Hypertension Quality Improvement Change Package

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Revised 2020

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EXECUTIVE SUMMARY

Hypertension increases the risk of heart disease and stroke, and is a contributing factor of cardiovascular disease, which is the leading cause of death nationwide.[1] In 2013, the National Center for Health Statistics reported that Ohio had the 12th highest death rate from heart disease in the United States.[2] In 2006, heart disease accounted for 26% of deaths in Ohio, and almost 200,000 hospitalizations.[3]

Background

A microsimulation analysis conducted by IHS Life Sciences found the projected total cost of chronic disease in Ohio from 2016 to 2030 to be $1.5 trillion. While all chronic conditions pose a significant risk and contribute to increasing medical costs, cardiovascular disease is the leading cause of death in Ohio and is the most costly chronic condition in Ohio and the United States.[4]

Health Disparities

Overall men and women face similar risks for being diagnosed with cardiovascular (CV) disease. However, there are significant racial disparities. Among those with hypertension and enrolled in Medicaid, blood pressure control <140/90 mmHg is lower among African American adults (52.4%) than among White adult Medicaid recipients (64.4%) even though the prevalence of hypertension within this group is slightly higher.[5] Additionally, African American men (+21%) and African American women (+26%) disproportionately die from CV disease at higher rates than white men and women.[6] Focused efforts to address the treatment of African Americans diagnosed with hypertension are therefore necessary to impact the overall Medicaid population and to reduce disparities.

About the Hypertension Quality Improvement Project

The Ohio Department of Medicaid (ODM), as part of the Medicaid Technical Assistance and Policy Program, partnered with Case Western Reserve University (CWRU) and the Ohio Colleges of Medicine Government Resource Center (GRC) to lead a Hypertension Quality Improvement Project (QIP) as part of the Chronic Conditions Quality Collaborative (CCQC).

The project targeted primary care practices that serve high volumes of individuals enrolled in Medicaid. The primary aims were to (1) increase the average percentage of adults with hypertension in a practice who had blood pressure control <140/90 mmHg* by 15%, and (2) increase the percentage of African American adults with hypertension control by 20%. These aims were achieved by designing and testing best practices to improve blood pressure control and collaborating with Medicaid managed care plans to address system-level factors that facilitate blood pressure treatment.

*Practice-level blood pressure control was defined as <140/90 mmHg,which corresponded to NCQA, HEDIS performance measures adopted by many practices. New ACC/AHA guidelines recommend a target blood pressure in individual patients of <130/80 mmHg.

Strategies Included:

- Accurate measurement of blood pressure, using evidence based techniques including obtaining more than one blood pressure reading

- Streamlined treatment algorithm using effective, low-cost medication taken once daily

- Monthly follow-up until blood pressure is controlled

- Coordinated outreach to patients with elevated blood pressure

- Enhanced communication with patients

Results

Between 2013 to 2016, these practices were implemented in 23 safety net primary care clinics serving high-volume disadvantaged patients in collaboration with Better Health Partnership, a regional health improvement collaborative serving Northeast Ohio[7,8] Blood pressure control within the top 16 of 23 safety net primary care clinics implementing the hypertension best practice improved 9 to 25 points.

The first wave of the Ohio Hypertension QIP included eight practices serving high-volume disadvantaged and Medicaid eligible populations statewide. Across the eight practices, blood pressure control improved by 15.7%. Among non Hispanic black patients with hypertension, blood pressure control improved by 13.5%. A second wave of the QIP began in April 2019 to test interventions to reduce racial disparities in hypertension control.

The Hypertension QIP Change Package

The resources compiled in this Hypertension QIP Change Package can assist primary care providers and other health care professionals to streamline processes and improve care related to hypertension with the goal of increasing the percentage of patients with controlled blood pressure and reducing complications and deaths related to hypertension.

HYPERTENSION QUALITY IMPROVEMENT PROJECT KEY DRIVER DIAGRAM (KDD)

COLLABORATIVE AIM
Increase control of blood pressure by:
15% among target population
20% among African-Americans

7 PRIMARY DRIVERS (KEY ELEMENTS)

A. Accurate BP Measurement

B. Effective Treatment

C. Timely Follow-up

D. Race/Ethnicity ID

E. Effective Outreach

F. Effective Communication

G. Consumer Education

20 SECONDARY DRIVERS (INTERVENTIONS)

A_1 Good Techniques
A_2 *Repeat BP*
A_3 Compliance

B_1 Treatment Algorithm*
B_2 Low Cost
B_3 Single Dose
B_4 90 Day Script

C_1 Scheduled Appointment
C_2 *Standardized RN/MA Visit*

D_1 Clear Questions
D_2 Effective Process

E_1 Standard Process Flow
E_2 Multiple Venues

F_1 Empathy*
F_2 Nonverbal*
F_3 Cultural Competencies*
F_4 Implicit Bias*
F_5 Health Literacy*

G_1 DASH Diet Low Salt

■ Clinical Drivers
■ Foundational Drivers

*Includes disparity-specific content
Italics = Priority Driver

USING THIS CHANGE PACKAGE

Initiating Program Activities

The activities that take place in the months leading to implementing program activities will prepare Hypertension QIP teams to begin testing interventions using Plan-Do-Study-Act Cycles (PDSAs), submitting Electronic Health Record (EHR) extracts every two weeks, and testing tools and resources. Activities your practice will engage in include:

- **Form a Core Quality Improvement Team.** Prior to starting project activities, gain leadership buy-in! Organizational support is critical to implementing an effective and sustainable quality improvement effort. Teams should be comprised of a practice champion, key institutional leaders, and supporting interdisciplinary team members such as a medical assistants, nurses, pharmacists, or community health workers. Smaller workgroups may be necessary to address each Clinical Driver (i.e., Accurate BP measurement, Timely Follow-up, and Effective Treatment), and to address Foundational Driver D (Accurate Identification of Race/Ethnicity)

- **Extract Electronic Health Record (EHR) data.** Your practice should establish a method for abstracting and viewing EHR data elements. The EHR data will be used to create run and control charts to inform your practice of progress on achieving SMART aims over time

- **Build a relationship with an identified Managed Care Plan (MCP)**

- **Assess current process for collecting race/ethnicity data from patients (Resource IX)**

- **Begin to examine how your practice currently ensures accurate blood pressure measurement and the need for repeat blood pressure measurements**

- **Review the treatment algorithm (Resource III) and consider adapting for your practice**

CLINICAL DRIVER A: ACCURATE BLOOD PRESSURE MEASUREMENT

Measuring blood pressure is a standard practice conducted at the start of most patient visits. Accurate blood pressure measurement is a fundamental skill required for the correct diagnosis and treatment of hypertension.[10] This section provides educational resources and tips for accurately measuring blood pressure, including repeating blood pressure measurements. Providers and staff can use the Blood Pressure Training Checklist as a competency tool to ensure new or existing staff know how to obtain an accurate blood pressure reading. Prior to completing the training checklist, you may want to have your staff review the video on accurate blood pressure measurement (see link on page 8) and complete the Knowledge Checklist on page 12.

Secondary Driver A1: Proper Blood Pressure (BP) Measurement

We encourage you to show this New England Journal of Medicine video[11] (**http://bit.ly/2f5AfjE**) on reviewing proper BP measurement technique with your staff, and have them take the post-test on BP measurement technique (Resource II) prior to any competency review.

☐ **CORRECT CUFF SIZE:** Provide the patient with the correct cuff size

- ° If cuff is too small, it will produce a higher reading
- ° If cuff is too big, it will produce a lower reading

☐ **CORRECT PLACEMENT ON ARM:** Place cuff directly on the patient's bare arm

☐ **FEET FLAT ON FLOOR:** Have the patient sit in a chair (not a bed) with feet are flat on the floor, legs uncrossed, and back supported

- ° Seated Systolic Blood Pressures (SBP) are up to 8 mmHg higher when measured on an exam table compared to a chair

☐ **ARM AT HEART LEVEL:** Ensure the patient's arm is straight and at the heart level

☐ **NO TALKING:** Instruct the patient not to speak during BP measurement

☐ **EYES LEVEL WITH MANOMETER:** Remind the healthcare provider to keep their eyes level on the manometer if taking a manual BP measurement

☐ **PROPER INFLATION OF CUFF:** Do not over-inflate the blood pressure cuff

☐ **WAIT:** Have the patient sit down 5-10 minutes before measuring their BP

- ° This is how BP is measured in randomized trials showing improvements in BP control and reductions in heart attack, stroke and deaths
- ° BP usually decreases by about 10 mmHg after a 5-10 minute wait

☐ **EMPTY BLADDER:** Allow the patient to use the bathroom prior to a BP measurement

- ° A full bladder can impact the accuracy of the results

Secondary Driver A2: Repeating the Blood Pressure

- SBP often decreases by **waiting 5-10 minutes** after the patient sits down to measure BP

- Repeating BP is the standard of care for adults with hypertension and helps account for BP variability

- Multiple BP measurements allows providers to identify if it is necessary to intensify BP medication and helps avoid overtreatment

- Wait at least one minute between BP readings. You may consider waiting longer than one minute depending on how long the patient was sitting prior to the first reading. Consider taking more than two BP readings if the difference between the first and second reading is greater than 5 mmHg

- Provide patient the SBP/DBP readings both verbally and in writing

Secondary Driver A3: Staff Compliance with Good BP Measurement Technique and Repeat BP Measurement

We encourage you to develop a blood pressure training checklist or modify your current training checklist using the example provided (Resource I) on page 10. Establishing an annual review process to keep staff engaged and ensure proper BP measurement technique is critical to accurate BP measurement over time and sustaining efforts.

