chronic condition seen in the primary care setting. Individuals who have hypertension are at risk for more serious chronic diseases and the condition places excessive strain on the health care system. It is a leading risk factor for stroke, cardiovascular disease, heart failure, and kidney disease, with 7.1 million deaths per year relating directly to hypertension!

Hypertension is present in one out of three adults and in two out of three for those over 64 years of age.

Intensifying the concern is that, of those treated, only 35 percent are controlled (national average) and one in three people with hypertension *do not even know they have the condition*.

It is a public health concern

Given that it is a top risk factor and common in our population, hypertension is a major public health concern. There are many efforts across the country to learn how to better manage blood pressure and to improve the control of hypertension.

Inaccurate measurement of blood pressure is common

Blood pressure is the most common and one of the most important clinical measurements performed in health care. Clinical staff perform the measurement of blood pressure multiple times every day, yet the American Heart Association reports that *"Blood Pressure readings are one of the most inaccurately performed measurements in clinical medicine."*

Accurate measurement is critical. It is time to take a fresh look at how we measure blood pressure!

Standardized, accurate blood pressure measurement is the FIRST STEP in improving the management of blood pressure and the control of hypertension.

This training guide

This guide will provide the tools you need to evaluate your blood pressure measurement protocols and to conduct staff training sessions to ensure that blood pressure is measured correctly on every patient, every time.

Thank you for your efforts in improving the measurement, screening, and control of blood pressure!

Blood Pressure Measurement

For the Trainer

Preparing for the Training

1. Review the following documents to compare your processes to the recommendations and identify variances:
   - Blood Pressure Measurement: Procedures (with Rationale), page 72
   - Article, "Blood-Pressure Measurement" by the New England Journal of Medicine (NEJM), page 75 *accompanies video clip of the same name*
   - Blood Pressure Measurement: Equipment/Materials Guidelines and Assessment, page 79
   - Blood Pressure Measurement: A Word about Calibration and Maintenance, page 82
2. Review the NEJM Blood Pressure Measurement video clip, "Blood-Pressure Measurement" (separate document on the Training Kit CD at http://here.doh.wa.gov/materials/bp-measurement-training-kit).
3. Make enough copies of the handout, "Blood Pressure Measurement: Pre-Test/Post-Test Questions" (page 83) so that each participant will have two copies.
4. Make enough copies of the handouts, "Blood Pressure Measurement: PowerPoint Training Presentation" (page 87) and "Blood Pressure Measurement: Procedure Guide" (page 91) so that each participant will have a copy.
5. Have available equipment to show a video clip and PowerPoint presentation.
6. Gather sphygmomanometers, stethoscopes, and measuring tapes to be used for the skills testing.
7. Provide paper for participants to record their blood pressures.
8. Make enough copies of the document, "Blood Pressure Measurement: Skills Testing – Trainer Observation Checklist" (page 93) so that the trainer will have two copies per participant.

Conducting the Training

1. Distribute the handout, "Blood Pressure Measurement: Pre-Test/Post-Test Questions." Ask participants to complete the test and set it aside.
2. Distribute the handout, "Blood Pressure Measurement: PowerPoint Training Presentation," and give the PowerPoint presentation (separate document on the Training Kit CD, titled "PowerPoint Training Presentation.pptx," at http://here.doh.wa.gov/materials/bp-measurement-training-kit). This will take about 8–10 minutes.
3. Show the NEJM Blood Pressure Measurement video clip (9 minutes).
4. Demonstrate the procedure for taking an accurate blood pressure to confirm proper technique.
5. Have participants take the post-test (same as pre-test). Give answers using the handout on page 85. Have participants compare their answers from pre-test to post-test to ensure understanding.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

For the Trainer continued

6. Distribute the "Blood Pressure Measurement: Procedure Guide" and conduct a practice session having participants use the handout.
7. Perform skills testing:
   - Each participant should be evaluated as they take two blood pressures on a minimum of two individuals.
   - Additional blood pressures should be taken until the participant can pass the skills test.
   - The trainer should use the document titled "Blood Pressure Measurement: Skills Testing – Trainer Observation Checklist." Two of these forms, at minimum, should be completed for each participant.
   - Once each participant passes, the trainer should place the Skills Testing results in their employee files.
   - Recheck each year or as determined by your institution.

Blood Pressure Measurement

Procedures (with Rationale)

Physical Environment

Procedure	Rationale
Comfortable room temperature	Cold can cause peripheral vasoconstriction and decreasing blood flow, which can cause a false low reading.
Table and chair: Table at a height so that the client's upper arm is supported and the brachial artery is level with heart.	Chair arm rests are too low • If arm is too low: false high • If arm is too high: false low

Blood Pressure Monitor

Procedure	Rationale
Wall mount sphygmomanometer: Position the monitor at screener eye level and within one meter from the screener.	• Stays in calibration longer and can't be dropped. • Eye level in order to make accurate reading.
Cuff size: Four cuff sizes should ideally be available. At minimum, an adult and large adult cuff should be available. **Cuff size with arm and bladder circumferences:** • Small Adult: 22-26 cm, 12x24 cm • Adult (standard): 27-34 cm, 16x30 cm • Large adult: 34-44 cm, 16x36 cm • Thigh: 45x52 cm, 20x42 cm	The most common error in blood pressure measurement is the use of an inappropriate cuff size. Errors over 30 mmHg can occur if an under-sized cuff is used. • Cuff bladder length should be at least 80 percent of arm circumference. • Cuff bladder width should be at least 40 percent of arm circumference. • If cuff is too small = false high (more pressure needed to occlude artery). • If cuff too large = false low (less pressure needed to occlude artery).

Client Preparation

Procedure	Rationale
• Office staff escorts client to screening area. • Client sits quietly for five minutes before blood pressure check with legs uncrossed, feet flat on the floor, back supported, and upper arm bare.	• Blood pressure taken with legs dangling or unsupported back leads to falsely high readings (on average five mmHg). • Crossing the legs may increase systolic pressures.
Ask why the client is here for a blood pressure check.	In order to provide the appropriate service for the client, ask: • Are you having symptoms? • Have you been instructed by your health care provider to have checks? • Other questions?

continued

Procedures (with Rationale) continued

Procedure	Rationale
Ask which arm is usually used for checks. If the client doesn't know, take pressure in both arms.	• Arms can have significant differences in readings. • The arm with the highest pressure should be used in the future.
Ask if the client has smoked or used caffeine within the past 30 minutes, or if they need to empty their bladder.	Any of these can cause a false high.
Explain that some pressure will be felt around arm for about 30 seconds.	Anxiety can produce a false high.
Position arm so it is relaxed and resting on the table, with palm up and brachial artery at heart level.	Improper arm position can result in: • Muscle contraction: false high • Arm too high: false low • Arm too low: false high
Have client remove clothing from arm.	Rolled up sleeve can tighten around the arm causing an inaccurate reading.
Ask that there be no talking by the client or screener during the reading.	Talking by either the client or screener can cause false highs.

Taking the Reading

Procedure	Rationale
• Palpate the brachial artery and place middle of the bladder length over the brachial artery. • Many cuffs have an indicator mark. Position the cuff half to one inch above elbow joint.	To ensure that cuff is positioned correctly.
Wrap and secure the cuff snugly. Screener should be able to slide only one finger between the cuff and the arm.	To ensure that cuff is positioned correctly.
• Determine the level of inflation by palpating the radial pulse. • Palpate the radial artery, rapidly inflate cuff, note the reading when the radial pulse disappears (this is an estimate of systolic pressure). • Deflate rapidly and completely.	Palpation is done to estimate the systolic pressure to determine how high to pump the cuff. • Pumping the cuff higher or lower than required can lead to inaccurate readings. • Inflating too high is uncomfortable, can increase anxiety, and can lead to false highs. • Inflating too low can give a false low with ausculatory gap issues.
• Place bell of stethoscope lightly over brachial artery. • Bell should not touch clothing, cuff, or rubber tube to avoid friction sounds.	• Too much pressure can distort the artery, producing sounds below diastolic pressure. • Touching clothing or tubing can result in extra noise that can compete with sounds below diastolic pressure.

continued

Procedures (with Rationale) continued

Procedure	Rationale
• Inflate cuff rapidly to 30 mmHg above the number where the radial pulse disappeared. • Then deflate at two to three mmHg per second.	Pumping the cuff higher or lower than required can lead to inaccurate readings. Steady release of air allows for the recognition of the Korotkoff ausculatory sounds: • Deflate too slowly, venous blood trapped = false high • Deflate too fast = false low • Ten mmHg errors are common
The first of two consecutive sounds is recorded as the systolic pressure. The diastolic pressure is recorded at the level where the sound disappears. Record reading to the nearest two mmHg. ***Note:*** *Do not round up.*	Rounding up to the nearest five or 10 mmHg is a common practice and leads to consistently high or low readings. This is particularly an issue when someone has borderline hypertension. For the systolic reading, record the level at which two consecutive beats are heard. (Phase I) For diastolic reading, record the level at which the sounds disappear. (Phase V) If the sounds disappear at zero, use muffling sound. (Phase IV) • This can occur in high output states such as pregnancy If sounds are heard immediately, deflate cuff and start over after one to two minutes (it means it wasn't inflated 30 mmHg above estimated systolic pressure). If you do **not** hear sounds or miss sounds, deflate completely, wait one to two minutes, and start over. Korotkoff ausculatory sounds: • Phase I: Clear tapping sounds corresponding to the appearance of a palpable pulse that gradually increases in intensity for at least two consecutive beats (systolic pressure). • Phase II: Sounds become softer and longer • Phase III: Sounds become crisper and louder • Phase IV: Sounds become muffled and softer • Phase V: Sounds disappear completely (diastolic pressure) Ausculatory gap: Sounds disappear between systolic and diastolic for a short time, then reappear as cuff deflates.
Measure blood pressure twice, 30 seconds apart. If the second reading is more than 10 mmHg systolic or six mmHg diastolic different from the first reading, wait two minutes and measure twice more, 30 seconds apart. ***Note:*** *Do this on both arms on first visit to establish which arm to use.*	Due to the numerous variables in getting an accurate blood pressure measurement, including environmental factors and white coat syndrome, the accuracy of the final reading increases with the number of readings taken.
Provide client with blood pressure card, or use what they bring, and record the average of the last two measurements. Record date, reading, and which arm was used.	This is to support the client in self-management.

VIDEOS IN CLINICAL MEDICINE

Blood-Pressure Measurement

Jonathan S. Williams, M.D., M.M.Sc., Stacey M. Brown, M.S., and Paul R. Conlin, M.D.

From the Medical Service, Veterans Affairs Boston Healthcare System (J.S.W., P.R.C.); the Division of Endocrinology, Diabetes, and Hypertension, Brigham and Women's Hospital (J.S.W., S.B., P.R.C.); and Harvard Medical School (J.S.W., P.R.C.) — all in Boston.

N Engl J Med 2009;360:e6.

INDICATIONS

Blood-pressure measurement is indicated in any situation that requires assessment of cardiovascular health, including screening for hypertension and monitoring the effectiveness of treatment in patients with hypertension. In the routine outpatient setting, blood-pressure measurement is obtained indirectly. Proper techniques are important to ensure consistent and reliable measurements.

