

Improving Hypertension Follow-up in Primary Care

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Abstract

Background: Hypertension is a major concern for healthcare organizations today, especially in primary care. Causes of high blood pressure are multi-factorial and may include: poor medication adherence, lifestyle choices, ineffective follow-up, and patient and health care provider knowledge deficit. Accordingly, reduction of blood pressure is multifactorial, and all aspects need to be addressed for adequate follow-up and control.

Objective: The purpose of this evidence-based practice project is to create a protocol to address blood pressure follow-up in an urban primary care setting.

Methods: The protocol was implemented in an adult urban primary care clinic over four weeks. Data was collected at pre-intervention and post-intervention.

Results: Initial review of the data showed a small decrease from the pre-intervention means of systolic and diastolic blood pressures at post-intervention (135.78, 136.82) and (74.43, 74.92) respectively. The Healthcare Effectiveness Data and Information Set (HEDIS) scores showed a slight increase toward the organizational goal with a pre-intervention mean of 82.95, and post-intervention score of 83.20. The percentage of follow-up blood pressure appointments increased slightly as well, with the mean pre-intervention at 74.80% and post-intervention at 77.1%.

Conclusion: However, statistical analysis revealed no statistically significant improvement after intervention. It can be argued a larger sample size, and longer project runtime may have yielded statistically significant results. Nevertheless, these small improvements seen, though not statistically significant, should not be ignored and can be promising to a similar future project.

Keywords: hypertension, management, protocols, guidelines, HEDIS, quality, follow-up, adherence, primary care

Introduction and Background

Hypertension or high blood pressure is a major concern for healthcare organizations today. This is especially true in primary care, as it is the frontline for preventing and improving uncontrolled blood pressure (Harrison et al., 2016). The annual cost of uncontrolled blood pressure is estimated at \$51 Billion, of which \$47.5 billion is due to direct medical expenses (Centers for Disease Control and Prevention [CDC], 2017). If patients continue to have uncontrolled blood pressure they are at risk of stroke, kidney or heart attack which further increases costs to an organization (Shrivastava, Shrivastava, & Ramasamy, 2014). Organizations aim to track their quality of care through quality care measurements such as Healthcare Effectiveness Data and Information Set (HEDIS) (Chazal and Creager, 2016). Currently, the host site, which is part of an integrated health delivery system, is not meeting its HEDIS goal for hypertension.

HEDIS plays an important role in the primary care setting, and especially to integrated health delivery systems that compete with other organizations for contracts and members. The organization has to remain compliant to receive reimbursement and competitive to obtain new contracts and members (The National Committee for Quality Assurance [NCQA], 2017). What has been shown to be effective in increasing HEDIS scores is having an integrated program using collaboration and evidence-based practice (Jaffe, Grace, Lee, Young, Sidney & Go, 2013). An effective intervention would be incorporating an evidence-based protocol for blood pressure follow-up. Introducing an evidence-based protocol for blood pressure follow-up will increase hypertension HEDIS measurement at the host organization (Jaffe, Lee, Young & Go, 2013). Once the protocol is successfully implemented and evaluated, this pilot can be shared region-wide.

Problem Statement

HEDIS is a standardized measurement tool for objectively measuring quality of care, prevention and treatment among health plans. Over 90% of American health plans use HEDIS as a measure, and the numbers are reported to insurance plans and Centers for Medicare and Medicaid Services (CMS) to demonstrate quality (NCQA, 2017). Treatment of hypertension is one of the reported quality measures within HEDIS (Patel et al., 2014). If the HEDIS number reflects blood pressure control within the organization, then an organization is reimbursed and remains competitive (NCQA, 2017).

Currently, the host site's goal for HEDIS measurement is at 90%, and yet at the host site measurement remains below goal at 85%. If the host organization is to stay competitive to attract new members, employer contracts, and maintain reimbursement from CMS the HEDIS scores must increase (Phillips, Han, Petterson, Makaroff & Liaw, 2014). Introducing an evidence-based protocol for blood pressure follow-up will decrease high blood pressure thereby increasing the hypertension HEDIS scores at the host organization (Go et al., 2014). Current workflows which are separate and not congruent will be evaluated for evidence based practice and be incorporated into a comprehensive protocol.

Causes for high blood pressure are multi-factorial and may include: poor medication adherence, lifestyle choices, lack of effective follow-up, the need to improve awareness of patient and health care provider (Go et al., 2014). The numbers of persons with hypertension continue to increase (Bozkurt et al., 2016). According to the latest estimates reported by the Centers for Disease Control and Prevention (CDC), 70 million adults in the United States have high blood pressure, and only 52% of those persons have their blood pressure under control (CDC, 2017). With the introduction of the Affordable Care Act (ACA), there are increased

numbers of persons obtaining care that will need treatment and can increase organizational costs (Li, Bruen, Lantz, & Mendez, 2015). Campaigns have been launched by the CDC and The Department of Health and Human Services that aim at encouraging health care organizations to develop protocols to reduce hypertension in order to prevent one million strokes and heart attacks by 2017 (Ritchey, Wall, Gillespie, George & Jamal, 2014). Therefore, it is imperative for organizations to have an evidence-based guideline for blood pressure follow-up.

Purpose Statement (Aims and Objectives)

The purpose of this evidence-based practice project is to create a protocol to address blood pressure follow-up in an urban primary care setting. This protocol will address many variables that have an impact on HEDIS scores. Variables to be addressed are outreach, adherence to treatment, education, staff training and attitudes, home monitoring, treatment guidelines and screening for secondary causes of hypertension and resistant hypertension. Some of these variables are already addressed in separate workflows, and this project will aim to examine them for evidence-based practice and combine them into one protocol. Internal HEDIS scores will be measured pre- and post-intervention.

The secondary goals include dissemination of knowledge to clinicians and staff, implementation, and evaluation of a protocol to address blood pressure follow-up. The overall aim of this project is to increase the hypertension HEDIS score at the host site. Another benefit of this project is to free up resources and save money for the host site.

Project Objectives

1. Create a protocol to address blood pressure follow-up in an urban primary care clinic.
2. Disseminate protocol to staff and clinicians of host organization.
3. Implement the protocol in the primary care clinic host organization.

4. Track hypertension HEDIS scores for improvement.
5. Present project to a regional conference.

Project Question

Will an evidence-based protocol addressing blood pressure follow-up improve hypertension HEDIS Scores in an Urban Primary Care Clinic in the Sacramento area?

Review of Literature

What is Currently Understood

Hypertension or high blood pressure, is defined as blood pressure greater than 139/89 mm Hg for persons under 60 years of age or age 60 years of age with diabetes mellitus or chronic kidney disease and less than 149/89 mm Hg for patients age 60 years and older without diabetes mellitus or chronic kidney disease (Chazal & Creager, 2016). Several measurements are taken over several occasions to confirm the diagnosis of hypertension (Schwartz & McManus, 2015). Hypertension is costly, costing \$46 billion annually and affects approximately 75 million people in the United States, of which only 54% of persons affected have their blood pressure under control (CDC, 2017). If patients continue to have uncontrolled blood pressure, they are at risk of developing stroke, kidney failure or heart attack which can further increase health care costs (Shrivastava, Shrivastava, & Ramasamy, 2014). One way in which blood pressure control can be measured is by utilizing the nationally accepted and researched HEDIS (Agency for Healthcare Research and Quality [AHRQ], 2014). HEDIS is a set of standardized measurement tools of quality shared with commercial insurance plans and Centers for Medicare and Medicaid Services (CMS) to demonstrate quality [NCQA, 2017]. There are many categories of goals that organizations must achieve to maintain reimbursement and stay competitive among the commercial market (Shaw, 2014). Hypertension control is a HEDIS measure. Meeting the

goal hypertension control entails patients having blood pressure measurements at the levels outlined earlier and are then reported as percentages. HEDIS criteria and goals are evaluated and revised annually. Chazal and Creager (2016) mention the 2016 HEDIS target for adequate blood pressure control were relaxed to less than 150/90 mm Hg for patients age 60 years and older without diabetes mellitus or chronic kidney disease. The 2017 HEDIS target for blood pressure control remains unchanged (NCQA, 2017). However, the American Heart Association (AHA) and American College of Cardiologists (ACC) have stated that the blood pressure goal for all patients should be less than 140/90, and are working on new guidelines which could tighten HEDIS measures in the next few years (Chazal & Creager, 2016). Implications for healthcare organizations would be to tighten blood pressure goals further to meet future HEDIS goals to ensure reimbursement and competitiveness. To tackle this growing problem, the CDC in conjunction with The U.S. Department of Health and Human Services (HHS) has launched the Million Hearts Campaign with focused aims to decrease blood pressure and prevent one million strokes and heart attacks by 2017 (Department of Human Health & Services, Million Hearts, 2016). Additionally, the American Heart Association AHA has set a goal to see lower blood pressures and improve cardiovascular health and decrease strokes by 2020 (Rebholz et al., 2016). The cause of uncontrolled blood pressure is multifactorial, and so is its management (Jaffe, Lee, & Young, 2013). According to Go et al. (2014), medication adherence, lifestyle modifications, evidence-based treatment, patient, and health care provider awareness of hypertension, access to care, and adequate follow-up are elements that need to be addressed for adequate blood pressure control. Therefore, a targeted approach to blood pressure follow-up using guidelines and collaboration among healthcare providers are needed to address this problem.

Literature review utilized PubMed, EBSCO, OVID and ProQuest database search engines and a Boolean search was employed using terms “hypertension” AND “management” AND “protocols” or “guidelines” AND “HEDIS” or “quality” and “follow-up” or “adherence” AND “primary care”.

Inclusion Criteria

Studies were included if they:

- were in English;
- focused on adult populations;
- occurred in the setting of ambulatory care, primary care or community care (with the exception of a blood pressure technique study which occurred in an acute care study as it is applicable to the chosen setting);
- focused on targeted populations with primary hypertension or populations with comorbid conditions with focus on hypertension;

Exclusion Criteria

Studies were excluded if they

- contained research older than five years (unless it was a landmark study);
- editorials/opinions;
- continuing education articles;
- articles that focused on specific cultures or ethnicities;
- dissertations;
- study design and protocols ahead of research;
- articles about blood pressure telemonitoring;
- articles not in English;

- pregnant population;
- pediatric population;
- set in acute care (with the exception as mentioned in the inclusions);

Discussion of Literature Findings

Comprehensive management. Jaffe et al. (2013) conducted an observational quality improvement study demonstrating a large-scale approach to improve blood pressure control is effective as compared to both state and national blood pressure control rates. Components of the large-scale approach included a comprehensive hypertension registry, developing and sharing performance metrics, evidence-based guidelines, medical assistant visits for blood pressure measurement and a single-pill combination pharmacotherapy. HEDIS scores were measured to assess blood pressure control during this study and demonstrated that blood pressure control increased from 43.6% to 80.4%, during the study period. This measured increase was much higher than the national HEDIS blood pressure control rate which increased from 55.4% to 64.1% and California's HEDIS rate which increased from 63.4% to 69.4% during the study timeframe. This study highlights the necessity of a large-scale approach using evidence-based guidelines to improve blood pressure control and follow-up.

Medication nonadherence. Grigoryan, Pavlik, and Hyman (2013b), performed a cluster-randomized trial examining the patterns of nonadherence to antihypertensive medications in primary care. Participants were 21 years or older, and diagnosed with hypertension and uncontrolled blood pressure in their two most recent visits. Adherence was tracked by measuring the date and time of each bottle cap opening of up to 3 antihypertensive medications with an Aardex MEMS 6 Track Cap for 30 days. Patterns of drug omission were observed as single day omissions, two consecutive days omissions, three-day omissions or greater than or

equal to 4 days of medication omissions. At least 74% of participants in the study omitted their anti-hypertensives by at least one day in a month, with a one-day admission being the highest occurring frequency. Additionally, over 28% had four or more days where they did not take their medication, and 12% missed more than half of their medication in a month (Grigoryan, Pavlik, & Hyman, 2013). It was suggested that medications with a longer half-life be utilized to cover this gap. While this study does not focus on blood pressure follow-up, it does highlight the importance of recognizing patterns of nonadherence do occur and understanding this and incorporating solutions is a vital factor in developing a blood pressure follow-up protocol.

Need for hypertension protocols. Hyman et al. (2012) performed a cluster randomized trial to examine an intervention on reducing physician uncertainty in hypertension treatment. Five clinics used the intervention (IC) and were compared to five usual care clinics (UCC). Uncertainty reduction tools included 24-hr ambulatory BP monitoring, electronic bottle cap monitoring, and lifestyle assessment and counseling, and an intervention order form for uncertainty reduction tools was placed in the IC participants' charts before each visit and results fed back to the provider. The IC physicians intensified treatment in 81% of patients compared to 67% in the UCC group. The IC patients achieved 35.0% control at their last recorded visit compared to 31.9% of UCC. It was also discovered despite 90% of physicians responding yes to a survey regarding adhering to blood pressure treatment guidelines with a goal of less than 140/90 mmHg; the threshold was closer to 150 mmHg. Although this study reviewed physician attitudes and interventions to decrease their uncertainty to treat patients, it is an important variable to be aware of such attitudes when forming and instituting protocols for blood pressure follow-up.

Telephonic outreach. Harrison et al. (2013) conducted a randomized control trial to assess the effectiveness of an automated telephonic outreach program directed at adults with hypertension to improve blood pressure control. Patient data selection came from large hypertension registry database from an integrated care system. Patients selected had a blood pressure greater than 140/90 mmHg in the last year. Outreach to the prescreened patients consisted of an automated telephone messaging system with a scripted message in English or Spanish asking the patient to come in for a blood pressure check. Calls were programmed to retry a call two more times if there was a call failure. Patients then had their blood pressure measured in the four weeks after the intervention was completed. The outcome of this intervention resulted in 8.8% of patients obtaining blood pressure control. It was noted that a longer follow-up period should be obtained in the future. While this study concentrates on a phone outreach effort to increase blood pressure control, it has been shown as an effective component to increase blood pressure control. This type of outreach intervention can be effective component in a protocol for blood pressure follow-up.