Encouraging Staff Compliance with Repeat BPs through Visual Reminders

Examples of visual reminders include:

- Magnetic laminated "Check Blood Pressure" signs that can be visually displayed in both common areas and next to the blood pressure station
- Reminder posters next to all computer stations
- A reminder or flag to recheck a blood pressure in your Electronic Health Record System

Resource I: Vital Signs-Blood Pressure Training Checklist

Name: _____ Employee #: _____ Unit: _____ Date: _____

Employee Signature: _____

PURPOSE: ACCURATELY OBTAIN A BLOOD PRESSURE

Knowledge	Yes	No	N/A
1. Describe the benefits and limitations to obtaining a BP using a machine versus a manual BP cuff			
2. Discuss effective strategies to reduce errors			
3. Distinguish normal BP ranges from abnormal BP readings			
4. Describe the process for safe reporting of BP findings			

Skill	Yes	No	N/A
The following applies to machine measured and manual BP measurements			
1. Gather equipment			
2. Introduce yourself to the patient			
3. Wash your hands			
4. Identify patient using two patient identifiers			
5. Explain the procedure to the patient			
6. Have patient sit comfortably in a chair for five minutes with arm at level of the heart and resting on something. If sitting, have the patient place their feet flat on the floor. Ask the patient not to talk while their blood pressure is being taken			
7. Ask the patient to remove their arm from any bulky long sleeves; cuff should be on a bare arm (Sleeve NOT pulled up)			
8. Select proper cuff size. The bladder of the BP cuff should be long enough to wrap around 80% of the arm and wide enough to cover 2/3 of the upper arm			
9. Apply BP cuff approximately 1 inch above the elbow with the arrow over the brachial artery			
#10-14 applies to manual BP*			
10. Place bell of stethoscope on the patient's skin, over the brachial artery, and earpieces facing forward			
11. Palpate the brachial pulse with one hand while inflating the cuff. Note the gauge reading when you can no longer feel the pulse			
12. Inflate bulb until the gauge measures 30 mmHg higher than the palpated reading			

Skill	Yes	No	N/A
13. Release the bulb pressure at a steady rate of ~2 mmHg per second			
14. Note the BP when the first sound is heard (systolic) and when the last sound disappears (diastolic)			
15. Repeat and record a second BP after waiting at least one minute			
16. Remove cuff and clean per policy			
17. Record findings in EHR			
18. Provide BP to patient both verbally and in writing			
19. Identify normal/abnormal blood pressures			
20. Record BP obtained by the instructor and the person being tested utilizing a training stethoscope (systolic and diastolic MUST be within 4 mmHg match to the instructors, if both or either do not match within 4 mmHg, then it is not correct). Record here:	Instructor /	Staff /	
Repeat:	/	/	

Attitude	Yes	No	N/A
1. Value the contributions of reliability & accountability to safety			
2. Understand own role in accuracy of obtaining BP			
3. Describe own role in prompt reporting and documentation			

*If using an automatic blood pressure machine, then ensure staff are able to operate the automatic machine to begin the blood pressure measurement.

SKILLS EVALUATION

Satisfactory	Unsatisfactory	Comments
-Provides rationales for some behaviors -Demonstrates skill with minimal assistance/guidance -Follows hospital/clinic policy/procedure for skill -Receptive to learning	-Unable to provide rationale for behaviors -Needs repetitive prompting to complete skill -Does not follow hospital/clinic policy/procedure for skill -Not receptive to learning	

Name of Observer: _____   Date: _____

Signature of Observer: _____

Resource II: Knowledge Checklist

The Knowledge Checklist should be completed by every person on your care team. This list identifies common practices when taking a patient's blood pressure and allows your team to identify their current practice in comparison to the recommended best practice.

1. The diastolic blood pressure is determined when:
   A. All sounds disappear
   B. The sounds become muffled
   C. The first sound is heard

2. A cuff that is too small for the patient's arm will result in:
   A. An inaccurately low reading
   B. An inaccurately high reading
   C. Sounds heard down to zero

3. Common causes of errors in blood pressure measurement include:
   A. Cuff applied over clothing
   B. Leaks in the tubing
   C. Arm above or below heart level
   D. Cuff deflated too rapidly
   E. All of the above
   F. B and D only

4. You hear the first sounds beginning at a systolic blood pressure of 170, then hear nothing again until 150. After 150, you hear sounds consistently until 98 when all sounds disappear. What should be recorded as the systolic blood pressure?
   A. 170
   B. 150
   C. 98
   D. None of the above

5. At what rate of speed should you deflate the blood pressure cuff?
   A. 2 mmHg/second
   B. 5 mmHg/second
   C. 10 mmHg/second
   D. None of the above

6. At a minimum, how many blood pressure measurements should be done at the office visit?
   A. One
   B. Two
   C. Three

7. What is the minimum length of time the patient should be sitting before measuring the blood pressure?
   A. One minute
   B. Two minutes
   C. Five minutes
   D. 10 minutes

8. What is the minimum length of time you should wait between measuring a first and second blood pressure reading?
   A. One minute
   B. Two minutes
   C. Five minutes
   D. 10 minutes

Answers: 1-A; 2-B; 3-E; 4-A; 5-A; 6-B; 7-C; 8-A

CLINICAL DRIVER B: EFFECTIVE TREATMENT

Secondary Drivers B1-B4: Treatment Algorithm

The Effective Treatment section highlights lifestyle modification, encourages BP goal setting and self-monitoring, and provides two examples of evidence-based medication algorithms used by clinics in our statewide hypertension project. Lifestyle modification should incorporate key aspects of the Dietary Approaches to Stop Hypertension (DASH) diet and address alcohol, smoking, substance use, caffeinated beverages, and weight loss as appropriate to the individual patient's needs.

Both treatment algorithms are examples of simple effective pharmacologic therapy approaches for treating patients with hypertension which prioritizes once daily, low cost medications to enhance medication adherence. The treatment algorithms also prioritize lifestyle change, and in African American populations without chronic kidney disease, thiazide-type diuretics and calcium channel blockers as first line medications.[12] These algorithms represents two possible approaches to treating and controlling hypertension for your patient.
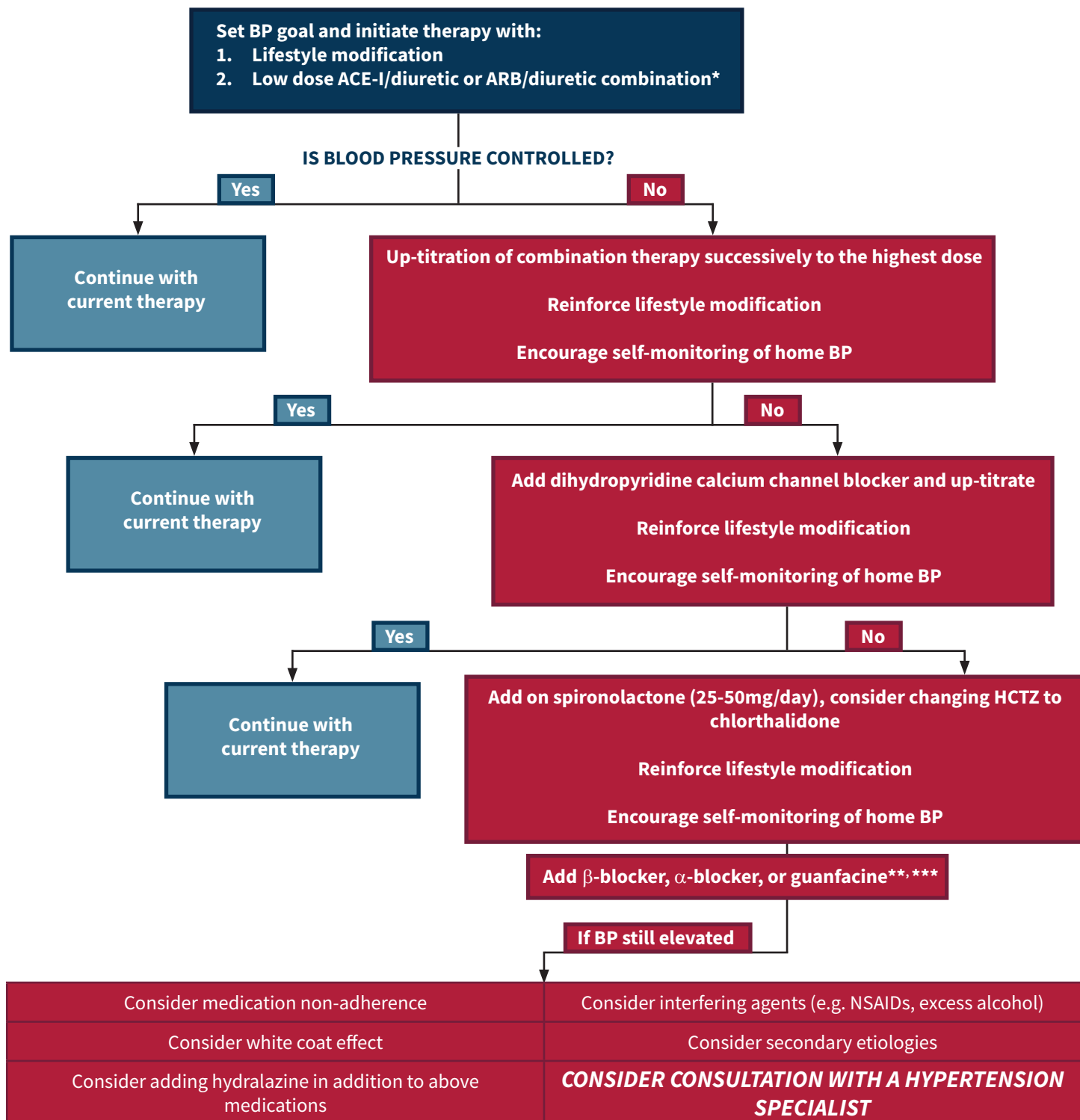
The first algorithm with hydrochlorothiazide is the most popular and has been used effectively in the Kaiser Healthcare System, Better Health Partnership member practices, and others with strong improvements in BP control among diverse patient populations. This algorithm may lead to underdosing of HCTZ (failure to intensify dose to optimal levels). Optimal dose of HCTZ for BP reduction and cardiovascular outcome reduction based on hypertension outcome trials is 25-50 mg per day and not the 12.5-25 mg per day commonly used in primary care settings. This may, in part, explain the lower BP control rates in Black hypertensive patients.

The second algorithm is the one that was recommended for use in the SPRINT Trial. The major difference between this algorithm and the one above is the use of chlorthalidone rather than HCTZ as the preferred thiazide-like diuretic for initial therapy. Chlorthalidone has a long half-life (up to 72 hours) and thus more forgiving of missed doses. The SPRINT-based algorithm was very effective in achieving even SBPs < 120 mmHg in SPRINT with no significant disparity in BP lowering or outcome benefit across race/ethnicity groups. It may be a better option in practices with large numbers of Black hypertensive patients. Primary care providers may feel more comfortable going from 12.5 to 25 mg per day of chlorthalidone compared with increasing from 25 to 50 mg of HCTZ from the first algorithm.

