
HYPERTENSION CONTROL

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HRSA CCM: HYPERTENSION CONTROL

The goals of this module are to provide a detailed overview of the HRSA’s Core Clinical Measure, **Hypertension Control**, outline the intended use for this measure, and highlight the benefits of implementing this measure into an organization’s quality improvement (QI) program.

Measure Description

Name	Description	Numerator	Denominator	Source	Reference
Hypertension Control	Percentage of patients 18 to 85 years of age with a diagnosis of hypertension (HTN) and whose blood pressure (BP) was adequately controlled (<140/90) during the measurement year	Patients from the denominator with last blood pressure measurement with systolic blood pressure less than 140 mm Hg and the diastolic blood pressure less than 90 mm Hg	All patients 18 to 85 years of age with a diagnosis of hypertension (HTN) during the measurement year	NQF/NCQA/ CMS-PQRI 2008	http://www.nqa.org/tabid/432/Default.aspx

Part 1: Introduction

Hypertension is one of the most common worldwide diseases afflicting humans. The most widely-used definition of hypertension was published by the *Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* in its Seventh Report (JNC VII 2003). Based on its recommendations, the classification of blood pressure, which is the average of two or more readings each taken at two or more visits after initial screening for adults aged 18 years or older, is as follows:

- Normal—systolic blood pressure (SBP) is lower than 120 mm Hg; diastolic blood pressure (DPB) is lower than 80 mm Hg
- Pre-hypertension—SBP is 120 to 139 mm Hg; DBP is 80 to 99 mm Hg
- Stage 1—SBP is 140 to 159 mm Hg; DBP is 90 to 99 mm Hg
- Stage 2—SBP is equal to or more than 160 mm Hg; DBP is equal to or more than 100 mm Hg

The JNC VII report also clarified a couple of helpful facts about blood pressure. Normal blood pressure (BP) with respect to cardiovascular risk is less than 120/80 mm Hg; however, unusually low readings should be evaluated for clinical significance. A new category of pre-hypertension was defined, emphasizing those patients with pre-hypertension are at risk for progression to hypertension, and lifestyle modifications are important preventive strategies.

Hypertension may be either essential or secondary. Essential hypertension is diagnosed in the absence of an identifiable secondary cause, including coarctation of the aorta, renal disease, pheochromocytoma, and Cushing's syndrome. Approximately 95 percent of American adults

have essential hypertension, while secondary hypertension accounts for fewer than 5 percent of the cases.

Hypertension has been described as the most important modifiable risk factor for coronary heart disease (leading cause of death in the United States), stroke (third leading cause), congestive heart failure, and end-stage renal disease. Over 50 million Americans have high blood pressure warranting some form of treatment, and in 2006, there were 44,879 million physician office visits for hypertension.¹

Data from the National Health and Nutrition Examination Survey (NHANES) 2005-2006 (2) summarized in the January 2008 issue of the National Center for Health Statistics, *NCHS Data Brief*, shows that:^{2,3}

- Twenty-nine percent of all United States adults aged 18 years or older have hypertension
- The prevalence of hypertension increases with age, from 7 percent among individuals aged 18 to 39 years to 67 percent in those 60 years of age or older
- Non-Hispanic Blacks had a significantly higher prevalence (41 percent) compared with non-Hispanic Whites (28 percent) and Mexican Americans (22 percent)
- Overall, 37 percent of adults had pre-hypertension (SBP 120 to 139 mm Hg or DBP 80 to 89 mm Hg) and were not taking antihypertensive medication
- The prevalence of pre-hypertension also increased with age and was higher in men (43 percent) than women (39 percent)

Layered on this high prevalence, is the fact that the impact of hypertension on cardiovascular morbidity and mortality is significant, and it continues to be a public health challenge. Death from ischemic heart disease (IHD) and stroke increases linearly from blood pressure levels as low as 115/75 mm Hg. For every 20 mm Hg systolic or 10 mm Hg diastolic increase in blood pressure, mortality from both IHD and stroke doubles.⁴ It was estimated that the direct and indirect costs of high blood pressure would be \$73.4 billion in the year 2009.⁵

Hypertension continues to be one of those diseases in which significant disparities still exist. It is more common, more severe, develops at an earlier age, and leads to more clinical sequelae in Blacks than in age-matched non-Hispanic Whites.⁶ Additionally, Mexican Americans and Native Americans have lower control rates than non-Hispanic Whites and Blacks.^{7,8}

Performance Measurement: Hypertension Control

Measuring performance allows an organization to document how well care is currently provided and lay the foundation for improvement. The HRSA Core Clinical Measures (CCMs) are a set of performance measures, designed for use by HRSA programs as an integral part of quality improvement programs, to improve care for the safety-net population. More information about the purpose and development of these measures can be found in the **CCM** modules.

The HRSA **Hypertension Control** measure is designed to measure the effectiveness of the care and management of patients diagnosed with hypertension. Blood pressure reduction has been shown to reduce the risk for developing complications from hypertension, including myocardial

infarction and stroke; hence, hypertension control is defined as an intermediate or outcome measure, or one of the proxy measures for assessing cardiovascular health in a community.

Consider the characteristics of a good performance measure and the Institute of Medicine (IOM) framework, ***Envisioning the National Healthcare Quality Report***:

- **Relevance:** Does the performance measure relate to a frequently-occurring condition or have a great impact on patients at an organization's facility?
- **Measurability:** Can the performance measure realistically and efficiently be quantified given the facility's finite resources?
- **Accuracy:** Is the performance measure based on accepted guidelines or developed through formal group decision-making methods?
- **Feasibility:** Can the performance rate associated with the performance measure realistically be improved given the limitations of the clinical services and patient population?

To ensure that a performance measure has these characteristics, it is often based on, or aligned with, an organization's existing and proven measures.

The HRSA CCMs were developed in alignment with national clinical practice guidelines and other performance measures that have been vetted through a national consensus process. The **Hypertension Control** measure aligns with measures endorsed by the **National Committee for Quality Assurance (NCQA)** and similar performance metrics used by HRSA grantees and programs. The measure also aligns with those adapted by the **Office of Regional Operations (ORO)** and is similar to the one used by the **Bureau of Primary Health Care (BPHC)** in the clinical portion of its **Uniform Data Systems (UDS)** process. Similar measures also exist in the national measure set for Healthy People 2010.

HRSA Core Clinical Measure: Hypertension Control

Name	Description	Numerator	Denominator	Source	Reference
Hypertension Control	Percentage of patients 18 to 85 years of age with a diagnosis of hypertension (HTN) and whose blood pressure (BP) was adequately controlled (<140/90) during the measurement year	Patients from the denominator with last blood pressure measurement with systolic blood pressure less than 140 mm Hg and the diastolic blood pressure less than 90 mm Hg	All patients 18 to 85 years of age with a diagnosis of hypertension (HTN) during the measurement year	NQF/NCQA/ CMS-PQRI 2008	http://www.nqf.org/tabid/432/Default.aspx

As with all performance measures, there are essential inclusions, exclusions, and clarifications that are required to ensure that an organization collects and reports data in the same way. This allows an organization using the measure to compare itself with others. Detailed specifications for the measure, with descriptions of inclusion and exclusion criteria, are found in the section, **Part 3: Data Infrastructure: Hypertension Control**.

Improvement Experience: Hypertension Control

As mentioned above, the **Hypertension Control** measure was chosen to align with existing measures. The data demonstrating the experience with these measures is discussed briefly in this section.

For more than three decades, the National Heart, Lung, and Blood Institute (NHBLI) has administered the National Blood Pressure Education Program Coordinating Committee, a coalition of major professional, public, and voluntary organizations and Federal agencies. An important function has been to increase awareness, prevention, treatment, and control of hypertension.

Through its efforts, considerable progress has been made toward achieving the goals of the program. As **Table 1.1: Trends in Awareness, Treatment, and Control of High Blood Pressure** indicates:

- Awareness of hypertension among Americans has improved from 51 to 70 percent over two decades
- Percentage of patients with hypertension receiving treatment has increased from 31 to 59 percent in the same period
- Percentage of person with high blood pressure controlled to below 140/90 has increased from 10 to 34 percent

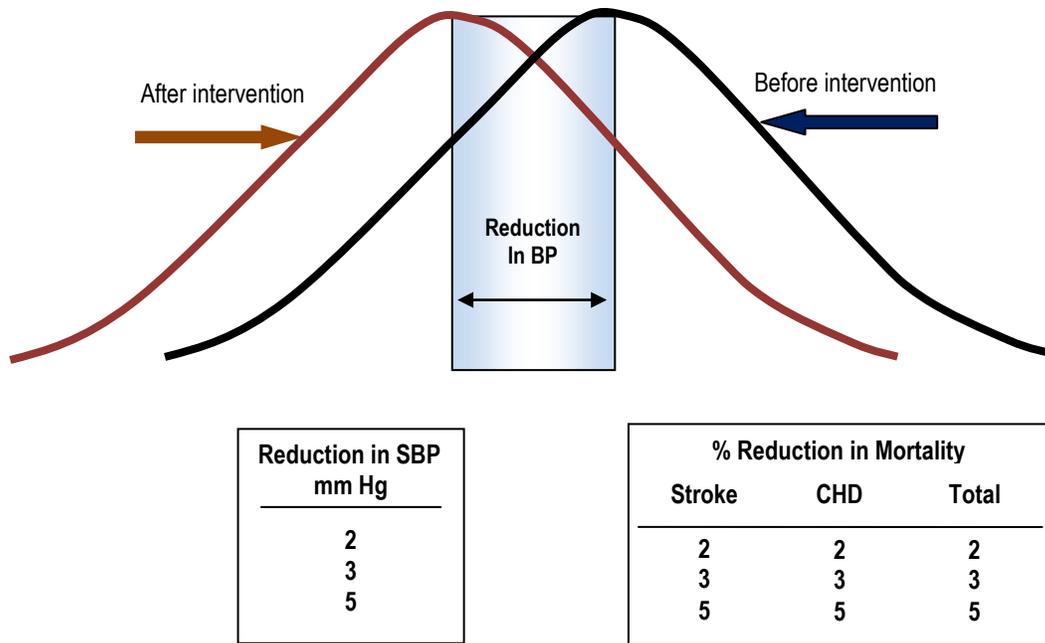
Table 1.1: Trends in Awareness, Treatment, and Control of High Blood Pressure (1976-2000)				
<i>Adapted from the National Health and Nutrition Examination Survey</i>				
Trends	1976-1980¹	1988-1991¹	1991-1994²	1999-2000^{*3}
Awareness	51%	73%	68%	70%
Treatment	31%	55%	54%	59%
Control[†]	10%	29%	27%	34%

**Percentage of adults aged 17 to 84 years with SPB of 140 mm Hg or greater, DBP of 90 mm Hg or greater, or taking antihypertensive medication.*

†SBP below 140 mm Hg and DBP below 90 mm Hg, and on antihypertensive medication.

These improvements are significant in individual and societal value since modest improvements in blood pressure have been shown to reduce morbidity and mortality. As presented in **Figure 1.1: Systolic Blood Pressure Distributions**, it is estimated that a five mm Hg reduction of SBP in the population would result in:⁹

- Fourteen percent overall reduction in mortality due to stroke
- Nine percent reduction in mortality due to coronary heart disease (CHD)
- Seven percent decrease in all-cause mortality



BP, blood pressure; CHD, coronary heart disease; SBP, systolic blood pressure

Source: Whelton PK, et al. Primary prevention of hypertension: Clinical and public health advisory from The National High Blood Pressure Education Program. JAMA 2002;288:1882-8.