A similar study conducted by Harrison et al. (2016), was a randomized control trial that assessed the effectiveness of automated phone calls for cardiovascular medication refill reminders effectiveness in increasing medication adherence in a large integrated health delivery system. Patients who were overdue for a refill by 2 to 6 weeks for the antihypertensive (Lisinopril-hydrochlorothiazide) or statin were eligible. An automated telephone messaging system with a scripted message in English or Spanish was then sent to both groups informing them a medication was due for a refill. The patient then had to call the pharmacy to determine which medication needed to be refilled. These two groups were looked at separately, and it was found that the antihypertensive group filled their prescription 6.5% more often and the refill time

was shortened by seven days. There was no improvement in blood pressure control. However, it was mentioned that to increase sustainability and to improve blood pressure a reminder should be sent by mail, as were done in prior studies. Although this study focused on improving medication refill behaviors, this is an important piece of medication adherence and in turn, a variable that affects blood pressure control. If this intervention can be strengthened with mailing out reminders, it can be an important part of a protocol for blood pressure follow-up addressing adherence.

Importance of patient education. Jarl, Tolentino, James, Clark, and Ryan (2014) performed a quasi-experimental time-series with a purpose to provide education to obese hypertensive patients in primary care. Education focused on lifestyle changes including Dietary Approaches to Stop Hypertension (DASH). This study was designed and lead by a nurse practitioner and used three group classes and two counseling telephone sessions over the course of two months. Outcomes of improvements in diet and lifestyle were measured using Rapid Eating Assessment for Patients (REAP) and Partners in Health (PIH) questionnaires. The mean of the REAP score pre-intervention was 57.5 and post-intervention 64.5. The PIH score pre-intervention was 72.7 and post-intervention 79.2. Statistically, significant scores occurred on both REAP and PIH questionnaires, as well as weight loss. While this study did not specifically focus on improving blood pressure control, it underscores the importance of patient education in improving blood pressure control, which can be included in a protocol developed for blood pressure follow-up.

Home blood pressure monitoring. Breaux-Shropshire, Judd, Vucovich, Shropshire, and Singh (2015) completed a systematic review to determine if home blood pressure monitoring can improve patient outcomes in primary care. Home blood pressure monitoring (HBPM) was

compared to 24-hr ambulatory blood pressure monitoring (ABPM). There were 1,742 titles and abstractions independently reviewed by two reviewers with only nineteen studies deemed relevant and were then further assessed. The Jaded scale, which is a scale that measures integrated blood pressure control, was used to assess the research methodology and scientific merit of the studies. It was found that home blood pressure monitoring was better at predicting mortality in older patients, could improve control even without making medication changes and if medications were titrated to HBPM, better control could be achieved. While this study focuses on home blood pressure monitoring, it is important to recognize that it is a powerful variable in blood pressure control and can aid in developing a protocol for blood pressure follow-up.

Hill and Conner (2016) conducted a quality improvement study to determine if blood pressure control could be improved and blood pressure monitoring could be increased in a primary care office by adding a well-studied home blood pressure monitoring (HBPM) intervention in conjunction with existing interventions. The intervention took place for 20 weeks in an urban family practice. Mean systolic and diastolic blood pressure measurements were monitored before and after the intervention. The data showed an increase in mean systolic blood pressure to 3.1 mm Hg and the mean diastolic blood pressure increased to 2.0 mmHg. However, neither increase was found to be statistically significant. This increase was thought to be due to medical assistants incorrectly measuring the blood pressure. According to the authors, these behaviors were observed multiple times and may have affected data collection. The study did find a 12.1% increase in HBPM. While this study did not focus on blood pressure follow-up, it does highlight the need to ensure that staff are properly trained to measure blood pressure to ensure adequate measurement. Additionally, the study does highlight the ability to increase home blood pressure monitoring in patients.

Staff competency in blood pressure measurement. Rabbia et al. (2013) performed a quality improvement study to determine if blood pressure management among hospital nurses was adequate and if a brief, one-day intensive training could improve the technique and accuracy of measurement. This study found technique was often inaccurate, with nurses placing the blood pressure cuff over clothing, not having patients sit comfortably with legs uncrossed and arms supported or proper stethoscope placement. Prior to the intervention 90% of the nurses did not choose the correct side for blood pressure measurement, and 60% did not choose the correct cuff for blood pressure measurement. However, 62% did correctly inflate the cuff, and 70% did correctly deflate the cuff and 84% kept silence during the measurement. There was no difference among nurses in different departments. After the intervention of a training program, the attitude of nurses toward correct blood pressure management increased, and the systolic and diastolic numbers more of the manual readings more closely matches the oscillometric blood pressure readings. While this study focuses on the accuracy and attitudes of nurses measuring blood pressure in the clinical setting, this study highlights the importance of accurate measurement of blood pressure by staff. This information can be applied to medical assistants as well. Additionally, training and evaluation should be incorporated into a blood pressure follow-up protocol to ensure blood pressure readings are accurately measured and reported.

Acknowledging and addressing resistant hypertension. Grigoryan, Pavlik, and Hyman (2013a) performed a controlled randomized trial regarding resistant hypertension (RH) to account for factors such as white coat hypertension, medication non-adherence or suboptimal medication doses. They investigated patients with uncontrolled blood pressure's drug combinations and dosages of medications of patients on at least three antihypertensives of different classes. The authors found that 49% of the patients with uncontrolled blood pressure

were on at least three antihypertensives of different classes, with 22% having controlled blood pressure while 29% were uncontrolled and non-adherent. The remaining 49% were adherent to their medications and having uncontrolled ambulatory hypertension. Ninety-one percent of the uncontrolled RH patients were prescribed a diuretic, with 24 persons on hydrochlorothiazide 25 mg. An Angiotensin-converting enzyme inhibitor, angiotensin receptor blocker, or calcium channel blocker, were prescribed maximal doses of these agents to less than half of these patients. Overall half of the RH can be attributed to white coat effect and poor medication adherence, with all the remaining patients on suboptimal drug combinations and/or doses. While this study focused on the factors that contribute to resistant hypertension, it can be concluded that inadequate treatment can lead to elevated blood pressure. Additionally, clinicians in primary care need education regarding recognition of RH and optimal treatment of RH, and this is an important component of a protocol for blood pressure follow-up.

Automated blood pressure machines. One area that has been recently studied and may cause controversy is the utilization of an automated blood pressure machine instead of manual blood pressure and its effect at decreasing white coat syndrome. Myers et al. (2012) performed a randomized control trial to examine this issue in primary care. Often manual blood pressure is the preferred blood pressure, especially in primary care. However, staff inaccuracies can invalidate measurements. To overcome this a BpTRU device which cycles through six blood pressures at two-minute intervals, with the first being a test measurement verifying the accuracy of placement. A cluster randomization of 36 different primary care practices occurred during a two-year period. The outcome was measured as the mean difference between automated and manual blood pressure management. It was found that the automated blood pressure measurement showed a decrease of 14.3% in systolic blood pressure versus 6.3% decrease in the

manual systolic reading at baseline measurement. At year two, the automated blood pressure measurement showed a decrease of 5.2% in systolic measurement versus the manual systolic decrease of 2.8%. The authors concluded that automatic blood pressure reduced office-induced or white coat hypertension. White coat hypertension is a valid condition that needs to be accounted for. AOBP machines provide a way to reduce this white coat hypertension and yield a more accurate blood pressure. This is an important variable that should be included in creating a blood pressure follow-up protocol.

Depression screening. Finally, Meng, Chen, Yang, Zheng, and Hui (2012), focused on an area of controversy in the area of the link between depression and hypertension. A meta-analysis of prospective cohort studies was performed on 75 studies, with nine studies meeting the inclusion criteria. It was found that depression did increase the incidence of hypertension. This evidence suggests that depression may be an independent risk factor for hypertension. However, it is noted more studies should be performed to account for confounding variables. Yet depression is an important factor to take into consideration when preventing and treating hypertension. While this study focused on determining if depression increases the risk of hypertension incidence, its findings highlight the need to address this variable in blood pressure treatment and follow-up protocols.

Theoretical Model

A theoretical framework can guide organizational change, such as quality improvement initiatives in healthcare. Organizational changes in healthcare are not only vital to the organization but should be sustainable (Hovlid, Bukve, Haug, Aslaksen, & von Plessen, 2012). There is an abundance of theoretical frameworks from many disciplines that can be utilized to achieve organizational change (Moran, Burson, & Conrad, 2014). Therefore, the theoretical

framework must be carefully considered. Keeping in mind goals, sustainability and the need for the theory to guide the change will help select the right theory (Bemker, 2016).

One theory that has been widely adapted for organizational change is Kotter's eight-step change model (Morrison, 2016). Dr. Jon Kotter is a Harvard University Business Professor, who developed the eight-step change model to help businesses with organizational change (Friesen, 2016). Kotter first introduced his theory in the 1990's (Appelbaum, Habashy, Malo, & Shafiq, 2012). It became popular among many organizations including healthcare and the nursing profession (Ojo, 2010). Kotter's model of change has been used for many quality improvement projects (Appelbaum et al., 2012).

Kotter's eight-step change model was developed after identifying resistance to change and the eight errors that lead to failure to change (Stoller, 2010). The eight errors are: allowing too much complacency, failing to create a sufficiently powerful guiding coalition, underestimating the power of vision, under-communicating the vision, permitting obstacles to block the new vision, failing to create short-term wins, declaring victory too soon, and neglecting to anchor changes firmly in the corporate culture (Kotter, 1996). The solutions to these eight errors are what encompasses the eight-step model. They consist of creating urgency, forming a powerful coalition, creating a vision for change, communicating the vision, removing obstacles, creating short-term wins, building on change and anchoring the changes in corporate culture (Kotter, 1996). Creating urgency helps build the emotional drive for change and can alleviate complacency or anxiety toward change (Morrison, 2016). Forming a coalition or team, should consist of persons with inside knowledge related to the change and can assist in creating the vision and include leadership to be effective (Kotter & Cohen, 2012). To create the vision for change, it should be concise and consider all available options (Kotter, 1996). The vision must

be communicated clearly to all involved parties (Stoller, 2010). Removing obstacles or barriers is an important point to continued change, and can be addressed individually as well as collectively among stakeholders (Kotter, 1996). Any gains for the organization should be widely broadcast to continue to build momentum through meetings or media for example (Kotter & Cohen, 2012). Building on change is the maintaining of support for change by utilizing parties who can effectively lend expertise and support (Kotter, 1996). Finally, the change must be sustainable and lasting which can be done in changes to organizational culture (Morrison, 2016).

The eight steps have also been grouped into three stages of change (Sorensen, Pestka, Sorge, Wallace, & Schommer, 2016). Stage one is creating a climate for change and includes creating urgency, forming a powerful coalition, creating a vision for change. Step two is engaging and enabling the whole organization and includes communicating the vision, removing obstacles, creating short-term wins. Finally, stage three is implementing and sustaining change which includes building on change and anchoring the changes in corporate culture. Sorenson et al. (2016), also demonstrate how these stages and steps can further be aligned with identified themes already existing within the organization. According to Kotter (1996), these steps do not need to occur linearly. This adds to the flexibility of this model.

Further strengthening Kotter's model that it not only includes the situational aspects of organizational change but emotional changes as well to lead to sustainable change (Kotter & Cohen, 2012). This type of emotional change is incorporated when influencing behaviors and buy-in of those involved in organizational change (Stoller, 2010). Nurses play an important role in leading organizational change, and they can advocate for their role in change by using a theoretical framework such as Kotter's (Morrison, 2016). Kotter's eight-step model would be an effective roadmap for a nurse practitioner initiating change in primary care. Formulating and

implementing a protocol for blood pressure follow-up would be a change that could be driven by Kotter's model.

Urgency within the primary care clinic and organization, for a blood pressure follow-up protocol could be elicited using a strong audiovisual presentation (Morrison, 2016). Formulating the team should include stakeholders as well as nurse leaders in primary care. The vision for the formulation and initiation of a blood pressure protocol can be further refined by involving stakeholders. At the start of initiating change, any concerns from stakeholders should be addressed right away. Any obstacles to change should be removed effectively and can be done so through identification of the barrier, which may be a lack of information, systems in place or people (Burden, 2016). Once identified, offering education and support may help alleviate them. As a blood pressure protocol is multi-faceted any gains within its implementation should be relayed in stakeholder meetings or even staff emails, to encourage support. Support of the project should be maintained by engaging stakeholders and staff. Finally, to sustain the change of a new protocol, urgency as to the purpose of the protocol must be revisited, and any further barriers must be addressed again.

Dorothea Orem developed the Self-Care Deficit Nursing Theory in 1971 and was expanded upon in 2001 (Seed & Torkelson, 2012). This theory describes when and how nursing care can help patients who cannot meet their own needs. Orem's theory is comprised of six components: self-care, self-care requisites, self-care and dependent-care, agency, therapeutic self-care demand, self-care deficit and nursing agency. Self-care is a thoughtful, learned action performed by someone who has developed capacities and powers to regulate their functions, allowing them to maintain their well-being. Self-care requisites are the ability of the individual to understand actions needed for regulating areas of their functioning, development, or well-

being. An example of requisites might be the need of shelter or food. Self-care and dependent-care agency are individuals who, as agents of action, can produce self-care or dependent to meet the continued regulation of human functioning, development, and well-being. This may often be a family member. Therapeutic self-care demand shows that an individual can process knowledge of the action needed to meet self-care requisites that will affect the desired regulation of human function or development. Self-care deficit occurs when the capacity and powers of an individual to meet their own or dependents' self-care needs are not appropriate due to health-related reasons or illness. When this occurs with the individual or family, the sixth element is needed. Nursing agency denotes an individual educated as a nurse who has power in the context of a legitimate interpersonal relationship to act, educate, and help a person in such a relationship meet their therapeutic self-care demands and can assist the individual in identifying self-care requisites and exercising their own self-care agency (Seed & Torkelson, 2012).

