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## Quantifying Hypertension Indicators Through Informatics

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QUANTIFYING HYPERTENSION INDICATORS THROUGH INFORMATICS

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Presented to the Faculty of the University of the Incarnate Word  
in partial fulfillment of the requirements  
for the degree of

DOCTOR OF NURSING PRACTICE

UNIVERSITY OF THE INCARNATE WORD

December 2020

## ACKNOWLEDGMENTS

I will be forever grateful to my project advisor, Dr. Christopher P. Weidlich, PhD, APRN, PMHNP-BC. Without Dr. Weidlich, this project would have never occurred. Dr. Weidlich has been a filter for my tangent writing, empathetic when I did not deserve it, and in arm's reach whenever needed. Thank you.

I also wish to acknowledge Dr. Karen L. Weis, PhD, RNC-OB, FAAN. Dr. Weis guided me to this project, and I am forever grateful for her efforts. Dr. Weis has taught me a variety of skills to improve my writing proficiency. I want to thank my editor, Martha Lashbrook. I appreciate all your help.

I must acknowledge both of my clinical mentors, Maricela Gonzales, MHA, and Catalina Cruz, QM Manager, for taking extra time out of their slammed schedules to help me with the project. Everyone at the clinic site was helpful, but these two went above and beyond to support me.

I wish to acknowledge my former boss, Kenith Shearn. Ken is the most patient man I have ever met, and the best nurse I ever worked with. He taught me discipline, accountability, and integrity.

Lastly, I wish to thank my amazing husband, Samuel Sanchez, FAO. He has dealt with my various moods and tearful struggles. He is my best friend, and without him, I would not be where I am today. Thank you love.

Diana Sanchez

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### **Abstract**

The purpose of this quality improvement project was to create optimal quality indicators for hypertension measures using evidence-based practice to increase metric percentages, improving hypertension management at a primary care practice. Implementing associated interventions for the quality measures and providing the interprofessional team with fundamental knowledge of inclusion and exclusion criteria empowered the team and improved patient care. An expert panel was chosen to conduct three Plan-Do-Study-Act (PDSA) cycles for systematic measurement until desired quality indicators were achieved during a 3-month period. The expert panel consisted of the head physician, a physician assistant, the facility administrator and clinical coordinator, the quality measure (QM) manager, and two registered nurses. The project outcomes were to have the quality indicators completed after PDSA cycles, and track the measure percentages weekly through the integrated dashboard, with a goal of 10% improvement in hypertension quality measures by May 21, 2020. After a series of three PDSA cycles, from February 7, 2020, to April 24, 2020, the finalized quality indicators were medication agreement greater than or equal to 80% equals 292 days, and controlled hypertension greater than or equal to 140/90, with the same inclusion and exclusion criteria per Centers for Medicare and Medicaid Services guidelines. By April 24<sup>th</sup>, 2020, the medication agreement quality indicator had increased from 33% to 40%, and the controlled hypertension quality indicator had increased from 63% to 80%.

*Keywords:* quality measures, hypertension, indicators



### **Quantifying Hypertension Indicators Through Informatics**

Technology innovates the future of medicine but not without a steep price. Society's fundamental needs of interaction, nourishment, exercise, and education are accessible with one keystroke. Leading a sedentary lifestyle comes with such risk factors as heart disease, diabetes, cancer, and depression.

Bexar County has 2 million residents, with 50% of the population classified as overweight by body mass index (City of San Antonio Metropolitan Health District, 2016). In Bexar County, cardiovascular disease is the leading cause of mortality for all race/ethnicity groups, causing 333 deaths per 100,000 with annual increases (Centers for Disease Control and Prevention [CDC], n.d.). Hypertension is a risk factor for cardiovascular disease, stroke, myocardial infarction, and heart failure. Hypertension affects 75 million Americans, and it is estimated that 46% have uncontrolled hypertension and do not have a primary care physician (CDC, n.d.).