CONTRAINDICATIONS

Measurement of blood pressure at the brachial artery is a generally benign procedure. However, there are some circumstances in which obtaining readings from a particular arm may not be appropriate; such circumstances include the presence of an arterial–venous shunt, recent axillary node dissection, or any deformity or surgical history that interferes with proper access or blood flow to the upper arm. If these relative contraindications are present, blood pressure should be assessed in the opposite arm. There may also be pre-existing conditions that can interfere with the accuracy or interpretation of readings, such as aortic coarctation, arterial–venous malformation, occlusive arterial disease, or the presence of an antecubital bruit. If neither arm can be used, then measurement of blood pressure in a leg may be indicated.

EQUIPMENT

Figure 1. Equipment used in blood-pressure measurement.

The essential equipment for blood-pressure measurement includes a stethoscope and a sphygmomanometer. The stethoscope tubing should be long enough to permit the practitioner to auscultate Korotkoff sounds while viewing the manometer at eye level. Use of the bell side of the stethoscope chestpiece facilitates auscultation of the low-frequency Korotkoff sounds. The sphygmomanometer consists of a blood-pressure cuff containing a distensible bladder, a rubber bulb with an adjustable valve for inflation, tubing that connects the cuff to the bladder, and a manometer (Fig. 1). Regular inspection and calibration of the equipment are important to ensure that it is in proper working order. For accurate measurement, calibrations are recommended every 6 months.[1,2]

Many institutions have removed mercury manometers from clinical settings and replaced them with aneroid manometers. The steps required for accurate blood-pressure measurement with an aneroid or a mercury manometer are identical.

PREPARATION

The examination room should be quiet, with a comfortable ambient temperature. Ideally, blood pressure should not be measured if the patient has engaged in recent physical activity, used tobacco, ingested caffeine, or eaten within the past 30 minutes.[3]

Positioning of the Patient

Correct positioning of the patient is essential for accurate measurement. The patient's back and legs should be supported, with the legs uncrossed and the feet resting on a firm surface.

The arm in which blood pressure will be measured should be bare to the shoulder, and the garment sleeve, if raised, should be loose, so that it does not interfere with blood flow or with proper positioning of the blood-pressure cuff. The arm should be supported and level with the heart. The manometer should be positioned at the health care practitioner's eye level.

Arm Measurement

A common error in measuring blood pressure is the use of an improperly fitted cuff. Undersized cuffs will result in overestimation of blood pressure. Selection of an appropriately sized cuff requires assessment of the patient's arm circumference at the midpoint of the upper arm. One half the distance between the acromion and the olecranon processes determines the midpoint of the arm (Fig. 2). The circumference is then measured at the midpoint.

Figure 2. Arm measurements for assessing cuff size.

Cuff Sizing

Cuffs are typically marked with line indicators intended to facilitate proper fitting. The index line runs perpendicular to the length of the cuff, and the range line runs parallel to the length of the cuff. Once the cuff has been wrapped around the arm, the index line should fall within the range-line limits, and the midpoint of the bladder should sit over the brachial artery.

In addition to index and range lines, cuffs will often indicate size or size ranges (e.g., adult or large adult). The sizes marked on the cuff should correspond to the appropriate arm circumference (Table 1). Although these may be helpful guides, it is most important to use a cuff size that is based on the arm measurement and on the match between the index and range lines once the cuff is placed on the patient. A cuff that is too small may contribute to a falsely elevated blood-pressure measurement.

Figure 3. Proper positioning of the blood-pressure cuff.

Cuff Placement

The cuff should be placed on a bare arm, approximately 2 cm above the elbow crease, with the midline of the bladder (usually indicated by the manufacturer) directly over the brachial artery (Fig. 3). It should fit snugly but should still allow for two fingers to slide under the cuff.

Table 1. Blood-Pressure Cuff Sizing.

Arm Circumference	Bladder Dimensions	Cuff Size
centimeters		
22 to 26	12×22	Small adult arm
27 to 34	16×30	Adult arm
35 to 44	16×36	Large adult arm
45 to 52	16×42	Adult thigh

Pulse-Obliteration Pressure

Inflating the cuff to an arbitrary level runs the risk of overinflation and undue patient discomfort or of underestimation of systolic blood pressure. To avoid underestimation of blood pressure due to an auscultatory gap, determine the pulse-obliteration pressure, which can be used to estimate an appropriate initial cuff-inflation pressure. An auscultatory gap is present when there is intermittent disappearance of the initial Korotkoff sounds after their first appearance. It is more likely to be present in older hypertensive patients and can lead to underestimation of systolic blood pressure.[4] Estimating systolic blood pressure by first measuring pulse-obliteration pressure helps to avoid an incorrect measurement of systolic blood pressure.

To determine the pulse-obliteration pressure, palpate the radial pulse while rapidly inflating the cuff to approximately 80 mm Hg. Then slow the inflation rate to approximately 10 mm Hg every 2 to 3 seconds, taking note of the reading at which the pulse disappears. After the pulse has disappeared, deflate the cuff at a rate of 2 mm Hg per second, noting when the pulse reappears, which confirms the obliteration pressure.

BLOOD-PRESSURE MEASUREMENT

Place the bell of the stethoscope over the brachial artery, using sufficient pressure to provide good sound transmission without over-compressing the artery. To avoid extraneous noise during cuff deflation, ensure that the stethoscope is not in contact with the patient's clothing or with the blood-pressure cuff.

Once the pulse-obliteration pressure is determined, initiate the auscultatory blood-pressure measurement by rapidly inflating the cuff to a level 20 to 30 mm Hg above the pulse-obliteration pressure. Then deflate the cuff at a rate of 2 mm Hg per second while listening for the Korotkoff sounds.

KOROTKOFF SOUNDS

As the cuff is deflated, turbulent blood flow through the brachial artery generates a series of sounds. Classically, these have been described according to five phases. Phase 1 is characterized by a clear, repetitive tapping sound, coinciding with reappearance of a palpable pulse. The initial appearance of phase 1 sounds is equal to the systolic blood pressure. During phase 2, audible murmurs in the tapping sounds are heard. In phases 3 and 4, muted changes in the tapping sounds occur (usually within 10 mm Hg of the true diastolic pressure) as the pressure measurement approaches the diastolic pressure. Phase 5 is not really a sound; it indicates the disappearance of sounds and equates to the diastolic blood pressure.

To ensure that diastole has been reached, continue to deflate the cuff pressure for an additional 10 mm Hg beyond the fifth Korotkoff sound.

Obtain a minimum of two blood-pressure measurements at intervals of at least 1 minute.[1] Record the average of the measurements as the blood pressure.

BLOOD-PRESSURE CLASSIFICATION

Normal adult blood pressure is defined as a systolic pressure less than 120 mm Hg and a diastolic pressure less than 80 mm Hg. Higher blood pressures are considered to indicate prehypertension and hypertension, which is also divided into stages (Table 2).[1]

OBSERVER ERROR

A common error in blood-pressure measurement is the introduction of observer bias, which occurs in two forms. The first occurs when practitioners show terminal-digit preference, and the second occurs when practitioners round the terminal

Table 2. Blood-Pressure Classification.

Classification*	Systolic	Diastolic
	mm Hg	
Normal	<120	<80
Prehypertension	120–139	80–89
Stage I hypertension	140–159	90–99
Stage II hypertension	≥160	≥100

* For classification of blood pressure as normal, the requirements for both systolic and diastolic pressure must be met; for the remaining categories, either the systolic or the diastolic requirement must be met.

digits, as when recorded blood-pressure levels are rounded to a 0 or a 5.[1] Manometer scales are generally scored in 2-mm increments, so a terminal digit of 5 cannot be read and the terminal digit 0 should occur only 20% of the time. Use of an appropriate deflation rate and careful recording of the appearance and disappearance of Korotkoff sounds generally facilitates precise measurement.

A parallax error may occur when mercury manometers are used if the observer is not at eye level with the mercury column. Such misalignment between the eye and the mercury meniscus may cause the meniscus to be read as higher or lower than the actual position.

SPECIAL CIRCUMSTANCES

Certain clinical conditions may complicate blood-pressure measurement or its interpretation. In the case of arrhythmias and dysrhythmias, irregularity in the timing of Korotkoff sounds (e.g., atrial fibrillation) can decrease the accuracy of a measurement. Accuracy can be improved by decreasing the deflation rate and by taking an average of several measurements.

Atherosclerotic vascular disease can result in the persistence of audible Korotkoff sounds (prolonged Korotkoff phase 4 or absence of phase 5) despite deflation to 0 mm Hg. This is called persistent systole and may occur in older patients and during pregnancy. In this situation, diastole should be estimated by noting the appearance of the fourth Korotkoff sound.

Occasionally, a patient with an exceptionally large arm circumference requires a cuff size that cannot be adequately positioned between the antecubital fossa and the upper arm. This can lead to patient discomfort and inadequate compression of the brachial artery. If an appropriate cuff cannot be fitted above the brachial artery, then it may be better to place a cuff on the forearm with auscultation of Korotkoff sounds at the radial artery. Care should be taken to ensure that the forearm is supported level with the heart. If the forearm is below heart level, a false elevation in pressure may occur, owing to increased hydrostatic forces.

Normal blood pressure fluctuates over a 24-hour period. In some situations, it may be prudent to obtain measurements at different times during the day, particularly when diagnosing or monitoring hypertension. It is also important to consider the timing and type of antihypertensive medications used when interpreting blood-pressure measurements in hypertensive patients.

Dr. Conlin reports receiving lecture fees from Merck. No other potential conflict of interest relevant to this article was reported.

REFERENCES

1. Pickering TG, Hall JE, Appel LJ, et al. Recommendations for blood pressure measurement in humans and experimental animals. I. Blood pressure measurement in humans: a statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. Hypertension 2005;45:142-61.
2. Beevers G, Lip GY, O'Brien E. ABC of hypertension: blood pressure measurement. II. Conventional sphygmomanometry: technique of auscultatory blood pressure measurement. BMJ 2001;322:1043-7.
3. Chobanian AV, Bakris GL, Black HR, et al. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003;42:1206-52.
4. Perloff D, Grim C, Flack J, et al. Human blood pressure determination by sphygmomanometry. Circulation 1993;88:2460-70.

Blood Pressure Measurement

Equipment/Materials Guidelines and Assessment

Evaluate Equipment and Exam Rooms

Purchase equipment and make room adjustments as needed. Use the Blood Pressure Measurement: Equipment/Room Assessment Sheet on page 81.

Sphygmomanometers

Aneroid sphygmomanometers are preferable because they can be used for a wider range of patients than electronic automatic digital monitors. A wall-mounted aneroid sphygmomanometer will stay in better calibration because it can't be dropped. An example is the Omron Large Face Sphygmomanometer, Model 11-675D.

- Wrist monitors are not recommended.
- Comfit (the rigid cuffs that someone slips arm into) are not recommended.