Since Orem's Self-Care Deficit Nursing Theory is a nursing theory, it is widely adaptable to nursing. An area it has been applied to is that of psychiatric nursing (Seed & Torkelson, 2012). Another area Orem's theory is useful is in education. In particular, people with type 2 diabetics have benefitted from nurses incorporating Orem's theory regarding diabetes self-management education and self-care deficit (Sürücü & Kizilci, 2012). Orem's theory has been utilized to help adolescent girls with dysmenorrhea manage symptoms (Wong, Ip, Choi, & Lam, 2015). Orem's theory has been used to guide a study using a protocol improving medication adherence thereby assisting the patient in self-care (Thomas & Stoeckel, 2016). Thomas and Stoeckel also found the strength of Orem's self-care deficit theory in their study supported the development of actions to help participants be more self-sustaining. Crabtree, Stuart-Shor, and McAllister (2013) demonstrate how advanced practice nurses can use Orem's theory and apply it

to encourage self-management through patient education. Specifically, Crabtree et al. (2013) focused on educating patients about risk factors leading to uncontrolled hypertension. By meeting the self-care deficit needs patients' ability and willingness to change and maintain certain behaviors such as adherence to medication regimens, self-monitoring of BP, and adherence to medical follow-up can be achieved (Crabtree et al., 2013). Using Orem's Self-care theory would further strengthen a protocol for blood pressure follow-up by addressing the self-deficits that are present in patients with uncontrolled hypertension.

The literature available for methods of blood pressure control and follow-up are multifactorial and stress an innovative approach using both collaborative care and evidence-based guidelines. Adequate follow-up of blood pressure control can be difficult because it is multifactorial and it is imperative that a protocol or guideline be developed to assist health care organizations with the utilization of effective evidence-based guidelines.

Project and Study Design

The focus of the selected project is to improve hypertension follow-up in the primary care setting. This evidence-based practice project will accomplish this focus by creating a protocol to address blood pressure follow-up. Since the project is focused on developing a protocol to demonstrate improvement of blood pressure, the most appropriate design for this project is quality improvement. According to Moran, Burson, and Conrad (2014), anytime a Doctor of Nursing Practice scholar project intends to bring change through intervention in the form of a protocol or process, quality improvement is one of the recommended design. Marino, Bucher, Beach, Yegneswaran, and Cooper (2015), offer an example of using a quality improvement design on introducing a protocol to the intensive care unit. Booth et al. (2016), shows how a

protocol can be introduced as a quality improvement project and changes can be assessed pre- and postintervention.

Project Objectives

1. Create a protocol to address blood pressure follow-up.
2. Disseminate protocol to staff and clinicians of host organization.
3. Implement the protocol in the primary care clinic host organization.
4. Track hypertension HEDIS scores for improvement.
5. Present protocol to regional headquarters.

According to Moran, Burson, and Conrad (2014) the quality improvement design will meet these objectives by “using data-based methods to improve health care systems outcome” (p.333). The protocol (Appendix A) will involve patients who have not shown up for two-week blood pressure appointments (as identified on biweekly reports from the host site) being notified by a phone call from a medical assistant. If the medical assistant is unable to reach a patient after three attempts, the medical assistant will mail a letter or send an e-mail to the patient. The content of the letter or e-mail will include asking patients to come in for a blood pressure check similar to Harrison et al., (2013). Additionally, the pharmacy will have an automated phone messaging system reach patients who are due for refills similar to Harrison et al., (2016). If the patient does not answer after three times, then an e-mail or letter for a refill reminder would be sent similar to Stewart et al., (2014). A new automated blood pressure machine for use on all patients returning for follow-up blood pressures will be put into use. The AOBP machines are similar to what is described by Myers et al. (2012). Staff will be trained on proper blood pressure technique and use of the machine by the charge nurse, lead medical assistant or nurse manager. Additionally, annual training of taking manual blood pressures and proper methods for taking a

blood pressure will be reviewed by all medical assistants and nurses. Medical assistants will review medication lists with all patients and give to the provider to review. Patients will be given a blood pressure log with instructions (Appendix B) and encouraged to take daily home blood pressures and either bring in their readings or e-mail the provider after two weeks. Blood pressure logs with information on how and when to take home blood pressure will be handed out by the medical assistant. The patient will be encouraged to purchase their own blood pressure machine. If the patient's blood pressure is not at goal, the patient will need to return with their log in two weeks. Otherwise, the patient may continue to monitor at home and return to the host site clinic if their blood pressure goes above goal. Medical assistants will ensure patients are handed evidence-based handouts that discuss the DASH diet (Appendix C). They will also give a handout explaining what elevated blood pressure is, what their blood pressure reading goal is, and lifestyle changes to improve blood pressure (Appendix D). Latest guidelines (Appendix E) for treating blood pressure which include use of automated blood pressure machines, home blood pressures and increasing medication adherence, screening for resistant hypertension, single anti-hypertensive combination therapy, use of home blood pressures and screening for depression will be distributed to all providers through e-mail and in a meeting format by a physician.

The population of interest in this project is adults with hypertension in an urban primary care clinic. The independent variable is the protocol. The dependent variable is blood pressure. The blood pressures will be measured by medical assistants. The tool used to measure blood pressures is the HEDIS scores. The data analysis would be of the continuous dependent variable of the HEDIS score or percentage of controlled hypertension at pre-intervention and post-intervention. That is examining the HEDIS score or percentage of controlled hypertension prior to implementing the protocol and after implementing the protocol. Additionally, raw blood

pressure numbers and the percentage of blood pressure follow-up appointments would be measured pre-and post-intervention. Assuming a large enough sample, of at least 30 samples, randomly sampled and even distribution, the appropriate test would be a parametric test (Pallant, 2013). Specifically, the independent-samples t-test would be employed. The independent-samples t-test would indicate if there is a statistically significant difference in the mean scores between time one and time two. This would be appropriate as there is only one group, those with controlled hypertension as measured in HEDIS score or percentage of controlled hypertension and it is a continuous variable that would be examined at two different time points, or pre- and post- protocol implementation. This would identify a statistically significant difference in the mean at time one and time two. That is, answering the question does the intervention of implementation of a protocol to improve hypertension follow-up in primary care significantly improve HEDIS scores for controlling hypertension in primary care? However, all assumptions must be carefully checked before choosing the parametric test. The assumptions that would need to be met are: the continuous data examined was found to have a normal distribution, each measurement is not influenced by another measurement, the sample is random, samples are obtained from populations with equal variances and the dependent variable is measured on a continuous scale. If any of the assumptions mentioned above were violated, then the nonparametric equivalent the Mann-Whitney U Test could be used to examine the HEDIS score or percentage of controlled hypertension. The Mann-Whitney U Test converts scores to ranks and then compares them at time one and time two. The nonparametric test would be a good fit if the sample was of smaller size or if measuring categorical or ranked scales, or again if it violated any of the other assumptions for using a parametric test.

Population of Interest & Stakeholders

The population of interest includes adults aged 18 years to 85 years of age, with both stage I and stage II hypertension. stage I hypertension is defined as having systolic blood pressure (SBP) between 120 and 159 mmHg or diastolic blood pressure (DBP) between 80 and 99 mm Hg (Hagins, Rundle, Consedine, and Khalsa, 2014). Stage II hypertension is defined as having SBP greater than or equal to 160 mmHg or DBP greater than or equal to 100 mmHg (Hagins, Rundle, Consedine, & Khalsa, 2014). Not being at goal for the HEDIS metric, refers to blood pressure greater than 139/89 mmHg for persons under 60 years of age or age 60 years of age with diabetes mellitus or chronic kidney disease and less than or equal to 149/89 mmHg for patients age 60 years and older without diabetes mellitus or chronic kidney disease (Chazal & Creager, 2016). Patients on dialysis or with end-stage renal disease would be excluded as they are generally managed by nephrology due to their complexity (Gull, Anwar, & Sherazi, 2016). Patients who are pregnant, on hospice would be excluded as they are not included in the blood pressure control HEDIS metric. Patients must be insured during the current year and prior measurement year to be included. A patient must have had a blood pressure reading in the past 12 months to be included. Inpatient and outpatient visits for a procedure, emergency room, and inpatient visits are excluded per the HEDIS metric. The racial, socioeconomic, gender, and marital status will not be a factor of exclusion all types will be included as they are in the HEDIS metric for blood pressure control. These inclusion and exclusions are applied automatically by the HEDIS software. All adults will be patients of the host site that are on the host site's registry for hypertension in an urban primary care clinic in Sacramento, California. A preliminary analysis of patients meeting the inclusion criteria resulted in approximately 7,000 patients. However, patients seen per week for blood pressure check numbers approximately 100 per day

and 500 per week. Confidentiality of patients will be strictly maintained by assigning numbers to the patients selected for chart review and data collection. Permission from the director of nursing from the host site and chief of medicine has been obtained to carry out this project. The director of nursing and the chief of medicine are direct stakeholders in this project. Meetings have been held with both parties in addition to the assistant chief of medicine, other physicians, and nurse practitioners in the host site.

Recruitment Methods

As previously discussed, patients will not be recruited for this quality improvement project. Instead, data will be obtained from the host site's registry for hypertension. There is no need to obtain consent since this is a quality improvement project. Additionally, patients at the host site would normally be scheduled for follow-up for blood pressure check at the host site and the data collected is public HEDIS data that is reported. Advertisements or incentives would not be used, as this project is looking at patient follow-up on a pre-existing schedule. Any advertisements or incentives would skew results by encouraging them to come in rather than testing the effectiveness of the protocol to compel patients to show up for their appointments. The patients from the registry list would simply be selected as defined by the inclusion criteria at a time point prior to the intervention start and would be assigned numbers to protect identity and maintain confidentiality.

Tools/Instrumentation

As mentioned previously, the tool used to measure blood pressure control will be the HEDIS scores for the host site, which is generated by randomly selecting patients and then reported as a percentage. Organizations aim to track their quality of care through quality care measurements such as HEDIS (Chazal & Creager, 2016). HEDIS is a standardized measurement

tool for objectively measuring quality of care, prevention and treatment among health plans. Over 90% of American health plans use HEDIS as a measure and the numbers are reported to insurance plans and Centers for Medicare and Medicaid Services (CMS) to demonstrate quality (NCQA, 2017). HEDIS is a valid and reliable measurement tool. The validity of HEDIS results is ensured through rigorous auditing by certified auditors using a process designed by The National Committee for Quality Assurance (NCQA) (NCQA, 2017). To ensure HEDIS stays up to date, the NCQA Committee on Performance Measurement reviews measures and their content annually (NCQA, 2017). The Agency for Healthcare Research and Quality (AHRQ) also mentions the HEDIS score strength as a valid measurement tool, as it undergoes “systematic assessment of face validity” using the Pearson correlation test and its reliability undergoes formal beta-binomial statistical analysis (NCQA, 2017). HEDIS plays an important role in the primary care setting, and especially to integrated health delivery systems that compete with other organizations for contracts and members. An organization has to remain compliant to receive reimbursement and competitive to obtain new contracts and members (NCQA, 2017).

Treatment of hypertension is one of the reported quality measures within HEDIS (Patel et al., 2014). If the HEDIS number reflects blood pressure control within the organization, then an organization is reimbursed and remains competitive (NCQA, 2017). Essentially as HEDIS measures are pay for performance measures (Meddings & McMahon, 2008). The 2016 HEDIS target for adequate blood pressure control are less than or equal to 139/89 mm Hg for persons under 60 years of age or age 60 years of age with diabetes mellitus or chronic kidney disease and less than or equal to 149/89 mm Hg for patients age 60 years and older without diabetes mellitus or chronic kidney disease (Chazal & Creager, 2016). The HEDIS measures for 2017 have not changed (NCQA, 2017). Introducing an evidence-based protocol for blood pressure follow-up

will decrease high blood pressure thereby increasing the hypertension HEDIS measurement at the host organization (Go et al., 2013).

Jaffe, Lee, Young, Sidney, and Go (2013) described introducing an evidence-based protocol for blood pressure follow-up and using HEDIS scores to measure improvement in hypertension indirectly. HEDIS then can provide the benchmark for determining if blood pressure is controlled. That is examining the HEDIS score or percentage of controlled hypertension prior to implementing the protocol and after implementing the protocol. This would show if blood pressure control rates were improved. Specifically, the independent-samples t-test would be employed to compare means of the two different groups, if data is found to be parametric. The independent-samples t-test would indicate if there is a statistically significant difference in the mean scores for pre-and post-intervention. If the data is nonparametric, then Mann-Whitney U Test could be used to examine the HEDIS score or percentage of controlled hypertension. Obtaining the review of a statistician may be involved with ensuring valid and reliable data has been collected.

Implementation

Data Collection Procedures

Data was collected by the author from the host sites hypertension registry, which was data generated from the data in the medical record at the host site. Three sets of data were collected. The HEDIS scores for hypertension control, raw data blood pressure measurements and the percentage of pressure appointments booked. Blood pressure reports were generated every two weeks and contain the most recently measured blood pressure and the blood pressure goal for the patient. The reports generated by the host site were set up to allow for exclusion criteria by age, presence of diabetes, and hypertension stage. The report indicated whether a

patient had a return two-week blood pressure appointment booked. A codebook was established. After data from the reports were obtained, each patient was assigned a number and entered into the codebook. Assigning a number to the patients accounted for keeping data private. Data was collected at two-time points, pre- and post-intervention, which occurred at time zero and two weeks. Additionally, a bi-weekly report generated the percentage of two-week blood pressure follow-ups that were booked was utilized.

Intervention/Project Timeline

The project spanned four weeks. The proposal sections were prepared before project approval and were not included in the four-week time frame. Approval for implementation was obtained by the department director. The project did not require Institutional Review Board (IRB) approval as it is a quality improvement project (Jordan, 2014). Participants were not recruited, as data was extracted from charts and reports, using no patient identifiers. The automated office blood pressure (AOBP) machines were obtained, and staff training for utilizing the machines was designed with the charge nurse and lead medical assistant with competency check-off sheets. New blood pressure treatment guidelines were reviewed and prepared for presentation to providers in the department, and the guidelines were presented by a department physician at department meetings. The training of the AOBP machine and guideline review occurred one to two weeks prior to protocol implementation, to ensure all staff and providers were familiar with the most recent blood pressure treatment guidelines, protocol, and machine use. The implementation of the project was carried out at time zero along with the data collection. Data was collected again at two weeks. Evaluation of the data took approximately two weeks.