For every major diagnosis, there are several evidence-based guidelines with prioritized approaches to care that family practice providers reference. For hypertension, there are more than 75 guidelines available to reference. The outcome of a sensitivity analysis performed on hypertension guidelines revealed only eight were consistent in strength and direction (Alper et al., 2019). The rest of the study varied in recommendations, and lacked a united and standardized level of care among hypertensive patients (Alper et al., 2019).

While deciphering which guidelines to utilize during practice, the relevancy to the population served should also be given significant consideration. Patients that seek primary care understand the consequences of chronic conditions but may not have the financial means to prevent further disease progression. Understanding the

surrounding community's cultural practices, societal factors, and economic barriers enhances the quality of medical care.

### **Assessment**

A microsystem assessment was completed at a primary care practice on the south side of San Antonio. The top five diagnoses of the patient population were hypertension, hypercholesterolemia, diabetes mellitus, hyperlipidemia, and autoimmune disorders; 13,408 (54%) were diagnosed with hypertension at the time of assessment (Sanchez, 2019). The patient population consisted of 78% Hispanic, 12% White (non-Hispanic), 5% Black (non-Hispanic), and 5% other race (Sanchez, 2019). More than 70% of the patients were insured by Medicare, Medicaid, and WellMed (Sanchez, 2019). The Centers for Medicare and Medicaid Services (CMS) adhere to the Eighth Joint National Committee (JNC 8) guidelines for hypertension. The JNC 8 guidelines recommend managing patient care by focusing on risk factors, lifestyle choices, blood pressure measurements, and creating a plan of care with shared decision-making (James et al., 2014).

The primary stakeholders and owners of the company are the head physician, and the facility administrator. The facility administrator and clinical coordinator, Maricela Gonzales, work comprehensively supervises the staff, oversees accounting and billing, and conducts training operations for staff at all levels of the company. Catalina Cruz is the quality measure manager for the patient access team. Gonzales and Cruz were the project mentors and helped with gathering any data necessary for the project.

The findings of the microsystem assessment were presented, and the physician agreed with the findings. He mentioned the workload and accelerated patient increase was demanding on the staff, in general. He reported hiring three new providers along

with ancillary staff but was dissatisfied with the management of patients' chronic diseases. The physician also reported seeing primary medicine shifting from a quantity-based model to a quality-based model and was perplexed on how to prepare the company for this change. The stakeholders and the interprofessional group consisting of the healthcare providers, expressed their frustration with the daily struggles of not having time to address the patients' chronic conditions and improve their quality of life. All providers communicated approval and readiness for implementation of an innovative approach.

### **Merit-Based Incentive Payment System**

Most practices monitor quality measurement performance since the rapid shift accelerated movement to a value-based practice. In 2015, congress passed the Medicare Access and CHIP Reauthorization Act (MACRA), providing funding for quality of performance versus quantity patient load (WellMed, 2019). The MACRA program consists of various subprograms physicians can take part in based on the size of the company, patient load, and amount of CMS patients seen annually (Adkins & Hall, 2018, Chapter 2).

The practice is currently enrolled in a value-based performance program called the Merit-Based Incentive Payment System (MIPS). The MIPS program assists practices hoping to improve health outcomes and measure performance in underserved populations with limited resources (Adkins & Hall, 2018, Chapter 2). The MIPS program measures performance in four categories including quality measure reporting, interoperability, improvement activities, and resource use (Adkins & Hall, 2018, Chapter 2). By assessing the performance of a practice based on their available resources and the population they serve, the clinic can receive additional compensation from CMS annually (Adkins & Hall, 2018, Chapter 2).

A persistent problem communicated amongst the providers is MIPS and quality measure performance in hypertension, diabetes mellitus, and cholesterol. Quality measures help providers maintain a consistent and credible standard of care by providing a quantitative score and comparing it to national benchmarks for comparison (Navar-Boggan et al., 2013). The providers wanted to improve their care and stress the inevitable failure of the clinic's performance due to the location of the practice.