Equipment Validation

- Before purchasing a monitor, check for documentation of validations by an independent institution to ensure accurate measurement over a wide range of blood pressures, ages, and clinical conditions.
- Lists of approved monitors can be found at:

  Dabl Educational Trust: http://www.dableducational.org/sphygmomanometers.html

Other Equipment/Materials

- **Chair** in which someone can sit with their back supported and feet flat on the floor.
- **Table or counter** with space on which someone can rest their arm level with their heart, or a chair with adjustable armrests. (Upper arm should be at level of heart – mid-sternum.)
- **Four sized cuffs** (minimum adult and large adult cuffs in room; small adult and thigh quickly available). Refer to the listed measurements for cuff and bladder.
  Note: *Manufacturers may have different names for their various sized cuffs.*
  - **Small adult size:** Cuff size 22–26 cm; bladder circumference 12–24 cm
  - **Adult size (regular or standard):** Cuff size 27–34 cm; bladder circumference 16–30 cm
  - **Large adult size:** Cuff size 34–44 cm; bladder circumference 16–36 cm
  - **Thigh size:** Cuff size 45–52 cm; bladder circumference 20–42 cm
- **Cloth tape measure** to measure distance around upper arm to determine the correct size of cuff to use

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Equipment/Materials Guidelines and Assessment continued

- **Pen, paper, and calculator** for averaging multiple readings
- **Health messaging materials**
- **Wallet card** for documenting blood pressure and arm used

Room Assessment

- Blood pressure equipment: Does it work? Can it be calibrated? Is it in good shape (no obvious damage and/or not too old)?
- Can the chair be positioned next to the Sphygmomanometer?
- Is the Sphygmomanometer mounted where it can be read at eye level while taking the patient's blood pressure?
- Can either arm be supported at heart level? (Blood pressure should be taken on the arm with the highest reading as determined at first visit.)
- At a minimum, is there an adult and a large adult cuff in the room and other cuffs readily available?
- Is there a tape measure, calculator, and hypertension health messaging materials available in the room?

Equipment/Materials Guidelines and Assessment continued

Equipment/Room Assessment Sheet

Make copies of this form as needed.

Clinician Name:	
Room No. or Name:	
Item	**Description**
What are the blood pressure and other equipment and material needs?	
Can the chair be positioned correctly?	
Is the Sphygmomanometer mounted in an appropriate place?	
What is needed to ensure that both arms be supported at heart level?	
Are there the appropriate cuffs in the room?	
Equipment that will stay in room: Is it working and in good condition?	

Additional Comments:

Blood Pressure Measurement

A Word about Calibration and Maintenance

The purchase or sale of mercury sphygmomanometers is now illegal in Washington State and clinics are replacing them with the aneroid sphygmomanometers. However, aneroid sphygmomanometers do not maintain their stability over time, particularly if handled roughly, and require a check for calibration at regular intervals. Wall-mounted aneroid sphygmomanometers are more accurate than hand-held monitors because of less susceptibility to trauma.

Aneroid devices or other non-mercury monitors should be checked by connecting the manometer to a mercury column (if there's one available) with a Y-tube. (Each institution needs to decide whether or not they will keep 1–2 mercury monitors to use solely for calibration checks.) The needle should rest at the zero point before the cuff is inflated and should register a reading that is within 4 mmHg of the mercury column reading when inflated to pressures of 100–200 mmHg. The needle should return to zero after deflation. If a mercury monitor is not available for checking calibration, a non-mercury pressure vacuum meter can be used (see below).

The following suggested calibration check 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 the Advancement of Medical Instrumentation.

PROTOCOL

- 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.
- A digital pressure and vacuum meter, such as the Digimano* (Netech Corp, Hicksville, NY) 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 if possible and also checked by the manufacturer on an annual basis.
- A Y tube should be used to connect the inflation bulb to the reference and aneroid devices. The tube is then inflated to 240 mmHg on the reference device and the corresponding value on the aneroid device is recorded. The system is then deflated in increments of 20 mmHg to a lower limit of 60 mmHg with corresponding values from the aneroid device taken at each interval.
- 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.

* *Example of a digital pressure and vacuum meter available on the market for blood pressure calibration checks*

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

Blood Pressure Measurement

Pre-Test / Post-Test Questions

Date: _____ Name: _____

Pre-Test _____ **Post-Test** _____

Circle letters for ALL correct answers.

1. A 61-year-old woman, who has no chronic disease, has her blood pressure checked. The reading is 136/86. You tell her:

a. Good, it is in a healthy range.

b. A normal BP is less than 120/80. Your doctor may want to discuss this with you.

c. That's low for your age.

d. It looks like you may have high blood pressure.

2. A large man comes in to have his blood pressure checked. What cuff do you use?

a. The cuff that has a bladder that encircles 80 percent of the circumference of his arm.

b. The cuff that when wrapped around his arm, fits comfortably, and does not pull apart when inflated.

c. The cuff that is available, because most offices have a limited number of cuffs.

d. The cuff that is the correct size determined by measuring the circumference of his arm with a tape measure.

3. How high do you inflate the cuff when measuring blood pressure?

a. Ask what the person's normal blood pressure is, then pump 20 mmHg higher.

b. Pump cuff to 200 mmHg, then slowly deflate.

c. Pump cuff to 150 mmHg, then if you immediately hear beats, pump up another 30 mmHg, then deflate.

d. Palpate the radial artery, inflate noting where pulse disappears, deflate, and then pump 30 mmHg higher.

4. Circle ALL that can cause a false high blood pressure reading:

a. Client's legs are crossed.

b. Client has been waiting in chair five minutes.

c. Cuff is too small.

d. Arm is resting on arm of chair.

e. Client is told that he/she will feel some pressure on arm.

f. Client needs to use the bathroom.

g. Client is talking during measurement.

5. A man comes in to see you for the first time. What arm should you use when taking his blood pressure?

a. Either arm as long as there is not an injury or an AV fistula that would preclude the use of one arm.

b. The arm that is next to the table or bench so it is able to be positioned at heart level for the reading.

c. Both arms to determine which has the higher reading.

d. On the arm that the man indicates is the arm he usually uses.

6. What is the most common error made by health care workers when taking a blood pressure?

a. Using a cuff that is not the right size for an individual's arm.

b. Not performing pulse obliteration to assess how high the cuff should be inflated.

c. Rounding up, i.e., the BP is 138/78 and health care worker rounds up to 140/80.

d. Not palpating the radial artery to determine the correct placement of the cuff.

7. A person comes to the office for a blood pressure check. The first blood pressure reading is 146/90. You wait 30 seconds and repeat. The second reading is 119/78. You should then:

a. Average the two readings and record on the person's wallet card.

b. Record the second reading.

c. Wait 30 seconds, take one more reading, average the two highest, and record.

d. Wait two minutes, repeat measurement twice, and record average of last two readings.

Blood Pressure Measurement

Pre-Test / Post-Test Answers

Date: _____ Name: _____

Pre-Test _____ **Post-Test** _____

Correct answers are bold and circled.

1. **A 61-year-old woman, who has no chronic disease, has her blood pressure checked. The reading is 136/86. You tell her:**

   a. Good, it is in a healthy range.

   (b.) A normal BP is less than 120/80. Your doctor may want to discuss this with you.

   c. That's low for your age.

   d. It looks like you may have high blood pressure.

2. **A large man comes in to have his blood pressure checked. What cuff do you use?**

   (a.) The cuff that has a bladder that encircles 80 percent of the circumference of his arm.

   b. The cuff that when wrapped around his arm, fits comfortably, and does not pull apart when inflated.

   c. The cuff that is available, because most offices have a limited number of cuffs.

   (d.) The cuff that is the correct size determined by measuring the circumference of his arm with a tape measure.

3. **How high do you inflate the cuff when measuring blood pressure?**

   a. Ask what the person's normal blood pressure is, then pump 20 mmHg higher.

   b. Pump cuff to 200 mmHg, then slowly deflate.

   c. Pump cuff to 150 mmHg, then if you immediately hear beats, pump up another 30 mmHg, then deflate.

   (d.) Palpate the radial artery, inflate noting where pulse disappears, deflate, and then pump 30 mmHg higher.

Pre-Test / Post-Test Answers continued

4. Circle ALL that can cause a false high blood pressure reading:

(a.) Client's legs are crossed.

b. Client has been waiting in chair five minutes.

(c.) Cuff is too small.

d. Arm is resting on arm of chair.

e. Client is told that he/she will feel some pressure on arm.

(f.) Client needs to use the bathroom.

(g.) Client is talking during measurement.

5. A man comes in to see you for the first time. What arm should you use when taking his blood pressure?

a. Either arm as long as there is not an injury or an AV fistula that would preclude the use of one arm.

b. The arm that is next to the table or bench so it is able to be positioned at heart level for the reading.

(c.) Both arms to determine which has the higher reading.

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a. Average the two readings and record on the person's wallet card.

b. Record the second reading.

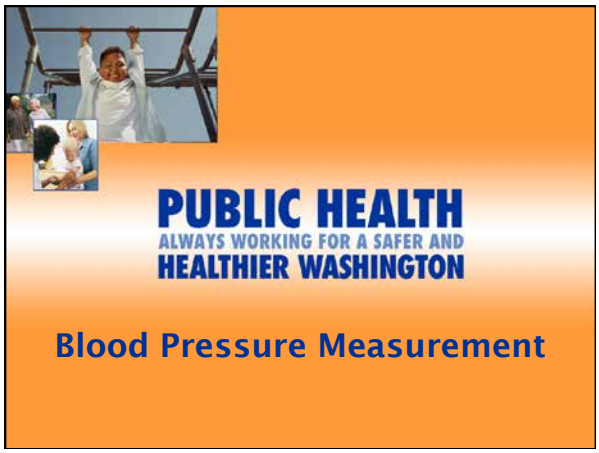
c. Wait 30 seconds, take one more reading, average the two highest, and record.

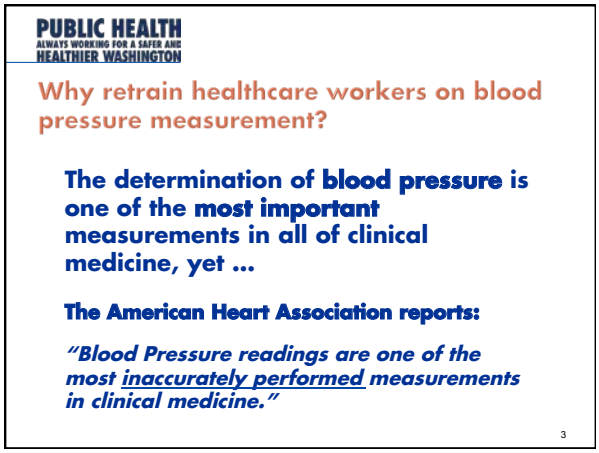
(d.) Wait two minutes, repeat measurement twice, and record average of last two readings.

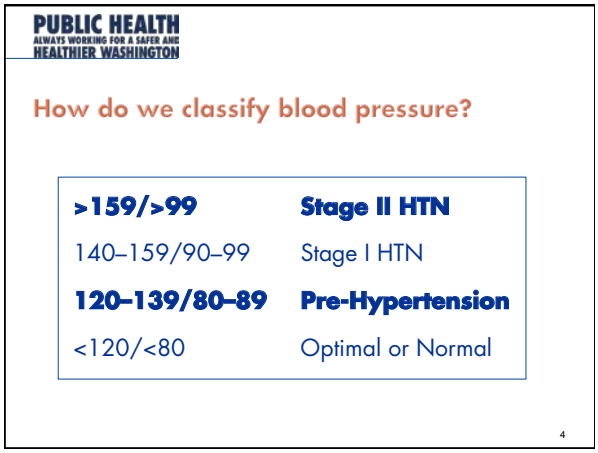
Blood Pressure Measurement

PowerPoint Training Presentation

This PowerPoint presentation is on the Blood Pressure Measurement Training Kit CD available at:
http://here.doh.wa.gov/materials/bp-measurement-training-kit







Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

PowerPoint Training Presentation continued

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

High blood pressure in the United States

Hypertension:
- 30% of U.S. adults
- 50% of Americans 65 years old

Pre-hypertension:
- 25% of U.S. adults
- Vascular damage is already occurring

Risk factor for stroke, CKD, and heart disease

5

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

What hypertension does?