Ethics and Human Subjects Protection

Patient identifying information, was removed during the data collection process and a numbering system was created (Kushida et al., 2012). No harm was caused to participants as they received their usual blood pressure checks. As mentioned earlier, this project was a QI project and did not require IRB approval.

Plan for Analysis/Evaluation

As mentioned previously, the tool used to measure blood pressure control was the HEDIS scores, which is reported as a percentage (NCQA, 2017). The change in percentage in the data collected was how the intervention was measured. A successful change would show an increase in HEDIS scores toward the organization's benchmark of 90%, and decrease in blood pressure, and an increase in blood pressure appointments booked. The sample size was approximately 200 patients with hypertension. Independent-samples t-test was used to determine if there is a statistically significant difference in the mean scores for pre-and post-intervention. A consultation with a statistician was done to ensure valid and reliable data was collected and analysis was performed correctly.

Significance/Implications for Nursing

In the United States Hypertension affects approximately 75 million people, of which only 54% of affected persons have their blood pressure under control, (CDC, 2017). When patients continue to have uncontrolled blood pressure they are at risk of developing stroke, kidney failure or heart attack which can further decrease their health status and increase health care costs (Shrivastava, Shrivastava, & Ramasamy, 2014). Go et al. (2014) states that many elements such as medication adherence, lifestyle modifications, evidence-based treatment, patient, and health care provider awareness of hypertension, access to care and adequate follow-up are elements

need to be addressed for adequate control. Therefore, a targeted approach to blood pressure follow-up using guidelines and collaboration is needed to address this problem. It is imperative that a protocol or guideline be developed to assist health care organizations with the utilization of effective evidence-based guidelines. The project has profound implications for the nursing profession, as nurses and especially nurse practitioners are the frontline health care professionals who play a role in ensuring evidence-based care is being delivered, and disparities in care are being addressed. Jarl et al. (2014) emphasize the important impact nurse practitioners can have in reducing hypertension in primary care. Further Dyal, Whyte, Blankenship, and Ford (2016) show the importance of having evidence-based guidelines and protocols for nurse practitioner students, clinicians, and patient outcomes, for improving blood pressure control. Wood and Gordon (2012), mention how nurse practitioners by assisting patients in maintaining blood pressure control prevent patients, specifically women, from developing cardiovascular disease. Nursing theory can often help to give a lens to address a problem and both develop an intervention and assess it. Dorothea Orem's Self-Care Deficit Nursing Theory describes when and how nursing care can help patients that cannot meet their own needs or self-deficits fits the problem of uncontrolled blood pressure and the nurse's role (Thomas & Stoeckel, 2016). Drevenhorn, Bengtson, Nyberg, and Kjellgren (2015) point out the ability of nurse practitioners to address the self-deficits patients with hypertension often have in order to increase their health. Crabtree, Stuart-Shor, and McAllister (2013) also addressed how nursing can help patients overcome the self-deficits of medication adherence and home blood pressure monitoring and maintain follow-up. As Jarl et al. (2014) mention, nurse practitioners have an important role in improving patient outcomes and hypertension is a wide-reaching problem with significant consequences if not properly addressed with evidence-based interventions. Again, current

literature points to multifaceted team approach to address hypertension care and follow-up. This project is aimed at incorporating multiple elements and tying them together as an evidence-based protocol that can be used by the healthcare team to improve blood pressure control.

Evaluation

Analysis

Participant demographics. The participants consisted of a total of 241 adults with both stage I and stage II hypertension including 112 in the pre-intervention phase and 129 in the post-intervention phase. The demographic information of the participants is summarized in Tables 1 and 2. In both the pre-intervention and post-intervention phase, there were more female participants (58% in pre-intervention; 50.4% in post-intervention; 67.3% overall) than male participants (42% in pre-intervention; 48.8% in post-intervention; 53.9% overall). The mean age of the adult participants in the pre-intervention phase was 63 years old (SD = 13.38) with the oldest 85 years old and youngest 18 years old. The mean age of the adult participants in the post-intervention phase was 60 years old (SD = 14.54) with the oldest 85 years old and youngest 19 years old.

Table 1

Frequency and Percentage Summaries of Sex of Samples

		Period		Total	
		1 Pre- Intervention	2 Post- Intervention		
Sex	F	N	65	65	130
		%	58.0%	50.4%	53.9%
	M	n	47	63	110

	%	42.0%	48.8%	45.6%
	n	0	1	1
N	%	0.0%	0.8%	0.4%
	n	112	129	241
Total	%	100%	100.0%	100.0%

Table 2

Descriptive Statistics Summaries of Age of Samples

Period	Mean	N	Std. Deviation	Minimum	Maximum
Pre-Intervention	62.71	112	13.38	18	85
Post-Intervention	60.38	129	14.43	19	85
Total	61.46	241	13.97	18	85

Normal distribution testing. The assumption of normal distribution of the dependent variable should be tested prior to inferential statistics, specifically using independent sample t-test, in order to address the objectives of any study or project (Pallant, 2013). The independent sample t-test requires that dependent variable data be numerical data, representing samples from normally distributed populations. Normality testing was conducted using Shapiro-Wilk test, which is often used for normality testing (Hanusz & Tarasińska, 2015). Results of the Shapiro-Wilk test in Table 3 showed that the data of dependent variables of systolic blood pressure ($SW(3) = 0.82, p = 0.17$), diastolic blood pressure ($SW(3) = 0.83, p = 0.19$), % blood pressure appointments booked ($SW(3) = 0.99, p = 0.93$) and HEDIS score ($SW(3) = 0.92, p = 0.46$) were normally distributed. This was because the p-values of the Shapiro-Wilk test were greater than the level of significance value set at 0.05.

Table 3

Results of Shapiro-Wilk Test of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Systolic Blood Pressures	0.82	3	0.17
Diastolic Blood Pressures	0.83	3	0.19
Blood Pressure Follow-up Appointments Booked	0.99	3	0.93
HEDIS BP Control target =90%	0.92	3	0.46

Results of test of difference. As stated, the independent sample t-test was conducted to determine whether systolic and diastolic blood pressure measurements, % blood pressure appointments booked and HEDIS scores were significantly different between the pre-intervention and post-intervention period. A level of significance of 0.05 was used in the independent sample t-test. There is a significant difference if the p-value is less than the level of significance of 0.05.

Blood pressure. First, the independent sample t-test was conducted to determine the difference in blood pressures. Results in Table 5 showed that both the systolic ($F = 0.09, p = 0.76$) and diastolic blood pressures ($F = 0.33, p = 0.57$) have equal variances assumed. Thus, the required assumption of samples are obtained from populations with equal variances was satisfied. Independent sample t-test results in Table 5 showed that the readings of systolic ($t(239) = 0.48, p = 0.64$) and diastolic blood pressures ($t(239) = 1.55, p = 0.12$) were not significantly different between the pre-intervention and post-intervention. That is, it showed no significant improvements in the blood pressures of the adults with both stage I and stage II

hypertension after undergoing the intervention.

Table 4

Descriptive Statistics Summaries of Systolic and Diastolic Blood Pressures During Pre-Intervention and Post-Intervention

	Period	N	Mean	Std. Deviation	Std. Error Mean
Systolic Blood Pressures	Pre-Intervention	112	136.82	18.88	1.78
	Post-Intervention	129	135.78	15.06	1.33
Diastolic Blood Pressures	Pre-Intervention	112	77.43	13.19	1.25
	Post-Intervention	129	74.92	11.85	1.04

Table 5

Independent Sample t-test Results of Difference of Systolic and Diastolic Blood Pressures between Pre-Intervention and Post-Intervention

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Systolic Blood Pressures	Equal variances assumed	0.09	0.76	0.48	239	0.64	1.04	2.19	-3.27	5.35
Diastolic Blood Pressures	Equal variances assumed	0.33	0.57	1.55	239	0.12	2.51	1.61	-0.67	5.68

HEDIS scores. Second, the independent t-test was conducted to look at the difference in HEDIS scores or percentage of controlled hypertension. Results in Table 7 showed that the Levene’s test for equal variances cannot be computed since the sample size was too small. Independent sample t-test results in Table 7 showed that HEDIS score ($t_1 = -0.96, p = 0.51$) were not significantly different between the pre-intervention and post-intervention. A Mean comparison showed that the HEDIS score in the pre-intervention of 82.95 (SD = 0.21) was close

with the HEDIS score in the post-intervention of 83.20. The means are close in value, indicating no significant improvement in the HEDIS scores or the percentage of controlled hypertension in adults with both stage I and stage II hypertension after undergoing the intervention.

Table 6

Descriptive Statistics Summaries of HEDIS Scores During Pre-Intervention and Post-Intervention

	Period	N	Mean	Std. Deviation	Std. Error Mean
HEDIS BP Control target =90%	Pre-Intervention	2	82.95	0.21	0.15
	Post-Intervention	1	83.20	.	.

Table 7

Independent Sample t-test Results of Difference of HEDIS Scores between Pre-Intervention and Post-Intervention

	Levene's Test for Equality of Variances	t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
HEDIS BP Control target =90%	Equal variances assumed	.	.	-0.96	1	0.51	-0.25	0.26	-3.55 3.05

Blood pressure appointments. Last, the independent sample t-test was conducted to look at the difference in % of blood pressure appointments booked. Results in Table 8 showed that the Levene’s test for equal variances cannot be computed since the sample size was too small. Independent sample t-test results in Table 9 showed that in % of blood pressure appointments booked ($t_1 = -1.897, p = 0.31$) were not significantly different between the pre-intervention and post-intervention. The mean comparison showed that the % of blood pressure appointments booked in the pre-intervention of 74.80 (SD = 0.99) was close to the % of blood pressure appointments booked in the post-intervention of 77.10. This result indicates no significant improvement in % of blood pressure appointments booked in the adults with both

stage I and stage II hypertension after undergoing the intervention.

Table 8

Descriptive Statistics Summaries of % Blood Pressure Appointments Booked During Pre-Intervention and Post-Intervention

	Period	N	Mean	Std. Deviation	Std. Error Mean
% Blood Pressure Appointments Booked	Pre-Intervention	2	74.80	0.99	0.70
	Post-Intervention	1	77.10	.	.

Table 9

Independent Sample t-test Results of Difference of % Blood Pressure Appointments Booked between Pre-Intervention and Post-Intervention

	Levene's Test for Equality of Variances	t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Blood Pressure Follow-up Appointment Booked	Equal variances assumed	.	.	-1.897	1	0.31	-2.3	1.21	-17.71 13.11

Conclusion

Discussion

This project aimed to improve hypertension follow-up in the primary care setting, through the use of an evidence-based protocol (Appendix A) to address blood pressure follow-up. The variables addressed by the protocol were outreach, adherence to treatment, education, staff training and attitudes, home monitoring, treatment guidelines that included screening for secondary causes of hypertension resistant hypertension and depression. The protocol included

many evidenced supported interventions including, phone calls by medical assistants and sent notification for those unreachable by phone as indicated by Harrison et al., (2013). It also included use of an automated phone messaging system to reaching patients who are due for refills similar to Harrison et al., (2016). A new automated blood pressure machine was introduced for use in patients returning for follow-up blood pressures and included adequate staff training similar as described by Myers et al. (2012). Evidence-based handouts explaining the DASH diet (Appendix C), defining hypertension and lifestyle changes (Appendix D), in addition to home blood pressure logs (Appendix B), that include directions on taking blood pressure were provided. The protocol also included the use of medical assistants who reviewed medication lists with patients prior to provider to review. Finally, the latest guidelines for treating blood pressure (Appendix E), were distributed to all providers in the clinic.

Data analysis. Initial review of the data did show a small decrease in both the means of systolic and diastolic blood pressures post-intervention, as seen in table 4. Additionally, the HEDIS score did show a slight increase toward the organization goal of 90%, and the percentage of follow-up blood pressure appointments had a slight increase as well, as seen in table 6 and 8 respectively. However, the statistical analysis of the data revealed no statistically significant improvement post-intervention. This indicates that the protocol did not improve blood pressure or blood pressure follow-up. This may be in part to the short length of runtime for the project and sample size. As it can be argued that a larger sample size and longer project runtime may have yielded statistically significant results (Buchheit, 2016). Nevertheless, these small improvements seen, though not statistically significant, should not be ignored and can be promising to a similar future project.

Demographics. The demographics provided some interesting trends. More women than men were present at appointments than men. It also appears as though more men participated in blood pressure follow-up. Though the conclusion is hindered by the groups not containing the same participants pre- and post-intervention. It is also interesting to note the average age of both groups tended to be in their sixties. This demographic may be only representative of this clinic however and cannot be inferred to be representative of all patients coming to a clinic for a blood pressure check. However, analyzing demographics can indicate the population in a given clinic, and outreach methods can be better tailored to the demographics identified.

Significance

Causes of blood pressure and its treatment are multifactorial (Go et al., 2014). As mentioned previously, blood pressure control is a widespread problem and can be difficult to get under control (Bozkurt et al., 2016). Jaffe, Lee, and Young (2013) also discuss how “elusive” blood pressure control is (p. 702). Despite this, there was also improvement seen in HEDIS scores in Jaffe et al. (2013). These improvements may have been more evident, as Jaffe et al. (2013) had a study with a time span of eight years, and it was after the start of a multifactorial approach to blood pressure control and follow-up. This does give hope to seeing better outcomes if this project was replicated and carried out over a longer time frame.