### **CMS Quality Measures**

Quality measures are tools that help quantify health care processes, outcomes, and quality of care (WellMed, 2019). Quality measures are regulated by all government and private insurance companies, and they report results to primary practices quarterly based on insurance reports, pharmacy claims, and patient satisfaction surveys. The practice is given an overall star rating that can be viewed publicly on the internet, providing consumers with the highest-scoring primary care offices. The Star rating system was created by the Balanced Budget Act of 1997, and requirements have evolved over time (WellMed, 2019). Quality measures are based on the National Committee for Quality Assurance, and the Healthcare Effectiveness Data and Information Set (HEDIS; WellMed, 2019). The HEDIS data is utilized by more than 90% of America's health plans, allowing their performance on key dimensions of care and service to be rated and ranked (WellMed, 2019). CMS uses star ratings on a 6-point scale to measure patient satisfaction and quality of care, and it evaluates measure reliability, recommendations, stakeholder feedback, and data issues on an annual basis (WellMed, 2019).

There are more than 250 quality measures that are available for primary care practices to follow. Each quality measure has an indicator associated with it to help

recognize of the desired process or outcome. After becoming familiarized with CMS policies, analyzing quality measures with the lowest ratings became the focus of the project. Knowing that 54% of the patient population had a diagnosis of hypertension, strategizing interventions for hypertension quality measure improvement became the priority (Sanchez, 2019). The two main hypertension quality measures monitored by the primary care practice were controlling blood pressure (CBP) and medication adherence for antihypertensive (MAH) medications. For the CBP measurement, the inclusion criteria include patients who are 18-85 years of age, with a new or established diagnosis of hypertension (WellMed, 2019). The patient's BP must be less than 140/90 mm Hg for two different visits, with the first visit occurring within first half of the year. Patients that can be excluded from the measurements are those diagnosed with end-stage renal disease, pregnancy, frailty, or advanced illness and those who have had a kidney transplant, dialysis, an inpatient stay, or long-term acute hospital care (WellMed, 2019). For the MAH measurement, the person must be 18 or older and fill their prescription 80% or more of the time (WellMed, 2019) and the exclusion rules are identical to the CBP criteria. Insurance companies report measurement percentages quarterly to primary care practices based on physician notes, insurance claims, and pharmacy claims.

### **Statement of the Problems**

After careful consideration of the practice, the stakeholders, and available resources, there were several opportunities for quality improvement that could assist with interoperability of the practice. After reviewing evidence-based practices other facilities were incorporating, the following recommendations were discussed with the interprofessional team.

### ***Hypertension Indicators***

All quality measures have a recognized indicator to assist providers with desired performance outcomes. For instance, “controlling blood pressure” is the indicator for the CBP measurement, and “medication adherence for antihypertensive medications” is the indicator for the MAH measurement. The indicators for the measures are generic, while the inclusion and exclusion criteria are specific. Most of the providers were unaware of the criteria for the measurements because it is not in a scholastic program curriculum. Indicators were created by the government and the National Quality Forum, but how the data are executed and presented to the practice is individualized.

A proposed solution was to create specific indicators for the practice’s hypertension measures. Appointing an expert panel to use Plan-Do-Study-Act (PDSA) cycles as a systematic approach to generate desired indicators would determine final indicators. Providing the team with inclusion and exclusion criteria, associated interventions to help with indicator success, and weekly updates of the progress, as well as promoting open communication among the staff, would increase quality measure percentages. The proposed interventions would empower the providers and promote adaptation of value-based performance in the practice. By simplifying the metrics and specifying the indicators for the staff, quality measure percentages in hypertensive adults in the practice would improve.

### ***Incorporating Sociodemographic Data***

After years of government program implementation of quantity-based performance, there was an emerging pattern. Medical practices that received high-performance percentages on quality measures were in higher income neighborhoods. Providing health care to the underserved populations became a financial challenge and

undesirable for providers. The MIPS program served as a Band-Aid to a severed arm. The intention to help the emerging dilemma was evident but would never fix the problem.

