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Assessment of Blood Pressure Control in Patients Diagnosed with Hypertension in a Primary Care Setting

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Abstract

Purpose: To evaluate provider adherence to the current hypertension management guideline, JNC 8, by assessing blood pressure control in individuals diagnosed with hypertension in an internal medicine clinic.

Methods: A retrospective chart review was conducted to assess the percentage of patients diagnosed with essential hypertension meeting the blood pressure goals set forth in JNC 8. In the absence of blood pressure control, provider intervention was assessed. Data collected included blood pressure, use of home blood pressure log, documentation of blood pressure medication compliance, and provider interventions in the absence of blood pressure control across three office visits. In addition, current blood pressure control in the clinic was compared to blood pressure control from Guiliani's (2014) quality improvement (QI) project.

Results: This QI project demonstrated that 44% of patients across all three visits had blood pressure control, with greater control in patients who were age 60-89 as compared to those patients who were age 18-59. In the absence of blood pressure control, providers failed to document any type of intervention in 34.3-54.3% of patients. When compared to the Guiliani's (2014) QI project, blood pressure control across all visits has appeared to increase, from 24% in 2013 to 44% in the current project.

Conclusion: The current project demonstrated an improvement in blood pressure control as compared to Guiliani's (2014) project, but providers failed to document changes in hypertension management plans for patients in the absence of blood pressure control up to 50% of the time. This is indicative of the continued presence of clinical inertia. Ensuring providers understand the importance of documenting interventions in the absence of control is essential in the management of hypertension as well as reducing the morbidity and mortality associated with uncontrolled blood pressure.

Assessment of Blood Pressure in Patients Diagnosed With Hypertension in a Primary Care Setting

Background

Hypertension is defined as a systolic blood pressure greater than or equal to 140mmHg or diastolic blood pressure greater than or equal to 90mmHg (James et al., 2014). Currently, it affects 1 in 4 Americans adults and may affect more than 90% of adults during their lifetimes (Wang & Vasan, 2009). In the United States in 2009, the direct and indirect cost of hypertension to Americans was $51 billion and these costs only continue to increase (American Heart Association, 2013). Hypertension is a preventable risk factor for cardiovascular events and adequate treatment of hypertension reduces the risk of stroke, coronary heart disease, congestive heart failure and mortality (Wang & Vasan, 2009).

Despite being a common preventable risk factor for heart disease and stroke, hypertension remains a significant issue. Recent studies have shown that as many as two thirds of those adults with hypertension are either untreated or undertreated, resulting in uncontrolled hypertension (Wang & Vasan, 2009). Nearly 90% of adult Americans with uncontrolled hypertension have a usual source of healthcare as well as health insurance (CDC, 2012), highlighting many missed opportunities for improvement of blood pressure control by providers working in primary health care settings. Adequate control of blood pressure is of great importance to public health and the burden of uncontrolled hypertension is too great to be ignored. Therefore, Healthy People 2020 has set a goal to reduce the proportion of adults with hypertension from 29.9% to 26.9%, which is equal to a 10% improvement (USDHHS, 2013). Even further, they have set a goal to increase the proportion of adults with hypertension whose blood pressure is under control from 43.7% to 61.2% (USDHHS, 2013). Primary care providers are in a key position to meet the goals set by

Healthy People 2020 by working with patients and within the health care system to create plans to decrease the rates of uncontrolled hypertension.

Healthcare providers are held to quality of care standards to help ensure patients are receiving the appropriate care for management of their health issues based on the most recent clinical practice guidelines. The Physician Quality Reporting System (PQRS) is a quality-reporting program that encourages providers and group practices to report information on Medicare patients (Centers for Medicare and Medicaid Services [CMS], 2015). PQRS allows providers and participating group practices the opportunity to assess the quality of care they provide to their patients. This helps to ensure patients receive the right care at the right time. By reporting on PQRS measures to the CMS, participating providers can also quantify how often they are meeting a particular quality metric. Beginning in 2015, the CMS program implemented a negative payment adjustment to individual providers and group practices that did not satisfactorily report data on quality measures (CMS, 2015). Hypertension, or high blood pressure measurement, is included as a required PQRS reportable quality measure, further highlighting the importance of blood pressure control.

In an attempt to offer providers the most current evidence based practice recommendations, clinical practice guidelines are assembled by clinical experts. The most current guideline available for the management of hypertension in adults is JNC 8, created by the Joint National Committee's eighth meeting. JNC 8 addresses thresholds and goals for pharmacologic treatment of hypertension, also suggesting a treatment algorithm for optimal blood pressure control (James et al., 2014). The guideline defines goal blood pressure for patients with hypertension as less than 140/90mmHg for 18-59 years of age, as well as those with diabetes or chronic kidney disease (CKD) and less than 150/90mmHg for those age 60 and older (table 1).