There is much work remaining in the area of hypertension management and follow-up. DNP-prepared nurses are leaders in improving population health in areas such as chronic diseases. Hypertension is a chronic condition that needs a collaborative, innovative, multifactorial approaches. DNP-prepared nurses lead the way in understanding new technologies, using nursing theory to motivate not only patients but staff and colleagues to improve patient outcomes (Bemker, 2016). Using both Orem’s theory to motivate patients and

Kotter's theory to motivate organizational change can be very powerful when introducing any new protocol, not just the one discussed in this project. Orem's theory has been very successful in other studies with chronic disease management (Sürücü & Kizilci, 2012). Using these theories and lessons learned from this project can lead to improved outreach and protocol development and refinement. This is not only true for hypertension, but other chronic diseases as well.

Limitations

Project design. This project did have limitations which should be addressed. Not having enough equipment was a limitation, as there were only two AOBP machines available for use. There was at least one day where it was reported that one AOBP machine was not properly charged for use. This meant that one machine had to be utilized among 13 medical assistants instead of two. Even having two machines per 13 medical assistants was stretching resources thin in an already busy clinic environment. Staff inconsistencies may have also played a role as there were a total of 20 medical assistants that participated as there were days when per diem staff filled in for regular staff. Having one or two medical assistants assigned to taking blood pressures pre- and post-intervention may have led to more consistent results. On the other hand, having multiple staff mimics the real-world situation of the clinic.

Another limitation of the project design was time. The project was conducted over four weeks and only allowed for two different pre-intervention and one post-intervention time points for data collection. A longer project runtime would have allowed for more data to be collected. More data points would increase the likelihood of statistically significant results. More data collected could also allow for a strengthened trend of sustainability.

Data collection. With regards to data collection, the decision was made to focus on gathering data from approximately 200 patients. Either of these decisions may have prevented enough

varied data from being gathered and may have led to the lack of statistical significance. Another limitation was not having the same group of participants pre- and post-intervention. Having one group with outcomes measured at two-time points may have led to statistically significant results.

Dissemination and Sustainability

Dissemination. Dissemination is an important conclusion of any scholarly project (Chism, 2016). This is particularly important to this project as it gives much insight into the approaches needed to develop a protocol for blood pressure follow-up. It also reveals the challenges and areas that future projects may need to address to see statistical significance and success. Therefore, this project will be shared at local staff meetings, peer review committees, locally and regionally. The paper will be submitted to an external repository as required by Touro University, Nevada. The goal would be to take the knowledge gained and share it with others who desire to transform practice and improve patient outcomes. The knowledge of this project can also assist with future protocol design.

Dissemination of this project in the manner described will allow the information to be disseminated to the target audience. This includes DNP students, DNP-prepared nurses, nurse practitioners, physicians and other nurse leaders. This can allow others to gain insight into protocol development and the issues to address when working with hypertension.

Sustainability. The work from this project is sustainable as there is much work to be done in hypertension and this project includes much of the groundwork of the latest evidence-based interventions. To continue the sustainability of the quality improvement project within the host site, many measures can be taken. Ensuring enough AOBP machines and allowing only a select few highly trained medical assistants to take the blood pressures. This would ensure all

blood pressures are taken on an AOBP machine and would decrease the amount of staff error when multiple staff are involved. This would also ensure that blood pressure logs and handouts outlining lifestyle changes are given out consistently. Continued provider refreshing on evidence-based practice for blood pressure treatment should be done at a minimum annually, but ideally quarterly. A multidisciplinary team could be organized to review performance and compliance with the protocol. These measures should increase blood pressure control and the organizational HEDIS scores. Data could be gathered and analyzed and shared with host site stakeholders, to review reductions in blood pressures and increase in HEDIS scores. Continued positive outcomes would sustain the protocol within the host organization.

The information presented here is translatable to any primary care clinic setting and allows for replicating this project or intervention. Much can be learned through translating the evidence outlined in this project into practice. Additionally, this project can be expanded upon or modified to include similar interventions for other chronic conditions. Having this type of sustainability is important to lead to improvement in healthcare policy and patient and population outcomes.

References

- Agency for Healthcare Research and Quality (2014). Controlling high blood pressure: percentage of patients 18 to 85 years of age who had a diagnosis of hypertension (HTN) and whose BP was adequately controlled during the measurement year. Retrieved from <https://www.qualitymeasures.ahrq.gov/summaries/summary/48819/controlling-high-blood-pressure-percentage-of-patients-18-to-85-years-of-age-who-had-a-diagnosis-of-hypertension-htn-and-whose-bp-was-adequately-controlled-during-the-measurement-year>
- Appelbaum, S. H., Habashy, S., Malo, J.-L., & Shafiq, H. (2012). Back to the future: revisiting Kotter's 1996 change model. *The Journal of Management Development*, 31(8), 764–782. <https://doi.org/http://dx.doi.org/10.1108/02621711211253231>
- Bemker, M. (2016). *The dnp degree & capstone project*. Lancaster, PA: DEStech Publications, Inc.
- Booth, K., Rivet, J., Flici, R., Harvey, E., Hamill, M., Hundley, D., ... Collier, B. (2016). Progressive mobility protocol reduces venous thromboembolism rate in trauma intensive care patients: A quality improvement project. *Journal of Trauma Nursing*, 23(5), 284–289. <https://doi.org/10.1097/JTN.0000000000000234>
- Bozkurt, B., Aguilar, D., Deswal, A., Dunbar, S. B., Francis, G. S., Horwich, T., ... Yancy, C. (2016). Contributory risk and management of comorbidities of hypertension, obesity, diabetes mellitus, hyperlipidemia, and metabolic syndrome in chronic heart failure: A scientific statement from the American Heart Association. *Circulation*, 134(23), e535–e578. <https://doi.org/10.1161/CIR.0000000000000450>
- Breaux-Shropshire, T. L., Judd, E., Vucovich, L. A., Shropshire, T. S., & Singh, S. (2015). Does home blood pressure monitoring improve patient outcomes? A systematic review

comparing home and ambulatory blood pressure monitoring on blood pressure control and patient outcomes. *Integrated Blood Pressure Control*, 8, 43–49.

<https://doi.org/10.2147/IBPC.S49205>

Buchheit, M. (2016). The numbers will love you back in return--I promise. *International Journal of Sports Physiology & Performance*, 11(4), 551–554.

Burden, M. (2016). Using a change model to reduce the risk of surgical site infection. *British Journal of Nursing*, 25(17), 949–955.

Centers for Disease Control and Prevention. (2017). High Blood Pressure. Retrieved from: <http://www.cdc.gov/bloodpressure/index.htm>.

Chazal, R. A., & Creager, M. A. (2016). New quality measure core sets provide continuity for measuring quality improvement. *Hypertension*, 67(5), 1053–1054.

<https://doi.org/10.1161/HYP.0000000000000043>

Chism, L. A. (Ed.). (2016). *The doctor of nursing practice: a guidebook for role development and professional issues* (Third edition). Burlington, Massachusetts: Jones & Bartlett Learning.

Crabtree, M. M., Stuart-Shor, E., & McAllister, M. (2013). Home blood pressure monitoring: An integrated review of the literature. *The Journal for Nurse Practitioners; Philadelphia*,

9(6), 356–361. <https://doi.org/http://dx.doi.org/10.1016/j.nurpra.2013.04.020>

Department of Human Health & Services, Million Hearts (2016). About Million Hearts.

Retrieved from <https://millionhearts.hhs.gov/about-million-hearts/index.html>

Drevenhorn, E., Bengtson, A., Nyberg, P., & Kjellgren, K. I. (2015). Assessment of hypertensive patients' self-care agency after counseling training of nurses. *Journal of the American*

- Association of Nurse Practitioners*, 27(11), 624–630. <https://doi.org/10.1002/2327-6924.12222>
- Dyal, B., Whyte, M., Blankenship, S. M., & Ford, L. G. (2016). Outcomes of implementing an evidence-based hypertension clinical guideline in an academic nurse managed health center. *Worldviews on Evidence-Based Nursing*, 13(1), 89–93. <https://doi.org/10.1111/wvn.12135>
- Friesen, W. (2016). Change Management: A key to a successful future. *Business Credit*, 118(9), 42–43.
- Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Borden, W. B., ... on behalf of the American Heart Association statistics committee and stroke statistics subcommittee. (2013). Heart disease and stroke statistics--2013 update: A report from the American Heart Association. *Circulation*, 127(1), e6–e245. <https://doi.org/10.1161/CIR.0b013e31828124ad>
- Go, Alan S., Bauman, M. A., King, S. M. C., Fonarow, G. C., Lawrence, W., Williams, K. A., & Sanchez, E. (2014). An effective approach to high blood pressure control. *Hypertension*, 63(4), 878–885. <https://doi.org/10.1161/HYP.0000000000000003>
- Grigoryan, L., Pavlik, V. N., & Hyman, D. J. (2013a). Characteristics, drug combinations and dosages of primary care patients with uncontrolled ambulatory blood pressure and high medication adherence. *Journal Of The American Society Of Hypertension: JASH*, 7(6), 471-476. doi:10.1016/j.jash.2013.06.004
- Grigoryan, L., Pavlik, V. N., & Hyman, D. J. (2013b). Patterns of nonadherence to antihypertensive therapy in primary care. *Journal of Clinical Hypertension (Greenwich, Conn.)*, 15(2), 107-111. doi:10.1111/jch.12030

- Gull, Z., Anwar, Z., & Sherazi, B. A. (2016). Management of hypertension and anti-hypertensive drug profile in end-stage-renal-disease patients undergoing maintenance hemodialysis. *Medical Channel, 22*(3), 41–46.
- Hagins, M., Rundle, A., Consedine, N. S., & Khalsa, S. B. S. (2014). A randomized controlled trial comparing the effects of yoga with an active control on ambulatory blood pressure in individuals with prehypertension and stage 1 hypertension. *Journal of Clinical Hypertension, 16*(1), 54–62. <https://doi.org/10.1111/jch.12244>
- Hanusz, Z., & Tarasińska, J. (2015). Normalization of the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality. *Biometrical Letters, 52*(2), 85–93. <https://doi.org/10.1515/bile-2015-0008>
- Harrison, T. N., Green, K. R., Liu, I.-L. A., Vansomphone, S. S., Handler, J., Scott, R. D., ... Reynolds, K. (2016). Automated outreach for cardiovascular-related medication refill reminders. *The Journal of Clinical Hypertension, 18*(7), 641–646. <https://doi.org/10.1111/jch.12723>
- Harrison, T. N., Ho, T. S., Handler, J., Kanter, M. H., Goldberg, R. A., & Reynolds, K. (2013). A Randomized controlled trial of an automated telephone intervention to improve blood pressure control. *The Journal of Clinical Hypertension, 15*(9), 650–654. <https://doi.org/10.1111/jch.12162>
- Hill, J. R., & Conner, R. S. (2016). Use of home monitoring to improve blood pressure control. *The Journal for Nurse Practitioners, 12*(10), e423–e425. <https://doi.org/10.1016/j.nurpra.2016.06.012>

- Hovlid, E., Bukve, O., Haug, K., Aslaksen, A. B., & von Plessen, C. (2012). Sustainability of healthcare improvement: what can we learn from learning theory? *BMC Health Services Research*, *12*(1), 235–247. <https://doi.org/10.1186/1472-6963-12-235>
- Hyman, D. J., Pavlik, V. N., Greisinger, A. J., Chan, W., Bayona, J., Mansyur, C., ... Pool, J. (2012). Effect of a physician uncertainty reduction intervention on blood pressure in uncontrolled hypertensives—a cluster randomized trial. *Journal of General Internal Medicine*, *27*(4), 413–419. <https://doi.org/10.1007/s11606-011-1888-1>
- Jaffe, M. G., Lee, G. A., Young, J. D., Sidney, S., & Go, A. S. (2013). Improved blood pressure control associated with a large-scale hypertension program. *JAMA*, *310*(7), 699–705. <https://doi.org/10.1001/jama.2013.108769>
- Jarl, J., Tolentino, J. C., James, K., Clark, M. J., & Ryan, M. (2014). Supporting cardiovascular risk reduction in overweight and obese hypertensive patients through DASH diet and lifestyle education by primary care nurse practitioners. *Journal Of The American Association Of Nurse Practitioners*, *26*(9), 498–503. <https://doi.org/10.1002/2327-6924.12124>
- Jordan, S. R. (2014). Public service quality improvements: A case for exemption from IRB review of public administration research. *Accountability in Research: Policies & Quality Assurance*, *21*(2), 85–108. <https://doi.org/10.1080/08989621.2013.804347>
- Kotter, J. P. (1996). *Leading change*. Boston, Mass: Harvard Business School Press.
- Kotter, J. P., & Cohen, D. S. (2012). *The heart of change: real-life stories of how people change their organizations*. Boston, Mass: Harvard Business Review Press.
- Kushida, C. A., Nichols, D. A., Jadrnicek, R., Miller, R., Walsh, J. K., & Griffin, K. (2012). Strategies for de-identification and anonymization of electronic health record data for use

- in multicenter research studies. *Medical Care*, 50 Suppl, S82–S101.
<https://doi.org/10.1097/MLR.0b013e3182585355>
- Li, S., Bruen, B. K., Lantz, P. M., & Mendez, D. (2015). *Impact of health insurance expansions on nonelderly adults with hypertension*. *Preventing Chronic Disease*, 12E105.
doi:10.5888/pcd12.150111
- Marino, J., Bucher, D., Beach, M., Yegneswaran, B., & Cooper, B. (2015). Implementation of an intensive care unit delirium protocol: An interdisciplinary quality improvement project. *Dimensions Of Critical Care Nursing: DCCN*, 34(5), 273–284.
<https://doi.org/10.1097/DCC.0000000000000130>
- Meddings JA, & McMahon LF Jr. (2008). Measuring quality in pay-per-performance programs: from “one-size-fits-all” measures to individual patient risk-reduction scores. *Disease Management & Health Outcomes*, 16(4), 205–216.
- Meng, L., Chen, D., Yang, Y., Zheng, Y., & Hui, R. (2012). Depression increases the risk of hypertension incidence: a meta-analysis of prospective cohort studies. *Journal of Hypertension*, 30(5), 842–851. <https://doi.org/10.1097/HJH.0b013e32835080b7>
- Moran, K. J., Burson, R., & Conrad, D. (Eds.). (2014). *The doctor of nursing practice scholarly project: a framework for success*. Burlington, Mass: Jones & Bartlett Learning.
- Morrison, J. (2016). Nursing leadership in ACO payment reform. *Nursing Economic\$, 34(5)*, 230–235.
- Myers, M. G., Godwin, M., Dawes, M., Kiss, A., Tobe, S. W., & Kaczorowski, J. (2012). The conventional versus automated measurement of blood pressure in the office (CAMBO) trial: masked hypertension sub-study. *Journal Of Hypertension*, 30(10), 1937–1941.