A 3-year RCT of 22 community centers were conducted to find a correlation between HEDIS measures and sociodemographic factors to determine if performance of the clinic was affected by the geographic location, impacting financial reimbursement (Hu et al., 2018). The results revealed significant correlations stating, “poverty was significantly associated with BP control and marginally associated with poor HbA1c control and LDL control” (Hu et al., 2018, p. 10).

As of 2019, 19.2% of San Antonio’s population (west and southern regions) lived below poverty level with 17.7% uninsured, coming in second place nationally to Detroit (Wang, 2019). This multifactorial problem needed to be addressed. A recommended solution was to hire case management nurse to assist with patients who had multiple chronic conditions and needed social support finding available financial assistance.

### ***Uniform Dashboard***

The practice has a quality measurement team that manually collects data from physician notes, insurance, and pharmacy claims. QM Manager Cruz uploads the data to different electronic Excel spreadsheets per insurance company. The spreadsheets provide the practice a real-time monitoring system to keep continuous track of the clinic’s progress versus receiving the information quarterly. Uploading data to spreadsheets is time-consuming due to the daily data mining through physician notes and claims.

Cruz requested a uniform electronic system that is able to extract data from the electronic health record (EHR) system and generate an accessible dashboard that is compatible with their current EHR system. The electronic dashboard has all quality

measures available to observe and offers prompts to providers during point of care to keep patients compliant with preventative screenings and treatments.

One of the main concerns of the stakeholders was the integrity and preciseness of the informatic data. A proposed solution was to hire a population health registered nurse to provide guidance with patient cases and chart audits to ensure the integrity of the dashboard. A registered nurse was recommended because of their educational knowledge and use of evidenced-based practice in a primary care practice. If the dashboard extracts data electronically from the EHR system, there is a smaller margin of error, if there's accurate placement of documentation.

### **Project Identification**

While all the proposals were favored, the primary proposal chosen was generating quality indicators for hypertension measures using evidence-based practice to increase metric percentages, improving hypertension management for the practice. Implementing associated interventions for the quality measures and providing the interprofessional team with fundamental knowledge of inclusion and exclusion criteria and would empower the team and improve patient care.

An expert panel was chosen to conduct a series of three PDSA cycles for systematic measurement until desired quality indicators were achieved, within a 3-month period. The expert panel consisted of the head physician, a physician assistant, the facility administrator and clinical coordinator, the quality measurement manager, and two registered nurses. The project outcomes consisted of having the quality indicators completed after the PDSA cycles and tracking the measured percentages weekly through the integrated dashboard, with a goal of 10% improvement in hypertension quality measures by May 21, 2020.



### **Theoretical Framework**

The theoretical framework that served as the foundation of the project was based on the chronic care model (CCM) by Edward Wagner (Wagner, 2004). This framework was chosen because of the physician's concerns of how to manage chronic conditions on a long-term basis.

The six components of the chronic care model include the organization of the health system, clinical information systems, delivery system design, decision support, self-management, and community resources (Stellefson, et al., 2013). Four of the six concepts involve the application of best-practice strategies for team-centered care, and the other two concepts involve direct patient-centered care (Fiandt, 2006). After researching the CCM, the components that displayed the highest significance when regulating chronic conditions were health system organization, clinical information systems, and delivery system design (Stellefson et al., 2013).

In a systematic review, 25 practices implemented the CCM and its six components to improve patient outcomes according to the designated chronic disease. The outcomes measured included "optimal clinical targets (HbA1c less than or equal to 7%, BP less than or equal to 130/80 mmHg or LDL less than or equal to 100 mg/dl)" (Yeoh et al., 2018, p. 280). The number of participants ranged from 68 to 553,556 people, with a follow-up timeline ranging from 3 months to 4 years (Yeoh et al., 2018, p. 280). The results of the studies concluded that 28% of the patients met the HbA1c target, 45% met the blood pressure target, and 58% met the lipid target (Yeoh et al., 2018). For all the studies and programs that were reviewed, there was a general satisfaction of care with the implement of the chronic care model components when compared to the previous level of care. Yeoh et al. (2018) reported 76% of the practices that used the CCM, adopted three of the six components after the study. The most

utilized components were the delivery system design, health system organization, and clinical information systems.