When force of blood hitting the walls of the blood vessels is too high—

- Damages the walls
- Causes snags so fatty substances stick
- Vessels get clogged and narrow, raising pressure even higher
- Vicious cycle of damage affecting vessels throughout the body

Hypertension causes systemic vascular disease and leads to other chronic diseases

6

PUBLIC HEALTH
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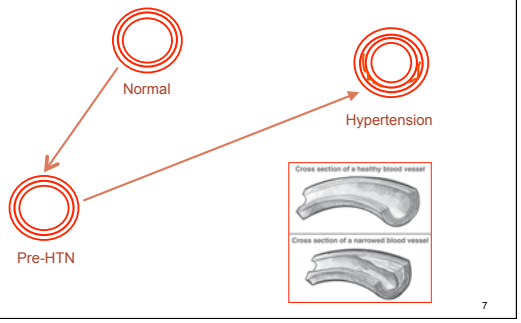
AND…Vascular Damage Starts with Pre-Hypertensive Blood Pressure Levels



7

PUBLIC HEALTH
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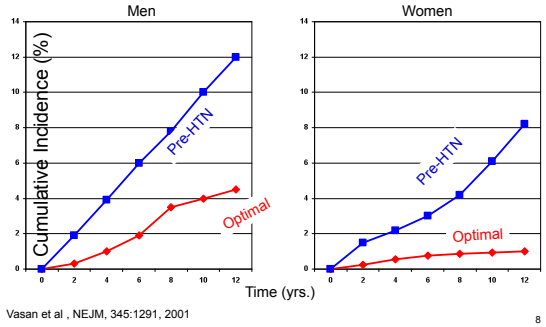
Cumulative Incidence of Cardiovascular Events for Adults with Pre-Hypertension

(Framingham, n=6,852)



Vasan et al , NEJM, 345:1291, 2001

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PowerPoint Training Presentation continued

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

The costs of making small measurement errors

An error of -5 mmHg =
Missing 21 million borderline hypertensive patients (42 percent of all patients with hypertension) [2002 data]

An error of +5 mmHg =
Moving 27 million people from pre-hypertension into the high blood pressure range [2002 data]

Cost of care: 27 billion for "non-disease"

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PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Small changes In blood pressure lead to reduction in risks for patients

5 point decrease in blood pressure reduces risk of stroke by 34% and risk of heart attack by 21%

Making a **small to moderate change in just one lifestyle change** can result in 5-10 points decrease in blood pressure

For our patients: Even small changes can reduce their risk and increase their confidence in making important lifestyle changes. **ACCURACY MATTERS!**

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PUBLIC HEALTH
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Being Exact Matters!

It is critical that we measure blood pressure correctly and identify small blood pressure changes.

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Where are the errors?

Cause	Systolic Effect
Cuff too small	+10-40 mm Hg
Cuff too large	-5-25 mm Hg
Cuff placed over clothing	+/-10-40 mm Hg
Arm above heart level	+2 mm Hg per inch
Arm below the heart level	-2 mm Hg per inch
Feet not flat on floor	+5-15 mm Hg
Back not supported	+5-15 mm Hg
Legs crossed	+5-8 mm Hg
Patient doesn't rest 3-5 min	+10-20 mm Hg
Tobacco or Caffeine use	+ 6-11 mm Hg
Patient in pain	+10-30 mm Hg
Patient talking	+ 10-15 mm Hg
Full bladder	+ 10-15 mm Hg
Difficulty breathing	+ 5-8 mm Hg
Artery line not centered	+4-6 mm Hg
White Coat Syndrome	+/- 10-40 mm Hg

American Family Physician; Practice Guidelines - New AHA Recommendations for Blood Pressure Measurement; Vol 72, Number 7, Oct . 2005

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PUBLIC HEALTH
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Update on technique

Prepare your patient. Then:

1. Select appropriate cuff – most common error
2. Determine arm to use – measure on both arms for new patient and use arm with highest reading
3. Position arm at heart level and well supported
4. Use pulse obliteration to determine level of inflation
5. Record the reading (no rounding up or digit preference)
6. Take multiple readings due to BP point to point variances (30 seconds –1 minute between readings)
7. Take and average two additional readings if first two readings differ by 10 mmHg Systolic or 6 mmHg Diastolic

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Show Video Clip:

New England Journal Of Medicine (NEJM)
Blood Pressure Measurement

14

PUBLIC HEALTH
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References

- **American Family Physician; Practice Guidelines – New AHA Recommendations for Blood Pressure Measurement; Vol 72, Number 7, Oct . 2005**
- **JNC-7 Express: www.nhlbi.nih.gov/guidelines/hypertension/express.pdf**
- **Pickering, T.J., et al. Recommendation for Blood Pressure Measurement in Humans and Experimental Animals. Part 1. Blood Pressure Measurement in Humans. A Statement for Professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. Circulation 2005; 111.697-716.**

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Blood Pressure Measurement

Procedure Guide

Physical Environment

- ❑ Set a comfortable room temperature.
- ❑ Place table at a height that allows the upper arm to be supported at heart level.

The Equipment

- ❑ **Wall mount sphygmomanometer:** Position the monitor at screener eye level and ideally within one meter from the screener.
- ❑ **Cuff size:** Four cuff sizes should ideally be available. At minimum, an adult and large adult cuff should be available.
- ❑ Correct cuff is selected by using "range lines" on cuff or by arm measurement.
- ❑ Arm circumference should be measured at midpoint between shoulder and elbow. Cuff size is selected according to arm circumferences:

Small adult:	22 – 26 cm
Adult (standard):	27 – 34 cm
Large adult:	34 – 44 cm
Thigh:	45 x 52 cm

Preparing the Patient

- ❑ Office staff escorts client to screening area.
- ❑ Determines if client has smoked or used caffeine within the past 30 minutes, or if they need to empty their bladder.
- ❑ Explains procedure including number of readings, rest period, positioning, and that there should be no talking during rest and reading.
- ❑ Has client remove clothing from arm (both arms, if the first time patient has been seen).
- ❑ Explains that some pressure will be felt around arm for about 30 seconds during the measurement.
- ❑ Positions arm so it is relaxed and resting on a surface with palm up and brachial artery (upper arm) at heart level.
- ❑ Client sits quietly for five minutes before blood pressure check with legs uncrossed, feet flat on the floor, back supported, and upper arm bare.

The Measurement

Preparation

- ❑ Palpate the brachial artery in upper medial inner arm and place middle of the bladder over the brachial artery (there may be an indicator arrow).
- ❑ Position the cuff about 1" above the crease in the elbow.
- ❑ Wrap and secure the cuff snugly. Screener should be able to slide only one finger between the cuff and the arm.
- ❑ Determine the level of inflation:
  - Palpate (feel) for radial pulse.
  - Quickly inflate cuff to about 70 mmHg, then inflate by 10 mmHg increments until radial pulse disappears (this is the estimated systolic BP). Continue to inflate to about 30 mmHg above the estimated obliteration point and then deflate slowly until can verify the pulse obliteration point.
  - Deflate cuff rapidly and completely.
  - Wait 15 seconds.

Taking the Blood Pressure Reading

- ❑ Place earpieces in forward position and place bell (preferably) of stethoscope lightly over brachial artery. The stethoscope should not touch clothing, cuff, or rubber tubing to avoid friction sounds.
- ❑ Inflate cuff to 30 mmHg above the number where the radial pulse disappeared (pulse obliteration point).
- ❑ Then deflate cuff at two to three mmHg per second.
- ❑ The first of two consecutive sounds is recorded as the systolic pressure. The diastolic is recorded at the level where the sound disappears. Record reading to the nearest two mmHg (no rounding up or down of reading).
- ❑ Measure blood pressure twice, 30 seconds to one minute apart.
- ❑ If the second reading is more than 10 mmHg systolic or 6 mmHg diastolic different from the first reading, wait two minutes and measure twice more, 30 seconds to one minute apart.
- ❑ Record the average of the last two measurements. Record the date, reading and arm used. You may also want to document the cuff size.
- ❑ Provide the patient their blood pressure reading on a wallet card or other tool, and provide additional resources and support to assist patient in managing their blood pressure.

Note: *If the patient is new to your office, take the blood pressure on both arms (unless contraindicated) to identify the arm with the highest reading. Record the highest blood pressure reading and use that arm in subsequent visits.*

Blood Pressure Measurement

Skills Testing – Trainer Observation Checklist

Instructions: The trainer should use this checklist to assess the participant's ability to take an accurate blood pressure, per protocol. The participant should take at least two blood pressures on two patients/individuals. The trainer will use this checklist to observe and record notes and readings. When the step asks for measurements (the arm circumference, cuff size, radial pulse oblitoration point, maximum inflation level, actual inflation level, and blood pressure reading), the actual measurement should be recorded by the trainer, *as reported by the participant*.

"Yes" is only marked if all steps are performed correctly; otherwise check "No."

Participant: _____

Trainer: _____ Date: _____

Steps		Observation #1	Observation #2
1	**Procedure explanation and proper preparation of patient:** • Explains procedure and number of readings • Explains rest period, positioning and need to avoid conversation during measurement	Yes _____ No _____	Yes _____ No _____
2	**Cuff size:** • Accurately obtains arm circumference at measured midpoint • Selects correct cuff **Cuff placement:** • Places bladder center over brachial artery – palpated on upper medial arm • Lower edge of cuff approximately 2 1/2 cm above elbow crease; cuff is smooth and snug	Yes _____ No _____ Arm circumference: _____ Cuff size selected: _____	Yes _____ No _____ Arm circumference does not need to be measured.
3	**Estimates the systolic blood pressure through radial pulse obliteration procedure:** • Locates the radial pulse • Rapidly inflates to approximately 80 mmHg • Then inflates at rate of about 2 mm/Hg until radial pulse obliteration (disappears) is achieved • Inflates to 20 mmHg above obliteration and then deflates until pulse is felt again to verify pulse obliteration pressure • Quickly deflates down to zero • States the estimated systolic blood pressure and maximum inflation level	Yes _____ No _____ Pressure when radial pulse disappeared: _____ Maximum inflation level: _____	No need to repeat

continued

Skills Testing – Trainer Observation Checklist continued

Steps		Observation #1	Observation #2
4	**Stethoscope:** • Palpates medial side of arm at the bend in the elbow, locates the strongest brachial pulse, and marks that point • Places ear pieces in the forward position • Places bell of stethoscope (if stethoscope has a bell) directly over palpated artery	Yes _____ No _____	Yes _____ No _____
5	**Inflation/deflation:** • Inflates rapidly and smoothly • Inflates to correct level (record level of inflation) – should match the maximum inflation level recorded in Step 3 • Deflates at 2–3 mmHg per second	Yes _____ No _____ Cuff inflated to: _____mmHg	Yes _____ No _____ Cuff inflated to: _____mmHg
6	**Blood pressure readings:** • Waits at least 30 seconds between readings • Readings are recorded at the nearest .2 mmHg (no rounding)	Yes _____ No _____ Recorded BP #1: _____ **Repeat Steps 1–6 for Observation #2**	Yes _____ No _____ Recorded BP #2: _____ **Proceed to Step 7 (below)**
7	**Additional blood pressure readings if necessary:** Trainer asks participant whether additional BP's are required for this patient. Did they answer correctly? (If second reading is more than 10 mmHg systolic or 6 mmHg diastolic different from the first reading, the person taking the BP should wait two minutes and measure twice more, 30 seconds apart.)	Yes _____ No _____	N/A
8	**Records readings:** Averages the last two readings. Documents the date, blood pressure, and arm used. Gives results to patient	Yes _____ No _____	N/A
9	**Trainer takes blood pressure and compares:** Takes readings on the same subject and compares readings to those of participant. Readings should not differ by more than +/- 4mmHg.	BP #1: _____	BP #2: _____

Pass: Yes_____ No_____

Blood Pressure Measurement

References (for pages 69–94)

American Heart Association

British Hypertension Society

Heart Foundation of Australia, Guide to Management of Hypertension, 2008.