The guideline also makes suggestions for antihypertensive treatment based on ethnic groups, comorbid conditions, and current blood pressure. Major outcomes such as overall mortality and cardiovascular disease related mortality are also considered. Providers treating patients with hypertension should be familiar with this guideline as well as its predecessor, JNC 7. The two guidelines should be utilized together to effectively manage hypertension in the primary care setting.

Although clinical guidelines such as JNC 7 and JNC 8 have led to an increase in blood pressure control in adults with hypertension, the rates of controlled hypertension remain below the Healthy People 2020 goal of 61.2 percent. One reason is due to the presence of clinical inertia. Clinical inertia is the resistance of providers to increase or intensify therapy in order to achieve disease control (Bosworth et al., 2009). It was identified in the literature as a major barrier to obtaining blood pressure control (Bosworth et al., 2009; Holland et al., 2008; Huebschmann et al., 2012; Khatib et al., 2014; Sarafidis & Bakris, 2008). Wexler et al. (2009) found 50% of providers failed to intensify treatment in the absence of blood pressure control. Similarly, around 40% of patients remained on the same blood pressure medication regimen despite having documented uncontrolled blood pressure at an office visit (Sarafidis & Barkis, 2008). Many providers identified lack of awareness of the guideline's recommendations as a reason for poor adherence (Choma et al., 2009; Khatib et al., 2014), but when patients had uncontrolled hypertension at an office visit, even those providers who were aware of the guidelines failed to document a hypertension management plan or intensify the medication regimen (Holland et al., 2008). Additionally, providers identified a barrier of belief of inaccurate blood pressure readings, and cited this as a reason for delays when increasing medication (Holland et al., 2008). Providers also

identified patient non-compliance as a barrier to uncontrolled hypertension (Holland et al., 2008; Huebschmann et al., 2012; Khatib et al., 2014).

In 2013, Guiliani (2014) conducted a QI project that assessed blood pressure control among patients in an internal medicine clinic. When looking at three separate visits, the Guiliani (2014) found that blood pressure control at all three visits was only present in 24% of patients, while 20% of patients never had blood pressure control. Additionally, when patients had uncontrolled blood pressure, providers did not document an intervention in 18.2-28% of patients (Guiliani, 2014). Less than 66% of providers documented medication compliance and less than 50% documented use of a home blood pressure log (Guiliani, 2014). These findings could suggest clinical inertia, especially when blood pressures are elevated in continued visits.

Purpose

Given the importance of blood pressure control and the absence in clinical practice, a QI project was completed. The purpose of this QI project was to evaluate provider adherence to JNC 8 by assessing blood pressure control in patients diagnosed with hypertension as well as assessing provider interventions in the absence of blood pressure control. This project assessed the proportion of patients with hypertension whose blood pressure is at goal in order to assist providers in reaching the Healthy People 2020 goal of blood pressure control in 61.2% of adults with hypertension. A second aim was to compare the 2016 findings regarding blood pressure control to the findings of the 2013 QI project. Both projects were conducted in the same internal medicine practice.

A retrospective medical record review was completed to assess documentation of blood pressure control in patients diagnosed with hypertension. The JNC 8 guideline states blood

pressure control for individuals age 18-59 and those with diabetes or CKD, is less than140/90 mmHg and for those individuals age 60-89 is less than 150/90 mmHg (table 1). In addition to assessing blood pressure control, the study assessed provider interventions in the absence of blood pressure control.

Methods

Study Permission

Permission to conduct the study was granted from the University of Kentucky (UK) Institutional Review Board (IRB). Patient consent was waived in accordance with IRB regulations since the nature of data collection was a retrospective medical record review, where patient identifiers were not collected.

Design

A retrospective medical review was completed in February 2016 to assess documentation of blood pressure control in those patients diagnosed with hypertension. In the absence of blood pressure control, provider interventions aimed at achieving blood pressure control were assessed. Medical records were chosen using systematic sampling.

Study Population

This QI project was completed in an internal medicine clinic within a university setting. A systematic sampling of 100 medical records of patients with a diagnosis of essential hypertension (50 medical records of patients between the ages of 18-59 and 50 medical records of patients between the ages of 60-89) from January 2015 through December 2015 was conducted. The

inclusion criteria was: 1) men and women with a diagnosis of essential hypertension. The exclusion criteria was: 1) men and women less than 18 years of age, or greater than 89 years of age.

Data Extraction Procedures

The Center for Clinical and Translational Science (CCTS) at UK compiled a list of medical record numbers of patients that were seen between January 2015 and December 2015 in the internal medicine clinic with a diagnosis of hypertension using ICD-9 codes: 401, 401.1, 401.9 and ICD-10 code: I10. Systematic sampling was utilized, starting with the third medical record and included every third medical record that met inclusion criteria until the investigator reached 50 adults age 18 to 60 and 50 adults age 60 to 89.