Figure 1.1: Systolic Blood Pressure Distributions
Adapted from CDC Web site – DHDSP – High Blood Pressure (9)

Part 2: Characteristics for Success: Hypertension Control

Organizations that were successful in improving **Hypertension Control** for their patients approached the issue in a systematic way, with careful attention to the factors that have an impact on blood pressure control. Although clinics may differ in specific work flow, documentation, and staffing models, organizations that experienced successful improvement efforts shared these three fundamental characteristics:

1. Clear direction
2. Functional infrastructure for quality improvement
3. Commitment from leadership

1. Clear Direction

Successful organizations found that it is important to define clearly what they are trying to accomplish. Most often in improvement work, leadership defines an aim that guides an organization's efforts. An aim is a written, measurable, and time-sensitive statement of the accomplishments a team expects to achieve from its improvement efforts. The aim statement contains a general description of the work, the system of focus, and numerical goals. The aim statement includes a very specific indication of what success looks like and

may include guidance that further frames the work, including methodologies to be used and budgetary and staffing limitations. Examples of tools used by *QI teams* to create their aim statements include the **Aim Worksheet** and the **Aim Statement Checklist**.¹⁰ Additional information, including tools and resources to assist an organization in developing its aim statement, are found in the **Readiness Assessment and Developing Project Aims** module. A completed aim statement for the measure, **Hypertension Control**, is shown in **Example 2.1: Assessing the Aim Statement for Sunshine Health Care Center (SHCC) Using the Aim Statement Checklist**.

The following hypothetical example provides an aim statement created by a fictional QI team at the Sunshine Health Care Center and the checklist the team used to assess its completed aim statement. Using the Aim Statement Checklist to assess the QI team's aim statement provides reassurance that the team included the necessary components of the aim statement for its improvement project.

Example 2.1: Assessing the Aim Statement for Sunshine Health Care Center (SHCC) Using the Aim Statement Checklist

Aim Statement: *Over the next 12 months, we will redesign the care systems of SHCC to improve blood pressure control in hypertensives so that 65 percent of the hypertensive patients will have a blood pressure less than 140/90 mm Hg.*

Guidance:

- *No additional staffing will be required as a result of this improvement*
- *A key focus will be education of patients and families*

***Here is an example of how SHCC evaluated its aim statement using the Aim Statement Checklist:**

Aim Statement Checklist for Example 2.1:¹⁰

- ✓ What is expected to happen?
SHCC: A higher percentage of hypertensive patients will have a blood pressure less than 140/90 mm Hg
- ✓ Time period to achieve the aim?
SHCC: 12 months
- ✓ Which system will be improved?
SHCC: Care systems that improve hypertension management
- ✓ What is the target population?
SHCC: Patients diagnosed with hypertension
- ✓ Specific numerical goals?
SHCC: More than 65 percent of the hypertensive patients with a blood pressure less than 140/90 mm Hg
- ✓ Guidance, such as, strategies for the effort and limitations?
SHCC: As noted, no new staff plus focus on education of patients and families

Evaluating what others achieved provides appropriate context for choosing the numerical portion of an organization's aim. In some cases, data is available to show average performance for a group of practices that focused on a particular measure. While the goal of *100 percent of hypertensive patients achieving a blood pressure of less than 140/90* is optimal, an organization can set an appropriate and realistic goal based on the data provided within this report after consideration of a number of factors, including progress to date with the indicator and funding agency expectations. For some measures, it may be possible to find examples of benchmark data, which demonstrates the performance of a best practice. It is important to consider an organization's particular patient population when making comparisons to others' achievements. An organization may consider socioeconomic status and/or race/ethnicity of the population served, organizational size, payer mix, and other criteria in an effort to achieve an accurate comparison. Reviewing what others accomplished may help an organization to understand what is feasible to achieve. The numerical part of the aim should be obtainable, yet high enough to challenge the team to substantially and meaningfully improve. Additional guidance about setting aims can be found in the **Readiness Assessment and Developing Project Aims**.

Sources to consider when choosing an aim or making performance comparisons for the measure, **Hypertension Control**, include the Healthy People 2010 goal, which is 50 percent. Other sources of data for additional comparisons vary regionally but may include payers, State programs, and State or regional quality improvement programs.

2. Functional Infrastructure for Quality Improvement

Successful organizations found that improvement work requires a systematic approach to measuring performance, testing small changes, and tracking the impact of those changes over time. This section describes four essential components of an infrastructure to support quality improvement efforts, including:

- Quality improvement teams
- Tools and resources
- Organizing improvements
- Building on the efforts of others by using changes that worked

There is considerable variation in how this infrastructure is created and maintained. It is important that each component is addressed in a way that fits an organization.

Quality Improvement Teams

Multidisciplinary QI teams are typically tasked to carry out this work. For improvement focused on **Hypertension Control**, it is important to include a provider who wants to focus on improving the rate of **Hypertension Control**, i.e., a *provider champion* for improvement.¹¹ In addition to the provider champion, other appropriate members of a QI team may include:

- Nurses
- Pharmacists

- Case managers
- Health educators
- Patient outreach specialist
- Patient navigator
- Scheduling staff
- Information specialist
- Other staff involved in the patient care process, such as, receptionists, administrative staff, medical assistants, and health coaches

It should be noted that patients can add great value to the QI process when prepared to participate in a meaningful way. The reference manual by the **National Quality Center (NQC)**, *A Guide to Consumer Involvement*, has practical ideas to assist an organization on how to involve patients in its QI process.¹²

There are no wrong answers here. Members of a team bring expert knowledge of the work they do for hypertensive patients. Together, the team learns where and how its individual actions intersect and how each can have an impact on patients' blood pressure control. The ability to think from a systems perspective and the will to improve **Hypertension Control** care are the primary prerequisites that contribute to a successful improvement team. A more advanced discussion on forming an improvement team can be found in the **Improvement Teams** module.

Tools and Resources

It is important that a QI team have the tools and resources necessary to achieve its established organizational aim. Some personnel may struggle shifting from the daily work of patient care to their roles on the quality improvement team. Those challenges can be straight forward, such as, coordinating meeting times or developing content for the meetings to support the team's quality improvement efforts. Successful QI teams learned that organizing meetings efficiently is essential in their improvement efforts. Tools, such as **Tips for Effective Meetings**, can help a QI team to structure meetings that focus its scheduled time on improvement efforts. Another useful tool includes one that displays data in a way that makes sense to the team members. These types of tools are commonly used by improvement teams to remain focused on the work of improvement. The most important resource needs are uninterrupted time to focus on quality improvement and autonomy to test changes responsibly. Additional team resources and tools can be found in the **Improvement Teams** module.

Organizing Improvements

Successful organizations learned that planning an approach to change is essential. Change is, by nature, unsettling for some and presenting a clear direction and methodology can be reassuring. Most organizations with quality improvement experience adopted methodologies that help them organize their improvements.

As a QI team approaches improvement of **Hypertension Control**, it should use quality models already embraced by its organization. For example, many organizations adopted the **Care Model** to organize their approaches to implementing quality improvement changes. Others successfully embraced the FOCUS PDSA approach; both of these models provide a framework for a health care organization to plan and move toward implementing its improvement efforts. There is no single model that is considered correct. Organizational alignment of methodology makes sense from the perspective of efficient training. A consistent quality improvement approach and the sharing of improvement ideas among members of a quality team can facilitate the replication of QI activities across an organization and maximize the impact of the overall QI program.

Just as organizations that are experienced in quality improvement activities adopted quality models that guide their work, many embraced a change methodology. A change methodology guides the actual change process, which involves managing *how* changes are made as opposed to *what* changes are made.

For some organizations, all changes are approved by a decision leader and then implemented. Others use a committee structure to evaluate and implement changes. Again, there is no right or wrong methodology, but one change methodology has been found to be particularly helpful in quality improvement called the *Model for Improvement*. The Model for Improvement, developed by Associates in Process Improvement, is a simple, yet powerful, tool for accelerating improvement. The model is not meant to replace a change model that an organization may already be using, but rather to accelerate improvement. This model has been used successfully by health care organizations to improve many different health care processes and outcomes.

The Model for Improvement encourages small, rapid-cycle tests of changes. In improvement, this has a distinct advantage in decreasing the time it takes for changes resulting in improvement to be implemented. This methodology also directly involves the individuals who do the work, which provides additional insights into how to rapidly improve care processes. Advance discussions can be found in the **Testing for Improvement** module.

Building on the Efforts of Others by Using Changes that Worked

One hallmark that successful organizations found beneficial in advancing their quality improvement programs is that everyone across the organization uses the same tools and language to make continuous improvements. A motto of many QI training leaders is "steal shamelessly." This is not the unethical, criminal intent, but instead the sense of "Why reinvent the wheel?" What does it mean to "steal shamelessly"? It means "stealing" or using what has worked in other organizations and "shamelessly" testing and implementing it to create rapid change in one's own organization.

Specific *change ideas* that worked for others to successfully improve hypertension care are detailed later in this module in the **Changes that Work** section. Additionally, an organization that has improvement experience in another measurement area, such as,

diabetes, cancer screening, or immunizations, often adapts the successful tools to use with this measure.

3. Commitment from Leadership

For quality improvement efforts to be effective and sustained, leaders must show commitment to them. Typically, leaders may make a commitment to specific target areas for improvement once they consider the overall needs of the organization, requirements of funders, and how the proposed efforts align with the organization's mission and strategic plan. Leaders that consider quality improvement efforts as an "add-on" may be unable to maintain QI as a priority as other realities compete for the organization's attention and resources. Successful leaders in quality improvement integrate and align QI activities as part of their daily business operations.

A quality improvement team needs to have leadership commitment expressed in a tangible way. Often, it is an explicit dedication of resources, which may include team meeting time, data support, and specific planned opportunities that communicate actionable improvement suggestions to an organization's leadership. The authority of the improvement team and any constraining parameters should be clear. Detailed information highlighting the important role of leadership in a QI project can be found in the **Quality Improvement** module.

The case story below introduces a fictional QI team as it identifies a problem with its hypertensive patients accessing early hypertensive care. The various phases of hypothetical case story are presented throughout the module to demonstrate one QI team's approach to improving the care for its hypertensive patients.

The Problem:

Sunshine Health Care Center (SHCC) is a fictional organization that provides full-scope primary care services to residents in a suburban area. It has one main and six smaller satellite sites and twenty-seven school-based clinics that are strategically located in different sectors of its service area. It is served by a provider staff of 16 family physicians, 3 physician's assistants, 18 advanced registered nurse practitioners, and 4 obstetricians. The center also has six dentists, four psychiatrists, an optometrist, and a podiatrist. As a result of an economic downturn with mounting unemployment, the area experienced an increasing number of uninsured patients, the majority of whom earn incomes below 100 percent of the Federal poverty level.

SHCC recently started using an electronic health record, and data obtained from it indicates that the percentage of hypertensive patients with a controlled blood pressure is much lower than the care teams expected. The clinicians are very much concerned about care outcomes for their patients with hypertension. Additionally, the organization's leadership has informed the staff that this is a measure that is reported to a major funding agency annually, and a lack of improvement could jeopardize its funding.

Part 3: Implementation of HRSA CCM: Hypertension Control

Before following the steps in Part 3, an organization should first make a commitment to improve **Hypertension Control** and complete the initial steps outlined in the previous section that include:

- Developing an aim statement
- Creating an infrastructure for improvement
- Gaining commitments from leadership

Performance on this measure indicates how effectively all the steps of the processes used to deliver care work together to achieve optimum blood pressure for patients. Since there are so many factors that can have an impact on blood pressure control, it helps to visualize how these steps are mapped. The next section defines *Critical Pathway* and illustrates the application of this concept to implement **Hypertension Control**.

The case story continues...

The Approach:

SHCC's leadership agreed that this was a priority area to focus on immediately. It decided that since this had a significant impact on its patients and the community, known as a high volume, and resources were limited, it was necessary to establish a Hypertension Management Task Force (HMTF) to address the problem. Another reason that supported this decision was the apparent long-standing problem of hypertension that involved multiple disciplines. Additionally, there was a potential adverse impact on SHCC's future funding in the presence of national discussions on pay-for-performance. After much deliberation, members for the task force were selected. They included a provider champion (Dr. Philippe), a medical assistant, the unit RN nurse coordinator, the unit front desk clerk, the medical director, the vice president for nursing, and the director of finance.