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Pharmacotherapy for Prehypertension-Mission Accomplished?, Massachusetts Medical Society; March 14, 2006; Downloaded from NEJM on March 14, 2006

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O'Brien et al. Blood Pressure Measuring Devices: Recommendations of the European Society of Hypertension. BMJ, 2001, 322: 531-536

Williams, J.S., et al. Blood Pressure Measurement. New England Journal of Medicine, 2009, 360:5

Website listing validated sphygmomanometers:
Dable Educational Trust: http://www.dableducational.org/sphygmomanometers.html

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 2:
Bubble Diagram

If you have *high blood pressure*, here are some things you can talk about with your health care provider. Choose to talk about changing any of these and add other concerns in the blank circles:

Reducing sodium (salt)

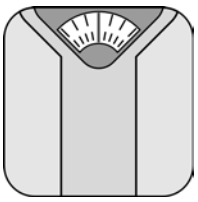
Taking medications to help control high blood pressure

How the medications are making me feel

Physical activity

Smoking

Losing weight



Depression

Diet

Adapted from "Partnering in Self-Management Support: A Toolkit for Clinicians."

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 3:
How Can I Control My High Blood Pressure?

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-clin-bp-goalsht.pdf

Eat Better

Be Physically Active

Take My Medicine

OTHER

Monitor My Blood Pressure at Home

Cope with Stress

Limit Alcohol

Stop Smoking

My goal for the next month is (What I want to do. For example, start walking everyday):

_____

My action plan is (Something I want to do right away):

_____

One thing that could keep me from my goal and what I will do about it.

_____

I will do this to make my success more likely.

_____

My confidence that I can reach my goal is:
(Scale of 1-10 with 1 being not confident at all, 10 being very confident.) _____

Follow-up plan (How and when): _____

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Michael R. Bloomberg, Mayor
Thomas R. Frieden, M.D., M.P.H., Commissioner
nyc.gov/health

TAKE CARE NEW YORK — KEEP YOUR HEART HEALTHY: A Key Step to a Healthier New York

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

¿Cómo puedo controlar mi presión alta?

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-clin-bp-goalsht-sp.pdf

Comer Mejor

Sea Físicamente Activo

Tomar Mi Medicina

OTRA

Controlar Mi Presión Arterial En El Hogar

Enfrentar El Estrés

Limitar Las Bebidas Alcohólicas

Dejar De Fumar

Mi objetivo para el próximo mes es (Qué quiero hacer. Por ejemplo, empezar a caminar todos los días):

_____

Mi plan de acción es (Algo que quiero hacer enseguida):

_____

Una cosa que puede dificultar lograr mi objetivo y cómo puedo manejarla.

_____

Voy a hacerlo para lograr alcanzar el éxito.

_____

Mi confianza de que voy a alcanzar mi objetivo es:
(Escala de 1-10 siendo 1 no hay confianza, y 10 mucha confianza.) _____

Plan de seguimiento (cómo y cuando): _____

NYC Health nyc.gov/health
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Michael R. Bloomberg, Alcalde
Thomas R. Frieden, M.D., M.P.H., Comisionado

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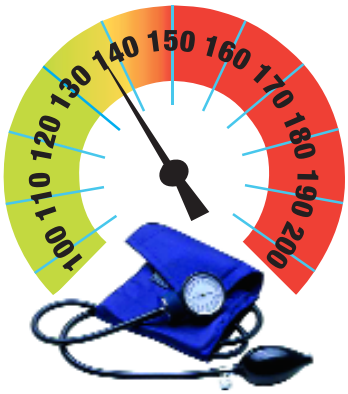
Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 4: High Blood Pressure Action Plan

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-clin-bp-actionplan.pdf

BLOOD PRESSURE



Today's Date: _____

Blood Pressure: _____ /_____

YOUR GOAL: LESS THAN

☐ 140/90 ☐ 130/80

EAT LESS SALT
EAT MORE FRUITS & VEGETABLES

Food Plan: _____

_____

_____

TAKE YOUR MEDICINE

1. Medication:_____
_____/Times a day
2. Medication:_____
_____/Times a day
3. Medication:_____
_____/Times a day
4. Medication:_____
_____/Times a day

BE PHYSICALLY ACTIVE

_____
Activity

_____
Minutes

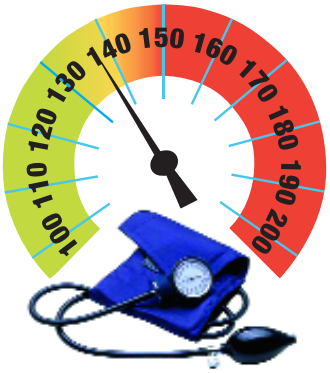
_____
Times per week

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Plan de acción para la presión alta

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-clin-bp-actionplan-sp.pdf

PRESIÓN ARTERIAL



Fecha de hoy: _____

Presión arterial: _____ /_____

SU OBJETIVO: MENOS DE

☐ 140/90 ☐ 130/80

CONSUMA MENOS SAL COMA MÁS FRUTAS Y VEGETALES

Plan de alimentos: _____

_____

_____

TOME SU MEDICINA

1. Medicamento:_____
   _____/Cuantas veces al día
2. Medicamento:_____
   _____/Cuantas veces al día
3. Medicamento:_____
   _____/Cuantas veces al día
4. Medicamento:_____
   _____/Cuantas veces al día

SEA FÍSICAMENTE ACTIVO

_____
Actividad

_____
Minutos

_____
Cuantas veces por semana

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Adaptado del Gouverneur Healthcare Services Diabetes Project

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Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 5: Medicines to Help You – High Blood Pressure (FDA document)

Source: FDA Office of Women's Health – High Blood Pressure[26]
www.fda.gov/ForConsumers/ByAudience/ForWomen/ucm118529.htm

SECTION OVERVIEW

Types of High Blood Pressure Medicines:

- ACE Inhibitors
- Beta Blockers
- Calcium Channel Blockers
- Peripherally Acting Alpha-Adrenergic Blockers
- Angiotension II Antagonists
- Vasodilators
- Centrally-acting Alpha Adrenergics
- Renin Inhibitors
- Combination Medicines
- Diuretics (sometimes called "water pills")

The following gives brand and generic names, side effects, and warning signs that can be used by the practice team and patient.

This information reflects the Food and Drug Administration's (FDA) current analysis of data available to FDA concerning these products. FDA intends to update this sheet when additional information or analyses become available.

For the most recent information about each drug, refer to:

FDA Approved Drugs

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

(ACE) Inhibitors: Angiotension-Converting Enzyme

Brand Name	Generic Name
Aceon	Pereindopril
Accupril	Quinapril
Altace	Ramipril
Capoten	Captopril
Lotensin	Benazepril
Mavik	Trandolapril
Monopril	Fosinopril
Prinivil	Lisinopril
Univasc	Moexipril
Vasotec	Enalapril/Enalaprilat
Zestril	Lisinopril

ACE Inhibitors: What You Should Know

Warnings

- Women who are pregnant should talk to their doctor about the risks of using these drugs late in pregnancy.
- People who have kidney or liver problems, diabetes, or heart problems should talk to their doctor about the risks of using ACE drugs.
- People taking diuretics (water pills) should talk to their doctor about the risks of using ACE drugs.

Common Side Effects

- Cough
- Dizziness
- Feeling tired
- Headache
- Problems sleeping
- Fast heartbeat

Warning Signs – Call your doctor if you have any of these signs:

- Chest pain
- Problems breathing or swallowing
- Swelling in the face, eyes, lips, tongue, or legs

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Beta-Blockers

Brand Name	Generic Name
Bystolic	Nebivolol/Timolol
Coreg	Carvedilol
Corgard	Nadolol
Inderal	Propranolol
Inderal LA	Propranolol/Betaxolol
Levatol	Penbutolol
Lopressor	Metoprolol
Sectral	Acebutolol
Tenormin	Atenolol
Toprol XL	Metoprolol
Trandate	Labetalol/Pindolol
Zebeta	Bisoprolol

Beta-Blockers: What You Should Know

Warnings

- Do not use these drugs if you have slow heart rate, heart block, or shock.
- Women who are pregnant or nursing should talk to their doctor before they start using Beta-Blockers.
- The elderly and people who have kidney or liver problems, asthma, diabetes, or overactive thyroid should talk to their doctor about the specific risks of using any of these Beta-Blockers.

Common Side Effects

- Feeling tired
- Upset stomach
- Headache
- Dizziness
- Constipation or diarrhea
- Feeling lightheaded

Warning Signs – Call your doctor if you have any of these signs:

- Chest pain
- Problems breathing
- Slow or irregular heartbeat
- Swelling in the hands, feet, or legs

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Calcium Channel Blockers

Brand Name	Generic Name
Norvasc	Amlodipine
Cleviprex	Clevidipine
Cardizem	Diltiazem
Dilacor XR	Diltiazem
Tiazac	Diltiazem
Plendil	Felodipine
DynaCirc CR	Isradipine
Cardene	Nicardipine
Adalat CC	Nifedipine
Procardia	Nifedipine/Nimodipine
Sular	Nisoldipine
Calan	Verapamil
Covera HS	Verapamil
Isoptin	Verapamil
Verelan	Verapamil

Calcium Channel Blockers: What You Should Know

Warnings

- Do not use calcium channel blockers if you have a heart condition or if you are taking nitrates, quinidine, or fentanyl.
- People who have liver or kidney problems should talk to their doctor about the specific risks of using any Calcium Channel Blocker.
- Women who are pregnant or nursing should talk to their doctor before they start using these drugs.

Common Side Effects

- Feeling drowsy
- Headache
- Upset stomach
- Ankle swelling
- Feeling flushed (warm)

Warning Signs – Call your doctor if you have any of these signs:

- Chest pain
- Serious rashes
- Swelling of the face, eyes, lips, tongue, arms, or legs
- Fainting
- Irregular heartbeat

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Peripherally Acting Alpha-Adrenergic Blockers

Brand Name	Generic Name
Cardura	Doxazosin
Dibenzyline	Phenoxybenzamine
Minipress	Prazosin
Hytrin	Terazosin

Peripherally Acting Alpha-Adrenergic Blockers: What You Should Know

Warnings

- The elderly and people who have liver problems should talk to their doctor about the risks of using these drugs.