Blood pressure readings for each patient over three office visits were assessed for documentation of blood pressure control, defined as a blood pressure of less than 140/90 mmHg for patients age 18-59 and those with diabetes or CKD and less than 150/90 mmHg for patients age 60-89. In the absence of blood pressure control, documentation of provider interventions aimed at achieving blood pressure control were assessed. The project specifically assessed for documentation of medication additions or changes, lifestyle modification discussion, or need for follow up blood pressure check. Demographic data were collected including age, gender, race, and presence of diabetes or CKD. Documentation of the use of a home blood pressure log and documented medication compliance per patient report was assessed at each visit. All medical records were accessed in the chairperson's secure clinic office on a computer that was encrypted as well as password protected. Data collected during the medical record review were stored using REDCap, a secure web-based program created to support data capture and storage for research

studies, where data is securely kept on Biomedical Informatics servers in the secure data center run by the Institute for Pharmaceutical Outcomes and Policy.

Data Analysis

Results from the retrospective medical record review were analyzed using Statistical Analysis System (SAS) software, as well as Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics including frequencies were used to assess age, gender, presence of blood pressure control at each visit, documented interventions in the absence of blood pressure control, documentations of the use of home blood pressure log and control in the home blood pressure log, as well as documented medication compliance.

Results

One hundred medical records were reviewed, 41 were male and 59 were female. Fifty medical records were obtained for patients who were age 18-59 and fifty medical records were from patients who were age 60-89. Of the 100 patient records reviewed, 71 were Caucasian, 26 were African American, and 3 were considered other. Only 2 patients had CKD, while 25 patients had diabetes, and 4 patients had both CKD and diabetes.

Visit One

At visit one, 65% of patients were considered to have blood pressure control as defined by JNC 8 (table 1). When stratified into age groups, 54% of patients age 18-59 and 76% of patients age 60-89 were considered to have blood pressure control. Patients with diabetes or CKD demonstrated a 61.3% rate of blood pressure control. Sixteen percent of patients documented the

use of a home blood pressure log. Of those patients with a home blood pressure log, 68.8% had documented blood pressure control on the home log. Of the patients who had a home blood pressure log, 56.3% demonstrated blood pressure control at the office visit, while 43.8% did not demonstrate blood pressure control. Hypertension medication compliance was documented in the note of 27% of patients, with 81.5% stating compliance and 18.5% stating non-compliance.

In the absence of blood pressure control, there was a medication change in 27.3% of patients, a medication addition in 39.4% of patients, a lifestyle modification discussion in 33.3% of patients and a return visit for blood pressure scheduled in 42.4% of patients. At visit one, in the 35% of patients who lacked blood pressure control, 65.7% of those patients received an intervention.

Visit Two

During visit two, blood pressure control was present in 61% of patients. When stratified by age groups, 48% of those age18-59 had blood pressure control and 74% of patients age 60-89 had blood pressure control. Patients with diabetes or CKD demonstrated a 64.5% rate of blood pressure control. Only 15% of patients were documented to have used a home blood pressure log, and of those using a home log, 66.7% demonstrated control. Of the patients who had a home blood pressure log, 33.3% demonstrated blood pressure control at the office visit, while 66.7% did not demonstrate blood pressure control. Hypertension medication compliance was assessed and documented in the note by the provider in 33% of patients, with 72.7% of patients stating they were compliant with medication therapy and 27.3% of patients stating that they were non-compliant with medication therapy.

In the absence of blood pressure control at visit two; providers documented a medication change in 28.6% of patients, a medication addition in 35.7% of patients, having a lifestyle modification discussion in 32.1% of patients, and recommended a return visit for blood pressure in 42.9% of patients. At visit two, in the 39% of patients who demonstrated an absence of blood pressure control, 46.1% of those patients received an intervention.

Visit Three

At visit three, 65% of patients demonstrated blood pressure control, which was the same as visit one. By age group, 60% of patients who were age18-59 had blood pressure control and 70% of patients who were age 60-89 had blood pressure control. At visit three, of those who had diabetes or CKD, 67.7% had blood pressure control. At visit three, 20% of patients were using a home blood pressure log, and of those using a home log, 75% demonstrated control in the home log. Of the patients who had a home blood pressure log, 55% demonstrated blood pressure control at the office visit, while 45% did not demonstrate blood pressure control at the office. Hypertension medication compliance was assessed and documented by the provider in the note in 29% of patients, with 82.8% of those patients stating they were compliant with medication therapy and 17.2% of those patients stating that they were non-compliant with medication therapy.

In the absence of blood pressure control at visit three; providers documented a medication change in 42.9% of patients, a medication addition in 42.9% of patients, having a lifestyle modification discussion in 28.6% of patients, and recommended a return visit for blood pressure in 38.1% of patients. At visit three, in the 35% of patients who demonstrated an absence of blood pressure control, 54.3% of those patients received an intervention.