Key steps in the SHCC's efforts were as follows:

1. The CEO met with the HMTF and formally presented his charge for it to improve hypertension control with a sustained target of 65 percent within 24 months. He approved its recommendation to meet weekly initially then biweekly when progress had been made, and asked for biweekly updates from the medical director and VP for nursing.
2. The HMTF then defined rules of engagement to guide its teamwork, and selected a leader and timekeeper.
3. Data from the practice management system indicated that the organization had over 3,000 hypertensive patients. The team felt it would be difficult to address all of SHHC's hypertensive patients at the outset.
4. The team decided to focus initially on Dr Philippe's 250 hypertensive patients, and invited the nutritionist to the next meeting.
5. It was not sure which performance improvement methodology would best facilitate its improvement journey and decided to learn more about successful approaches. The team leader decided to go online to research this.

Critical Pathway for Hypertension Control

A critical pathway, also known as a clinical pathway, is a visual depiction of the process steps that result in a particular service or care. The sequence and relationship among the steps are displayed, which reveals a *map* of the care process. Additional information, including tools and resources regarding the mapping of care processes, can be found in the **Redesigning a System of Care to Promote QI** module. In an ideal world, the care process is reflective of evidence-based medical guidelines. Evidence-based medicine aims to apply the best available evidence gained from the scientific method for medical decision making.¹³

A map of the care process steps, which incorporates all of the known evidence and follows respected evidence-based medical guidelines, can be considered the *idealized critical pathway*. While the needs of individual patients should always be considered, clinical guidelines synthesize the best evidence into a pragmatic set of action steps that strive to provide the optimum health care delivery system. It is important to emphasize that clinical evidence and guidelines will evolve as knowledge progresses; therefore, the idealized critical pathway may evolve over time and not meet the needs of every individual.

Note: Please consider the following regarding critical pathways:

- There can be more than one way to depict the idealized critical pathway.
- Authorities vary on critical issues that have an impact on important decisions in medicine, and there is latitude within guidelines for variation related to less critical matters.
- It is important that an organization agrees on the guidelines with which to align. There are multiple specific guidelines that address processes to optimize mammographic screening for breast cancer. An organization may interpret those guidelines differently than illustrated in Figure 3.1. If so, creation of a different schematic that reflects its interpretation of the best evidence is encouraged. References are located in *Part 6: Supporting Information* at the end of this module.

In **Figure 3.1**, the schematic incorporates available evidence and represents an idealized critical pathway for **Hypertension Control**. The boxes represent typical steps in care delivery. If these steps happen reliably and well, effective care is delivered.

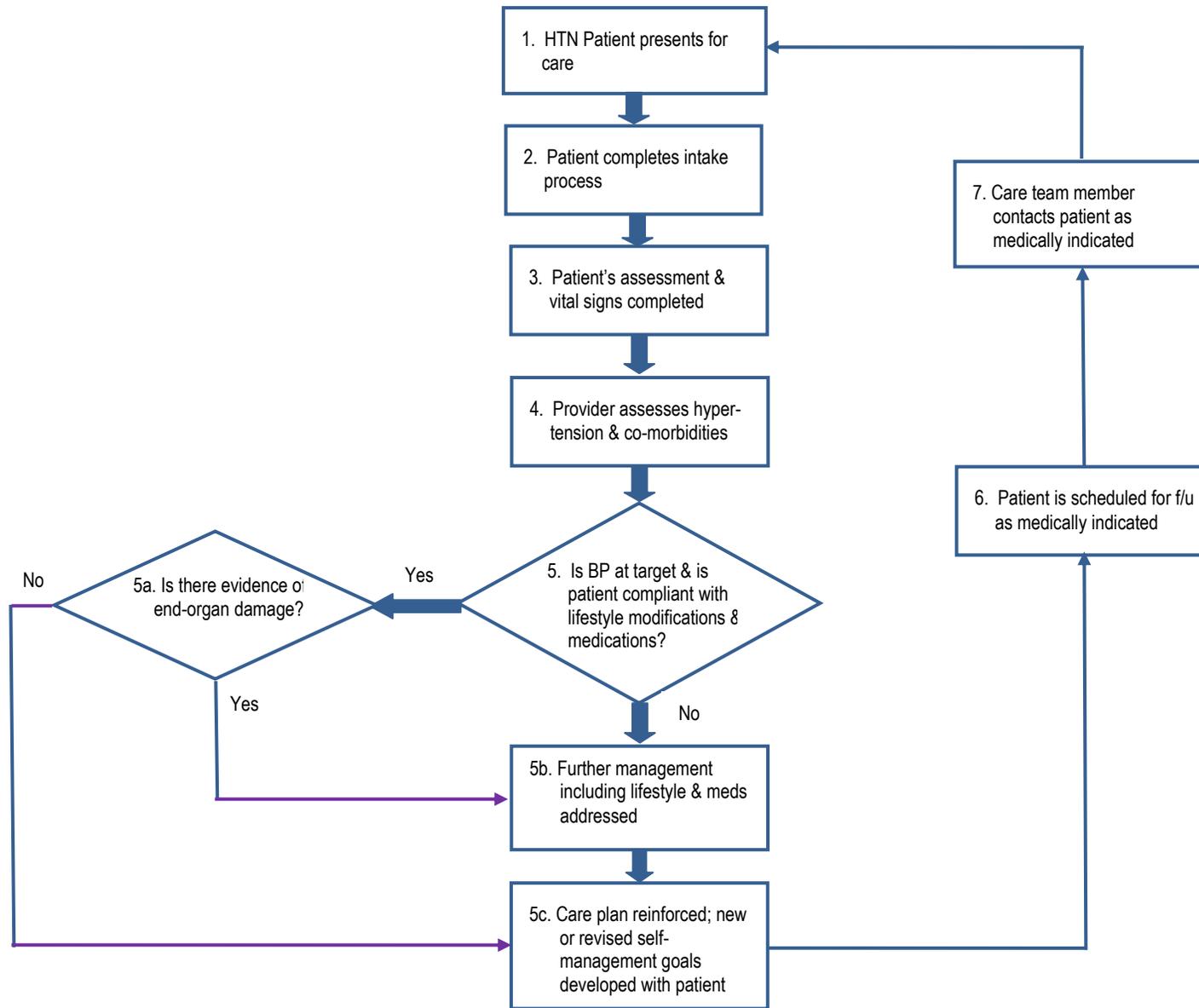


Figure 3.1: Critical Pathway for Hypertension Control

Walkthrough of the Idealized Critical Pathway

This critical pathway exists both inside the clinic and beyond the clinic walls. Each of these steps is important to effective blood pressure management and emphasizes the importance of all members of the care team in achieving hypertension control:

1. The patient presents for care as a result of any of the following:
 - a. A scheduled appointment from the previous visit
 - b. A scheduled appointment following a contact by a member of the care team after the previous visit
 - c. An unscheduled appointment (walk in) for elevated blood pressure, medication refill, etc.
2. The patient is identified as being hypertensive based on alerts in the management information system or flags in the HIPAA-compliant paper chart. Each patient is given an education handout on blood pressure control to read while waiting to be seen. The staff emphasizes the importance of reading the material and noting any questions that may need to be discussed with the provider.
3. During the patient assessment and prior to the provider's encounter, the staff:
 - a. Informs the patient of the blood pressure reading and the target blood pressure
 - b. Asks about the patient's current medications and compliance with his or her medications and lifestyle changes
 - c. Commences the process of self-management goal setting, for example, reviewing key factors that have the most impact on a patient's blood pressure using a patient-friendly self-management tool to facilitate the discussion
 - d. Reviews health maintenance requirements for a hypertensive, including the need for an annual eye doctor visit, cholesterol and blood sugar screening, etc.
 - e. Initiates referral requests and lab test orders
 - f. Informs the patient about in-house and community resources available to assist with blood pressure control, including group visits, nutrition counseling, safe local parks and discounted gym memberships for exercising
 - g. Documents all of the information above in the patients record
 - h. Flags the record if the patient has a blood pressure more than 140 mm Hg systolic or more than 90 mm Hg diastolic
4. Provider sees the patient and completes the appropriate assessment. Key areas include:
 - a. Reviewing the support staff's patient assessment and documentation
 - b. Assessing co-morbidities
 - c. Reviewing the patient's self-management goals and addressing any potential barriers to achievement, for example, homelessness, unemployment, depression, and medication costs
5. Key decision points are when the provider determines if the patient's BP is at target and the patient complies with lifestyle modifications and medications. The responses to these questions influence a patient's care plan:

- 5a. If the patient has an appropriate blood pressure and is compliant with lifestyle modifications and medications, the provider then needs to determine if there is any evidence of end-organ damage, for example, a fundoscopy to look for retinal damage, electrocardiogram for heart damage, and creatinine and urine protein for renal damage. Evidence of end-organ damage requires a different blood pressure target, additional therapeutic options to minimize progression, and may trigger a follow-up with an appropriate specialist, such as, a nephrologist or cardiologist.
- 5b. Provider focuses on different self-management goals even when target blood pressure is attained and the patient is compliant with life style modifications and medications, or steps up the care plan when:
 - a. Blood pressure is not at target
 - b. Patient is not compliant with necessary lifestyle changes
 - c. There is evidence of end-organ damage
- 5c. Provider develops or reinforces the care plan based on the assessment. The plan includes:
 - a. Necessary medication changes
 - b. New or revised self-management goals
 - c. Referral and lab test orders
 - d. Patient linkage to helpful resources, such as an invitation to group medical visits for hypertension
 - e. Scheduling a follow-up as necessary
6. Patient is discharged and scheduled for follow up as medically indicated. Support staff emphasizes key education points and hypertension management changes. A current medication list is printed for the patient.
7. A member of the care team contacts the patient a few days after the visit to emphasize key points in the education provided and to ensure that barriers to achieving the blood pressure target are addressed, such as medication refills. Patient is advised of the importance regarding follow-up care and the need for monitoring as medically indicated (at minimum annually).

A few important notes:

- The idealized critical pathway for **Hypertension Control** may be developed based on key staff contacts and functions performed at each step, or based on critical decision points in blood pressure control regardless of the type and qualification of staff performing that function. Either type of pathway chosen by an organization may be used in its improvement effort.
- An organization may adopt additional hypertensive guidelines that include important care parameters. The Institute for Clinical Systems Improvement by the *National Guidelines Clearinghouse* describes guidelines for **Hypertension Control**.
- A critical pathway can also be constructed to illustrate *how care is currently provided* within an organization (the existing pathway). Understanding the gap between an organization's *existing* critical pathway (how you provide care now), and the *idealized*

critical pathway (how to provide reliable, evidence-based care aligned with current guidelines), form the basis for improvement efforts.

Factors That Impact the Critical Pathway

In addition to understanding the steps for providing **Hypertension Control**, factors that interfere with optimal care should be understood. As there may be several of these factors, a QI team may find it helpful to focus its attention on factors that interfere with ideal outcomes. This becomes especially useful as plans are developed to mitigate these factors.

Factors that have an impact on **Hypertension Control** can be organized into those that are patient-related, relative to the care team, and a result of the health system. Overlaps exist in these categorizations, but it is useful to consider factors that have an impact on care processes from each perspective to avoid overlooking important ones.