Ojo O. (2010). Home enteral nutrition NICE guidelines and nutrition support in primary care.

British Journal of Community Nursing, 15(3), 116–120.

Pallant, J. F. (2013). *SPSS survival manual: a step by step guide to data analysis using SPSS for*

Windows. Crows Nest, N.S.W.: Allen & Unwin.

Patel, M. M., Datu, B., Roman, D., Barton, M. B., Ritchey, M. D., Wall, H. K., & Loustalot, F.

(2014). Progress of health plans toward meeting the million hearts clinical target for high

blood pressure control - United States, 2010-2012. *MMWR: Morbidity & Mortality*

Weekly Report, 63(6), 127–130.

Phillips Jr, R. L., Han, M., Petterson, S. M., Makaroff, L. A., & Liaw, W. R. (2014). *Cost,*

utilization, and quality of care: An evaluation of Illinois' Medicaid primary care case

management program. Annals Of Family Medicine, 12(5), 408-417.

doi:10.1370/afm.169

Rabbia, F., Testa, E., Rabbia, S., Praticò, S., Colasanto, C., Montersino, F., ... Veglio, F. (2013).

Effectiveness of blood pressure educational and evaluation program for the improvement

of measurement accuracy among nurses. *High Blood Pressure & Cardiovascular*

Prevention: The Official Journal of the Italian Society of Hypertension, 20(2), 77–80.

<https://doi.org/10.1007/s40292-013-0012-5>

Rebholz, C. M., Anderson, C. A. M., Grams, M. E., Bazzano, L. A., Crews, D. C., Chang, A. R.,

... Appel, L. J. (2016). Relationship of the American Heart Association's impact goals

(life's simple 7) with risk of chronic kidney disease: Results from the atherosclerosis

risk in communities (ARIC) cohort study. *Journal of the American Heart Association:*

Cardiovascular and Cerebrovascular Disease, 5(4).

<https://doi.org/10.1161/JAHA.116.003192>

- Ritchey, M. D., Wall, H. K., Gillespie, C., George, M. G., & Jamal, A. (2014). *Million hearts: prevalence of leading cardiovascular disease risk factors - United States, 2005-2012*. MMWR: Morbidity & Mortality Weekly Report, 63(21), 462-467.
- Seed, M. S., & Torkelson, D. J. (2012). Beginning the recovery journey in acute psychiatric care: Using concepts from Orem's Self-Care Deficit nursing theory. *Issues in Mental Health Nursing*, 33(6), 394–398. <https://doi.org/10.3109/01612840.2012.663064>
- Schwartz, C. L., & McManus, R. J. (2015). *What is the evidence base for diagnosing hypertension and for subsequent blood pressure treatment targets in the prevention of cardiovascular disease?*. BMC Medicine, 13256. doi:10.1186/s12916-015-0502-5
- Shaw, K. M. (2014). Improving blood pressure control in a large multiethnic California population through changes in health care delivery, 2004–2012. *Preventing Chronic Disease*, 11. <https://doi.org/10.5888/pcd11.140173>
- Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2014). The determinants and scope of public health interventions to tackle the global problem of hypertension. *International Journal Of Preventive Medicine*, 5(7), 807–812.
- Sorensen, T. D., Pestka, D., Sorge, L. A., Wallace, M. L., & Schommer, J. (2016). A qualitative evaluation of medication management services in six Minnesota health systems. *American Journal of Health-System Pharmacy*, 73(5), 307–314. <https://doi.org/10.2146/ajhp150212>
- Stewart, K., George, J., Mc Namara, K. P., Jackson, S. L., Peterson, G. M., Bereznicki, L. R., ... Lau, R. (2014). A multifaceted pharmacist intervention to improve antihypertensive adherence: a cluster-randomized, controlled trial (HAPPy trial). *Journal Of Clinical Pharmacy And Therapeutics*, 39(5), 527–534. <https://doi.org/10.1111/jcpt.12185>

Stoller JK. (2010). Implementing change in respiratory care. *Respiratory Care*, 55(6), 749–757.

Sürücü, H. A., & Kizilci, S. (2012). Use of Orem's Self-Care Deficit nursing theory in the self-management education of patients with type 2: A case study. *Self-Care, Dependent-Care & Nursing*, 19(1), 53–59.

The National Committee for Quality Assurance (2017). *HEDIS 2017*. Retrieved from <http://www.ncqa.org/hedis-quality-measurement/hedis-measures/hedis-2017>

Thomas, O., & Stoeckel, P. (2016). Hypertensive black men's perceptions of a nurse protocol for medication self-administration. *Care Management Journals: Journal of Case Management; The Journal of Long Term Home Health Care*, 17(1), 37–46. <https://doi.org/10.1891/1521-0987.17.1.37>

Wong, C. L., Ip, W. Y., Choi, K. C., & Lam, L. W. (2015). Examining self-care behaviors and their associated factors among adolescent girls with dysmenorrhea: An application of Orem's Self-Care Deficit nursing theory. *Journal of Nursing Scholarship*, 47(3), 219–227. <https://doi.org/10.1111/jnu.12134>

Wood, J., & Gordon, P. (2012). Preventing CVD in women: The NP's role. *Nurse Practitioner*, 37(2), 26–34. <https://doi.org/10.1097/01.NPR.0000410275.21998.b5>

HYPERTENSION FOLLOW-UP PROTOCOL

Medical Assistant (MA) Blood Pressure BP Workflow

Assigned MA (or MA per PCP or letter coverage) monitors BP schedule to bring scheduled and walk-in patients back for BP within 10 minutes of registration.

MA prints current medication list (all meds) and hands to patient to cross off what not taking.

MA places check mark in chart for medications that patient reports taking and marks as reviewed

MA enters revisions to patient reported medications in the visit notes, noting what the patient is not taking and why. MA notes the time of day that the last dose of BP medication was taken.

MA reviews Allergies

MA enters chief complaint "Blood Pressure Check"

MA reviews history for last documented blood pressure.

MA takes BP measurement with AOBP MACHINE per completed competency (including standing BP age 70 and older).

MA AOBP will be programmed to run for 3 cycles and the average BP will be documented.

MA will document first of 3 readings in the first vitals column and then the average AOBP reading will be documented in the second vitals column. Both will be reported to the provider.

If the average blood pressure reading is $<139/89$ or $>90/60$ and HR is >60 and <100 patient is discharged.

If average blood pressure measurement is abnormal ($>139/89$):

MA Books 2 week follow-up **AND**
Notifies NP, PCP or covering Physician
Follows instructions from provider

If $>179/109$, the MA
Books 2 week follow-up **AND**
Ensures clinical assessment by NP, Physician or RN **ASAP**

MA Documents in visit notes using the department approved dot phrase: .MAPROCEDURES

If the patient has any complaints, the MA will **BOLD** the complaint.

MA to give handouts explaining elevated blood pressure, blood pressure log and DASH diet

MA CC's chart to PCP (for all readings, even normal)

For abnormal BP:

When notifying NP/covering provider/PCP, MA must include:

HYPERTENSION FOLLOW-UP PROTOCOL

1. Patient Room #
2. Any *reported* symptoms of chest pain or shortness of breath only
3. Confirming complete and accurate med reconciliation (which is in the chart) including time of day last BP medication was taken.
4. Patient willingness to accept changes to treatment
5. BP reading
6. Confirming that 2 week follow up was booked so that patient can be discharged

Hypertension Outreach

Assigned MA (or MA per PCP or letter coverage) calls all “no-show” BP checks before the end of each unit to reschedule BP appointment.

If MA cannot reach patient, they will call 2 more times in attempt to reschedule and send letter and/or an e-mail (secure message) if unable to contact by phone.

Telephone, secure message and letter encounters should be documented in in the chart.

Outreach lists are sent by every 2 weeks via Lotus Notes.

MA checks Lotus Notes routinely to work on most current list.

MA huddles weekly (or more frequently) with assigned provider to review Hypertension Outreach Lists.

MA and provider will develop strategy for which patients for the MA to outreach

MA works on outreach calls during assigned outreach time and in periods of available time

MA documents outreach by using telephone/online/letter encounters.

Reason for call is “Outreach” and MA documents using the department approved dot phrase:

.MABPOUTREACH

MAAs are expected to complete bi-weekly lists by calling each patient at least 3 times and sending a letter or secure message if unable to reach by phone.

MA uses the dot phrase .MABLETTEROUTREACH for letters and the dot phrase .MABPSMOUTREACH for secure messages

MAAs are responsible to turn in completed outreach lists to Charge Nurses every 2 weeks when new lists arrive.

MAAs should aim to schedule every patient on the list for a BP appointment

HYPERTENSION FOLLOW-UP PROTOCOL

MAs are expected to proactively engage assistance from their fellow pod MAs, Charge Nurses and/or Sr. LVNs if they anticipate that they will be unable to complete their lists

Charge Nurses are responsible for verifying the accuracy of completed lists, auditing documentation and outreach, and assisting Medical Assistants in completing their lists

Pharmacy Outreach

Automated calls will be sent out to patients listed in the hypertension registry to patients with antihypertensive medications that are 2 to 6 weeks overdue using an automated telephone system by regional pharmacists.

Letters and secure messages will be sent out to those who do not answer the automated call.

Provider Treatment of Hypertension

All primary care providers will be educated on and given the latest guidelines for treating hypertension, which focuses on addressing adherence, depression screening, assessing for resistant hypertension, encouraging home blood pressure monitoring, lifestyle changes (including DASH diet) and using evidenced based medication treatment plans. The guidelines are not a substitute for clinical judgement by providers.

Providers will be encouraged to have their patients to return in 2 weeks for follow-up whenever blood pressure is $>139/89$.

How to Take Blood Pressure Measurements at Home

Wrist and fingertip devices are not accurate and should NOT be used.

BE SURE TO TEST your device in your doctor's office. Bring your device with you to an appointment. Ask staff to check your blood pressure with your device AND with the office device to compare readings.

PREPARE yourself to ensure an accurate reading:

DO

1. Use the bathroom before you measure your blood pressure so that you are comfortable.
2. Sit in a quiet room.
3. Sit in a chair with your back supported with BOTH feet resting on the ground.
4. Flex your arm at the elbow and rest on a flat tabletop or other surface for support.
5. Put the cuff in **direct contact** with the skin of your arm.

DON'T

1. DO NOT cross your legs.
2. DO NOT **position cuff over clothing.**
3. NOT talk when you take your reading.
4. **DO NOT smoke, drink caffeinated beverages, or exercise within 30 minutes BEFORE taking your blood pressure.**

What are the BEST times to measure blood pressure?

1. **Early morning.** Measure blood pressure *within 1 hour of waking* **BEFORE** taking any morning medicines.
2. **Evening.** Measure your blood pressure *1 hour or more after eating dinner* but **BEFORE** taking any evening medicines.

NOTE: Morning readings are HIGHER than evening readings for many people. Because of this, it is *important that at least half of your readings are morning readings.*

How many readings should you take?

1. Take "sets" of morning AND "sets" of evening readings for best results.
2. Each set should include either 2 or 3 readings.
3. Measure blood pressure at least **3 days** over the course of one week.
4. If you can, make sure not to skip days between readings.

Use the Blood Pressure Results Log on the back of this page to record blood pressure readings.

Home Blood Pressure Results Log

- Check your blood pressure **3 mornings** during the week between 6 a.m. and 10 a.m. AND **3 evenings** during the week between 6 p.m. and 10 p.m.
- Your morning and evening blood pressures can both be done on the same day or on separate days.
- Take 2 to 3 blood pressure readings each time you take your blood pressure. Each should be at least 1 minute apart.
 1. REST for 5 minutes BEFORE taking the FIRST reading.
 2. Wait 1 minute AFTER the FIRST reading, THEN take the SECOND reading.
 3. Wait 1 minute AGAIN, and THEN take the THIRD reading.
 4. Write all 3 readings down on a piece of paper. Be sure to note the date and times.

Sunday/Date:		Monday/Date:		Tuesday/Date:		Wednesday/Date:	
Time	Systolic / Diastolic	Time	Systolic / Diastolic	Time	Systolic / Diastolic	Time	Systolic / Diastolic
a.m.	/	a.m.	/	a.m.	/	a.m.	/
a.m.	/	a.m.	/	a.m.	/	a.m.	/
a.m.	/	a.m.	/	a.m.	/	a.m.	/
p.m.	/	p.m.	/	p.m.	/	p.m.	/
p.m.	/	p.m.	/	p.m.	/	p.m.	/
p.m.	/	p.m.	/	p.m.	/	p.m.	/

Thursday/Date:		Friday/Date:		Saturday/Date:	
Time	Systolic / Diastolic	Time	Systolic / Diastolic	Time	Systolic / Diastolic
a.m.	/	a.m.	/	a.m.	/
a.m.	/	a.m.	/	a.m.	/
a.m.	/	a.m.	/	a.m.	/
p.m.	/	p.m.	/	p.m.	/
p.m.	/	p.m.	/	p.m.	/
p.m.	/	p.m.	/	p.m.	/

DASH Diet

The DASH diet is an eating plan that can help lower your blood pressure. DASH stands for Dietary Approaches to Stop Hypertension. Hypertension is high blood pressure.

The DASH diet focuses on eating foods that are high in calcium, potassium, and magnesium. These nutrients can lower blood pressure. The foods that are highest in these nutrients are fruits, vegetables, low-fat dairy products, nuts, seeds, and legumes. But taking calcium, potassium, and magnesium supplements instead of eating foods that are high in those nutrients does not have the same effect. The DASH diet also includes whole grains, fish, and poultry.