Overall Blood Pressure Control

Across all three visits, 44% of patients had blood pressure control, while 17% of patients did not demonstrate blood pressure control at any visit. Of the patients who demonstrated blood pressure control at all three visits, 40.9% were age 18-59 and 59.1% were age 60-89. Of the 17% of patients who lacked blood pressure control across all three visits, 70.6% of the patients were age 18-59 and 29.4% of the patients were 60-89 (figure 2). Taking all visits into account, for those patients who used a home blood pressure log, 19% had blood pressure control at the corresponding office visit. Additionally, taking all the visits into account, for those patients who stated they were compliant with hypertension medication therapy, only 33% demonstrated blood pressure control at the office visit.

Across all visits, medication addition and suggesting a return visit for blood pressure check were the most common interventions (24% of the time). A medication change was administered 18% of the time and a lifestyle modification discussion was administered 15% of the time. Of the patients that did not have blood pressure control, 34.3% did not receive any type of intervention at visit one, 53.9% did not receive any type of intervention at visit two, and 45.7% did not receive any type of intervention at visit three.

Blood Pressure Control and Medication Compliance

In patients who reported medication compliance to the provider, blood pressure control occurred in 72.7% of patients at visit one, 62.5% of patients at visit two, and 58.3% of patients at visit three. Documented medication compliance without blood pressure control occurred in 27.3% of patients at visit one, 37.5% of patients at visit two, and 41.7% at visit three. When providers documented patient medication non-compliance, absence of blood pressure control in the office

was present in 80% of patients at visit one, 88.9% of patients at visit two, and 100% of patients at visit three (table 3).

Blood Pressure Control and Use of Home Blood Pressure Log

When the use of a home blood pressure log was documented, 56.3% of patients at visit one, 33.3% of patients are visit two, and 55% of patients at visit demonstrated blood pressure control at the office visit. Blood pressure control in the home blood pressure log as well as blood pressure control at the office visit occurred in 81.8% of patients at visit one, 50% of patients at visit two, and 60% of patients at visit three. At the first and second visit, 100% of patients who lacked blood pressure control in the home blood pressure log also lacked blood pressure control at the office visit. At the third visit, 60% of patients lacked blood pressure control in the home log as well as in the office visit (table 2).

Discussion

Blood pressure control is a major risk factor for heart disease and stroke, both of which are leading causes of death in the United States (AHA, 2013). While many patients who have been diagnosed with hypertension are aware of their condition and are being treated, many still have blood pressure that is uncontrolled. Ninety percent of patients with uncontrolled blood pressure have a usual source of healthcare and health insurance (CDC, 2012). In primary care, there are several opportunities for those patients with hypertension to gain control, yet many of those opportunities are missed. Therefore, all primary care providers should treat uncontrolled blood pressure at each office visit to help decrease the disease-associated morbidity and mortality.

The results from this QI project demonstrated that blood pressure control was present in 44% of patients at all three visits. The presence of blood pressure control at all visits (44%) is substantially lower than the Healthy People 2020 goal of blood pressure control in 61.2% of adults (USDSHHS, 2012). Across all three visits, adults age 60-89 consistently had higher rates of blood pressure control when compared with the 18-59 age group.

In the absence of blood pressure control at the office visit, providers failed to intervene 34.3-53.9% of the time. Also, providers failed to document medication compliance in the note in 67-73% of patients across all visits. If medication therapy is the mainstay of treatment for hypertension, providers should be assessing for medication compliance at each visit. It is unknown if the lack of interventions initiated in the presence of uncontrolled blood pressure is due to clinical inertia, or is simply due to lack of documentation. It is plausible that providers actually did implement certain interventions but failed to document the interventions in the patient chart. Unfortunately, these actions lead investigators to assume that the interventions were simply not implemented.

Hypertension medication compliance was associated with blood pressure control. Across all three visits, 58.3-72.7% of those who reported blood pressure medication compliance demonstrated blood pressure control at the office visit. Hypertension medication non-compliance correlated with a lack of blood pressure control at all three visits. This is consistent with the literature review (Holland et al, 2008; Huebschmann et al., 2012; Khatib et al., 2014; Wexler et al., 2009) finding that providers felt that a reason for uncontrolled blood pressure was related to patient non-compliance. As with the treatment of other chronic illnesses in which long-term or lifetime treatment is required, adherence to prescribed medication for the treatment of hypertension can be problematic (Chobanian, 2009). Studies have shown that around 50% of

patients self-discontinue antihypertensive medications without provider instruction within 6-12 months of their initiation (Chobanian, 2009).

Over all of the visits, 18.2-50% of the patients that showed blood pressure control according to the home blood pressure log lacked blood pressure control at the office visit. This could be indicative of white coat syndrome. This demonstrates that patients keeping a blood pressure log at home can help to justify lack of intervention at the office visit when there is an absence of blood pressure control. In support of this, 100% of the patients who lacked blood pressure control in the home blood pressure log in both visits one and two also lacked blood pressure at the office visit.