Patient factors are characteristics that patients possess, or have control over, that have an impact on care. Examples of patient factors are age, race, diet, and lifestyle choices. Common patient factors may need to be addressed more systematically, such as, a targeted approach to address low health literacy, or a systematic approach to educate staff on the cultural norms of a particular ethnic group. Examples of how patient factors may influence blood pressure control include:

- **Age**—hypertension worsens with age and becomes more difficult to control
- **Cultural differences**—these may influence perceptions of causation, diet choices, and level of concern about weight gain
- **Health literacy**—affects ability to understand education provided and to ask appropriate questions
- **Work status**—may influence income, health insurance, and ability to access health care
- **Co-morbid diagnosis**—complicates treatment choices, increases cost of care (medications, lab tests, etc.), and ability to follow the care plan
- **Socioeconomic status**—may have an impact on access to medications and food choices

Care team factors are controlled by the care team. These types of factors may include care processes, workflows, how staff follows procedures, and how effectively the team works together. Care team factors that may influence **Hypertension Control** include:

- Staff education, training, and skill set
- Cultural competence
- Appreciation of value of each individual's work effort to the collective ability to improve care outcomes

Health system factors are controlled at the *high level* of an organization and often involve finance and operational issues. Health system factors that may influence care for hypertensive patients include:

- **Cost**—co-pays for medical visits and lab tests, and medications
- **Scheduling systems**—availability of evening, weekend and same-day appointments, and wait time may have an impact on access
- **Location**—no transportation or an unsafe location may present barriers

These factors, when added to the critical pathway, create another dimension to the map as shown in **Figure 3.2**:

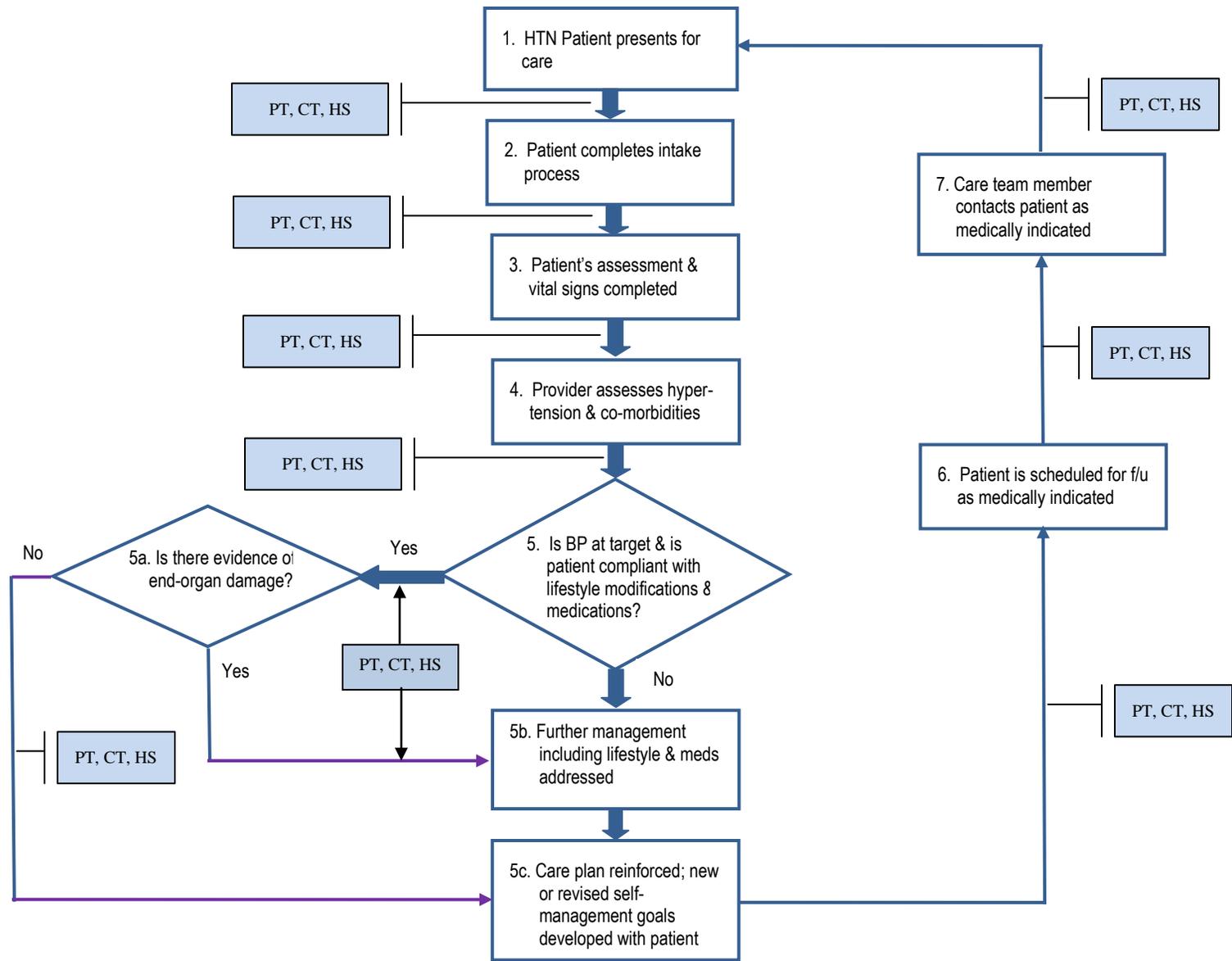


Figure 3.2: Critical Pathway for Hypertension Control

Next, a team may identify specific factors that pertain to the way care is provided for its patients as in **Example 3.1**:

Example 3.1: A Team’s Brainstorming Session

The task force brainstorms on factors that have an impact on the arrow (or opportunity) between Steps 6, 7 and 1 of the Critical Pathway for Hypertension Control (from Figure 3.2).

Factor Category	Factors Pertinent to our Organization
Patient	Limited appreciation of the gravity of the disease and the importance of regular follow-up with patient’s Primary Care Provider (PCP), cultural norms and myths about blood pressure and medications, financial limitations to seeking care, and transportation barriers
Care Team	No consistency in appointment-reminder process for patients; inefficient workflow with prolonged patient waiting times causing high no-show rates; no consistent process to follow-up on missed appointments; available educational materials are not culturally appropriate for the population
Health System	High cost of medical visits; next available appointment for a patient is in four weeks; patients needing medication refills are required to schedule an appointment to see a provider; policy of organization for all patients to have a follow-up appointment regardless of reason for visit is “clogging” schedules and limiting access for those patients needing appointments

The team continues to look at different parts of the pathway to identify relevant impacts for each part. Once it is able to evaluate where there are potential opportunities for improvement, it can use this information to target its efforts. Additional examples of strategies to improve care for the measure, **Hypertension Control**, are described in the **Improvement Strategies** section of this module.

Once the team visualizes the pathway and identifies opportunities for improved care, the next step is to collect and track data to test and document them. First, a QI team needs to determine *how* to collect data to support its improvement work. This step is essential for understanding the performance of its current care processes, before improvements are applied, and then monitoring its performance over time.

Data Infrastructure: Hypertension Control

This section begins to address the important role of data throughout the improvement process. It is important to recognize that different types of data are collected during the improvement project. First, data to calculate and monitor the **Hypertension Control** performance measure results is needed. Monitoring a performance measure involves calculating the measure over time and is used to track progress toward a numerical aim. This section provides an overview of what is needed. A detailed and stepwise approach follows to explain the types of infrastructure elements needed to gather data to support improvement. Second, changes an organization is making to improve care processes and their effects must be tracked. Tracking the impact of changes reassures the team that the changes caused their intended effects.

Data Infrastructure to Monitor the Performance Measure—An Overview

There are three major purposes for maintaining a data infrastructure for quality improvement work:

- To know the starting baseline
- To track and monitor performance as changes are implemented
- To perform systematic analysis and interpretation of data in preparation for action

The first step to creating a data infrastructure for monitoring the performance measure is to determine the baseline. A baseline is the calculation of a measure before a quality improvement project is initiated. It is later used as the basis for comparison as changes are made throughout the improvement process. For the **Hypertension Control** measure, an organization can determine the percentage of hypertensive patients with a blood pressure less than 140/90 mm Hg. Systems of care reflect the current organizational infrastructure and the patient's interactions with existing care processes and the care team.

Baseline data is compared to subsequent data calculated similarly to monitor the impact of quality improvement efforts. The details of how to calculate the data must be determined to ensure that the calculation is accurate and reproducible. The difference between how an organization provides care now (baseline) and how it wants to provide care (aim) is the gap that must be closed by the improvement work.

The next step of data infrastructure development involves a process in place to calculate the measure over time as improvements are tested. A QI team's work is to make changes, and it is prudent to monitor that those changes result in achieving the stated aim. This involves deciding how often to calculate the measure and adhering to the calculation methodology.

Finally, an organization's data infrastructure must include systematic processes that allow analysis, interpretation, and action on the data collected. Knowledge of performance is insufficient for improvement. It is important for an organization to understand why performance is measured and to predict which changes will improve **Hypertension Control** based on an organization's specific situation. Collecting data related to specific changes and overall progress related to achieving an organization's specified aim are important to improvement work. The

next section describes in more detail how to develop a data infrastructure to support improvement.

Implementation: Hypertension Control

This section explores each step to create the data infrastructure used to improve performance on the measure, **Hypertension Control**.

Note: If an organization is currently funded by HRSA, some performance measures, including the HRSA CCM set, may be among those that will be reported to HRSA. An organization should consult its program’s Web site plus links to bureau- and office-required guidelines and measures for more information:

[BPHC](#) [MCHB](#) [HAB](#) [BHP_r](#) [ORHP](#) [OPAE/OHITQ](#) [ORO](#)

General information on HRSA grants, including searchable guidelines, is available and accessible at the [HRSA Grants Web site](#).

Grantees are encouraged to contact their project officers with questions regarding program requirements.

1. Step 1 - Determine and Evaluate the Baseline

As discussed above, a *baseline for improvement* is a calculation that provides a snapshot of the performance of the *systems* of care for a measure before improvements are applied. The baseline is determined by calculating the measure and collecting the information for the numerator and denominator.

The following tables depict a decision algorithm for the measure, **Hypertensive Control**. The algorithm outlines the steps that an organization follows to determine its baseline and monitor improvements for **Hypertension Control**:

Identify the Denominator	
The denominator for this measure is the number of patients 18 to 85 years of age with a diagnosis of hypertension (HTN) during the measurement year.	
a. Use a one-year date range, hereafter called the measurement year.	
<i>b. Choose a selection method</i>	Claim/Encounter Data—patients who had two face-to-face encounters with a diagnosis of hypertension AND who turned 18 up to 85 years of age in the measurement year. The diagnosis must have been made prior to June 30 of the measurement year including years prior to the measurement year.
	Electronic Health Record Data—patients who had two face-to-face encounters with a diagnosis of hypertension AND who turned 18 up to 85 years of age in the measurement year. The diagnosis must have been made prior to June 30 of the measurement year, including years prior to the measurement year.

Identify the Denominator	
<p>c. Exclude patients with end-stage renal disease diagnosed before the end of the measurement year, on dialysis or post-renal transplant and pregnant patients</p>	<p>Statements, such as, <i>rule out hypertension, possible hypertension, white-coat hypertension, questionable hypertension, and consistent with hypertension</i>, are insufficient to confirm the diagnosis of hypertension, if they are the <i>only</i> notations of hypertension in the medical record, and should be excluded when identified.</p>

Identify the Numerator	
<p>a. Based on an organization’s systems, evaluate all of the individuals who remain in the denominator and choose an Electronic Method or the Medical Record Audit method to determine the numerator. For Electronic Method, use electronic data from an Electronic Medical Record or registry to identify the most recent blood pressure during the measurement year. The patient should be included in the numerator if the:</p>	
<p>i. SBP is < 140 mm Hg AND the DBP is < 90 mm Hg.¹⁴</p>	
<p>ii. BP reading is after the date of the diagnosis (and if the information system can discern the difference).</p>	
<p>b. Medical Record Audit: Audit all patients in the denominator or use valid sampling methodology. The records audited may be electronic or paper. Include the patient in the numerator if the:</p>	
<p>i. SBP is < 140 mm Hg AND the DBP is < 90 mm Hg.¹⁵ If there are multiple blood pressure readings on the same day, the lowest systolic and diastolic readings respectively may be selected.</p>	
<p>ii. BP reading is after the date of the diagnosis.</p>	
<p>c. Exclusions</p>	<p>Do not include BP readings obtained on the same day as a major diagnostic or surgical procedure. Do not include BP home-monitoring results or self-reported BP readings, such as, home and health fair BPs. NOTE: If no BP is recorded during the measurement year, assume the patient is <i>not controlled</i>.</p>

Calculate the Measure
<p>Divide the numerator by the denominator and multiply by 100 to get the percentage of the hypertensive population with a controlled blood pressure.</p>

Detailed specifications can be accessed on the **HRSA Clinical Quality Performance Measures** and the **NCQA** Web sites, including instructions for identifying the denominator and numerator for the measure, **Hypertension Control**.