The DASH diet is one of several lifestyle changes your doctor may recommend to lower your high blood pressure. Your doctor may also want you to decrease the amount of sodium in your diet. Lowering sodium while following the DASH diet can lower blood pressure even further than just the DASH diet alone.

Follow-up care is a key part of your treatment and safety. Be sure to make and go to all appointments, and call your doctor if you are having problems. It's also a good idea to know your test results and keep a list of the medicines you take.

How can you care for yourself at home?

Following the DASH diet

Eat 4 to 5 servings of fruit each day. A serving is 1 medium-sized piece of fruit, ½ cup chopped or canned fruit, ¼ cup dried fruit, or 4 ounces (½ cup) of fruit juice. Choose fruit more often than fruit juice.

Eat 4 to 5 servings of vegetables each day. A serving is 1 cup of lettuce or raw leafy vegetables, ½ cup of chopped or cooked vegetables, or 4 ounces (½ cup) of vegetable juice. Choose vegetables more often than vegetable juice.

- Get 2 to 3 servings of low-fat and fat-free dairy each day. A serving is 8 ounces of milk, 1 cup of yogurt, or 1 ½ ounces of cheese.
- Eat 6 to 8 servings of grains each day. A serving is 1 slice of bread, 1 ounce of dry cereal, or ½ cup of cooked rice, pasta, or cooked cereal. Try to choose whole-grain products as much as possible.
- Limit lean meat, poultry, and fish to 2 servings each day. A serving is 3 ounces, about the size of a deck of cards.
- Eat 4 to 5 servings of nuts, seeds, and legumes (cooked dried beans, lentils, and split peas) each week. A serving is 1/3 cup of nuts, 2 tablespoons of seeds, or ½ cup of cooked beans or peas.
- Limit fats and oils to 2 to 3 servings each day. A serving is 1 teaspoon of vegetable oil or 2 tablespoons of salad dressing.
- Limit sweets and added sugars to 5 servings or less a week. A serving is 1 tablespoon jelly or jam, ½ cup sorbet, or 1 cup of lemonade.
- Eat less than 2,300 milligrams (mg) of sodium a day. If you limit your sodium to 1,500 mg a day, you can lower your blood pressure even more.

Tips for success

- Start small. Do not try to make dramatic changes to your diet all at once. You might feel that you are missing out on your favorite foods and then be more likely to not follow the plan. Make small changes, and stick with them. Once those changes become habit, add a few more changes.
- Try some of the following:
 - Make it a goal to eat a fruit or vegetable at every meal and at snacks. This will make it easy to get the recommended amount of fruits and vegetables each day.
 - Try yogurt topped with fruit and nuts for a snack or healthy dessert.
 - Add lettuce, tomato, cucumber, and onion to sandwiches.
 - Combine a ready-made pizza crust with low-fat mozzarella cheese and lots of vegetable toppings. Try using tomatoes, squash, spinach, broccoli, carrots, cauliflower, and onions.
 - Have a variety of cut-up vegetables with a low-fat dip as an appetizer instead of chips and dip.
 - Sprinkle sunflower seeds or chopped almonds over salads. Or try adding chopped walnuts or almonds to cooked vegetables.

- Try some vegetarian meals using beans and peas. Add garbanzo or kidney beans to salads. Make burritos and tacos with mashed pinto beans or black beans.

Elevated Blood Pressure: Care Instructions

Blood pressure is a measure of how hard the blood pushes against the walls of your arteries. It's normal for blood pressure to go up and down throughout the day. But if it stays up over time, you have high blood pressure.

Two numbers tell you your blood pressure. The first number is the systolic pressure. It shows how hard the blood pushes when your heart is pumping. The second number is the diastolic pressure. It shows how hard the blood pushes between heartbeats, when your heart is relaxed and filling with blood. An ideal blood pressure in adults is less than 120/80 (say "120 over 80"). High blood pressure is 140/90 or higher. You have high blood pressure if your top number is 140 or higher or your bottom number is 90 or higher, or both.

The main test for high blood pressure is simple, fast, and painless. To diagnose high blood pressure, your doctor will test your blood pressure at different times. You may have to check your blood pressure at home if there is reason to think that the results in the doctor's office aren't accurate.

If you are diagnosed with high blood pressure, you can work with your doctor to make a long-term plan to manage it.

Follow-up care is a key part of your treatment and safety. Be sure to make and go to all appointments, and call your doctor if you are having problems. It's also a good idea to know your test results and keep a list of the medicines you take.

How can you care for yourself at home?

- Do not smoke. Smoking increases your risk for heart attack and stroke. If you need help quitting, talk to your doctor about stop-smoking programs and medicines. These can increase your chances of quitting for good.
- Stay at a healthy weight.

- Try to limit how much sodium you eat to less than 2,300 milligrams (mg) a day. Your doctor may ask you to try to eat less than 1,500 mg a day.
- Be physically active. Get at least 30 minutes of exercise on most days of the week. Walking is a good choice. You also may want to do other activities, such as running, swimming, cycling, or playing tennis or team sports.
- Avoid or limit alcohol. Talk to your doctor about whether you can drink any alcohol.
- Eat plenty of fruits, vegetables, and low-fat dairy products. Eat less saturated and total fats.
- Learn how to check your blood pressure at home.

When should you call for help?

Call your doctor now or seek immediate medical care if:

- Your blood pressure is much higher than normal (such as 180/110 or higher).
- You think high blood pressure is causing symptoms such as:
 - Severe headache.
 - Blurry vision.

Watch closely for changes in your health, and be sure to contact your doctor if:

You do not get better as expected.

ADULT HYPERTENSION CLINICIAN GUIDELINE

Introduction This Clinician Guide was developed to assist primary care physicians and other health care professionals in the outpatient treatment of hypertension (HTN) in non-pregnant adults aged ≥ 18 years. The Guideline adopts the 2015 U.S. Preventive Services Task Force (USPSTF) recommendations for Screening for High Blood Pressure and the 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8), with minor modifications to the latter. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners.

Definitions

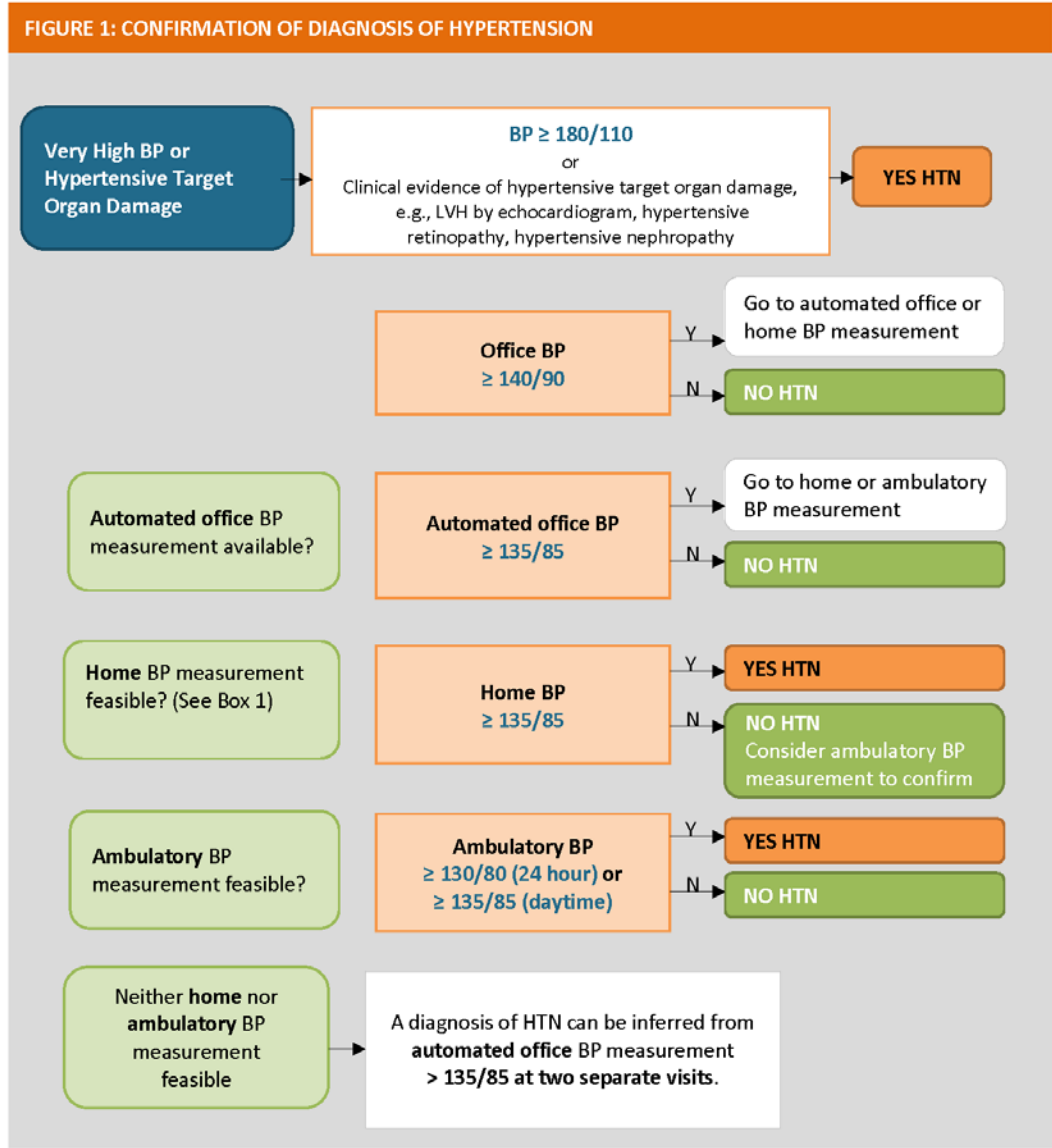
DEFINITION OF HYPERTENSION (JNC 7)		
The JNC 7 report defines blood pressure (BP) as:	Systolic Blood Pressure (SBP) mmHg	Diastolic Blood Pressure (DBP) mmHg
Normal	< 120	< 80
Pre-hypertension	120 – 139	80 – 89
Stage I hypertension	140 – 159	90 – 99
Stage II hypertension	≥ 160	≥ 100

- Key Points**
- ▶ Hypertension is an important and modifiable risk factor for atherosclerotic cardiovascular disease (ASCVD).
 - ▶ For all adults, encourage a heart-healthy lifestyle to reduce the risk of ASCVD. This includes regular physical activity, weight reduction and maintenance, smoking cessation, and controlling blood pressure, cholesterol, and diabetes.
 - ▶ For adults aged ≥ 60 without diabetes, treat to a goal systolic blood pressure (SBP) < 150 mmHg and goal diastolic blood pressure (DBP) < 90 mmHg.
 - ▶ For all adults aged < 60 and those aged ≥ 60 with diabetes, treat to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.
 - ▶ For all adults aged ≥ 60 with chronic kidney disease (CKD), consider treating to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.

Screening and Diagnosis of High Blood Pressure

- Screening**
- ▶ Screen all adults aged ≥ 18 for hypertension.
 - For adults aged 18-39 years with normal blood pressure (< 130/85 mm Hg) without other risk factors, screen every 3 to 5 years.
 - For adults aged ≥ 40 years and those at increased risk of high blood pressure, screen annually. Persons at increased risk include those who have high-normal blood pressure (130-139 / 85-89 mm Hg), who are overweight or obese, and African Americans.

- Diagnosis**
- Obtain measurements outside of the clinical setting for diagnostic confirmation before starting treatment.



Definitions

Office BP measurement: Taken in the clinic setting using an oscillometric or aneroid device but not including automated office BP measurement.

Automated office BP measurement: Taken in the clinic setting using a commercially available device that allows for measurements to be taken with patient unobserved.

Home BP measurement: Taken by the patient at home.

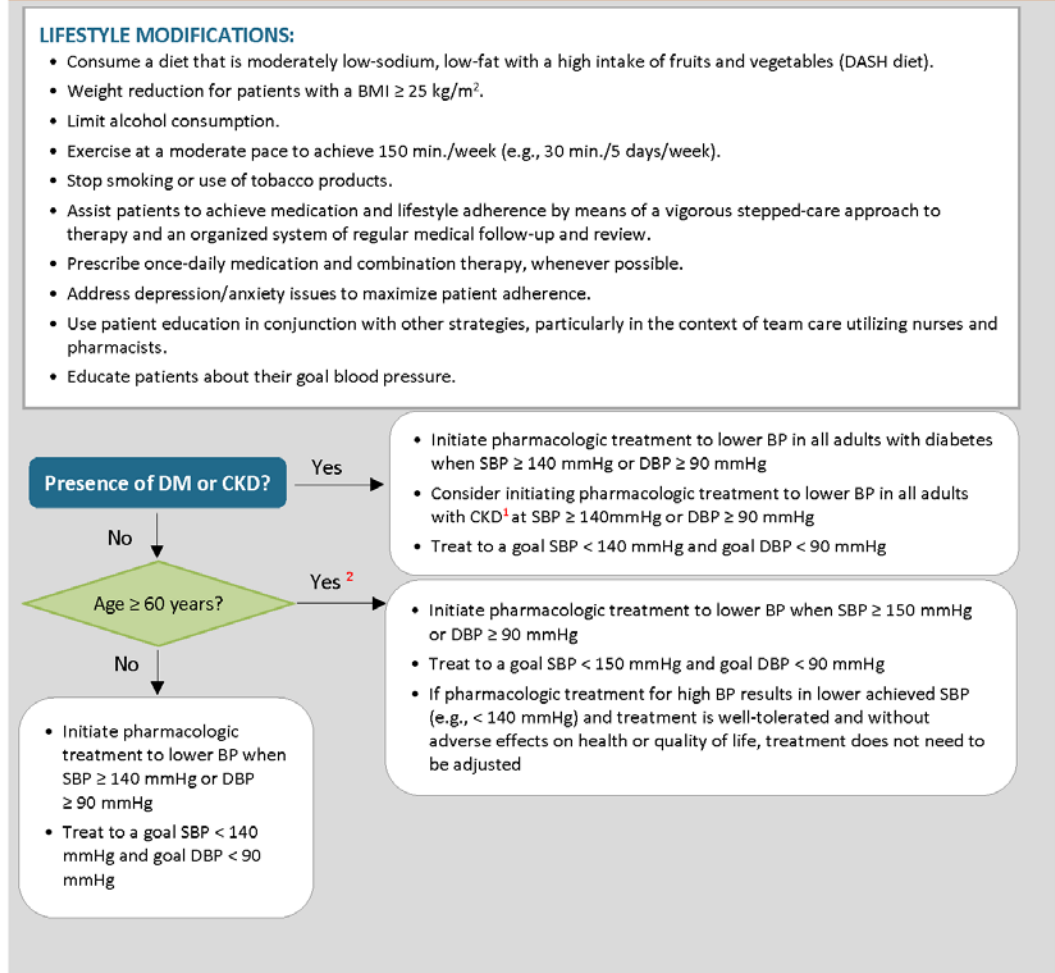
Ambulatory BP measurement: Taken at regular intervals by a device worn by the patient.