We encourage you to review the sample treatment algorithms and modify them if needed to fit your clinic. These treatment algorithms can serve as models for your staff-led hypertension visits. In addition, you may consider writing 90-day prescriptions once a patient is on a stable regimen to enhance medication adherence by minimizing trips to the pharmacy. Many managed care providers now support 90 day refills. Lastly, an example of how you might incorporate home blood pressure monitoring within your clinic is provided (Resource III).

Resource III: Treatment Algorithm[13] (Secondary Drivers B1-B3)

Use of a validated treatment algorithm will improve blood pressure control within your practice.

Set BP goal and initiate therapy with:
1. Lifestyle modification
2. Low dose ACE-I/diuretic or ARB/diuretic combination*

IS BLOOD PRESSURE CONTROLLED?

Yes → Continue with current therapy

No → Up-titration of combination therapy successively to the highest dose

Reinforce lifestyle modification

Encourage self-monitoring of home BP

Yes → Continue with current therapy

No → Add dihydropyridine calcium channel blocker and up-titrate

Reinforce lifestyle modification

Encourage self-monitoring of home BP

Yes → Continue with current therapy

No → Add on spironolactone (25-50mg/day), consider changing HCTZ to chlorthalidone

Reinforce lifestyle modification

Encourage self-monitoring of home BP

Add β-blocker, α-blocker, or guanfacine**, ***

If BP still elevated

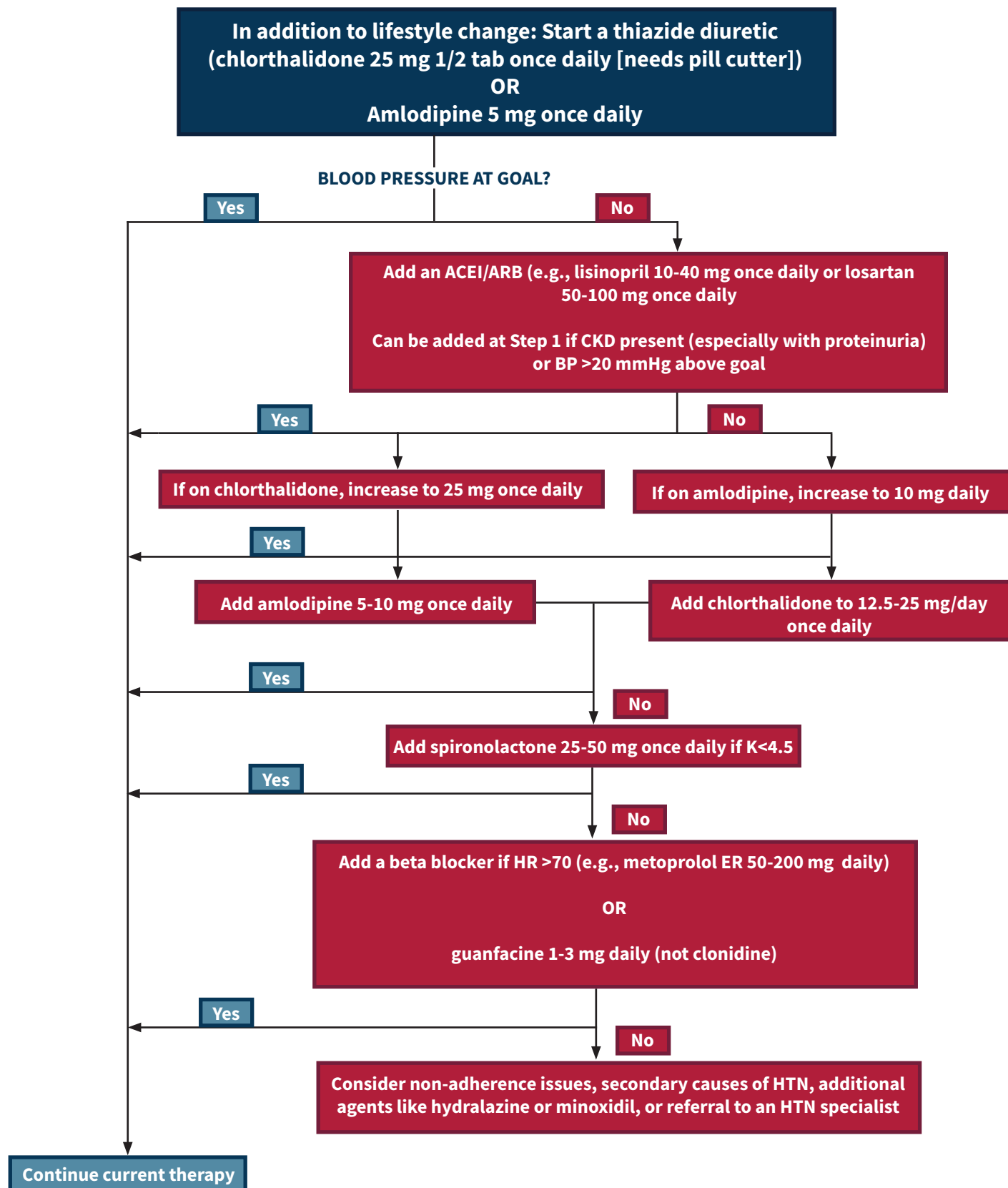|	
Consider medication non-adherence	Consider interfering agents (e.g. NSAIDs, excess alcohol)
Consider white coat effect	Consider secondary etiologies
Consider adding hydralazine in addition to above medications	*CONSIDER CONSULTATION WITH A HYPERTENSION SPECIALIST*

*If pregnant or pregnancy potential, avoid using ACE-I or ARB or spironolactone
**Avoid starting a beta blocker if pulse <70 or on a non-dihydropyridine calcium channel blocker
***Guanfacine has similar mechanism of action as clonidine and is once daily instead of three times a day

Resource IV: Hypertension Drug Treatment Algorithm

Use of a validated treatment algorithm will improve blood pressure control within your practice.

In addition to lifestyle change: Start a thiazide diuretic (chlorthalidone 25 mg 1/2 tab once daily [needs pill cutter])
OR
Amlodipine 5 mg once daily

BLOOD PRESSURE AT GOAL?

Yes → No

Add an ACEI/ARB (e.g., lisinopril 10-40 mg once daily or losartan 50-100 mg once daily

Can be added at Step 1 if CKD present (especially with proteinuria) or BP >20 mmHg above goal

Yes → No

If on chlorthalidone, increase to 25 mg once daily

If on amlodipine, increase to 10 mg daily

Yes

Add amlodipine 5-10 mg once daily

Add chlorthalidone to 12.5-25 mg/day once daily

Yes → No

Add spironolactone 25-50 mg once daily if K<4.5

Yes → No

Add a beta blocker if HR >70 (e.g., metoprolol ER 50-200 mg daily)

OR

guanfacine 1-3 mg daily (not clonidine)

Yes → No

Consider non-adherence issues, secondary causes of HTN, additional agents like hydralazine or minoxidil, or referral to an HTN specialist

Continue current therapy

Resource V: Incorporating Home Blood Pressure Monitoring Into Your Clinic

The following information should be provided to patients:
- Information regarding hypertension and BP variability, including letting patients know that home BP measurements can be more accurate than office BPs if done accurately

- Selection of equipment

- Interpretation of results

Devices:
- Verify use of automated validated devices. Note: *Use of auscultatory devices (mercury, aneroid or other) is not generally useful for home BP monitoring*

- Monitors with provision for storage of readings in memory are preferred

- Verify use of appropriate cuff size to fit the arm (arm cuff monitors are preferred. Wrist cuff or finger monitors are less accurate)

- Verify that left/right inter-arm differences are insignificant. If significant, instruct patient to measure BPs in the arm with higher readings

Instructions to patients on home BP monitoring procedures:
- **Remain still:**

    º Ensure at least ≥5 minutes of quiet rest before measuring BP

    º Avoid smoking, caffeinated beverages, or exercise for 30 minutes before measuring BP

    º Sit with back straight and supported (e.g. a straight-backed dining chair rather than a sofa)

    º Keep feet flat on the floor with legs uncrossed

    º Support arm on a flat surface (e.g. a table) with the upper arm at heart level

    º Place middle of the cuff directly above the bend of the elbow

- **Take multiple readings:**

    º Take at least two readings one minute apart in the morning before taking medications and in the evening before supper. Ideally, obtain BP readings daily during the week prior to a clinic visit and during any week after a change in the treatment regimen

    º All monitors should be brought to all clinic appointments so staff can verify monitor accuracy and review built-in memory when available

    º For clinical decision making, BP should be based on an average of twelve home blood pressure monitor readings (2 readings twice daily for 3-7 days[14])*

    º Reinforce the above with videos available from the American Heart Association online: http://bit.ly/2vXdV1C

*130/80 mmHg is consistent with the most recent ACC/AHA guideline recommendation for adequate blood pressure control. The HTN QIP set a target blood pressure of <140/90 mmHg, which corresponded with the HEDIS measure adopted by many participating practices. As with any guideline recommendation, clinical judgement takes precedence

Resource VI: Medication Reference List for Staff-led Hypertension Visits

The table below can be used by nurses and other staff during follow-up hypertension visits to monitor for side effects and determine whether lab work is needed based on the medication class being used.