Common Side Effects

- Dizziness
- Feeling tired
- Feeling lightheaded
- Vision problems
- Swelling of the hands, feet, ankles, or legs
- Decreased sexual ability

Warning Signs – Call your doctor if you have any of these signs:

- Chest pain
- Irregular heartbeat
- Painful erection in men

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

APPENDIX 5

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Vasodilators

Brand Name	Generic Name
None	Hydralazine
None	Minoxidil

Vasodilators: What You Should Know

Warnings

- Do not use these drugs if you are also taking bisulfates.
- Women who are pregnant or nursing should talk to their doctor before they start using these drugs.
- People who have diabetes, heart disease, or uremia (build up of waste in your blood) should talk to their doctor about the risks of using any of these drugs.
- People taking diuretics (water pills), insulin, phenytoin, corticosteroids, estrogen, warfarin, or progesterone should talk to their doctor about the risks of using any of these drugs.

Common Side Effects

- Headache
- Upset stomach
- Dizziness
- Growth in body hair

Warning Signs – Call your doctor if you have any of these signs:

- Fever
- Fast heartbeat
- Fainting
- Chest pain
- Problems breathing
- Sudden weight gain

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

APPENDIX 5

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Angiotension II Antagonists

Brand Name	Generic Name
Atacand	Candesartan
Avapro	Irbesartan
Benicar	Olmesartan
Cozaar	Losartan
Diovan	Valsartan
Micardis	Telmisartan
Teveten	Eprosartan

Angiotension II Antagonists: What You Should Know

Warnings

- Do not use these drugs if you are pregnant or nursing.
- People who have kidney disease, liver disease, low blood volume, or low salt in their blood should talk to their doctor about the risks of taking these drugs.
- People taking diuretics (water pills) should talk to their doctor about the risks of taking these drugs.

Common Side Effects

- Sore throat
- Sinus problems
- Heartburn
- Dizziness
- Diarrhea
- Back pain

Warning Signs – Call your doctor if you have any of these signs:

- Problems breathing
- Fainting
- Swelling of the face, throat, lips, eyes, hands, feet, ankles, or legs

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

APPENDIX 5

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Centrally-acting Alpha Adrenergics

Brand Name	Generic Name
Catapres	Clonidine
Tenex	Guanfacine

Centrally-acting Alpha Adrenergics: What You Should Know

Warnings

- Women who are pregnant or nursing should talk to their doctor before using these drugs.
- People with heart disease, recent heart attack, or kidney disease should talk to their doctor before using these drugs.
- Drinking alcohol may make side effects worse.

Common Side Effects

- Dizziness
- Dry mouth
- Upset stomach
- Feeling drowsy or tired

Warning Signs – Call your doctor if you have any of these signs:

- Fainting
- Slow or irregular heartbeat
- Fever
- Swollen ankles or feet

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

APPENDIX 5

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Renin Inhibitors

Brand Name	Generic Name
Tekturna	Aliskiren

Renin Inhibitors: What You Should Know

Warnings

- Women who are pregnant or planning to become pregnant should talk to their doctor before using this drug.
- People with kidney problems should talk to their doctor before using this drug.
- Tell your doctor if you are taking water pills (diuretics), high blood pressure medicines, heart medicines, or medicines to treat a fungus.

Common Side Effects

- Diarrhea

Warning Signs – Call your doctor if you have any of these signs:

- Low blood pressure
- Swelling of the face, throat, lips, eyes or tongue

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

APPENDIX 5

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Combination Medicines

Brand Name	Generic Name
Diovan HCT	Hydrochlorothiazide and Valsartan
Exforge	Amlodipine and Valsartan
Hyzaar	Hydrochlorothiazide and Losartan
Lotrel	Benazepril and Amlodipine
Tarka	Verapamil and Trandolapril
Vaseretic	Enalapril and Hydrochlorothiazide

Combination Drugs: What You Should Know

These medicines are made up of two different kinds of blood pressure medicines. Look for the **generic names** of these drugs on one of the other lists in this guide.

Warnings and Side Effects

The warnings and side effects for these drugs will be the same as those listed earlier for both generic drugs.

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

Other Combination Medicines

Brand Name	Generic Name
Caduet	Amlodipine and Atorvastatin

Caduet is used to treat people who have both high blood pressure and high cholesterol.

Warnings

- Do not take Caduet if you are pregnant or planning to become pregnant.
- Do not take Caduet if you are breastfeeding.
- Do not take Caduet if you have liver problems.

Common Side Effects

- Swelling of the legs or ankles (edema)
- Muscle or joint pain
- Headache
- Diarrhea or constipation
- Feeling dizzy
- Feeling tired or sleepy
- Gas
- Rash
- Nausea
- Stomach Pain
- Fast or irregular heartbeat
- Face feels hot or warm (flushing)

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Warning Signs – Call your doctor if you have any of these signs:

- Muscle problems like weakness, tenderness, or pain that happens without a good reason (like exercise or injury).
- Brown or dark-colored urine
- Skin or eyes look yellow (jaundice)
- Feel more tired than usual

Diuretics (sometimes called "water pills")

Brand Name	Generic Name
Aldactazide/Aldactone	Spironolactone
Demadex	Torsemide
Diuril	Chlorothiazide
Enduron	Methyclothiazide
Microzide/Oretic	Hydrochlorothiazide
Lasix	Furosemide/Indapamide
Saluron	Hydroflumethiazide
Thalitone	Chlorthalidone
Zaroxolyn	Metolazone

Diuretics: What You Should Know

Warnings

- Tell your doctor if you are breastfeeding. These medicines may pass into your breast milk.
- Do not use these medicines if you have problems making urine.
- People with kidney or liver problems, pregnant women, and the elderly should talk to their doctor about the risks of using diuretics.

Common Side Effects

- Dizziness
- Frequent urination
- Headache
- Feeling thirsty
- Muscle cramps
- Upset stomach

Warning Signs – Call your doctor if you have any of these signs:

- Severe rash
- Problems breathing or swallowing
- Hyperuricemia (Gout)

For more information about the risks and side effects for each drug, check Drugs@FDA:
FDA Approved Drugs

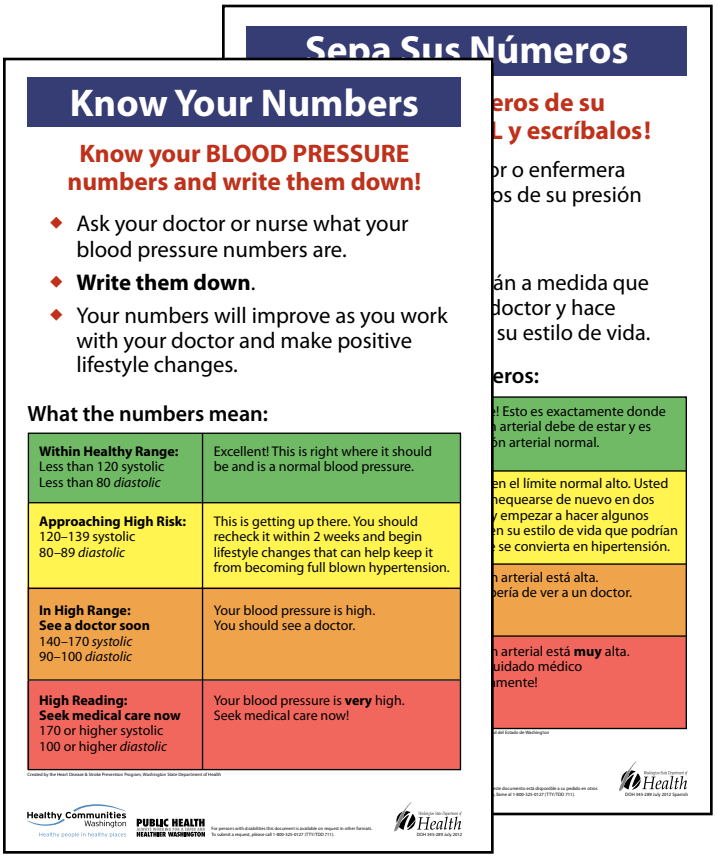
Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 6: Posters

Know Your Numbers

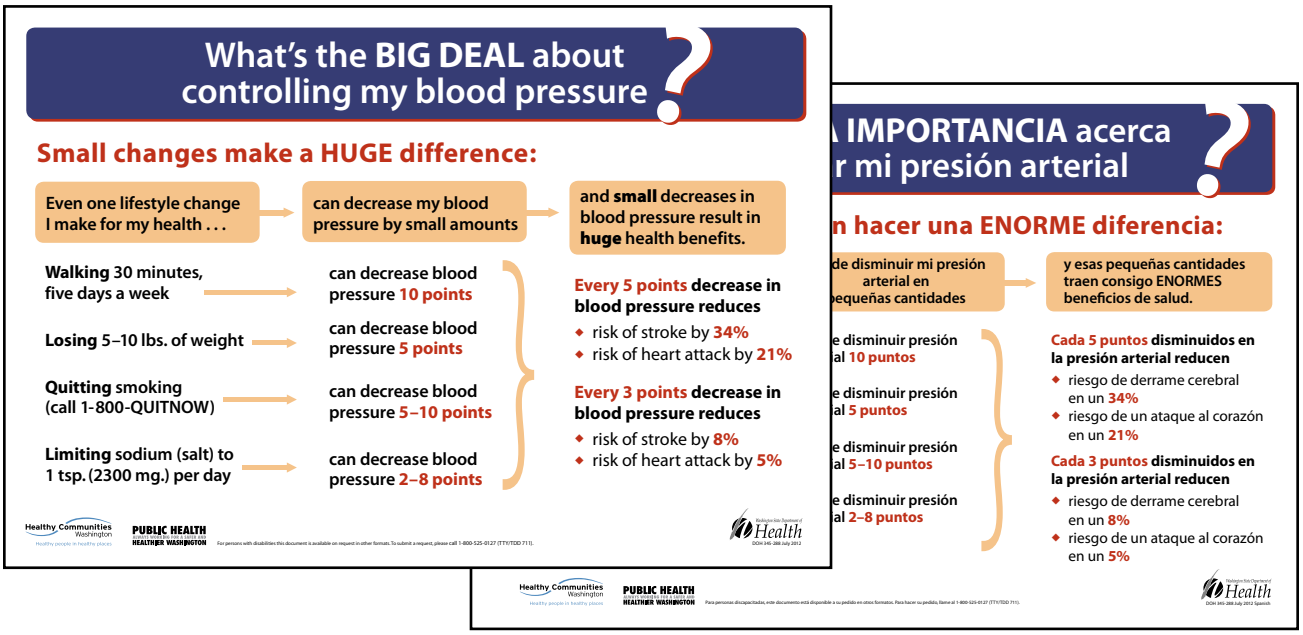
Available in English and Spanish
Download at:

http://here.doh.wa.gov/materials/know-your-numbers



What's the Big Deal About Controlling My Blood Pressure?

Available in English and Spanish.
Download at: http://here.doh.wa.gov/materials/control-blood-pressure



Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 7:
Home Monitoring Book
How to check your blood pressure

Available in English and Spanish. Download at:

http://here.doh.wa.gov/materials/how-to-check-your-blood-pressure

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 8: Patient Self-Measured Blood Pressure Monitoring (SMBP): A Provider's Guide

Adapted from Patient Self-Monitoring of Blood Pressure: A Provider's Guide by New York City Department of Health and Mental Hygiene

Patient self-monitoring of blood pressure is a valuable addition to the management of hypertension, supported by the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-7), the American Heart Association, and the American Society of Hypertension.