While the presence of blood pressure control at all visits (44%) is substantially lower than the Healthy People 2020 goal of blood pressure control in 61.2% of adults, it is an improvement from Guiliani's (2014) QI project, which found that only 24% of patients had blood pressure control at all three visits (figure 4). Additionally, Guiliani (2014) found that 20% of people lacked blood pressure control at any visit, while the current project found that number had decreased to 17 percent. At each visit, blood pressure control was present in 61-65% of the time in the current project, compared with 48-56% of the time in Guiliani's (2014) project. The presence of blood pressure control in patients diagnosed with hypertension at office visits appears to have slightly increased in the internal medicine clinic where both projects were performed.

Both projects recorded the same four interventions in the absence of blood pressure control in the office visit. In Guiliani's (2014) project, the most common intervention was recommending a return visit for blood pressure check. Providers choosing a follow up visit instead of medication addition or change could suggest the presence of clinical inertia. In the current project, two interventions, medication addition and suggesting a return visit for blood

pressure check, were the most common in the lack of blood pressure control. These findings support the continued presence of clinical inertia in this clinic due to the fact that there was no documented intervention 34.3-53.9% of the time where blood pressure was not at goal.

There may be many reasons why changes in the rates of blood pressure control in this clinic have occurred. Guiliani's (2014) project was completed in 2013 and the guideline recommended for the management of hypertension was JNC 7. The new guideline for blood pressure management, JNC 8, was released in December 2013 and contained two key departures from JNC 7. The new guideline was said to simplify care, introducing new recommendations for patient subgroups and blood pressure goals. Additionally, in the summer of 2015, the internal medicine providers received an educational presentation focused on JNC 8 and its implications for practice. This had the potential to make the providers more aware of the recommended blood pressure thresholds and treatment algorithms set forth by the new guideline.

Limitations

One limitation of this study is the small sample size. This prevents the results from this study from being able to be generalized to all internal medicine clinics. Another limitation was that the documentation of home blood pressure log and medication compliance was solely based on patient report to the provider. In this internal medicine clinic, a medical assistant is responsible for medication reconciliation in the ambulatory electronic health record (AEHR). Therefore, the provider may not have documented medication compliance in the note. Additionally, patients could have stated that they were 100% compliant with blood pressure medications, but in reality they were not. Also, providers might have implemented interventions in the absence of blood pressure control, but simply failed to document.

Implications for Practice

Interventions to increase blood pressure control rates in patients diagnosed with hypertension should focus on decreasing clinical inertia. Provider education about the newest treatment guidelines and standards of care can help in reducing clinical inertia. Education efforts should also focus on the importance of implementing interventions in the absence of blood pressure control, adequate documentation in the patient's electronic health record, and patient education regarding the hypertension management plan.

The results of both projects indicate that providers should be more aggressive in treating younger patients with hypertension. Both projects showed that blood pressure control was consistently greater for patients age 60 and older, but was lacking in the younger adult patients. Providing easily accessible treatment algorithms and guidelines at the point of care (POC) has been shown to help decrease clinical inertia (Choma et al., 2009; Glynn et al., 2010; Holland et al., 2008; Khatib et al., 2014; Wexler et al., 2009). Significant relationships between clinical decision support systems embedded in electronic health records and blood pressure control have also been found (Samal et al., 2011). Alerts placed in the AEHR system when a patient demonstrates uncontrolled blood pressure at the office visit could be helpful in decreasing clinical inertia. This would make the provider aware of the uncontrolled blood pressure while in the room with the patient, easily allowing for interventions to be implemented and changes to the hypertension management plan to be made during the visit.

Providers should be educated on the importance of lifestyle modifications in addition to medication therapy in the management of hypertension. Lifestyle modification discussion only occurred in 15% of the cases when an intervention was implemented in the absence of blood pressure control. Lifestyle modifications alone can decrease systolic blood pressure by 2-20

mmHg (Sacks & Campos, 2010) and just a 3-mmHg reduction in systolic blood pressure can lead to an 8% reduction in stroke mortality and a 5% reduction in mortality from coronary heart disease (Appel, 2003).

Patients and providers should work together to develop a working comprehensive hypertension management plan and the plan should be documented in the patient medical record (Choma et al., 2009; Holland et al., 2008). The management plan should include medication compliance, lifestyle modifications, specific blood pressure goals, the use of home blood pressure logs, and interventions implemented in the absence of blood pressure control. Management strategies should be tailored specifically to the patient, taking into consideration their age, race and co-morbidities, as well as their socioeconomic status. Management plans should be documented at every visit, making the patient aware of their blood pressure reading, ensuring the patient knows their specific blood pressure goal and what they should be doing to manage their hypertension including medication compliance and using a home blood pressure log.

To overcome non-compliance to medication therapy and lifestyle modifications, it is important to ensure the patient is aware of the nature and severity of hypertension, as well as the health consequences of non-compliance. Regular follow up visits should be scheduled. This allows the provider opportunities to monitor the patient's progress and alter medication regimen if needed. It also allows patients more time to ask questions and providers more time to educate (Huebschmann et al., 2012; Kalb et al., 2002).