COMMONLY ASSOCIATED SIDE EFFECTS OF BLOOD PRESSURE MEDICATIONS

Medication class (generic names of individual medications)	Common side effects	Needs metabolic panel if started or increased this med class
Diuretics (e.g. Hydrochlorothia-zide, chlorthalidone)	Increased urination (often goes away if use daily for several weeks), rash, low potassium	Yes
ACE-inhibitors (e.g. lisinopril, enalapril, benazepril)	Dry cough, increased potassium, increased creatinine	Yes
Angiotensin receptor blockers (e.g. losartan, valsartan)	Increased potassium, increased creatinine	Yes
Combinations which include an ACE-I, ARB, or diuretic	See side effects under individual classes	Yes
Aldosterone antagonist (e.g. spironolactone)	Increased potassium, increased creatinine, gynecomastia	Yes
Calcium channel blockers (e.g. amlodipine, verapamil, diltiazem)	Ankle edema (amlodipine), slow heart rate (verapamil, diltiazem)	No
Beta blockers (e.g. metoprolol, atenolol, carvedilol)	Fatigue (usually gets better after several weeks), slowed heart rate (watch for pulse <60)	No
Alpha Blockers (e.g., doxazosin, prazocin, terazocin)	Orthostatic hypotension	No
Centrally Acting α-2 Adrenergic Agonist (e.g., clonidine, guanfa-cine)	Sedation, dry mouth	No
Vasodilators (e.g., hydralazine, minoxidil)	Headache, edema, tachycardia	No

Abbreviations: ACE-I =Angiotensin converting enzyme inhibitor, ARB=angiotensin receptor blocker

Resource VII: Medication Reference List for Providers

PHARMACOLOGIC THERAPY[15]

Drug Class	Examples	Comments
Thiazide-type Diuretics	Chlorthalidone HCTZ	• May worsen hyperuricemia/gout • Monitor serum potassium and creatinine levels initially, then within 2-4 weeks and annually thereafter if normal • May cause photosensitivity (rare) • Chlorthalidone twice as potent and half-life 2-3 times longer than HCTZ at given dose
ACEI	Lisinopril Ramipril Benazepril Enalapril	• Contraindicated in pregnancy • Possible dry cough and/or angioedema • Avoid concomitant use with an ARB or direct renin inhibitor or ARNI* • Monitor serum potassium and creatinine initially, then within 2-4 weeks and annually thereafter if normal • Up to 30% increase in serum creatinine after initiation of therapy considered normal. Consider interruption or discontinuation if greater increase seen
ARB	Candesartan Irbesartan Losartan Valsartan Olmesartan Telmisartan	• Contraindicated in pregnancy • Avoid concomitant use with an ACEI or direct renin inhibitor or ARNI* • Monitor serum potassium and creatinine initially, then within 2-4 weeks and annually thereafter if normal • Up to 30% increase in serum creatinine after initiation of therapy considered normal. Consider interruption or discontinuation if greater increase seen
DHP CCB	Amlodipine Felodipine Nifedipine	• More common adverse drug reactions may include lower extremity edema and headache (often temporary) • Hepatic dysfunction can increase levels (begin at lower doses) • Amlodipine half-life more than twice that of felodipine or available sustained-release nifedipine
Non-DHP CCB	Verapamil Diltiazem	• Verapamil may cause constipation and is contraindicated in AV node dysfunction, systolic HF and decreased LV function • Diltiazem associated with less constipation but also contraindicated in AV node dysfunction, systolic HF and decreased LV function • Hepatic dysfunction can increase levels (begin at lower doses)
BB	*Non-selective* Propranolol *Cardioselective* Atenolol Metoprolol (Tartrate & Succinate) *Combined α- and β-blocker* Carvedilol Labetalol	• Discontinue with slow taper over a period of at least one week • Avoid combination with non-DHP CCBs and centrally acting α-2 adrenergic agonists due to increased risk of bradycardia and heart block • As dose increases, cardioselectivity decreases • Use with caution in patients with COPD, asthma, diabetes, and peripheral vascular disease; may want to consider use of a cardioselective BB in patients with those comorbid conditions • Concurrent use of centrally acting α-2 adrenergic agonists and a beta blocker may result in increased risk of sinus bradycardia • An exaggerated clonidine withdrawal response including rebound hypertension may be seen with beta blockers (except for labetalol or carvedilol)

ALDO ANTAG	Spironolactone Eplerenone	• Avoid use in cases of hyperkalemia (K+ > 5.0 mmol/L) or severe kidney dysfunction (GFR < 30 mL/min) • Dosing interval should be increased as renal function declines to every 24-48 hours for GFR < 50 mL/min • Monitor potassium and kidney function initially, then within 2-4 weeks and annually thereafter if normal • Higher risk of gynecomastia with spironolactone than eplerenone
Alpha-Adrenergic Blockers	Doxazosin Prazosin Terazosin	• Initiate at low doses • Administer first dose at bedtime to avoid syncope • Could be beneficial in patients with benign prostatic hyperplasia and hypertension • Alpha blockers are not recommended as a single agent for treating hypertension
Centrally Acting α-2 Adrenergic Agonist	Clonidine Guanfacine Methyldopa	• Monitor for adverse drug reactions such as somnolence and dry mouth • Discontinue with a slow taper to avoid rebound hypertension and withdrawal symptoms • Concurrent use of centrally acting α-2 adrenergic agonists and a beta blocker may result in increased risk of sinus bradycardia and an exaggerated clonidine withdrawal response including rebound hypertension • Note: *Guanfacine has similar mechanism of action as clonidine but can be given once daily*
Vasodilator	Hydralazine Minoxidil	• May result in edema and reflex tachycardia that respond well to concomitant use of a diuretic and β-blocker • Hydralazine can be prescribed twice daily • Monitor for headache and Lupus-like syndrome (dose-related) with hydralazine • Monitor for hypertrichosis and fluid overload including pericardial effusions with minoxidil (should monitor volume status closely)

*The only ARNI currently available is Entresto® (valsartan/sacubitril). It is NOT FDA-approved for HTN and should only be used in patients with chronic heart failure class II to IV. If a patient is on Entresto®; they should NOT be on concurrent ACEI or ARB therapy.

CLINICAL DRIVER C: TIMELY FOLLOW-UP

Patients who received a repeat BP and have an average BP result which is elevated* should be scheduled for follow-up within four weeks. The purposes of the follow-up hypertension visit are to: 1) obtain additional blood pressure readings; 2) assess and address barriers to medication taking; 3) start or intensify medications in adults who are adherent to medications but still have elevated blood pressures; 4) provide education on hypertension including lifestyle modification such as the DASH diet; 5) provide self-monitoring blood pressure instructions and; 6) assist with self-management goal-setting.

In this section, we provide a sample flow chart for scheduling a follow-up hypertension visit and a sample visit template to assess and address the purposes of the visit. You may want to consider other follow-up options such as telehealth visits, group visits, and home visits. The consumer education resources (Foundational Driver G) provides additional supports for patient education during this visit.

Data Feedback Provided to Participating Practices:

1. Percent of hypertensive adults with hypertensive BP who have a follow-up scheduled within 35 days

2. Percent of hypertensive adults with hypertensive BP who show up to their scheduled hypertension follow-up appointment

Foundational Driver C1: Scheduling a Follow-up Visit

Establishing guidelines and an agreed upon referral process for hypertension follow-up help to increase the percentage of patients returning for follow-up during the recommended period.

Foundational Driver C2: Hypertension Visit Template

Resource VIII is an example template that could be adapted for use in your EHR. To ensure a clear understanding of how the patient is self-monitoring their BP and adhering to recommended treatment for their hypertension, the assigned staff or provider leading the follow-up hypertension visit should document the information shown in the Follow-up Visit Template found in this section.

*Elevated BP is >=140/90

Resource VIII: Process Map for Follow-Up Visit Referral

START

Start of process
Activity
Decision point

Patient checks in

Vitals measured by RN/MA

BP Elevated?

Yes → Wait at least one minute and recheck BP

No → Provider visit

BP Elevated?

Yes → Follow-up RN/MA visit scheduled

No → Provider visit

Patient checks out

END
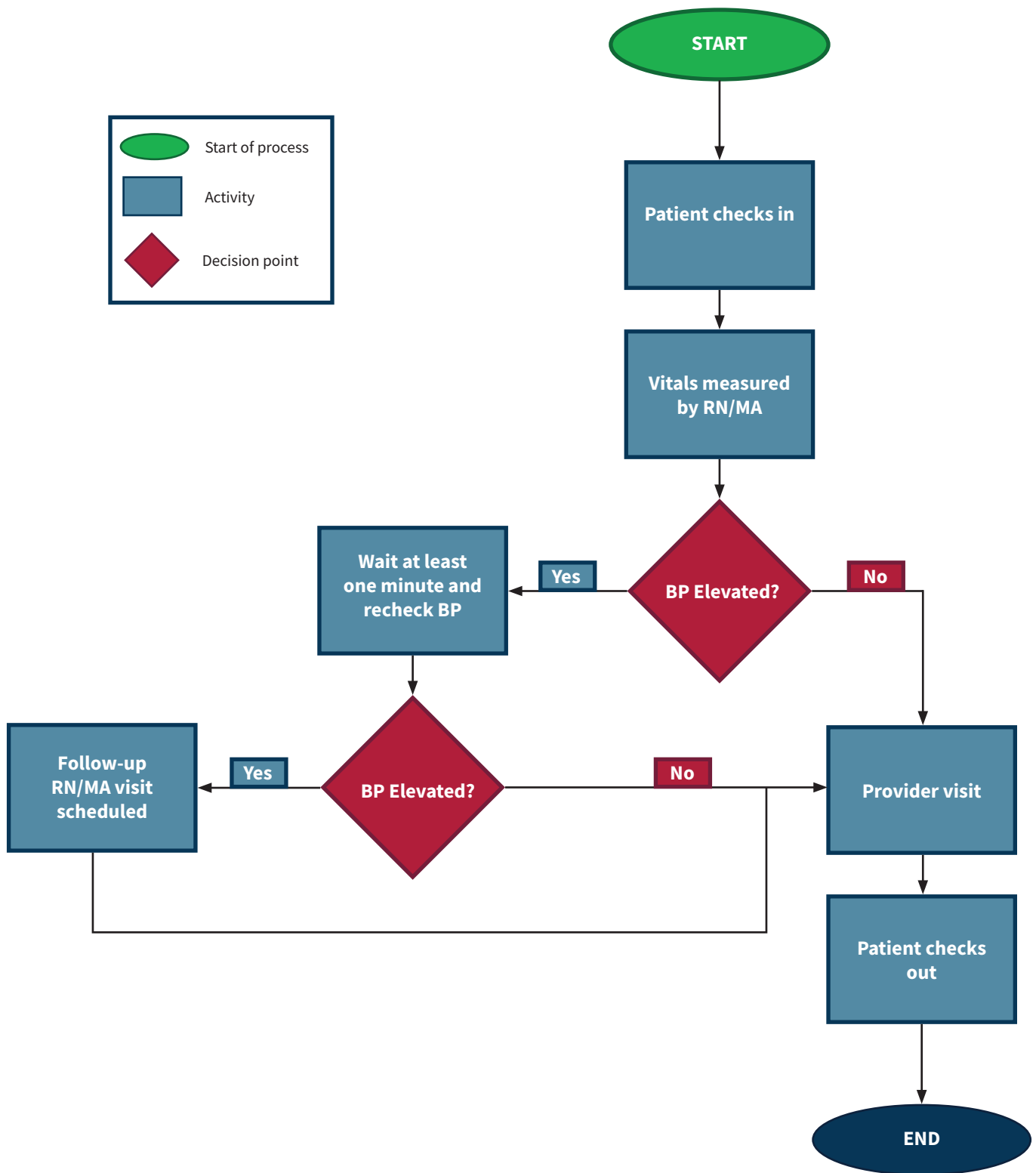
Resource IX: Template for Staff-led Follow-Up Visit

The assigned provider leading the follow-up visit should document the below information provided by the patient to ensure a clear understanding of how the patient is monitoring and adhering to recommended treatment for their hypertension diagnosis. Below is an example template that could be adapted for use in your EHR and modified for home visits.