- Self-monitoring, with additional clinical and health coaching support, is especially useful for patients with poorly controlled hypertension.
- It can be used to titrate medications, improve control, and screen for white-coat hypertension.
- Home readings may be an equal or better predictor of cardiovascular risk and of target organ damage than office readings.
- Self-monitoring, with support, can enable and motivate patient participation in managing a condition that is often asymptomatic.

While self-monitoring can be done by most patients, it may be contraindicated for those with certain conditions: cardiac arrhythmias, and certain physical and mental disabilities. Because home monitors are not covered by most insurance plans, cost may be a barrier.

Introducing Self-Monitoring to Your Patient

1. **Explain the value of the home monitor in controlling high blood pressure.**
   Encourage patients to "know their numbers," and describe what the numbers mean.
2. **Provide guidance on selecting a monitor.**
   Recommend:
   - A validated monitor only. For a list, see: www.dableducational.org/sphygmomanometers/devices_2_sbpm.html#UpperArm
   - A brachial cuff model. Wrist and finger models are often used incorrectly.
   - A monitor with a fully automated—rather than a manual—inflation cuff.
   - An appropriate sized cuff. (Standard adult cuffs are too small for about a third of patients.)
   - Models equipped with printers or memory may improve reliability in record keeping, though they are also more expensive.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

3. **Validate the monitor.**
   Ask your patient to bring it in so you can check it against your office equipment. After that, check for accuracy about every 6 months (or per monitor instructions) and/or if faulty readings are suspected.

4. **Teach patients proper techniques.**
   - Rest 5 minutes before taking your blood pressure.
   - Don't smoke or drink caffeinated beverages for at least 30 minutes before.
   - Take your blood pressure before (not after) you eat.
   - Sit comfortably with your back supported and both feet on the floor (don't cross your legs).
   - Elevate your arm to heart level on a table or a desk.
   - Use the proper sized cuff. It should fit smoothly and snugly around your bare upper arm. There should be enough room to slip a fingertip under the cuff. The bottom edge of the cuff should be one inch above the crease of the elbow.
   - Ideally, take 3 measurements at one sitting and record the average.

5. **Provide self-blood pressure monitoring tools for patients to easily keep track of their numbers at home.**

Prescribe Self-Monitoring Frequency

Initially, blood pressure measurements should be taken in the morning and evening for 3–4 consecutive days. Disregard the first day when averaging outpatient readings. Home blood pressures are generally lower than office pressures (mean 8/6 mmHg lower).

Self-Measured Blood Pressure Monitoring (SMBP)

Excerpted from Self-Measured Blood Pressure Monitoring: Action Steps for Public Health Practitioners by Million Hearts®. Refer to the CDC's Million Hearts® Action Guide on Self-Measured Blood Pressure Monitoring: http://millionhearts.hhs.gov/Docs/MH_SMBP.pdf

The Agency for Healthcare Research and Quality (AHRQ) found strong evidence that self-measured blood pressure monitoring—plus additional clinical support—was more effective than usual care in lowering blood pressure among patients with hypertension.

Additional support strategies for SMBP

The type of additional support in the studies examined by AHRQ varied widely and fell into three main categories: regular one-on-one counseling, web-based or telephone support tools that did not involve one-on-one interaction, and educational classes.

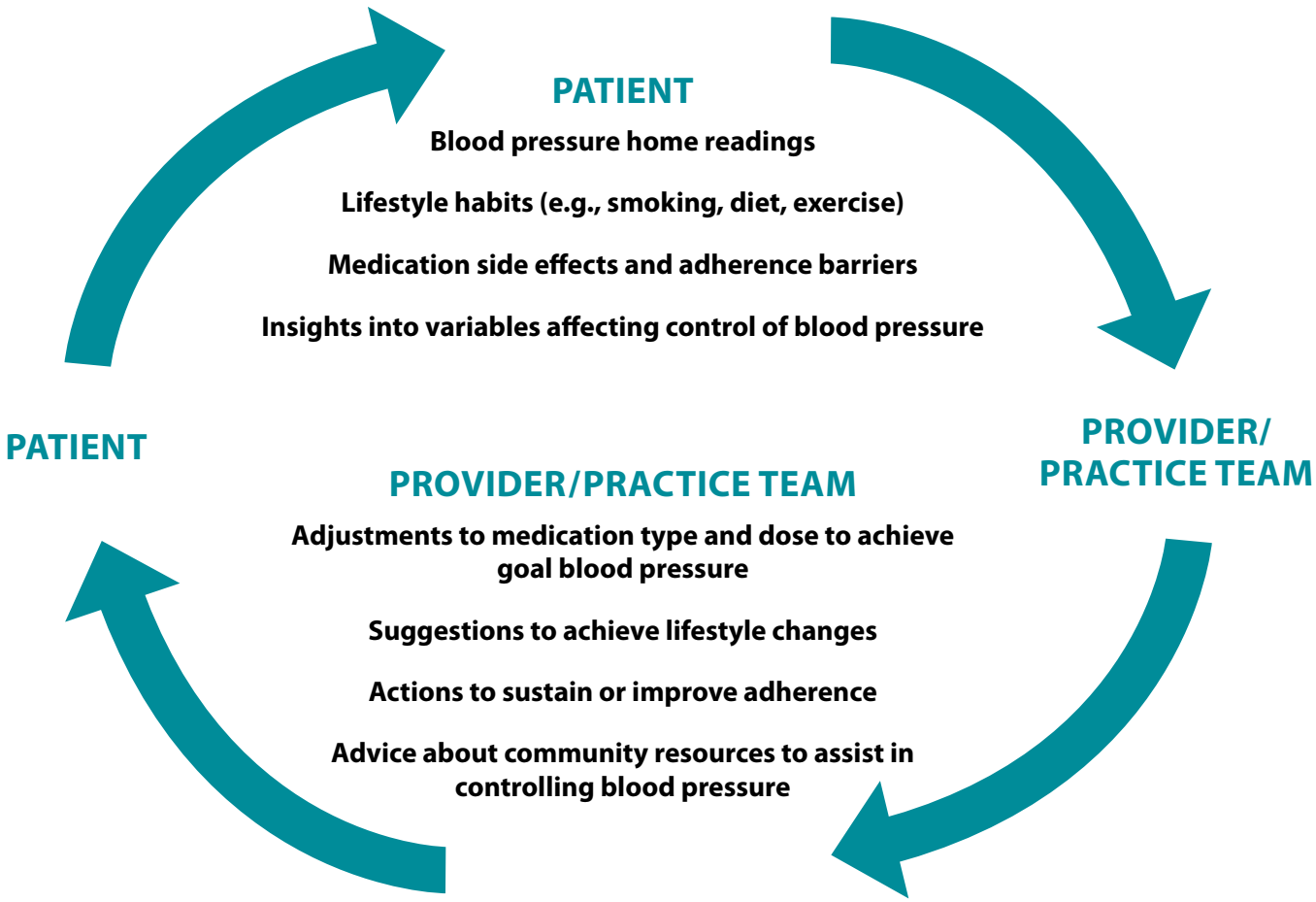
- **One-on-one counseling:** Examples included regular telephone calls from nurses to manage blood pressure-lowering medication and in-person counseling sessions with trained community pharmacists.

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

- **Web-based or telephone support:** Examples included an interactive computer-based telephone feedback system and secure patient website training, plus pharmacist care management delivered through web communication, both in response to patient-reported blood pressure readings.
- **Educational classes:** Examples included telephone-based education by nurses on blood pressure-lowering behaviors, delivered only when patients reported poor blood pressure readings, and small group classes on SMBP technique and lifestyle changes that help lower blood pressure, taught by physician assistants.

Patient-Provider/Health Coach Feedback Loop Using SMBP

Adapted from Centers for Disease Control and Prevention, Self-Measured Blood Pressure Monitoring: Action Steps for Public Health Practitioners. *Atlanta, GA; Centers for Disease Control and Prevention, US Department of Health and Human Services; 2013.*

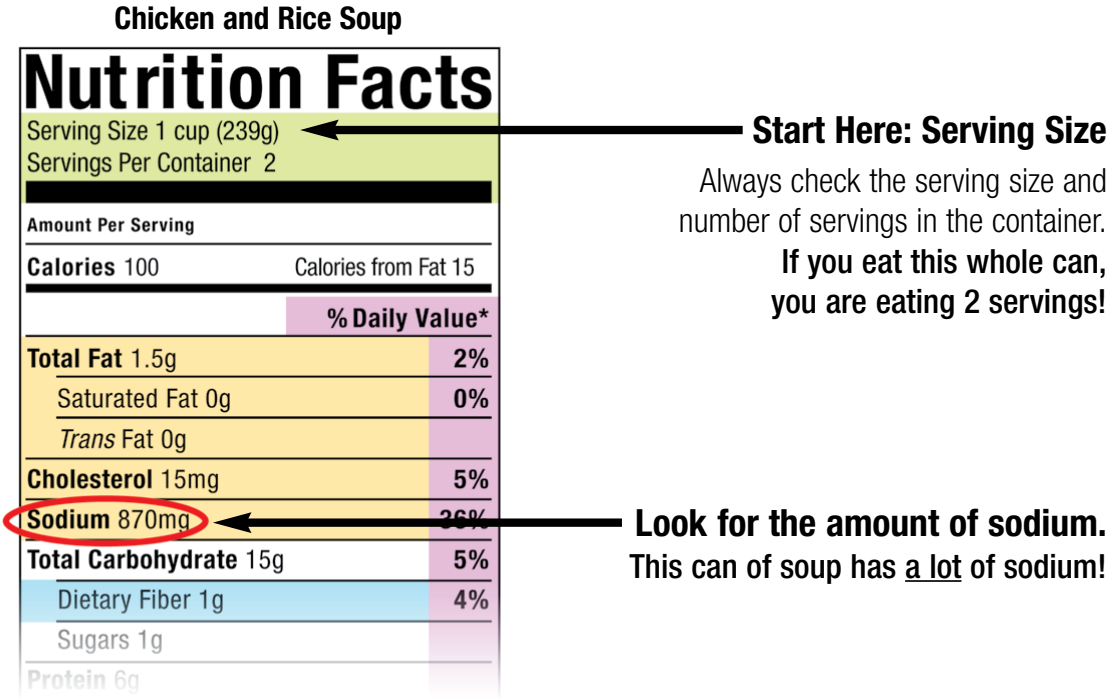


Appendix 9:
Reading Food Labels

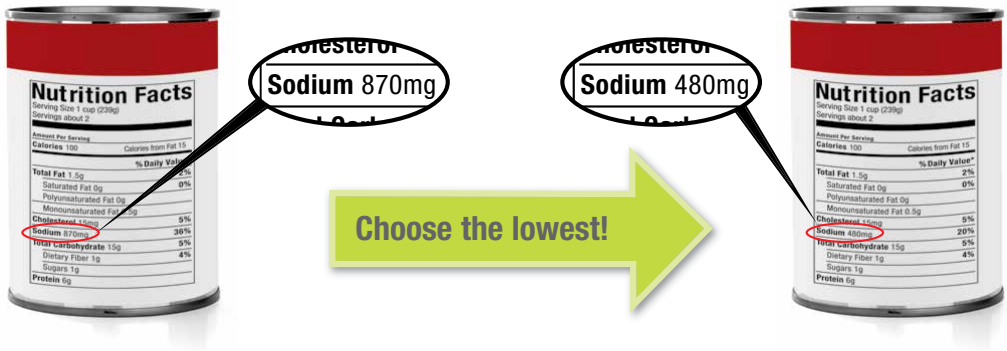
http://www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-pt-readlabel-fact.pdf

When you buy prepared and packaged foods, read the labels.