Evaluate the baseline. Initially, a team compares its baseline to the performance it hopes to achieve. It is important to remember this gap in performance is defined as the difference between how the care processes work now (baseline) and how an organization wants them to work (aim). An organization may often modify its aim or timeline after analyzing its baseline measurement and considering the patient population and organizational constraints.

As an organization moves forward, the baseline is used to monitor and compare improvements in care over time. While it is important for an organization to stay focused on its aim, it is equally significant to periodically celebrate the interim successes.

2. Step 2: Create a reliable way to monitor performance over time as improvements are tested.

An organization should standardize its processes and workflows to ensure the team collects and calculates performance data the same way over time. An organization should:

- a. Document exactly how the data is captured so staff turnover does not interfere with the methodology.

- b. Determine the frequency that performance will be calculated. Frequent data collection is often associated with higher levels of improvement. Monthly measurement is recommended, if feasible, as it is associated with a higher level of team engagement and success. If it is infeasible, quarterly measurements may be obtained. Less frequent performance measurements are adequate for reporting purposes, but do not adequately support improvement efforts. An advanced discussion can be found in the **Managing Data for Performance Improvement** module.
- c. Chart and display results. A simple chart audit form is appropriate for manual audits and can be repeated frequently as desired. Results of multiple audits can be presented in a graphic format to demonstrate trends. Refer to **Managing Data for Performance Improvement** module for more information and examples of data displays that have been used to communicate information about improvement efforts to a variety of stakeholders.

Note: The frequency of team meetings is not necessarily prescribed for success. Many successful teams meet once a week while others may meet bi-weekly when focusing their improvement efforts on any given measure. Success of these meetings is rather the output of the team members' active engagement in the meeting and being prepared to report on recent improvement findings. More information, including resources and tools for developing and implementing effective team meetings can be found in the **Improvement Teams** module.

3. Step 3: Create systematic processes that allow an organization to analyze, interpret, and act on the data collected.

Having the data is not enough. Improvement work involves thinking about the data and deciding what to do based on that analysis. A QI team needs to put processes in place – team meetings, scheduled reports, and periodic meetings with senior leaders, to use the data tracked. This section describes how a QI team may accomplish the work of creating actionable plans based on the data collected. In **Example 3.2: QI Team at Sunshine Health Care Center**, the scenario illustrates how a team may use these concepts to act on its data:

- a. **Analyze: What are the data trends?** Tracking performance over time for the measure, **Hypertension Control**, is critical to successful improvement, but calculation of performance is not enough. It is important for a team to meet to analyze the data on a regular basis. QI teams that are experienced in looking at data recognize these common patterns:
 - Performance is improving
 - Performance is decreasing
 - Performance is flat
 - Performance has no recognizable pattern

Additional examples of common data patterns are provided with further explanation in the **Managing Data for Performance Improvement** module. It is typical for a team to see little movement in its data over the first several months. If a team has chosen to monitor an associated process measure, such as, the percent of no-show hypertensive patients who are rescheduled, performance improvement may be evident more quickly. Regardless, it is important that a QI team review performance progress regularly. A QI team that meets regularly and calculates performance monthly should spend part of one meeting each month reviewing its progress to date.

- b. **Interpret: What do these data trends mean?** A QI team needs to then interpret what these data trends mean within the context of its own organization. If performance is increasing, but has not yet reached the numerical aim, perhaps the changes in place are having the desired effect and the aim will be reached over time. If performance is decreasing, what has changed? Are there new care process changes, a failure of registry data input, or a large increase in those patients included in the registry? If performance is flat, did the organization maximize the benefits from changes implemented or was there some regression to the former way of doing things? Improvement trends that have reached a plateau may indicate that an organization needs to think differently about future changes. A few suggestions that an organization may consider when experiencing a plateau in improving **Hypertension Control** are listed below:
- i. Consider looking at outliers that may create barriers to patients accessing hypertension control, for example, lack of insurance, transportation, or language and cultural differences.
 - ii. Consider changes in a different part of the framework to get improvement back on track. If using a critical pathway approach, an organization may look at the steps prior to where the problem seems to be. If a Care Model approach is used and the team worked hard on delivery system design issues, opportunities to better leverage the clinical information systems or engage the community may be considered.

Interpretation of data over time is critical in determining where a team will target its efforts. Additional tools that can assist a team in understanding underlying causes for data trends are beyond the scope of this manual but are discussed in detail in a monograph that was published by the NQC, **A Modern Paradigm for Improving Healthcare Quality**.

- c. **Act: Make decisions based on data.** Once a QI team has a better understanding of what the data means, efforts should be targeted to further advance the performance toward the aim. Often the decisions are made at the team level about what to tackle first. Then small tests of change can be accomplished to determine what improvements could be implemented to enhance performance. The practice of using small tests of change actually allows multiple changes to be tested simultaneously.

Note: An advanced discussion on how to use the data collected to advance an organization's improvement, including resources and tools to support improvement, can be found in the Managing Data for Performance Improvement module.

Example 3.2: QI Team at Sunshine Health Care Center (SHCC)

The Hypertension Management Task Force (HMTF) at SHCC agreed that an important first step would be to determine current performance on hypertension control. To ensure data accuracy and reliability over time, the team spent time reading about the data parameters and worked with its IT data specialist to define how it would obtain them from its Electronic Health Record (EHR)) and Practice Management System.

The most challenging task was defining which patients were assigned to which primary care physicians (PCP) in the management information system. After considerable deliberation, the team decided to define a patient as "belonging" to a PCP, if he or she had at least two medical encounters at least three months apart with that PCP. With this methodology, the team determined that Dr. Philippe had 225 active hypertension patients meeting the criteria and decided to focus on those patients.

Baseline data obtained from the EHR using the defined parameters indicated current performance at 42 percent across the organization and 45 percent for Dr. Philippe's assigned patients. The medical director confirmed that a high-performing sister community health center (CHC) had a compliance level of 68 percent. The team also decided to monitor performance monthly to ensure a quick assessment of which changes led to immediate improvement and asked for the data to be displayed in a line graph depicting monthly performance and goal.

The task force's next challenge was to determine why its organization's performance was less than predicted and below the sister CHC's performance. Members talked to other staff members as well as patients in a focus group held with hypertensive patients, the majority of whom had uncontrolled blood pressures. The team identified a number of factors that contributed to difficulty with achieving its goals. It commenced activities to improve blood pressure control and worked diligently using the Care Model approach.

***Analysis:** The team noted that during the first few months after its work commenced, the level of hypertension control in Dr. Philippe's patients improved slightly to 46 percent and remained fairly flat after that.*

***Interpretation:** The team then reviewed the possible reasons for the initial and then fairly flat improvement. It agreed that the initial improvement may have been due to an increased awareness of its focus on hypertension management, patients starting the process of self-management goal setting, and partial resolution of scheduling issues that limited patient access to care.*

The team leader asked for a list of those patients who had elevated blood pressures during their last visits—outliers for the measure. Further study of these specific patients showed that approximately two-thirds of them were noted to be non-compliant with their medication during those visits.

More work was needed. The team leader employed a common strategy to find additional opportunities. He looked at the population not in compliance (the outliers) for a common cause to be addressed. In this case, a common thread was that patients had not filled their prescriptions and came in without taking their medications the morning of their visits. This appeared to make it difficult for the clinicians to adjust their blood pressure medications.

***Act:** The information gathered from the analysis and interpretation of the data allowed the team to focus its next efforts. The team utilized PDSAs to test changes specific to these areas and monitor their progress.*

This information allowed the team to consider ways to ensure access to affordable medications and to encourage patients to take their medications on the day of their visits. It looked at **Changes that Worked** for ideas and then added suggestions based on its own patient population. The team decided to focus on following up on high-risk patients after their visits, patient outreach, education about medication compliance, and the ability to take most blood pressure medications on an empty stomach. To accelerate these

Example 3.2: QI Team at Sunshine Health Care Center (SHCC)

improvements, some members of the improvement team led an ad-hoc group to find culturally- and linguistically-appropriate materials, promoting the importance of hypertensive care and medication management, to be distributed at community venues. Another small group employed the Plan-Do-Study-Act (PDSA) cycle by working with the front desk staff and a few willing patient volunteers to develop a process for rapid medication refills for hypertensive patients. The task force planned to continue to monitor its performance to determine if these changes are effective for achieving its aim statement goals.

A QI team leader needs to monitor the pace of the progress over time. If there is insufficient progress to meet the specified aim, reasons should be analyzed and addressed. One organization may choose to accelerate its improvement efforts; another may decide to extend its initial allotment of time to achieve its aim and consider other constraints within the organization.

Part 4: Improvement Strategies: Hypertension Control

The actual improvement process is composed of three steps that respond to the following questions:

1. What changes can an organization make?
2. How can an organization make those changes?
3. How can an organization know the changes caused an improvement?

What Changes Can an Organization Make?

It is important to understand that improvement requires change, but not all change results in improvement. Considering all of the possible changes that can be made to health care systems, considerable effort has been dedicated to creating various quality improvement strategies providing a framework that organizes possible changes into logical categories. Frameworks for change in health care quality improvement are known as *quality models* and have been tested to guide change. In fact, considering that there are limited resources to dedicate to improvement, most organizations adopt one or more quality models to guide their improvement efforts. There is not a right or wrong approach, and there are many areas of overlap in quality models. Experienced quality improvement teams often use multiple strategies to overcome challenges as they progress. Two approaches often used by teams that are working to improve **Hypertension Control** are the *Care Model* approach and the *Critical Pathway* approach.

The case story continues...

The Improvement Journey:

The task force had heard about the Care Model approach to improving chronic disease care and decided to learn more about it and then apply it. The team leader reviewed the key components of the model and tools used from the HRSA Web site, www.healthdisparities.net, and educated the team on this strategy. The team then:

1. Created a spreadsheet with each of the key components of the model
2. Listed the barriers to meeting best-practice expectations in that model for each of the components.
3. Developed a list of possible strategies for each of the barriers identified to meet the intent of the model component.
4. Assigned a solution to each member of the task force to address with appropriate time lines.

An example of a barrier within the Decision Support component of the module identified by the team was the need for care team education on blood pressure management, including appropriate target blood pressures as well as the significance of mildly elevated blood pressures. This problem identification was the driver for the team's plan to invite a local cardiologist to review hypertension care with the staff.