Hypertension Clinic Documentation Tool for Electronic Health Records

HTN Clinic:	Visit number:
BP Readings from Last 4 Encounters: ( ), ( ), ( ), ( )	
Medication taken today?　☐ Yes　☐ No	Medication brought to visit?　☐ Yes　☐ No
Can name blood pressure medications?　☐ Yes　☐ No	Any recent medication changes? ☐ Yes　☐ No
What time is medication taken?_____ Is this correct?　☐ Yes　☐ No	How many missed doses in the past week? _____
Any side effects or new symptoms since last visit: (describe)	
Any OTC medication use?　☐ Yes　☐ No	Any cold, allergy, respiratory medications? ☐ Yes　☐ No
If you have sleep apnea are you using your Continuous Positive Airway Pressure (CPAP) nightly? ☐ Yes　☐ No	
Do you have a home monitor to check your BP? ☐ Yes　☐ No	If brought to clinic, was it checked to see if it is accurate?　☐ Yes　☐ No Was it accurate?　☐ Yes　☐ No
Do you drink beer, wine, or any other form of alcohol?　☐ Yes　☐ No How many drinks in the last 24 hours?_____	
Assessment	
Has the goal been met?　☐ Yes　☐ No Plan:_____ Medication changes:_____	Counseling tailored to the patient risks and needs (examples: DASH diet, exercise, smoking, self-management, caffeine): _____ (Describe and print After Visit Summary)
Follow up appointment with _____in _____ weeks	
BMP today?　☐ Yes　☐ No	PT agrees with plan?　☐ Yes　☐ No
Consulted with Dr.:_____	
Guidelines for follow-up: 　• If BP is at goal: See PCP in 3 months 　• If BP remains high: See RN in 4 weeks 　• After third visit with RN, if BP is still high, follow up with PCP in 2-4 weeks	

FOUNDATIONAL DRIVER D: IDENTIFYING AND MEASURING RACE/ETHNICITY

Accurate, consistent measurement and recording of race and ethnicity is a critical component to tracking the success of any quality improvement effort that seeks to reduce health disparities.

Efforts to eliminate disparities must first ensure that the race and ethnicity of patients is collected in a rigorous manner. Determining race/ethnicity based on appearance may lead to inaccurate categorization. Training staff to ask patients to self-report race increases the accuracy of this information and can assist in providing more effective treatment.

In this section, we provide suggested instructions for obtaining race/ethnicity in the most accurate manner. We provide a guidance sheet (Resource IX) on how to accurately obtain race/ethnicity data and address patient questions which may arise. We also provide an assessment to determine if your clinic is obtaining information about race/ethnicity accurately (Resource X).

Measurement Metric: Percent of hypertensive adults with a self-reported race and ethnicity recorded in the electronic health record

Secondary Driver D1: Clear Questions

The current standard for measurement of race and ethnicity is to use a variation of the 1997 Office of Management and Budget (OMB) approach. OMB provides a "minimum standards" directive that describes the minimum acceptable way to measure race and ethnicity. This approach was first adopted for the 2000 U.S. Census, and it remains the most widely used framework. The Institute of Medicine and the Agency for Health Care Research and Quality endorse the following approach to measurement.

Resource X: Employee Guidance for Implementing Measurement of Race and Ethnicity

Accurate and consistent measurement and recording of race and ethnicity is a critical component of high quality health care. The current standard for measurement of race and ethnicity is to ask about ethnicity first and then race. Patients are free to give the answer that best describes them. **The Institute of Medicine and the Agency for Health Care Research and Quality** endorses this approach to measurement.

"To make sure we have accurate records, I need to ask you a couple of additional questions."

Ethnicity
How would you describe your ethnicity? ☐ Hispanic or Latino ☐ Not Hispanic or Latino The following categories are not asked, but are made available if the patient volunteers these responses: ☐ [Declined] ☐ [Unknown] ☐ [Unavailable]
Race
How would you describe your race? (select all that apply) ☐ American Indian or Alaska Native ☐ Asian ☐ Black or African American ☐ Native Hawaiian or Other Pacific Islander ☐ White ☐ Some other Race The following categories are not asked, but are made available if the patient volunteers these responses: ☐ [Declined] (e.g. patient refuses to answer the question) ☐ [Unknown] (e.g. patient does not know their race) ☐ [Unavailable] (e.g. patient is non-responsive)
It's Up to the Patients • Under no circumstances should any employee select the race/ethnicity of a patient if it is not reported by the patient or their guardian/caregiver • Reluctant patients do not have to answer, but it can be helpful to respond by stating, **"Many studies from around the country have shown that a patient's race and ethnicity can influence the treatment they receive. We want to make sure this doesn't happen here so we use this information to check and make sure that everyone gets the best care possible. If we find a problem, we fix it."** • Visit hretdisparities.org/Howt-4176.php for additional material on how to discuss this topic with patients

Resource XI: Race and Ethnicity Data Quality Worksheet for Health Care Practices (Secondary Driver D2: Effective Process for Obtaining Race/ Ethnicity)

This worksheet is designed to help practices self-assess whether they can make improvements to the consistency and accuracy of the collection of race and ethnicity.

| |
|---|
| 1. Which employees in your practice have primary responsibility for collecting the race and ethnicity of patients? *Check all that apply* |
| ☐ Physicians, Physicians Assistants and Advanced Practice Nurses
☐ Nurses
☐ Medical or Nursing Assistants
☐ Other personnel
☐ Front desk staff
It's important to confirm that ALL employees who are collecting race and ethnicity data are doing so properly. |
| 2. Do these employees verbally ask all new patients to respond to two race and ethnicity questions as described in the guidance above? |
| ☐ Yes
☐ No
Under no circumstances should any employee select the race or ethnicity of a patient if it is not reported by the patient or their guardian/caregiver. Some employees may be reluctant to ask these questions of all patients. It can be helpful to remind employees to preface questions with the statement, "To make sure we have accurate records, I need to ask you a couple of additional questions." |
| 3. Are responses to both race and ethnicity questions recorded consistently in the electronic medical record? |
| ☐ Yes
☐ No
Reluctant patients do not have to answer, but it can be helpful to initially respond by stating, "The more we know about you the better. Do you want to provide the details of your racial background?" Regardless of the response given (e.g. unknown), every patient should have a value recorded in the race and ethnicity fields. |
| 4. Which employees in your practice have primary responsibility for entering the race and ethnicity of patients into the EMR? *Check all that apply* |
| ☐ Physicians, Physicians Assistants and Advanced Practice Nurses
☐ Nurses
☐ Medical or Nursing Assistants
☐ Other personnel
☐ Front desk staff
It's important to confirm that ALL employees entering race and ethnicity data are doing so properly. |
| 5. Do patients ever use pen and paper or a computerized device to answer race and ethnicity questions? |
| ☐ Yes
☐ No
If patients self-administer race and ethnicity in this manner, it is critically important that a member of the health care team CONFIRM that both questions have been completed and that both responses are properly entered into the electronic medical record. |

FOUNDATIONAL DRIVER E: EFFECTIVE OUTREACH & FOUNDATIONAL DRIVER F: COMMUNICATION

Outreach through text messaging, a patient portal, phone calls, or letters is an effective method for encouraging patients with elevated blood pressure and no follow-up appointment to schedule a follow-up hypertension visit. Described below is one approach to setting up an outreach process using multiple venues at your clinic. Please review and modify this process flow to best fit your clinic.

Potential method for measuring Effective Outreach: Percent of adults with hypertension who schedule an appointment within one month of the outreach attempt

Secondary Drivers E1 and E2: Sample Process for Outreach Using Multiple Venues
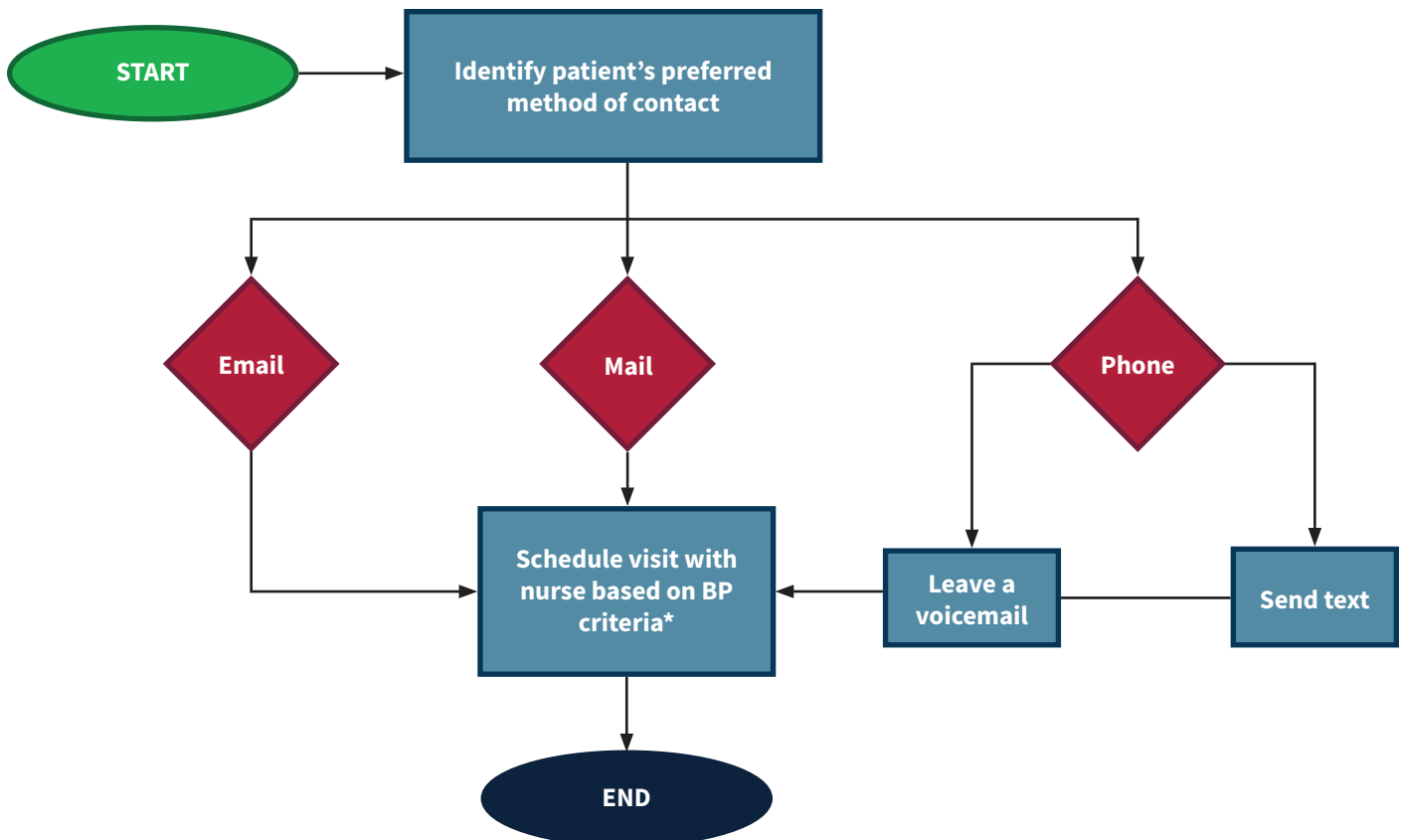
*If BP was high (<=140/90) in last 3 months, schedule visit with nurse, if BP was high(<=140/90) >3 months ago, schedule visit with provider