While blood pressure control is of utmost importance in reducing morbidity and mortality from heart disease, it is also an important quality of care measure being tracked by the Centers for Medicare and Medicaid Services (CMS) and impacts provider reimbursement. In 2015, the CMS implemented a negative payment adjustment to providers that did not satisfactorily report

data on quality measures and finalized its proposal to base 2017 Physician Quality Reporting System (PQRS) penalties off of 2015 reporting. The mandatory care measure, PQRS #236: Controlling High Blood Pressure, is a measure of patients age 18 through 85 years of age who had a diagnosis of hypertension and whose blood pressure was adequately controlled (<140/90 mmHg) and is required to be reported to CMS once every twelve months. In addition to being penalized financially for not reporting this quality measure, in 2015 the CMS began to publicly report the performance data for individual physicians/physician groups, making quality of care measures available to the general population, potentially influencing the choice of which provider to seek for care (CMS, 2015). In addition to Medicare and Medicaid reimbursement, some private insurers have begun to tie reimbursement levels of providers to their ability to achieve quality related goals, such as blood pressure control (Chobanian, 2009). The threat of income loss may be a motivator for clinicians to reduce clinical inertia and more effectively treat uncontrolled blood pressure in their patients.

Conclusion

Cardiovascular disease is among the most widespread and costly problems facing the United Stated today. The leading modifiable risk factor for cardiovascular disease is hypertension. Primary care providers are in a key position to impact blood pressure control, and therefore greatly impact patient outcomes by preventing the morbidity and mortality associated with uncontrolled hypertension.

Suggestions for improving blood pressure control in patients with hypertension include: creating alerts in AEHR, making current algorithms easily accessible, utilization of patient education materials which are available in AEHR, scheduling routine provider educational

programs to discuss current guidelines and management of patients with hypertension, and scheduling routine follow up visits for blood pressure monitoring. Blood pressure control in patients diagnosed with hypertension has improved in the internal medicine clinic where both projects were done, but control rates are not consistently at the Healthy People 2020 goal. By implementing interventions in the absence of blood pressure control, providers can help to decrease clinical inertia and gain blood pressure control in those diagnosed with hypertension.