1. **Care Model Approach:** Implementing the changes described in the Care Model is a proven method to improve care delivery. The Care Model, as shown in **Figure 4.1**, is an organizational framework for change and is organized into six domains:
 - a. Organization of Health Care
 - b. Clinical Information Systems
 - c. Delivery System Design
 - d. Decision Support
 - e. Community
 - f. Self-Management Support

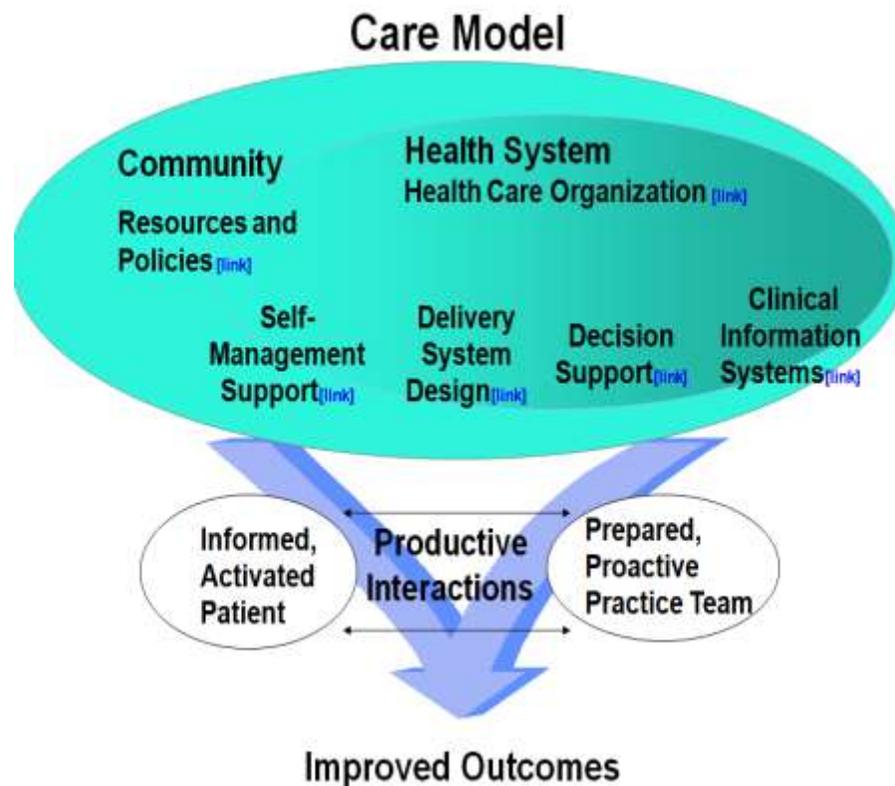


Figure 4.1: The Care Model

Changes within these domains can effectively leverage transformation of a current reactive care system to one that better supports care for preventative health measures, such as, **Hypertension Control** and chronic disease conditions. If an organization does not have general experience with the Care Model, reading the **Care Model** section before proceeding is recommended. The Care Model recognizes that care for **Hypertension Control** is ongoing and requires more proactive care than the health care system often provides. The Care Model is implemented to improve care by working in six domains, defined below, that transform the way care is delivered:

Community—To improve the health of the population, a health care organization reaches out to form powerful alliances and partnerships with State programs, local agencies, schools, faith organizations, businesses, and clubs.

Organization of Health Care—A health care system can create an environment in which organized efforts to improve the care of people with chronic illness take hold and flourish.

Self Management—Effective self management is very different from telling patients what to do. Patients have a central role in determining their care and one that fosters a sense of responsibility for their own health.

Delivery System Design—Delivery of patient care requires not only to determine what care is needed, but to clarify roles and tasks to ensure the patient receives the care; that all

of the clinicians who take care of a patient have centralized, up-to-date information about the patient's status, and make follow-up a part of their standard procedures.

Decision Support—Treatment decisions need to be based on explicit, proven guidelines that are supported by at least one defining study. A health care organization integrates explicit, proven guidelines into the day-to-day practice of primary care providers in an accessible and easy-to-use manner.

Clinical Information System—A registry, that is, an information system that can track individual patients and populations of patients, is a necessity when managing chronic illness or preventive care.

The above definitions are adapted from the Institute for Healthcare Improvement (IHI) Web site.¹⁶

In **Table 4.1: Care Model Key Changes**, key changes are presented that have been used successfully to improve **Hypertension Control** care within the Care Model framework.

Table 4.1: Care Model Key Changes

Community	Organization of Health Care	Self Management	Delivery System Design	Decision Support	Clinical Information System
<p>Obtain free or discounted resources from pharmaceutical firms, service groups, and health plans for: scales, meds, BP cuffs and education programs</p>	<p>Appoint senior leader to identify and allocate resources and remove barriers to implementation of Care Model components</p>	<p>Train patient care teams on importance of patient self-management support and value of each member which may lead to improving patient outcomes</p>	<ul style="list-style-type: none"> • Use registry queries to plan visits for patients, especially those with uncontrolled hypertension • Care team to review patient’s record prior to visit • Determine potential areas of focus to improve BP control • Contact patient to confirm appointment and to bring medications, medication list, and ambulatory BP readings 	<p>Provide comprehensive and on-going training to providers and care teams on all aspects of BP measurement and management based on their skill levels and knowledge</p>	<p>Develop a manual or electronic registry of patients with HTN; list can initially be limited to patients with uncontrolled BP</p>
<p>Promote non-traditional partnerships for places to exercise, monitor BP, and healthy food, i.e., parks, transportation, health clubs, schools, YMCA, faith-based organizations, restaurants, barbers, and beauty shops</p>	<p>Develop partnerships with other health care organizations interested in patient care and outcomes</p>	<p>Develop culturally- and linguistically-appropriate self-management support tools with demonstrated effectiveness</p>	<p>Develop innovative patient flow processes to ensure the implementation of appropriate interventions to improve BP control, such as support staff to:</p> <ul style="list-style-type: none"> • Flag charts of patients with uncontrolled BP on arrival • Review patient’s medication list and compliance prior to provider’s encounter • Assess patient’s compliance with self-management activities prior to provider’s encounter 	<ul style="list-style-type: none"> • Ensure providers have easy access to experts in BP and cardiovascular health, including cardiologists, endocrinologists and nephrologists • In group practices, an internist or family practitioner with such interests may be developed and trained to provide expert support, especially for difficult-to-treat patients 	<p>Use queries and reports proactively to plan patient’s care; queries can include a list of HTN patients per PCP with the last visit and BP reading</p>

Hypertension Control

Community	Organization of Health Care	Self Management	Delivery System Design	Decision Support	Clinical Information System
Use of promotoras, community health workers, and faith-based community to reach out to the community for education and screening	Board and senior leaders receive regular reports on hypertension control indicators and barriers to achieving goals	Embed sustainable self-management support process in a redesigned delivery system	<ul style="list-style-type: none"> • Use of multi-disciplinary care team--nutritionist, social worker, health educator, medical case manager • Target patients with uncontrolled hypertension initially and spread to all patients 	Adopt and use clinical guidelines in the organization	Provide information on BP trend (and indicating target BP) from registry/EMR to patient at time of visit
Develop relationships with universities and their providers to place students and interns in community projects	Ensure that the Care Model is integrated into the organization's strategic plans	Provide tools for self-management support (weighing scale, BP machines, pedometer, etc.)	Provide innovative patient flow and visit types (planned and group visits, drop in visits for BP checks, etc.)	Integrate guidelines into daily clinical practice (use of flow sheets, etc.)	Use an EMR or manual registry to ensure that providers have immediate individual patient's BP trends
Hospital and university linkages for specialty care	Senior leader is engaged; endorses and communicates content and progress to BOD and staff	Develop culturally-appropriate self-management approaches: promotoras/community health worker; group visits/support groups; stages of change model	Consistent and appropriate follow-up, especially high-risk patients using telephone, promotoras	Develop systems and mechanisms to facilitate communication between PCP, specialist, and hospital	Obtain and share BP control compliance data from the registry with patient care teams at defined intervals and in innovative user-friendly formats
Reach out to the community with health fairs and community education	QI team is empowered to make changes	Patient-tailored collaborative goal setting with form and follow up; copy of goals given to patient and noted in designated area in medical record	Anticipate and plan the hypertensive intake visit to ensure timely registration and follow up with clinician	Provide feedback to providers from population data (results and compliance with guidelines and measures)	Ensure integrity of registry data by defining accountability for oversight and maintenance, e.g., cross train support staff for data entry, data validity via sampling or for data downloads for patient care teams

Hypertension Control

Community	Organization of Health Care	Self Management	Delivery System Design	Decision Support	Clinical Information System
Partner with State, local and community public health programs	Incorporate training in the models into the orientation of new employees and staff	Protocols and training for staff relating to self-management support	Ensure clinical case management services for complex patients	Use standing orders and protocols when appropriate	Establish a process for obtaining records from other providers
Provide resources to assist an organization in continued education on cultural competency	Allocate resources and remove barriers for improving hypertensive care and access	Organize and/or provide patient support groups		Inform patients about guidelines pertinent to their care	
	Integrate attainment of hypertensive care goals into business, strategic and performance improvement plans	Create expectation that patient takes responsibility for scheduling and attending hypertensive visits			
		Use all staff interactions with patients as opportunities to assist in self-management goal setting and practices			
		Create mechanisms for patient peer support and behavior change programs, such as, group hypertensive visits			

This toolkit is meant as a guide to help organize ideas, but is also designed to allow flexibility for creative planning.

Note: An organization may choose to adapt and refine a tool to assist improvement for the measure, **Hypertension Control**. Testing the measure before fully implementing it offers a way to try something new and modify it before additional resources are spent.

The case story continues...

The Hypertension Management Task Force (HMTF) realized that to redesign the delivery system with incorporated elements of decision support and clinical information systems, it needed a different approach to improving care. The team leader had also learned about the use of critical pathways and recommended this approach after the team had been appropriately educated on the methodology.

The team downloaded a critical pathway for blood pressure management from the Internet and spent time customizing it to its organization's workflow. Based on the information reviewed on critical points in the pathway, the team decided to implement a number of changes:

1. Educate the front desk staff on how to identify hypertensive patients on arrival.
2. Develop a linguistically- and culturally-appropriate hypertension education handout to be given to patients on arrival by the front desk staff. The staff was taught to educate the patients on the need to read the handout prior to the provider's encounter.
3. Educate the nursing support staff to complete assessments of hypertension patients for compliance with lifestyle modifications, medication, and preventative health measures and self-management goal setting.
4. Create a new scheduling template with time slots defined for same-day appointments (walk-ins).

The team was confident that these strategies would work; however, as it had learned from its team leader, many of the changes would best be tested and refined prior to full implementation. This ensured buy-in and higher probability of a successful implementation and sustainment of future spread.

Critical Pathway Approach: As with all critical pathways, good performance relies on many different systems and processes working together efficiently. An organization is encouraged to map its own critical pathway for **Hypertension Control** or refer to the schematic in **Figure 4.2**. Often when a QI team maps its pathways, it readily can see how complex each step is. It is common for different team members to do the same step differently. Workflow inefficiencies become clear when an organization visualizes how each step is completed and the interdependencies among the steps. Some teams are overwhelmed by the possibilities of changes that can be made in their systems; others focus only on a specific group of factors.