Foundational Driver F: Effective Communication

The following section outlines a high-level overview of communications strategies or best practices which can assist your health care team in building trusting relationships with patients. Beyond improving patient satisfaction, improving communication skills has shown promising results on patient outcomes (such as blood pressure control) among diverse populations.[16,17] Sharing and discussing the articles and links below with staff and providers at your clinic may assist in improving communication. Watching the American Medical Association's Health Literacy video[18] at a practice meeting and then discussing evidence-based strategies to address health literacy is one way of building these skills.

When reflecting on how health care providers and staff currently communicate, they can start by thinking about a few basic questions:

What do you think an objective observer would say about how you interact with your patients?

What do you think your patients say about you?

Where do you currently find meaning in your work?
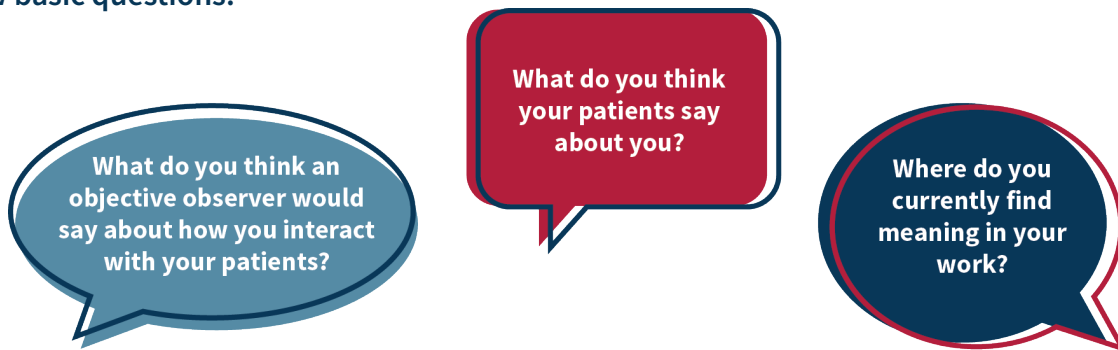
Secondary Drivers F1-F5: Communication Techniques
Several techniques and concepts that can assist in building trusting relationships with patients include:

Empathy: Defined as the ability to understand and share the feelings of another. Research has demonstrated that empathy is essential to achieving positive outcomes when interacting with patients.

Nonverbal Strategies: Some of the most common and effective nonverbal strategies include sitting down, leaning in toward the patient, nodding, and eye contact.

Culturally and Linguistically Appropriate Care: Culturally and linguistically appropriate care are a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals that enables effective work in cross-cultural situations.[19] Culture refers to integrated patterns of human behavior that include the language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups. Competence implies having the capacity to function effectively as an individual and as an organization within the context of the cultural beliefs, behaviors, and needs presented by consumers and their communities. Training resources can be found at thinkculturalhealth.hhs.gov.

Implicit Bias: Refers to the attitudes or stereotypes that affect understanding, actions, and decisions in an unconscious manner. The negative impact of implicit bias may be reduced by standardizing treatment as recommended in this "change package" for adults with hypertension.

Health Literacy: The degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions.

Communications Resources

Communication Practices of Physicians with High Patient-Satisfaction Ratings[20]

Article: This article from Kaiser Permanente describes the following provider strategies which are associated with higher patient satisfaction scores.

1. Focus on patient's agenda

2. Draw out the story

3. Demonstrate understanding, such as responding empathetically and showing caring

4. Provide detailed explanations of the clinical problem

5. Complete the patient's agenda, including delivering what was promised or negotiating until later

American Medical Association Health Literacy Video

Video: This four-minute video displays how patients may not understand a diagnosis or standard medication instructions given by a health care professional, and includes some scenarios that are specific to hypertensive patients. You may want to show the video to all staff/providers at one of your regular clinic meetings and discuss reactions to the video. To view this video, visit youtu.be/ubPkdpGHWAQ

1. Use of the Teach Back Method (i.e. ask patients to repeat back any instructions for their care)

2. Use pictures whenever possible

3. Give explicit medication instructions such as writing "in the morning and at night" instead of twice daily on prescriptions

4. Review patient education materials verbally with all patients or those who may screen positive for low literacy

FOUNDATIONAL DRIVER G: CONSUMER EDUCATION

These consumer education resources and handouts may be useful as patient handouts within your clinic.

Patient Instructions for Home Blood Pressure Measurements

Preparation
- Ask your doctor if the blood pressure monitor is on the list of approved monitors
- Note: Wrist or finger blood pressure monitors are **much less** accurate than arm monitors

Sit correctly
- Sit with back straight and supported (on a straight-backed dining chair, for example, rather than a sofa)
- Feet should be flat on the floor and legs **not** crossed
- Arm should be supported on a flat surface (such as a table) with the upper arm at heart level and not bent
- Bottom of the blood pressure cuff should be placed directly above the bend of the elbow

Remain still
- Avoid smoking, beverages containing caffeine, or exercise for 30 minutes before measuring blood pressure
- Sit quietly for at least 5 minutes before taking the first blood pressure reading

Take multiple readings
- Take at least two readings one minute apart in the morning before taking your medications and in the evening before supper
- Ideally, write down your blood pressure every week beginning two weeks after a change in the blood pressure medications and during the week prior to a clinic visit

Write down all readings
- Monitors with built-in memory should be brought to all clinic appointments
- The average of several blood pressures is needed for your doctor to know whether treatment is needed or working
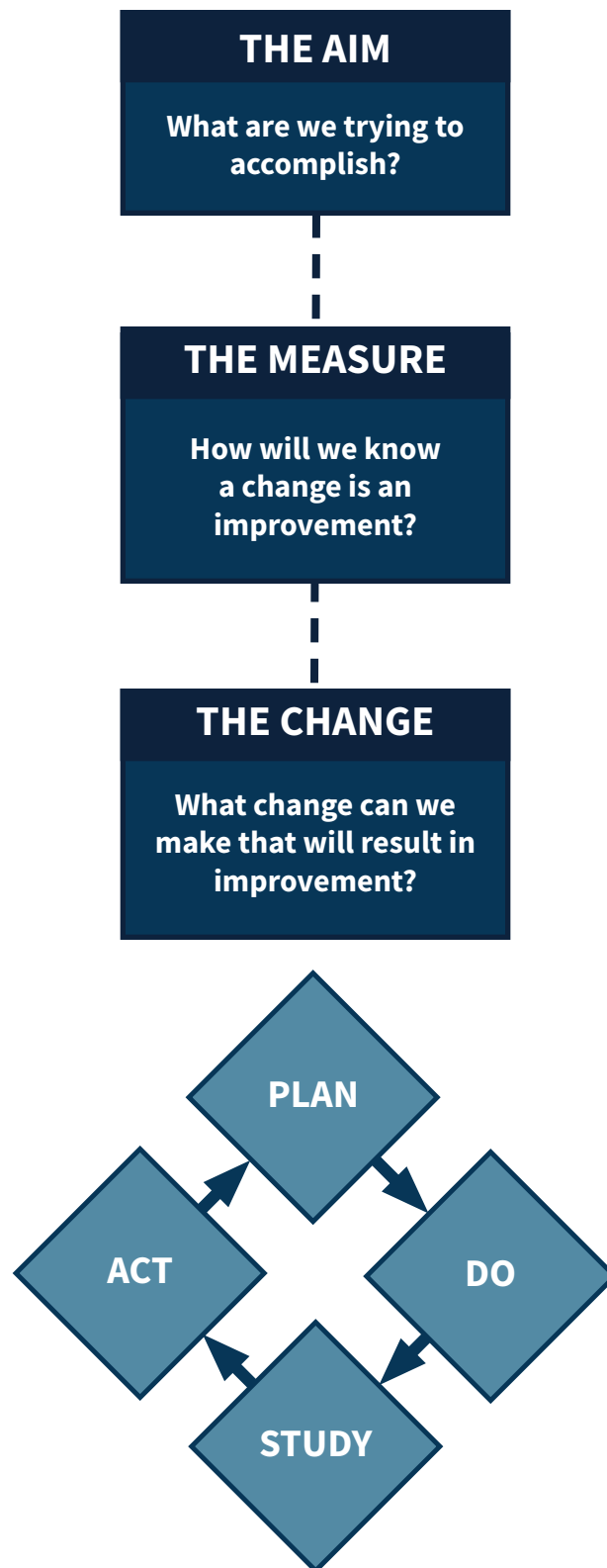
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4. What Is The Impact of Chronic Disease in Ohio? Partnership to Fight Chronic Disease. http://www.fightchronicdisease.org/ohio. Accessed February 9, 2017.

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12. Feldman RD et al. *Hypertension*. 2009; 53 646-653.

13. VA/DoD Clinical Practice Guideline. Diagnosis and Management of Hypertension in the Primary Care Setting.

14. Munter P, Shimbo D, Carey RM, et al. Measurement of blood pressure in humans: A scientific statement from the American Heart Association. *Hypertens.* 2019; 73:e1-32. DOI: 10.1161/HYP.000000000000008

15. Cooper LA, Roter DL, Carson KA, et al. A randomized trial to improve patient-centered care and hypertension control in underserved primary care patients. *Journal of General Internal Medicine.* 2011; 26:1297-304.