Figure 1

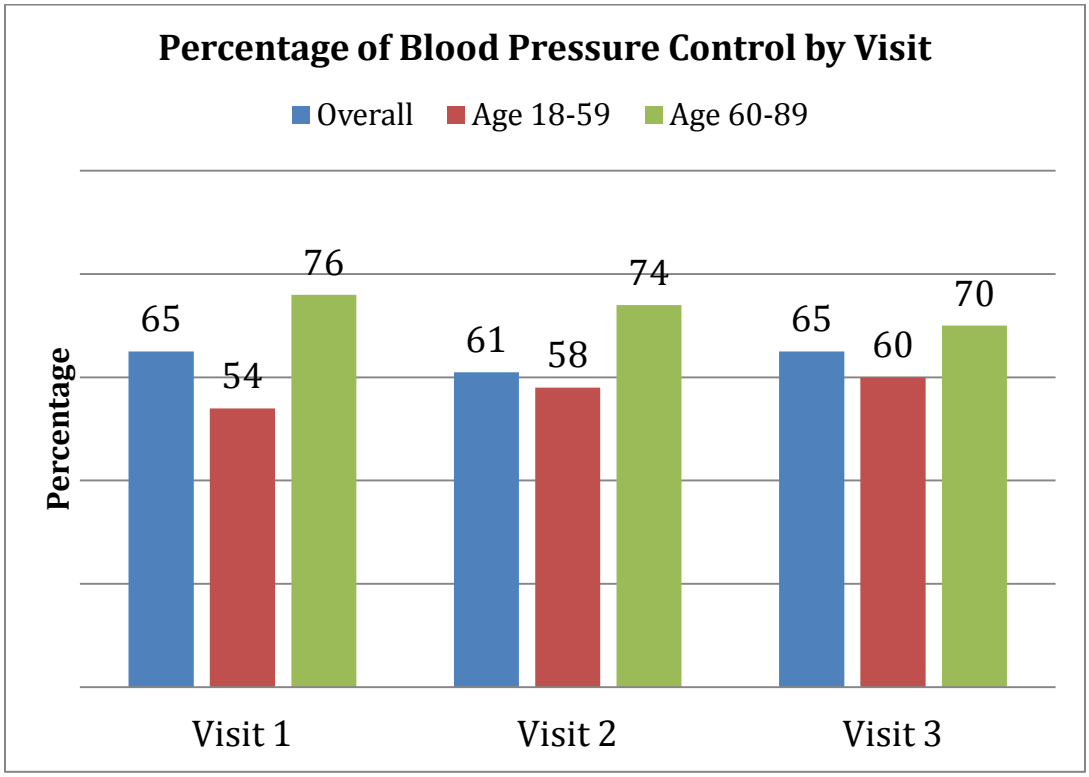

Figure 2

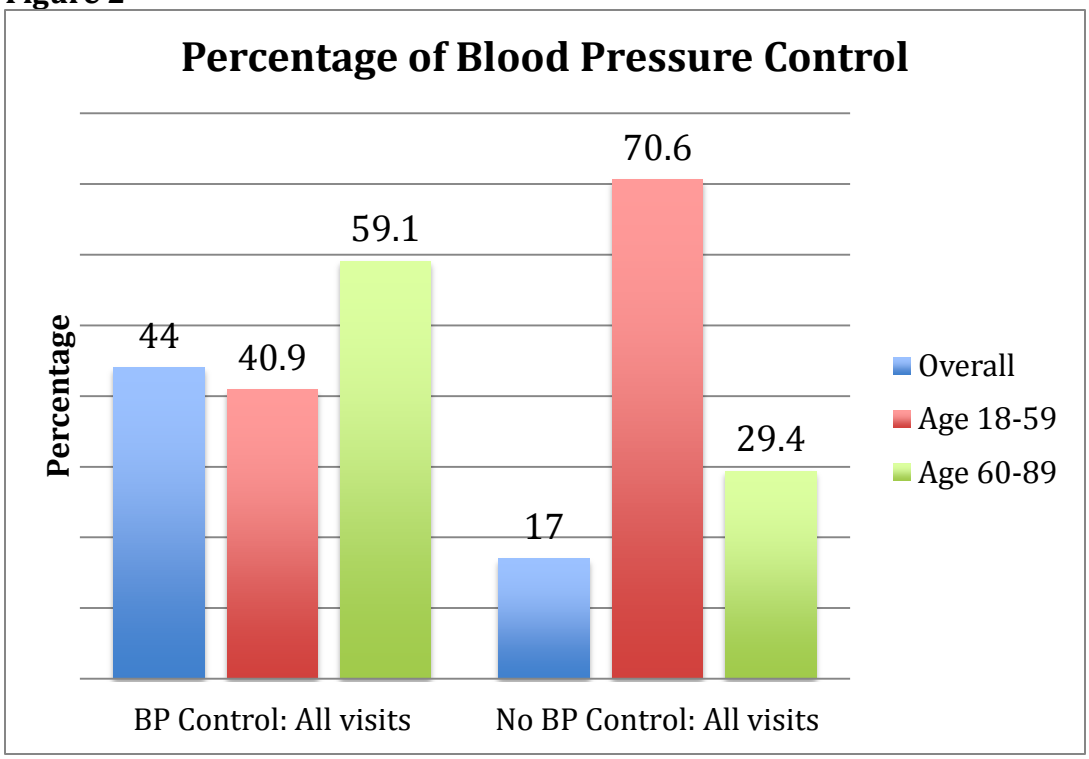

Figure 3

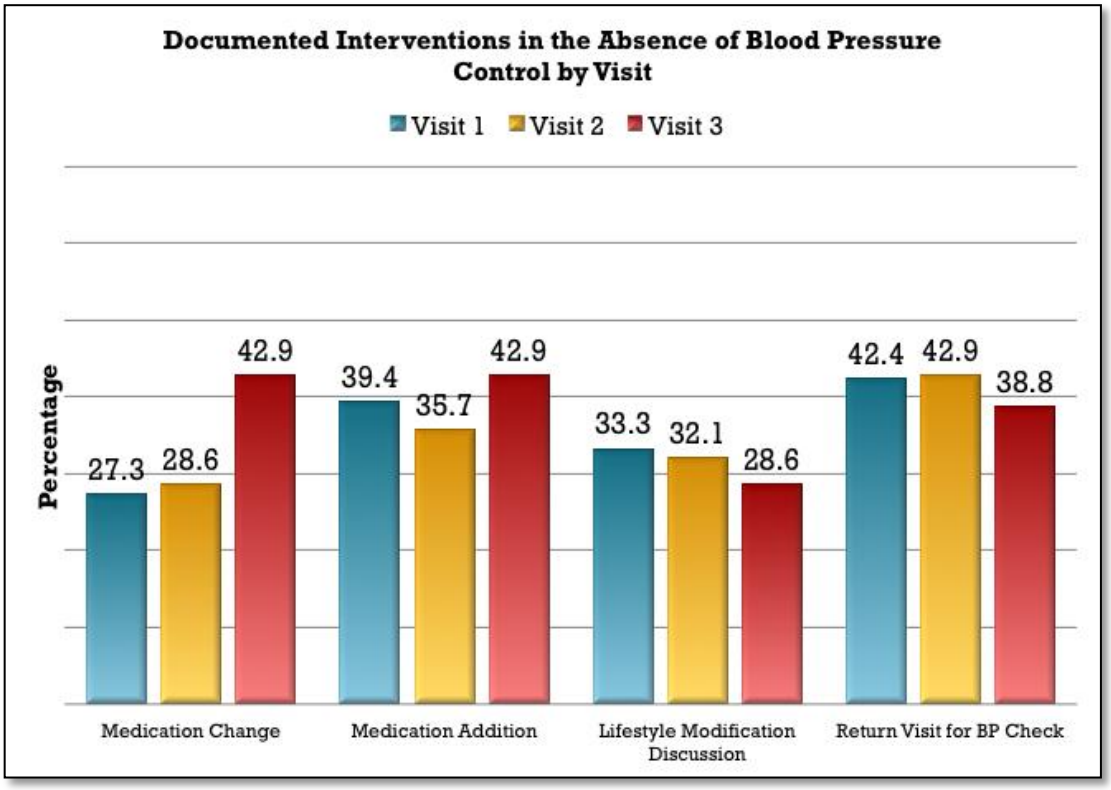

Figure 4

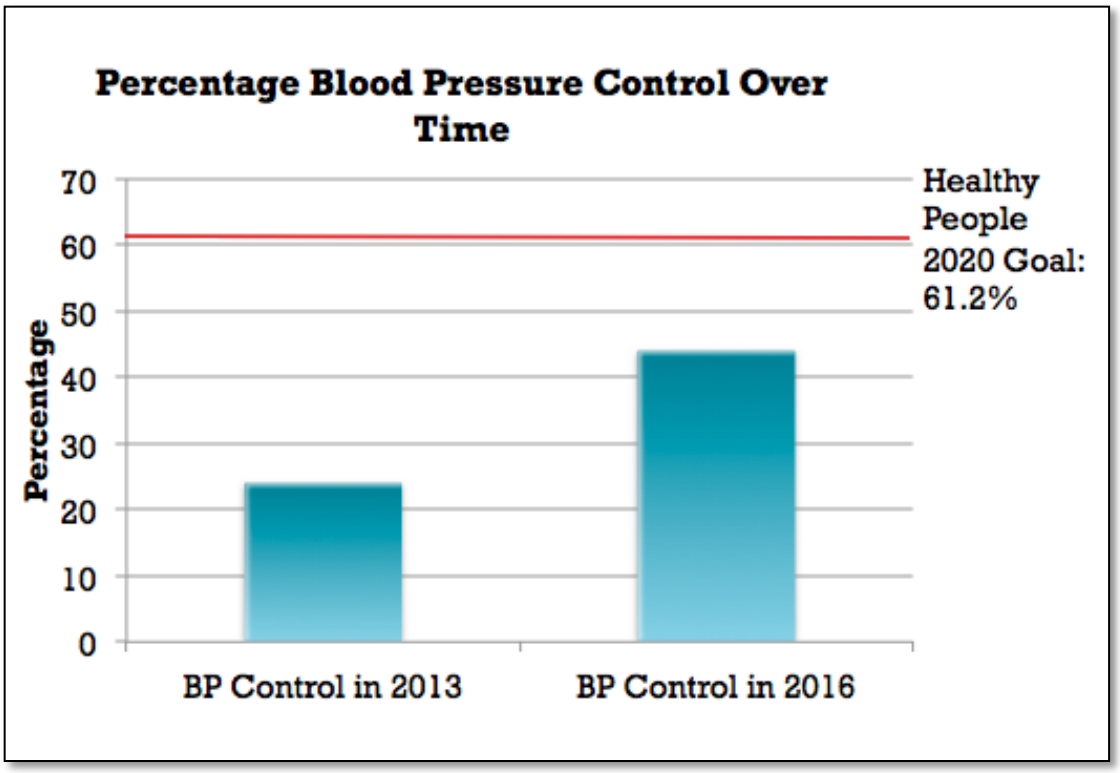

Table 1: JNC 8 Recommendations for Blood Pressure Goals

Category	Blood Pressure Goal
Age < 60 years	<140/90 mmHg
Age > 60 Years	<150/90 mmHg
Presence of Diabetes or Chronic Kidney Disease (regardless of age)	<140/90 mmHg

Table 2: Documented Use of Home Blood Pressure Log and Blood Pressure Control

	Visit 1	Visit 2	Visit 3
Home BP log use	16%	15%	20%
Home BP control	68.8%	66.7%	75%
BP control in the office	65%	61%	65%
BP control in home log and office	81.8%	50%	60%
BP control in home log, absent in office	18.2%	50%	40%
Absence of BP control in home log and in office	100%	100%	60%

Table 3: Documentation of Medication Compliance and Blood Pressure Control

	Visit 1	Visit 2	Visit 3
Medication documentation	27%	33%	29%
Patient reported medication compliance	81.5%	72.7%	82.8%
Patient reported medication non-compliance	18.5%	27.3%	17.2%
Medication compliance & BP control in office	72.7%	62.5%	58.3%
Medication compliance & absence of BP control in office	27.3%	37.5%	41.7%
Medication non-compliance and absence of BP control in office	80%	88.9%	100%

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