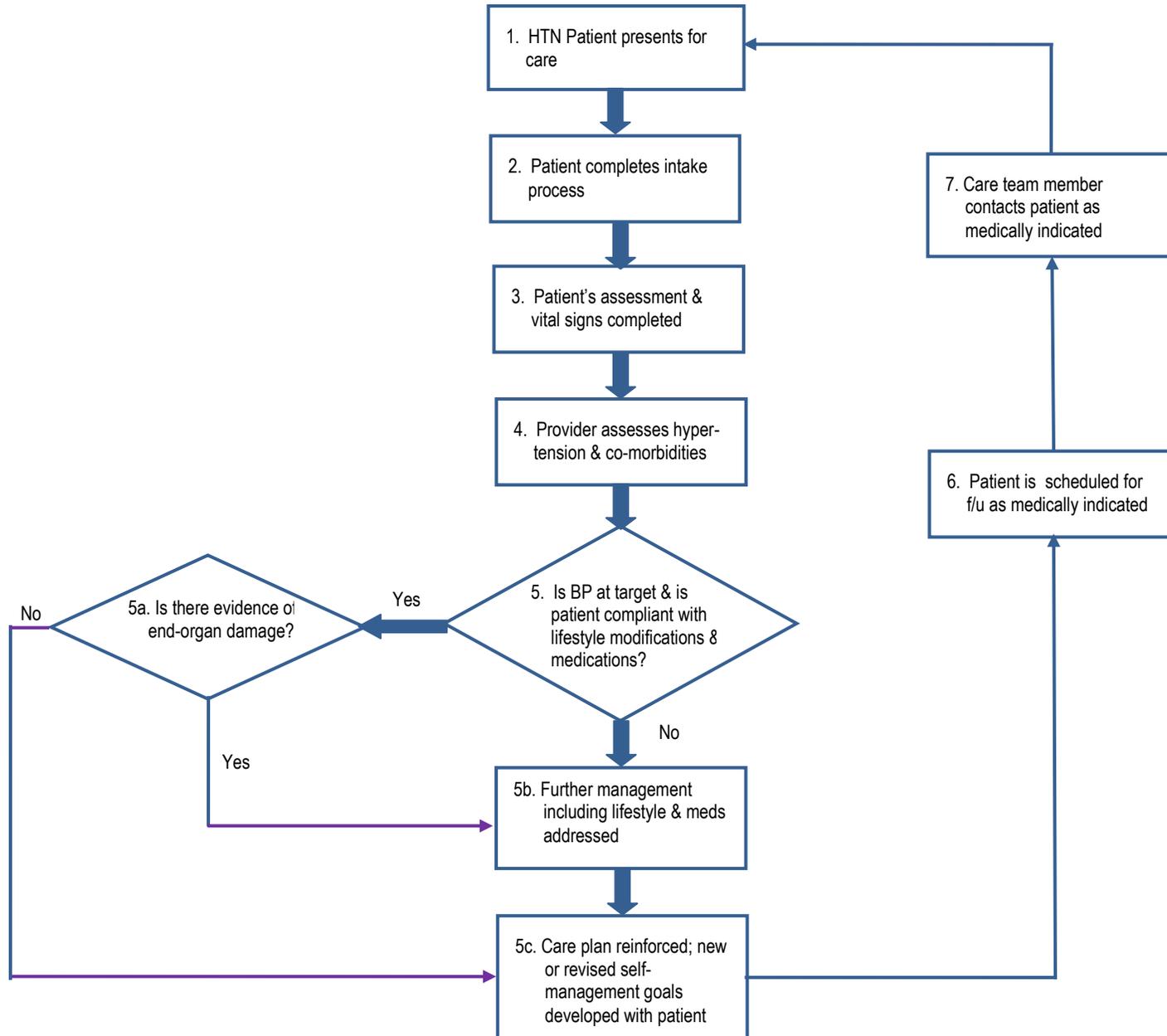


Figure 4.2: Critical Pathway Approach

One way to organize the factors that have an impact on the systems is to consider that some are controlled by the patient, others are primarily controlled by the care team, and still others are inherent in the system of care delivery. All three sets of changes must be considered to improve systems of care. In general, these categories can be defined as follows:

- **Patient changes**—efforts to support self-management efforts, patient engagement, and navigation of the care system
- **Care team changes**—changes in job duties or work flow that assist to retain patients in care and ensure timely evidence-based hypertensive care
- **Health system changes**—changes that have an impact on how care is delivered, independent of who does it

A team should use the steps along the critical pathway to target improvements. For this measure, **Hypertension Control**, an organization can think through each part of the critical pathway in turn, teasing out what happens, and what could be improved. In **Table 4.2**, changes that have worked for other QI teams are matched with the part of the system on which they have the most impact. These ideas are not meant to be inclusive, but to start a dialogue of what may improve each part of the critical pathway in an organization, and thus improve it overall.

Changes That Work

In **Table 4.2**, *sample* changes that work are linked to the critical pathway for **Hypertension Control**.

Table 4.2: Sample Changes That Work Are Aligned with the Critical Pathway for Hypertension Control in Figure 4.2

Number/Area of Critical Pathway		Patient Changes	Care Team Changes	C Health System Changes
1	HTN patient presents for care	<ul style="list-style-type: none"> Educate patients with resources regarding the importance of early hypertensive care and appropriate screening Create expectation that patient must take responsibility to ensure early hypertensive care 	<ul style="list-style-type: none"> Promote BP screenings for patients at every patient encounter Ensure messaging from the care team regarding importance of early hypertensive screening and treatment 	<ul style="list-style-type: none"> Implement standing orders for screening per protocol
2	Patient completes intake process	<ul style="list-style-type: none"> Education for patients on importance of hypertension screening and treatment including guidelines Assess patient beliefs for screenings Assist with appropriate self-management goal setting and strategies to overcome barriers Consider health literacy screening 	<ul style="list-style-type: none"> Culturally competent education for patients to support hypertension screening and treatment Continued education for appropriate screening and risk assessment Providers should agree on guidelines so that care among providers is congruent 	<ul style="list-style-type: none"> Display culturally appropriate posters and brochures in patient areas to encourage patients to talk to providers about HTN screening and treatment Clinical guidelines for HTN risk assessment, appropriate screening and treatment.
3	Patient assessment and vital signs completed	<ul style="list-style-type: none"> Education for patients on importance of hypertension screening and treatment, including guidelines in a cultural-competent manner 	<ul style="list-style-type: none"> Share clinical guidelines in patient-friendly format Providers should agree on guidelines so that care among providers is congruent Document current care plan and share copy with the patient Promote BP screenings for patients at every patient encounter 	<ul style="list-style-type: none"> CMEs for providers that support culturally-competent screening and education supporting appropriate hypertension treatment Clinical guidelines for HTN risk assessment, appropriate screening, and treatment
4	Provider assesses hypertension and co-morbidities	<ul style="list-style-type: none"> Education for patients on importance of hypertension screening and treatment, including guidelines in a cultural competent manner Education on importance of self-management goal setting 	<ul style="list-style-type: none"> Providers should agree on guidelines so that care among providers is congruent Consider health literacy screening Aid patients in self-management goal setting to address potential barriers to care plan Assess co-morbidities 	<ul style="list-style-type: none"> Clinical guidelines for hypertension screening and treatment Providers have continuing educational opportunities to stay current with appropriate interventions (lifestyle and medication)

Number/Area of Critical Pathway		Patient Changes	Care Team Changes	C Health System Changes
5	A key decision point is provider's determination if: <ul style="list-style-type: none"> • Patient's BP is at goal • Patient adheres to lifestyle modifications 	<ul style="list-style-type: none"> • Education for patients on importance of controlled BP • Assist with appropriate self- management goal setting to support lifestyle modifications 	<ul style="list-style-type: none"> • Continued education for appropriate screening and risk assessment • Providers should agree on guidelines so that care among providers is congruent 	<ul style="list-style-type: none"> • Patient routinely given documentation of current care plan • Tools to support hypertension treatment and screening • Providers have continuing educational opportunities to stay current with appropriate interventions • Display culturally appropriate posters and brochures in patient areas to encourage patients to talk to providers about HTN risk and management
5a	Is there evidence of end-organ damage?	Education and self-management support for patients experiencing organ damage for setting appropriate BP guidelines	<ul style="list-style-type: none"> • Provider determine if there is end organ damage (i.e., funduscopy for retinal damage, electrocardiogram for heart damage, etc.) per guidelines • Referral to proper specialist if organ damage exists 	<ul style="list-style-type: none"> • Clinical guidelines for hypertension screening and treatment • Providers have continuing educational opportunities to stay current with appropriate interventions (lifestyle and medication) • CMEs for guidelines pertaining to organ damage • Automatic referral to specialist per guidelines
5b	Further management, including lifestyle and medications addressed	<ul style="list-style-type: none"> • Education for patients on importance of controlled BP • Assist with appropriate self- management goal setting to support lifestyle modifications 	<ul style="list-style-type: none"> • Continued education for appropriate screening and risk assessment • Continued self-management support and education for patient • Providers should agree on guidelines so that care among providers is congruent • Set clear expectations for follow up 	<ul style="list-style-type: none"> • Clinical guidelines for hypertension screening and treatment • Providers have continuing educational opportunities to stay current with appropriate interventions (lifestyle and medication)
5c	Develop and reinforce care plan based on assessment	<ul style="list-style-type: none"> • Education on the importance of treatment of controlled blood pressure, including lifestyle modifications and medication compliance • Resources for patient support and shared care plan 	<ul style="list-style-type: none"> • Help patients to make follow-up appointments • Assess current care plan, barriers to following care plan, and collaborate with patient on care plan modifications 	<ul style="list-style-type: none"> • Culturally-competent education materials readily available to support care plan planning and reinforcement • Providers have continuing education opportunities to stay current with appropriate interventions (lifestyle and medication) • Clinical guidelines for hypertension screening and treatment

Hypertension Control

Number/Area of Critical Pathway		Patient Changes	Care Team Changes	C Health System Changes
6	Patient is scheduled for follow up	<ul style="list-style-type: none"> • Self-management support between visits as indicated • Ensure patients get the relevant information, education, make appointments for follow-up care 	<ul style="list-style-type: none"> • Set clear expectations for follow up • Assess current care plan, barriers to following care plan, and collaborate with patient on care plan modifications • Patient satisfaction survey on navigating system 	<ul style="list-style-type: none"> • Ensure patient receives guidance about access to the practice with interim concerns • Financial considerations and referral source for low-cost interventions and medications • Implement Patient Satisfaction Survey for chronic disease management
7	Care Team member contacts patient as medically indicated	<ul style="list-style-type: none"> • Self-management support between visits as indicated • Ensure patients get the relevant information, education, and make appointments for follow-up care 	<ul style="list-style-type: none"> • Set clear expectations for follow up • Assess current care plan, barriers to following care plan, and collaborate with patient on care plan modifications 	Ensure patient receives guidance about access to the practice with interim concerns

This toolkit is meant as a guide to help organize ideas, but is also designed to allow flexibility for creative planning.

Note: An organization may choose to adapt and refine a tool to assist improvement for the measure, **Hypertension Control**. Testing the measure before fully implementing it offers a way to try something new and modify it before additional resources are spent.

How Can an Organization Make Those Changes?

Earlier in this module, examples are provided of changes (Critical Pathway and Care Model) that have led to improved organizational systems of care and better patient health outcomes. Because every change is not necessarily an improvement, changes must be tested and studied to determine whether the change improves the quality of care. This concept is addressed in detail in the **Testing for Improvement** module.

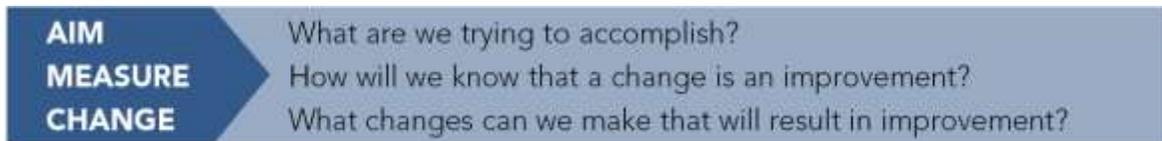
It is important that these changes be tested in the context of an organization's staff, current processes, and patients. The goal is that the change results in lasting improvements within an organization.