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APPENDICES

Appendix A: Quality Improvement Methodology

THE AIM

What are we trying to accomplish?

THE MEASURE

How will we know a change is an improvement?

THE CHANGE

What change can we make that will result in improvement?

PLAN

ACT

DO

STUDY

Appendix B: PDSA Worksheet

Team Name:	Date of Test:	Test Completion Date:
Overall team/project aim:		

What is the objective of the test?

What goal does the change impact?

PLAN:
Briefly describe the test:

How will you know that the change is an improvement?

What driver does the change impact?

What do you predict will happen?

List the tasks necessary to complete this test. For example: what?	Person responsible (who)	When	Where
Ensure that all staff have access to the form			
Get staff feedback on the form			
Find inconsistencies in utilization of the form			
Continued and more detailed conversation regarding the usage and adaptions			

Plan for collection of data:

DO: Test the changes.
Was the cycle carried out as planned? ☐ Yes ☐ No

Record data and observations.

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

STUDY:
Did the results match your predictions? ☐ Yes ☐ No

Compare the result of your test to your previous performance: What did you learn?

ACT: Decide to Adopt, Adapt, or Abandon.
☐ **Adapt:** Improve the change and continue testing plan. Plans/changes for next test:

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

☐ **Abandon:** Discard this change idea and try a different one.

Appendix C: Process Flow Chart Template and Key
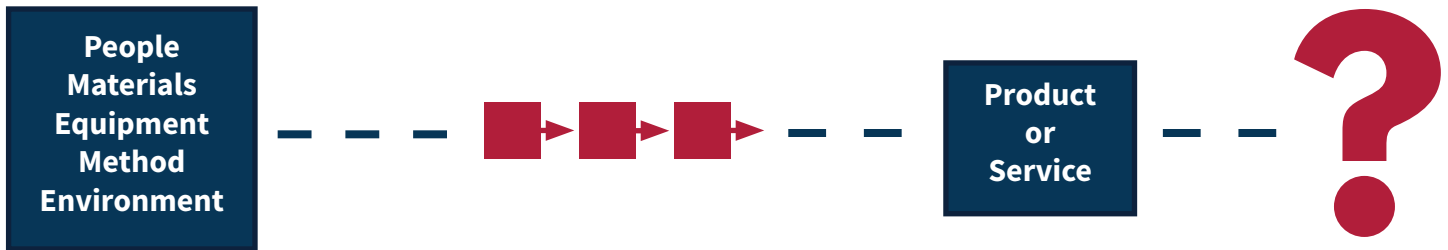
Flow charts create a visual map of a process from start to finish.

- A **high-level flowchart** (6-12 steps) is a mapping of the major, less detailed steps in a process. These types of flowcharts can be useful when making initial plans for process change.

- A **detailed flowchart** (12 or more steps) is an expanded mapping of a process that includes much more detail than the high-level flowchart. These are helpful for identifying precisely where issues arise in processes.
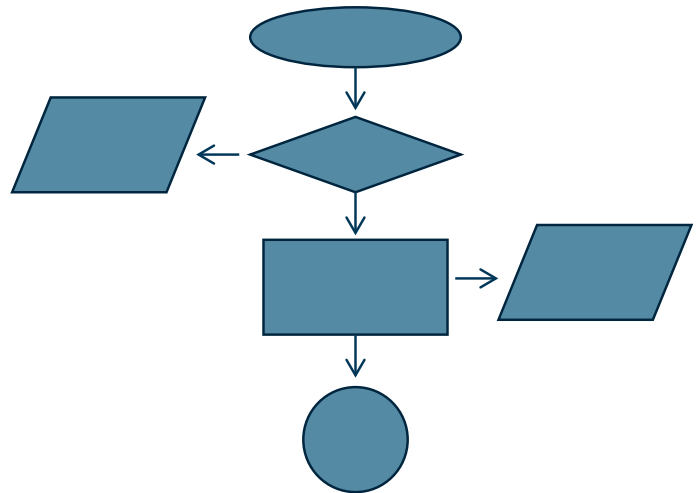
FLOW CHART SYMBOL	MEANING	EXPLANATION
	Start and end	The symbol denoting the beginning and end of the flow chart
	Step	This symbol shows that the user performs a task. (Note: In many flow charts steps and actions are interchangeable)
	Decision	This symbol represents a point where a decision is made
	Action	This symbol means that the user performs an action. (Note: In many flow charts steps and actions are interchangeable)
	Flow line	A line that connects the various symbols in an ordered way

Appendix D: Failure Mode and Effects Analysis Short Form

A Failure Modes and Effects Analysis (FMEA) is a step-by-step approach for identifying all potential things that can go wrong in the design or implementation of a process. This form can help prompt teams to create strategies to mitigate potential process failures.

Prior to using an FMEA, teams should develop a flow chart or process map of the process they are reviewing. Then complete the template shown in Table A as follows. First list the high-level process steps in descending order in the middle of the table. Second, identify all known or potential types of process failures in the column on the left. Enlist the aid of "skeptics" – they often can readily recite what can go wrong with a process. Third, list ways you might improve or prevent failures based on evidence and brainstorming in the column on the right. The interventions you identify may be considered for future PDSAs.

Table A: FMEA Short Form		
What can go wrong?	**High level process step**	**How might we improve?**

For More Information
Stamis D.H. (2003). *Failure Mode and Effect Analysis: FMEA from theory to execution*. Second Ed. ASQ Press: Milwaukee, WI.
http://www.ihi.org/resources/Pages/Tools/FailureModesandEffectsAnalysisTool.aspx.
https://asq.org/quality-resources/fmea.

Standard FMEA Template
https://www.lehigh.edu/~intribos/Resources/FMEA-template.xls

Appendix E: Improvement Team Development Success Factors

Improvement teams drive improvement work. Team leaders cannot and should not try to do it all. Build an improvement team to conduct the work. Populate your improvement team with a multi-professional group to ensure better understanding from various perspectives. Team members should also include at least one person from the "head/heart/hands" triad:

- Subject matter experts (head). These are people who understand both the process to be improved and the system of which the process is just one part.

- Process owners or beneficiaries (heart). These team members care deeply about the outcome or results that the process delivers. This may be a leader but get outside of the usual thinking and consider a real patient or customer. Who would care more?

- Process performers (hands). These are the people who do the daily work. They understand how the work is performed; sometimes different than what is intended. They are critical to determining the path to improvement.

Most improvement teams are formed around a core team of 4-8 individuals who will do most of the work surrounded by a variable number of experts who will temporarily join the team to contribute their expertise at the time of need. Team leaders provide purpose, structure, guidance and resources to the teams while building ongoing capability to do the improvement work.

Improvement teams use improvement science. An improvement team is not a committee. They are a small working group charged with testing their way into sustainable improvements rather than make recommendations for implementation. They must learn what the evidence suggests then determine how the evidence can be applied in their setting. They use a well-proven methodology such as the Model for Improvement, Lean Six-Sigma or other applied quality improvement methods to conduct their work. They make data-based decisions using both quantitative and qualitative data.

Improvement teams require active participation. Participation creates buy-in and improvement science requires participation. Buy-in at many levels is necessary for the improvements to be sustainable. One way to gain buy-in from multiple stakeholders is to bring them together to discuss three questions from the Model for Improvement:

- What are they trying to accomplish?

- How will they know if the changes they make are an improvement?

- What changes can be made to be an improvement?

An improvement team that collaborates to use a quality improvement tool will benefit beyond the results of the tool. Strong teams develop by having a successful team experience. The iterative process of using quality improvement tools contributes to team learning and a common team experience; both fundamental principles of building strong teams.

Team momentum needs to be nurtured. Even strong mature teams can get off track unless team leaders and other stakeholders help manage momentum. Routine and predictable events such as holidays, vacation, seasonal events and external reviews can disrupt the momentum and rhythm of improvement. Strategies to maintaining momentum are similar to managing other schedule disruptions:

- Appoint and train back-ups to perform if necessary

- Ensure plans & materials are in place prior to testing
- Personally contact those who are covering
- Make it easy to do the right thing
- Use visual reminders
- Embed the improvement work in your schedules

Additional sources for team development:
Covey, S. M. R. (2008). *The Speed of Trust: The One Thing That Changes Everything*. New York: Free Press

Davis, Todd. (2017). *Get Better: 15 Proven Practices to Build Effective Relationships at Work.* New York: Simon & Schuster.

Katzenbach, J.R & Smith, D.K. (2015). *The Wisdom of Teams: Creating the High-Performance Organization*. Reprint Edition. Boston: Harvard Business Review Press

Scholtes, P.R., Joiner, B.L., and Streibel, B.J. (2003). *The Team Handbook.* Third Edition: Madison, Wisconsin.

Appendix F: Intervention Examples

The following is a list of interventions tested by clinical practice sites that have participated in the Hypertension Quality Improvement Project.

Repeat Blood Pressure (BP)
- Training for accurate measurement and repeat BP measurement (videos or in-person) with annual training refreshers and new hire training for sustainability
- Visual aids: laminated heart to remind staff that a second reading is needed if the first BP is elevated
- Chart audits can be helpful to provide feedback to staff if repeat BP measurements are not being completed when indicated

Timely Follow-Up Appointment
- Visual aids: a laminated paper can indicate that a follow-up appointment needs to be scheduled if the repeat BP is high
- Patients with elevated BP can be scheduled for a follow-up with staff or a provider-led visit prior to leaving their appointment. This can be set up by a medical assistant, nurse or other staff when rooming the patient or at the desk when checking out using a reminder sheet
- Use a provider chart audit and feedback to see if a one month follow-up was scheduled

Home Blood Pressure Monitoring
- Prescription pad for ordering home blood pressure monitors
- Some sites worked directly with a Durable Medical Equipment (DME) supplier to ensure all hypertensive patients with elevated BP were able to obtain BP monitor
- Encourage providers to prescribe home blood pressure monitors

Treatment
- Implement evidence-based hypertension treatment algorithm
- Prescribe 90 day prescriptions
- Creation of staff-led visit template which asks and addresses medication adherence, lifestyle changes/ DASH diet, prompts education around DASH/low salt diet, and promotes medication intensification when appropriate (all sites completed at the beginning of the project)

Appendix G: Pareto Chart

A Pareto chart is a type of bar chart that is used to display the frequency of process failures. It is based on the Pareto Principle; which states that for many events, about 80% of effects come from about 20% of the causes. To utilize a Pareto chart, the improvement team first determines the categories detailing common known problem areas. Data is collected from the individual(s) impacted by the problem areas, typically either staff or patients. Data is counted by the number of occurrences within each defined category and entered into a spreadsheet or statistical software (see Table B). Once the data is entered into the table format, it can be used to create a Pareto Chart (see Figure 1).