- You can tell the sodium content by looking at the "**Nutrition Facts**" panel of a label.
- Listed are the amount for sodium in milligrams (mg) and the "Percent Daily Value."
- Keep in mind – that number is "per serving size," not the whole package.



COMPARE sodium in different products.
Choose products that have the least amount of sodium.



Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-pt-readlabel-fact-sp.pdf

Aprenda a leer las etiquetas de los alimentos

CONSUMIR MENOS SAL (SODIO) AYUDA A PREVENIR Y CONTROLAR LA PRESIÓN ARTERIAL ALTA

Sopa de pollo y arroz

Nutrition Facts

Serving Size 1 cup (239g)
Servings Per Container 2

Amount Per Serving

Calories 100 — Calories from Fat 15

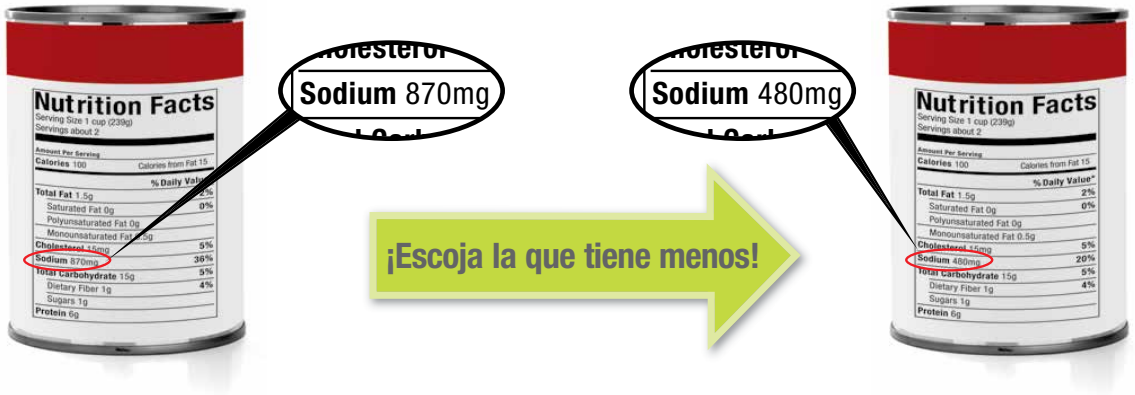
	% Daily Value*
Total Fat 1.5g	2%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 15mg	5%
Sodium 870mg	36%
Total Carbohydrate 15g	5%
Dietary Fiber 1g	4%
Sugars 1g	
Protein 6g	

Empiece aquí:
Tamaño de la porción.

Revise siempre el tamaño de la porción y el número de raciones en el envase.
Si consume todo el envase, ¡usted está comiendo 2 raciones!

Busque por la cantidad de sodio.
¡Esta lata de sopa contiene mucho sodio!

COMPARE el sodio en productos diferentes.
Seleccione productos que tengan la menor cantidad de sodio.



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Appendix 10

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-pt-nutrition-fact.pdf

Eat and Drink to Lower Blood Pressure

TAKING EVEN ONE OF THESE STEPS CAN MAKE A DIFFERENCE

If You...	Try This Instead...
Are overweight	**Eat less/smaller portions.** Losing weight can lower your blood pressure. ***Tip:*** In general, keep portions about the size of your fist. Check serving sizes (packages often have several servings).
Eat foods high in salt (sodium)	**Choose reduced-sodium or no-salt-added foods.** Always check packaged foods for sodium content and choose foods with less than 5% sodium per serving. Don't add salt to foods!
Always put salt on your food before eating	**Get the salt shaker off the table!** Use a salt substitute. Or try other spices instead of salt.
Drink soda and other drinks	**Drink water, club soda, or low-fat milk.** Even diet soda may have a lot of salt. Always check the label.
Eat too few fruits and vegetables	**Eat fresh fruits and vegetables at every meal.** If only frozen or canned fruits and vegetables are available, choose ones without added salt.
Often eat unhealthy snacks (chips, candy, and cookies)	**Snack on healthier foods.** Eat less junk food and sweets. Try fruit, vegetable sticks, unbuttered and unsalted popcorn, or nuts.
Add salt when cooking (rice, pasta, cereals)	**Use other spices instead of salt, such as onion or garlic powder.** Don't add salt to food or boiling water. Cut back on "instant" products (they usually have added salt).
Often eat red meat	**Eat fresh chicken, turkey, fish, or leaner meats.** Avoid canned, smoked, and processed meats (they have a lot of salt).
Eat a lot of high-fat dairy products (whole milk, ice cream)	**Switch to low-fat or non-fat milk, yogurt, cheese, and frozen yogurt.**
Eat fast food	**Eat less fast food – no more than once a week.** Avoid large and "super-size" portions. Fast food is high in calories and salt. Cooking at home allows you to control the amount of salt in your food.
Eat a lot of "convenience" foods (frozen dinners, packaged mixes, canned soups/broths)	**Cook at home whenever you can, without adding salt.** Eat fewer convenience foods and only those that are low in sodium.

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TAKE CARE NEW YORK — KEEP YOUR HEART HEALTHY
A Key Step to a Healthier New York

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-pt-nutrition-fact-sp.pdf

Comer y beber para reducir su presión arterial.

¡Seguir por lo menos uno de estos pasos puede hacer la diferencia!

Si usted...	Podría...
Tiene sobrepeso	**Comer menos/ porciones más pequeñas** Perder peso para poder reducir su presión arterial. ***Consejo:*** En general, mantenga porciones del tamaño de su puño. Revise el tamaño de las porciones (por lo general, los envases contienen *varias* porciones).
Come alimentos altos en sal (sodio)	**Escoger alimentos con menos sodio o sin sal.** Revise siempre el contenido de sodio en los alimentos empacados y seleccione los que tengan menos del 5% de sodio por porción. ¡No agregue sal a los alimentos!
Pone siempre sal en sus alimentos antes de comer	**¡Retirar el salero de su mesa!** Use un sustituto de la sal. O trate otros condimentos en lugar de la sal.
Bebe sodas y otras bebidas	**Beber agua, agua mineral, o leche con bajo contenido de grasa.** Aún las gaseosas de dieta pueden tener mucha sal. Revise siempre la etiqueta.
Come pocas frutas y vegetales	**Comer frutas y vegetales frescos en cada comida.** Si solamente están disponibles frutas y vegetales congelados o enlatados, escoja aquellos que no contengan sal agregada.
Come refrigerios no saludables frecuentemente (como papas chip, caramelos y bizcochitos)	**Comer alimentos más saludables.** Coma menos comida chatarra y dulces. Pruebe frutas, vegetales, palomitas de maiz sin mantequilla y sin sal o nueces sin sal.
Agrega sal cuando cocina (arroz, fideos, cereal)	**Usar otros condimentos en lugar de la sal como condimento de ajo o de cebolla en polvo.** No añada sal a los alimentos o al agua hirviendo. Reduzca el consumo de productos instantáneos (generalmente contienen sal agregada).
Come carne roja con frecuencia	**Comer pollo, pavo, pescado frescos o carnes con menos grasa.** Evite las carnes procesadas, ahumadas o enlatadas (contienen mucha sal).
Come productos lácteos con mucha grasa (como leche entera y helados)	**Cambiarlos por leche, yogurt y queso bajos en grasa y yogurt congelado.**
Come alimentos al paso o de preparación rápida	**Comer menos alimentos de preparación rápida – no más de una vez por semana.** Evite las porciones grandes o "supergrandes" ya que las comidas rápidas son muy altas en calorías y sal. Cocinar en su hogar le permite controlar la cantidad de sal en sus alimentos.
Come muchos alimentos pre-cocidos (comidas congeladas, mezclas empacadas, sopas/ caldos enlatados)	**Cocinar en su hogar siempre que pueda, sin agregar sal.** Consuma menos alimentos pre-cocidos, y seleccione aquellos con bajo contenido de sodio.

NYC Health nyc.gov/health
DEPARTAMENTO DE SALUD Y SALUD MENTAL DE LA CIUDAD DE NUEVA YORK
Michael R. Bloomberg, Alcalde
Thomas R. Frieden, M.D., M.P.H., Comisionado

CUÍDATE NUEVA YORK
Mantenga su corazón sano: Un paso clave para un Nueva York más saludable

Note: *Underlined text indicates a link. Refer to page 127 for the full set of web addresses used in this toolkit.*

Appendix 11:
Hypertension Treatment Chart Stickers

Hypertension Treatment Is it time for a change?		
Is today's blood pressure at goal?		Yes / No
Home monitored blood pressure range:	to	__/__ __/__

Appendix 12:
Self-Management Support
Patient Planning Worksheet

Set a SMART goal:
Specific, Measurable, Attainable, Realistic, Timely

1. **My goal** (be as specific as possible)**:**
   Example: *On Wednesdays and Fridays I will walk 20 minutes from my house immediately after returning home from work. I will start this Wednesday.*

   _____

2. **I will know that I have accomplished my goal by…** (how it is measured)**:**
   Example: *I will keep track in my journal of the days I walk, where I walk, and for how long.*

   _____

3. **What are the possible problems or barriers in meeting my goal?**
   Example: *I get involved in other things when I return home and forget that I planned to walk.*

   _____

4. **What is my plan for dealing with these possible problems or barriers?**
   Example: *I will leave my walking shoes and anything else I need for walking right next to the front door. As soon as I get home, I will put my shoes on and leave immediately.*

   _____

5. **What can I do or what support do I need to increase the likelihood that I will meet my goal?**
   Example: *I have a neighbor who would like to walk too. I will ask her if she wants to commit to doing this with me.*

   _____

6. **How confident am I that I can achieve this goal?**
   On a scale of 1–10, with ***1 as not very confident at all*** *and* ***10 as the most confident I could possibly be.***
   (*NOTE: If you are not at a 7 or above, modify your goal until you are. This helps to set realistic and achievable goals that will build confidence.)*

   1 2 3 4 5 6 7 8 9 10

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22	Safety Net Medical Home Initiative on Empanelment	www.safetynetmedicalhome.org/change-concepts/empanelment
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23, 29	Institute for Healthcare Improvement: Huddles	www.ihi.org/knowledge/Pages/Tools/Huddles.aspx
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58	Ask Me 3	www.npsf.org/askme3/
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70	NEJM Blood Pressure Measurement video clip, "Blood-Pressure Measurement"	http://here.doh.wa.gov/materials/bp-measurement-training-kit
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102–112	FDA Approved Drugs	www.accessdata.fda.gov/scripts/cder/drugsatfda/
113	Poster: Know Your Numbers	http://here.doh.wa.gov/materials/know-your-numbers

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Page/s	Name	URL
113	Poster: What's the Big Deal about Controlling My Blood Pressure?	http://here.doh.wa.gov/materials/control-blood-pressure
114	Home Monitoring Book: How to check your blood pressure	http://here.doh.wa.gov/materials/how-to-check-your-blood-pressure
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120	Eat and Drink to Lower Blood Pressure	www.nyc.gov/html/doh/downloads/pdf/csi/hyperkit-pt-nutrition-fact.pdf
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