Organizations commonly use tools to manage change as they work to improve their systems. For a comprehensive discussion of change management, refer to the **Testing for Improvement** and **Redesigning a System of Care to Promote QI** modules. Here are a couple of tools that are worth mentioning in the context of this measure:

1. Small tests of change – Model for Improvement and PDSA (Plan-Do-Study-Act)
2. Process mapping

1. Model for Improvement

The *Model for Improvement* identifies aim, measure, and change strategies by asking three questions:¹⁷



These questions are followed by the use of learning cycles to plan and test changes in systems and processes. These are referred to as PDSA (Plan-Do-Study-Act) cycles. The PDSA Cycle is a test-and-learning method for discovering effective and efficient ways to change a current process. In **Figure 4.3: The PDSA Cycle**, the graphic provides a visual of the PDSA process:



Figure 4.3: The PDSA Cycle

An organization focusing its improvement efforts on **Hypertension Control** for its patients benefits from implementing PDSAs to test change processes that have an impact on hypertension management. Those organizational processes tested may focus on outreach, operational procedures, or patient education interventions ensuring that patients have timely care. A few examples of such processes relating to **Hypertension Control** are listed below:

- What system is in place to provide patients with timely reminders regarding blood pressure screening?
- What are the assigned roles, duties, and tasks for planned visits to a multidisciplinary care team? Are members of the team cross-trained?
- Does the patient population understand its specific role in hypertension control, or is there an opportunity for education?
- Is there an opportunity to educate the community on the importance of hypertension control in a group visit setting?
- Are there cultural, linguistic, and literacy barriers that the organization may need to address?

As an organization plans to test a change, it should specify *who, what, where, and when* so that all staff know their roles clearly. Careful planning results in successful tests of change. Documentation of what happened – the *S* or study part of the PDSA – is also important. This can help a team to understand the impact of changes to a process as unanticipated consequences may occur.

The case story continues...

PDSA Cycles in Action:

The team had a long list of solutions it wanted to implement to improve hypertension care. Even though it felt empowered by the CEO to make whatever budget neutral changes were necessary to improve outcomes, it did not feel confident about successfully implementing a number of changes. The team was most concerned about its plans to train the nursing staff to complete more skilled assessments of patients with hypertension and to implement a new scheduling template to increase access to care for patients without appointments for medication refills and BP checks.

It decided to test these first using PDSA cycles. A nursing staff member of the care team was selected and trained by Dr. Philippe to perform more comprehensive initial assessments of patients. By the second day of implementation, Dr. Philippe noted that the staff completed certain aspects of the assessments in some patients and would forget about others. The team agreed that it would be helpful to create a user-friendly assessment tool in the EHR to which the nursing staff could refer and ensure that all components of the assessment are performed and consistent from one patient to the next. This was created with the MIS Manager, and after fine tuning it over a week, the team was confident it had the process working well.

Another change tested was a new scheduling template with time slots created for walk-in patients. The team quickly realized that walk-ins tended to arrive very early in the morning for refills and follow-up of elevated blood pressures; therefore, the slots were increased in the morning for such patients. This worked well quickly and the providers and patients expressed their satisfaction with the change.

The scheduling change was so successful, the team made a recommendation to the CEO and leadership team to implement it center-wide. The recommendation was quickly adopted and discussed at the appropriate forums for further input. It was implemented organization-wide within two months.

Tips for Testing Changes

- Keep the changes small and continue testing.
- Involve care teams that have a strong interest in improving hypertensive care.
- Study the results after each change. All changes are not improvements; do not continue testing something that does not work!
- If stuck, involve others who do the work even if they are not on the improvement team.
- Make sure that overall aims are improving; changes in one part of a complex system sometimes have an adverse effect in another.

2. *Process Mapping*

Process mapping is another valuable tool that an organization focused on improvement often uses. A process map provides a visual diagram of a sequence of events that result in a particular outcome. Many organizations use this tool to evaluate a current process and again when restructuring a process.

The purpose of process mapping is to use diagramming to understand the current process; i.e., how a process currently works within the organization. By looking at the steps, their sequence, who performs each step, and how efficiently the process works, a team can often visualize opportunities for improvement.

Process mapping can be used before or in conjunction with a PDSA cycle. Often, mapping out the current process uncovers unwanted variation. In other words, different staff may perform the process differently, or the process is changed on certain days or by specific providers. By looking at the process map, a team may be able to identify gaps and variation in the process that have an impact on **Hypertension Control**.

Process mapping, when used effectively, can identify opportunities for improvement, supporting the testing of changes in the current system of care. Additional information, including tools and resources to assist an organization in adapting process mapping as an improvement strategy within its organization, can be found in the **Redesigning a System of Care to Promote QI** module.

How Can an Organization Know That Changes Caused an Improvement?

Measures and data are necessary to answer this question. Data is needed to assess and understand the impact of changes designed to meet an organization's specified aim. Measurement is essential in order to be convinced that changes are leading to improvement. Organizations that have experienced successful improvement efforts found that data, when shared with staff and patients outside the core improvement team, led to the *spread of improvement* strategies, in turn generating interest and excitement in the overall quality improvement process.

Measures are collected prior to beginning the improvement process and continue on a regularly scheduled basis throughout the improvement program. Once an organization reaches its specified goal, frequency of data collection may be reduced. Additional information regarding frequency of data collection, tracking, and analyzing data can be found in the **Managing Data for Performance Improvement** module.

Part 5: Holding the Gains and Spreading the Improvement

Holding the Gains

Once an organization has redesigned the process for **Hypertension Control**, it can be tempting to move on to other issues and stop monitoring the process. Ongoing monitoring ensures that an organization *holds the gains* over time.

Although an organization may be able to reduce the frequency of monitoring the process, some ongoing assessment of the measure is necessary to ensure an organization continues to meet its intended goal. Processes that work well now may need to change as the environment shifts.

Because all systems are dynamic, they change unless efforts are made to ensure that the improvements continue. Organizations often do a few simple things to ensure that successful changes are embedded in the daily work. Examples include:

1. Change the procedure book to reflect the new care process.
2. Include key tasks in the new process as part of job descriptions.
3. Adjust the expectations for performance to include attention to quality improvement and teamwork to improve care.
4. Re-align hiring procedures to recruit individuals who are flexible and committed to quality improvement.

The case story continues...

Sustaining Improvements:

A year later, the task force noted an improvement of hypertension control in Dr. Philippe's patients from 55 to 60 percent. It made significant strides in its improvement project and learned how to design trials efficiently, involve relevant staff and patients, and to communicate the results. Successful changes included:

1. Support staff training to provide more skilled hypertension patient assessments.
2. Hypertension group visits and education classes.
3. A protocol for self management goal setting that included providing information about the importance of blood pressure control.
4. A new scheduling template to better accommodate walk-ins.
5. A follow-up system for contacting patients who missed appointments.

The team planned to continue its efforts in the coming year and include all of the hypertension patients of the providers working in the same unit as Dr. Philippe. To sustain improvements made, the team began to focus on:

1. Developing supporting policies and procedures.
2. Adding new expectations of staff to their job descriptions and performance evaluations as well as to new staff orientation.
3. Ensuring that discussions on hypertension management are standing agenda items in key meetings.
4. Developing an incentive plan to motivate care teams to address quality outcomes.

Spreading Improvement

Spread can be defined differently based on an organization's defined target population for the improvement effort. An organization often begins an improvement intervention on a smaller scale, possibly focusing on one site or one provider's patient panel, and then increases the population of focus (POF) or the number of providers. Spread can mean spreading improvements to another area of an organization. An organization can still focus on **Hypertension Control** but also include other or all providers that provide hypertensive care. Ideally, others can learn from the initial improvement experience and implement the interventions of the improvement team in their own environments. Spread of this kind is often at an accelerated pace as there is experience about changes that work within the organization.

Once it has successfully reached its goal for **Hypertension Control**, it may choose another measure to improve other aspects of **Hypertension Control**. Another option is to target a different topic or another population of patients. An organization may evaluate organizational priorities as it did when initially choosing the **Hypertension Control** measure and begin to plan for its next improvement effort.

Additional information on *Holding the Gains* and *Spreading Improvements*, including specific resources and tools to support an organization's improvement program, can be found in the **Redesigning a System of Care to Promote QI** module.

Part 6: Supporting Information

Case Story

To gain insight into how a fictional QI team approached this measure, review a case story highlighting the Sunshine Health Care Center and its approach to improving **Hypertension Control**.

References

1. American Heart Association. Heart disease and stroke statistics—2006 update. *Circulation*. 2009.
2. Ostchega Y, Yoon SS, Hughes J, Louis T. Hypertension awareness, treatment, and control -- continued disparities in adults: United States, 2005-2006. NCHS Data Brief No. 3. Hyattsville, Maryland: National Center for Health Statistics. 2008.
3. Centers for Disease Control and Prevention (CDC), National Center for Health Statistics. National Health and Nutrition Examination Survey 2005-2006. Hyattsville, Maryland: US Department of Health and Human Services, Centers for Disease Control and Prevention. 2007.
4. Lewington S, Clarke R, Qizilbash N, Peto R, Collins R. Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. Prospective Studies Collaboration. *Lancet* 2002;360:1903-13.
5. American Heart Association. Heart disease and stroke statistics—2006 update. *Circulation*. 2009.
6. Cooper R, Rotimi C. Hypertension in Blacks. *Am J Hypertens* 1997;10:804-12.
7. National Heart, Lung, and Blood Institute. *Strong Heart Study Data Book: A Report to American Indians Communities*. Bethesda, MD: National Institutes of Health, National Heart, Lung, and Blood Institute. NIH Publication No. 01-3285, 2001. pp. 19. http://www.nhlbi.nih.gov/resources/docs/shs_db.pdf.
8. Crespo CJ, Loria CM, Burt VL. Hypertension and other cardiovascular disease risk factors among Mexican Americans, Cuban Americans, and Puerto Ricans from the Hispanic Health and Nutrition Examination Survey. *Public Health Rep* 1996;111:7-10.
9. Whelton PK, He J, Appel LJ, Cutler JA, Havas S, Kotchen TA, et al. Primary prevention of hypertension: Clinical and public health advisory from The National High Blood Pressure Education Program. *JAMA* 2002;288:1882-8. Stamler R. Implications of the INTERSALT study. *Hypertension* 1991;17:116-20.
10. Institute of Medicine. Breakthrough Series College Aim Statement Checklist Boston: Institute for Healthcare Improvement. February 2004, www.ihl.org
11. Adapted from pre-work manual used in HRSA sponsored Health Disparities Collaborative www.healthdisparities.net

12. NQC "A Guide to Consumer Involvement"
<http://nationalqualitycenter.org/index.cfm/6142/13260>
13. Timmermans S, Mauck A (2005). "The promises and pitfalls of evidence-based medicine". *Health Aff (Millwood)* 24 (1): 18–28. doi:10.1377/hlthaff.24.1.18. PMID 15647212.
14. NQF-Endorsed™ National Voluntary Consensus Standards for Physician-Focused Ambulatory Care: APPENDIX A –NCQA Measure Technical Specifications April, 2008 V.7 Page 50
15. NQF-Endorsed™ National Voluntary Consensus Standards for Physician-Focused Ambulatory Care: APPENDIX A –NCQA Measure Technical Specifications April, 2008 V.7 Page 50
16. Adapted from Chronic Care Model...
17. Langley G., Nolan K., Nolan T., Norman C., Provost L. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. San Francisco. Jossey-Bass, 1996

Additional Resources

1. [Physician Performance Measures](#)
2. [Joint Commission](#)
3. NQF-Endorsed™ National Voluntary Consensus Standards for Physician-Focused Ambulatory Care [APPENDIX A –NCQA Measure Technical Specifications](#), April, 2008 V.7
4. [AHRQ Innovations Exchange](#). Strategies and quality-related tools to improve an organization's ability to innovate and adopt new ideas, and interact with innovators and adopters.
5. Health IT Adoption Toolbox -
http://healthit.ahrq.gov/portal/server.pt?open=512&objID=1135&mode=2&cid=DA_986294&p_path=/DA_986294
6. Improving Chronic Illness Care www.improvingchroniccare.org Dedicated to sharing strategies for improving how care teams deliver care for chronic illness
7. Institute for Healthcare Improvement www.ihl.org General topics and strategies for improvement, including diabetes care.
8. [National Heart, Lung and Blood Institute](#)
9. [CDC - DHDSP - High Blood Pressure Home](#)
10. [High Blood Pressure](#)