Table B: Problem Data

PROBLEM AREA	OCCURRENCES	PERCENT OF TOTAL	CUMULATIVE PERCENT
Unable to get off work	38	34.23%	34.23%
Forgot appointment	28	25.23%	59.46%
Ill with other condition	22	19.82%	79.28%
Transportation issue	16	14.41%	93.69%
No longer needed appointment	6	5.41%	99.10%
Severe Weather	1	0.90%	100.00%

Figure 1: Reasons for No Show
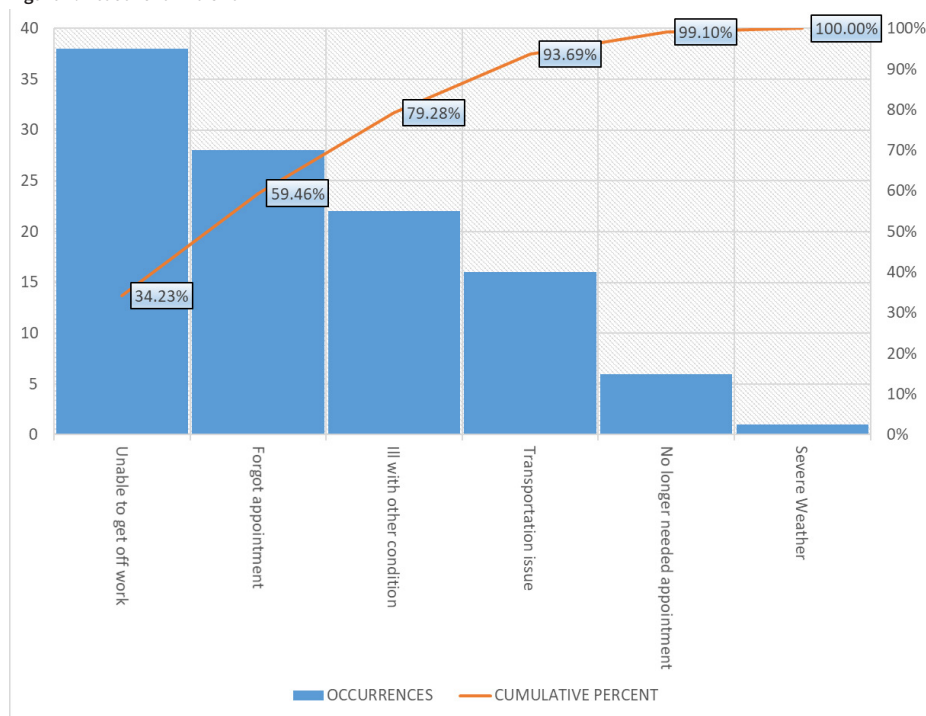
The Pareto chart will display a bar indicating the frequency of each category with a cumulative percent line above all the bars. Look across the cumulative percent line to approximately where the 80% value would fall. All the categories of failures that fall to the left of the 80% value would be considered those that most greatly contribute to the failures. Here is where you would start testing as this is where you would receive the greatest impact for your improvement efforts.

Review the below resources for more information on creating Pareto Charts
https://www.myexcelonline.com/blog/create-pareto-chart-excel-2016/

https://help.tableau.com/current/pro/desktop/en-us/pareto.htm

Appendix H: Patient Handout on How to Reduce Sodium[20] (Secondary Driver G2)

Most of us eat much more sodium or salt than we need, even if we never pick up the salt shaker. That's because more than 75% of the sodium we eat comes from packaged and restaurant foods. That can make it hard to control how much salt you eat, because it is already added to our food before we buy it.

I know that too much sodium hurts my health – what can I do to cut back?

At the store/while shopping for food:

- **Choose packaged and prepared foods carefully.** Compare labels and choose the product with the lowest amount of sodium (per serving) you can find in your store. You might be surprised that different brands of the same food can have different sodium levels

- **Pick fresh and frozen poultry that hasn't been injected with a sodium solution.** Check the fine print on the packaging for terms like "broth," "saline" or "sodium solution." Sodium levels in unseasoned fresh meats are around 100 milligrams (mg) or less per 4-ounce serving

- **Choose condiments carefully.** For example, soy sauce, bottled salad dressings, dips, ketchup, jarred salsas, capers, mustard, pickles, olives and relish can be sky-high in sodium. Look for a reduced or lower-sodium version

- **Choose canned vegetables labeled "no salt added" and frozen vegetables without salty sauces.** When you add these to a casserole, soup, or other mixed dish, there will be so many other ingredients involved that you won't miss the salt

- **Look for products with the American Heart Association's Heart-Check mark** to find foods that can be part of an overall healthy dietary pattern. Heart-Check is not a low-sodium program and the Heart-Check mark is not necessarily a sign that a product is "low-sodium", but it does mean that the food meets AHA's sodium criteria to have the Heart-Check mark. You can eat foods with varying amounts of

sodium and still achieve a balanced and heart-healthy diet. To learn more about the Heart-Check Food Certification Program, visit www.heartcheck.org

When preparing food:

- **Use onions, garlic, herbs, spices, citrus juices and vinegars** in place of some or all of the salt to add flavor to foods

- **Drain and rinse canned beans** (like chickpeas, kidney beans, etc.) **and vegetables** – this can cut the sodium by up to 40 percent

- **Combine lower-sodium versions of food with regular versions.** If you don't like the taste of lower-sodium foods right now, try combining them in equal parts with a regular version of the same food. You'll get less salt and probably won't notice much difference in taste. This works especially well for broths, soups, and tomato-based pasta sauces

- **Cook pasta, rice, and hot cereal without salt.** You're likely going to add other flavorful ingredients to these foods, so you won't miss the salt

- **Cook by grilling, braising, roasting, searing, and sautéing to bring out the natural flavors in foods** – that will reduce the need to add salt

- **For those who do not have chronic kidney disease**, **incorporate foods with potassium,** like sweet potatoes, potatoes, greens, tomatoes and lower-sodium tomato sauce, white beans, kidney beans, nonfat yogurt, oranges, bananas and cantaloupe. Potassium helps counter the effects of sodium and may help lower your blood pressure.

Is my food going to taste bland with less salt?

It certainly doesn't have to, especially when you use cooking techniques and other flavorful ingredients (noted in the tips above) to enhance your food. And as you take steps to reduce sodium gradually, you'll start to appreciate foods for their true flavor.

Over time, your taste buds can adjust to prefer less salt. Studies have shown that when people are given a lower sodium diet for a period of time, they begin to prefer lower-sodium foods and the foods they used to enjoy taste too salty. Try it and see for yourself!

What about salt substitutes?

There are many salt substitutes on the market for you to try. Some of them replace some or all of the sodium with potassium. Most people can use these products freely, unless you have certain medical conditions (like kidney disease) are taking certain medications that have implications for how much potassium you should eat. Talk with your healthcare professional about whether a salt substitute is right for you.

Appendix I: Recommended Reading in Quality Improvement in Healthcare

*A great first book on the topic

Improvement Leadership:

Barnas, Kim (2016). *Beyond Heroes: A Lean Management System for Healthcare*. Appleton, Wisconsin: Catalysis.

Deming, W. Edwards (1994). *The New Economics: For Industry, Government,* Education. Second Ed. Cambridge, Massachusetts: The MIT Press.

*Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L., and Provost, L.P. (2009). *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. Second Ed. San Francisco: Jossey-Bass.

Liker, Jeff K. (2004). *The Toyota Way.* New York: McGraw Hill.

Liker, J. K. and Convis, G.L. (2012). *The Toyota Way to Lean Leadership*. New York: McGraw Hill.

Understanding Variation in Improvement:

Graban, Mark (2019). *Measures of Success: React Less, Lead Better, Improve More*. Colleyville, Texas: Constancy, Inc.

Provost, L.P. and Murray S.K. (2011). *The Health Care Data Guide: Learning from Data for Improvement.* San Francisco: Jossey-Bass.

*Wheeler, D. J. (2000). *Understanding Variation: The Key to Managing Chaos*. Second Ed. Knoxville, Tennessee: SPC Press.

Change Management in Improvement:

Gawande, Atul (2009). *The Checklist Manifesto: How to Get Things Right.* New York: Picador.

Grenny, J, Patterson, K Maxfield, D, McMillan, R, Switzler, A (2013). *Influencer: The New Science of Leading Change.* Second Ed. New York: McGraw-Hill Education.

Heath, C & Heath D. (2010). *Switch: How to Change Things When Change is Hard*. New York: Broadway Books.

Kahneman, D. (2011). *Thinking, Fast and Slow.* New York: Farrar, Straus and Giroux.

*Kotter, John P. (1996). *Leading Change.* Boston: Harvard Business School Press.

Kotter, John P. and Cohen, D. S. (2002). *The Heart of Change: Real Life Stories of How People Change Their Organizations.* Boston: Harvard Business School Press.

McChesney, C., Covey, S. and Huling, J. (2012). *The 4 Disciplines of Execution*. New York: Free Press.

Systems Thinking

Senge, Peter (2006). *The Fifth Discipline: The Art & Practice of the Learning Organization*. Revised Edition. Doubleday.

Senge, P., Kleiner, A., Roberts, C., Ross, R.B., and Smith, B.J. (1994). *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*. New York: Currency.

*Weick, K.E. (2015). *Managing the Unexpected: Sustained Performance in a Complex World.* Second Ed. Hoboken, New Jersey: John Wiley & Sons, Inc.

Improvement Team Development:

*Lencioni, Patrick. (2002). *The Five Dysfunctions of a Team.* San Francisco: Jossey Bass.

Scholtes, P.R., Joiner, B.L. and Streibel, B.J. (2003). *The Team Handbook.* Third Ed. Madison, Wisconsin: Oriel Inc.

Appendix J: Resources for Validated Home Blood Pressure Devices

AMA US BP Validated Device Listing: www.validatebp.org

British Hypertension Society: bihsoc.org/bp-monitors/for-home-use

Canadian Hypertension Society: hypertension.ca/hypertension-and-you/managing-hypertension/measuring-blood-pressure/devices

dabl Educational Trust: www.dableducational.org/sphygmomanometers/devices_2_sbpm.html#ArmTable