BOX 1: ACCEPTABLE HOME READING PROTOCOL

An acceptable protocol for home BP measurement is for the patient to measure two sets of readings each day: one set in the morning and one set in the evening. Each set consists of 2-3 readings, with the first reading taken after 5 minutes of rest, and additional readings at 1-minute intervals. Average the lowest readings from each day's AM and PM set to determine control or lack of control. Encourage patients to validate their home devices by comparing measurements to an office device annually.

Treatment Initiation and Blood Pressure Targets

FIGURE 2: TREATMENT INITIATION



General Population

- ▶ Aged ≥ 60 years without diabetes:
 - Initiate pharmacologic treatment to lower blood pressure (BP) at systolic blood pressure (SBP) ≥ 150 mmHg or diastolic blood pressure (DBP) ≥ 90 mmHg. Treat to a goal SBP < 150 mmHg and goal DBP < 90 mmHg.
 - Consider not adjusting treatment if pharmacologic treatment for high BP results in lower achieved SBP (e.g., < 140mmHg) and treatment is well tolerated and without adverse effects on health or quality of life.
- ▶ Aged < 60 years and aged ≥ 60 with diabetes:
 - Initiate pharmacologic treatment to lower BP when SBP ≥ 140 or DBP ≥ 90 mmHg. Treat to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.

Chronic Kidney Disease (CKD)

- ▶ Aged ≥ 60 years with chronic kidney disease (CKD):
 - Consider initiating pharmacologic treatment at SBP ≥ 140mmHg or DBP ≥ 90 mmHg and treat to goal SBP < 140mmHg and goal DBP < 90mmHg.

NOTE: When weighing the risks and benefits of a lower BP goal for people aged ≥ 70 years with estimated GFR < 60 mL/min/1.73 m², antihypertensive treatment should be individualized, taking into consideration factors such as frailty, comorbidities, albuminuria, and estimation of non-age-related eGFR decline (e.g., if eGFR + (age/2) is < 85).

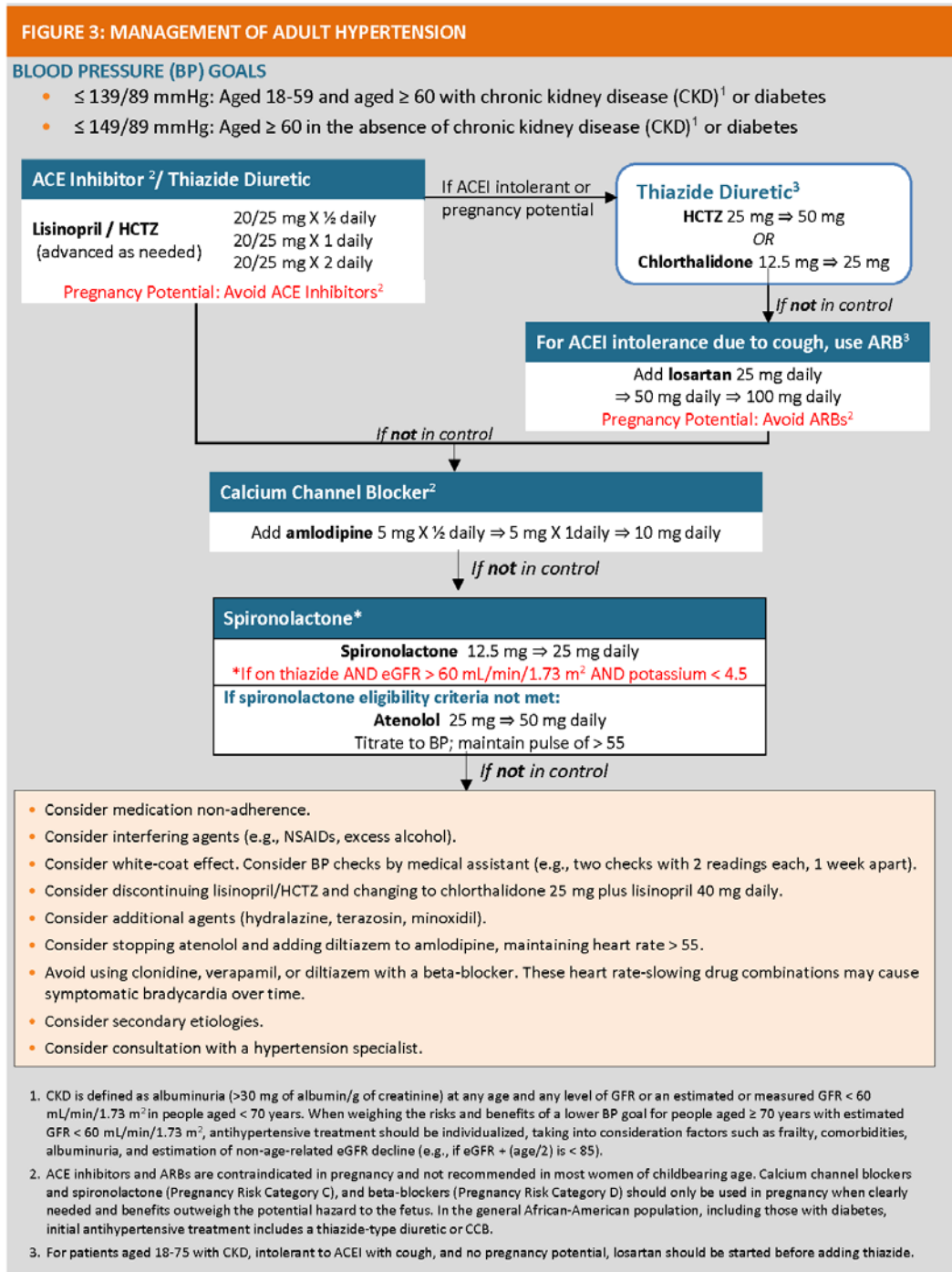
TABLE 1: eGFR CALCULATOR	
Men	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-0.203}$
Women	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-0.74}$
African-American	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-1.21}$

Risk of Postural Hypotension in the Elderly

- ▶ Because elderly patients are at higher risk of side effects of treatment, including postural hypotension, check standing blood pressures to guide treatment decisions.

Drug Treatment for Confirmed Diagnosis of Hypertension

- ▶ The main objective of hypertension treatment is to attain and maintain goal BP. If goal BP is not reached within a month of treatment, consider increasing the dose of the initial drug or adding a second drug from one of the thiazide-type diuretic, CCB, ACEI, or ARB classes in JNC 8 recommendation six. The clinician should consider continued assessment of BP and adjust the treatment regimen until goal BP is reached. If goal BP cannot be reached with two drugs, consider adding and titrating a third drug from the indicated classes. Consider avoiding combined use of an ACEI and an ARB. If goal BP cannot be reached using only the drugs in these classes because of contraindications or the need for more than three drugs to reach goal BP, antihypertensive drugs from other classes can be considered. Consider referral to a hypertension specialist for patients in whom goal BP cannot be attained using the above strategy or for the management of complicated patients for whom additional clinical consultation is needed.



Drug Treatment for Confirmed Diagnosis of Hypertension (continued)

- ▶ In the general population, including patients of any race/ethnicity and those with diabetes and/or CKD, consider initial single pill combination therapy with lisinopril-hydrochlorothiazide.
- ▶ For three drugs: If blood pressure is not controlled within a month of treatment on a thiazide-type diuretic plus ACEI, then consider using a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker.
- ▶ For four drugs: If blood pressure is not controlled within a month of treatment on a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker, then consider using a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker plus spironolactone (if on thiazide AND eGFR > 60mL/min/1.73 m² AND potassium < 4.5) or beta blocker.

Lifestyle Modifications

- ▶ Supplement treatment of uncomplicated hypertension with lifestyle modifications:
 - Moderately low-sodium, low-fat diet with a high intake of fruits and vegetables (e.g., DASH diet)
 - Sodium restriction (≤ 2.4 gm sodium daily)
 - Weight reduction for patients with BMI ≥ 25 kg/m²

TABLE 2: BMI CALCULATOR	
Metric (kg/m ²)	$BMI = \frac{Weight (kg)}{Height\ squared (m^2)}$
Imperial (lbs/in ²)	$BMI = \frac{Weight (lbs) \times 703}{Height\ squared (in^2)}$

- Limit daily alcohol consumption to ≤ 1 alcoholic drink (for women) or ≤ 2 alcoholic drinks (for men)
- Exercise at a moderate pace to achieve 150 min./week (i.e., 30 min./5 days/week)
- Stop smoking and use of tobacco products
- ▶ Encourage adherence to medications and lifestyle modifications:
 - Assist patients to achieve medication and lifestyle adherence by means of a vigorous stepped-care approach to therapy and an organized system of regular medical follow-up and review.
 - Prescribe once-daily medication and combination therapy whenever possible.
 - Address depression and anxiety issues to maximize patient adherence.
 - Use patient education in conjunction with other strategies, particularly in the context of team care utilizing nurses and pharmacists.
 - Educate patients about their goal blood pressure because patients who are knowledgeable about their goal BP are more likely to achieve it.

Special Considerations

Hypertension Treatment for Women of Childbearing Potential

- ▶ Half of all pregnancies are unplanned. Do not prescribe medications contraindicated in pregnancy, such as ACEIs/ARBs, to women of childbearing potential, unless there is a compelling indication.
- ▶ For women of childbearing potential taking medications contraindicated in pregnancy, such as ACEIs/ARBs:
 - Discuss potential risks to the fetus should they become pregnant.
 - Discuss practicing contraceptive measures with extremely low failure rates (sterilization, implant, or IUD).
 - Advise women using ACEIs/ARBs to stop these medications and contact their OB/GYN provider immediately if they become pregnant.
 - Advise women using ACEIs/ARBs for heart failure or cardiomyopathy who become pregnant to contact their obstetrician immediately.
 - Their obstetrician, in consultation with cardiology, will substitute a suitable alternative to avoid decompensation.

Lipid Therapy in Patients Taking Hypertension Medications

- ▶ Evaluate patients with hypertension for dyslipidemia and initiate or continue statin treatment according to their total cardiovascular risk profile.
 - Determine the need to initiate or continue lipid-lowering therapy based on ASCVD risk assessment using a risk calculator

Aspirin Therapy in Patients Taking Hypertension Medications

- ▶ Evaluate patients with hypertension for aspirin use and initiate or continue statin treatment according to their total cardiovascular risk profile and risk of adverse events

Recommendations for Patients with ACEI Intolerance Due to Cough

- ▶ HCTZ 25 mg, then 50 mg to achieve BP goal
- ▶ Add losartan 25 mg, then 50 mg, then 100 mg to achieve BP goal
- ▶ Add amlodipine 2.5 mg, then 5 mg, then 10 mg to achieve BP goal

TABLE 3. DOSAGE RANGE FOR SELECTED ANTIHYPERTENSIVE MEDICATIONS		
Selected Antihypertensive Medication		Usual Dosage Range
Thiazide-type Diuretics	Chlorthalidone (Hygroton)	12.5 – 25 mg daily
	Hydrochlorothiazide (HCTZ) (Esidrix)	25 – 50 mg daily
Thiazide-type Diuretic Single Pill Combinations	HCTZ/lisinopril (Prinzide)	10/12.5 mg - 20/25 mg BID
	Spironolactone/HCTZ (Aldactazide)	25/25 mg daily
ACE Inhibitors (ACEI)	Lisinopril (Zestril, Prinivil)	10 – 40 mg daily
	Benazepril (Lotensin)	5 – 40 mg daily
Long-Acting Dihydropyridine Calcium Channel Blockers (CCB)	Amlodipine (Norvasc)	2.5 – 10 mg daily
	Felodipine ER (Plendil)	2.5 – 20 mg daily
Angiotensin II Receptor Blockers (ARB)	Losartan (Cozaar)	25 – 100 mg daily
Aldosterone Receptor Blocker	Spironolactone (Aldactone)	12.5 – 25 mg daily
Beta-Blockers (BB)	Atenolol (Tenormin)	25 – 100 mg total, daily or BID
	Bisoprolol (Zebeta)	5 – 10 mg daily
	Carvedilol (Coreg)	3.125 – 37.5 mg BID
	Metoprolol (Lopressor)	25 – 100 mg BID

TERMINOLOGY		
Recommendation Language	Strength*	Action
Start, initiate, prescribe, treat, etc.	Strong affirmative	Provide the intervention. Most individuals should receive the intervention; only a small proportion will not want the intervention.
Consider starting, etc.	Weak affirmative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will want the intervention, but many will not. Different choices will be appropriate for different patients.
Consider stopping, etc.	Weak negative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will not want the intervention, but many will. Different choices will be appropriate for different patients.
Stop, do not start, etc.	Strong negative	Do not provide the intervention. Most individuals should not receive the intervention; only a small proportion will want the intervention.

*Refers to the extent to which one can be confident that the desirable effects of an intervention outweigh its undesirable effects.