Another systematic review studied implementation of the CCM and how it was useful in primary care clinics to obtain significant outcomes. The sample size included 7,190 participants. There were 20 CCM-based clinics in Tehran that were monitored for research findings for 1 year (Shahreza & Hazar, 2018). The outcomes measured were hemoglobin A1c, fasting glycemic values, blood pressure, lipid panel values, and body mass index. The analyzed data was displayed using a repeated analysis of variance (ANOVA) in SPSS (Shahreza & Hazar, 2018). The outcomes were measured every 3 months, and were resulted in consecutive intervals using ANOVA to improve reliability and validity of the data (Kim & Mallory, 2017, p. 391). Four of the six CCM components were used for the study, which included delivery system design, clinical information systems, decision support, and self-management support. Shahreza and colleagues (2018) reported the following results:

HbA1c (*P*-value: 0.001), fasting blood sugar (*P*-value: 0.001), systolic and diastolic blood pressures (*P*-value: 0.001), low density lipoprotein (*P*-value: 0.001), total cholesterol (*P*-value: 0.001), triglyceride (*P*-value: 0.001), and body mass index (*P*-value: 0.001) have significantly decreased during 4 measurement intervals. (p. 164)

The findings of the study gave promising statistical results showing that the CCM can provide exceptional outcomes for patients.

## **Strength of Evidence**

### **Lifestyle Modifications**

The goal of the project interventions was to improve hypertension management by implementing evidence-based indicators, optimizing quality measure performance. Prior to discussing alternative approaches, addressing nonpharmacologic interventions and lifestyle modifications were assumed because providers use evidence-based guidelines for medical practice decisions. The Seventh Joint National Committee (JNC 7) guidelines are referenced in the literature because this guideline emphasizes specific information including hypertension classifications, dietary recommendations, and risk factors associated with the condition (U.S. Department of Health and Human Services [HHS], 2003). The JNC 8 guidelines for hypertension provide a comprehensive summation of the JNC 7 guidelines, categories of HTN classification excluding prehypertension, stage one and two HTN. The JNC 8 guidelines provide more focus on blood pressure goals determinant on the patient's age, race, and medical conditions. Improvement strategies and recommended lifestyle modifications were briefly discussed because these were concepts shared with patients, which was an indirect result of the project.

Risk factors associated with hypertension include obesity, dyslipidemia, diabetes, smoking, a sedentary lifestyle, a glomerular filtration rate of less than 60 mL/min, and a family history of cardiovascular disease, and should be noted in the patient's medical history and physical evaluation (National Heart, Lung, and Blood Institute [NHLBI] & National High Blood Pressure Education program [NHBPEP], 2003). Diagnostic labs consist of a urine analysis, an albumin/creatinine ratio, a complete metabolic panel, a fasting lipid panel, a comprehensive metabolic panel, and an electrocardiogram (HHS, 2003).

The JNC 7 recommended lifestyle modifications consist of weight reduction, a DASH (Dietary approaches to Stop Hypertension) regimen, sodium restriction, physical activity, light alcohol consumption, and cessation of smoking (NHLBI & NHBPEP, 2003). Weight reduction, or a BMI goal of 25 kg/m<sup>2</sup> or less, can significantly affect the patient's BP measurements, reducing systolic blood pressure as much as 5 to 22 mmHg for every 22 pounds lost (NHLBI & NHBPEP, 2003). The DASH diet, which includes eating fruits, vegetables, dairy and grains low in fat content, can lower the patient's systolic blood pressure 8 to 14 mmHg (NHLBI & NHBPEP, 2003). Restricting the patient's sodium intake to 2400 gm, encouraging brisk walking at least 30 minutes per day, and limiting alcohol intake can also lower systolic pressure by 10 points or less per intervention (NHLBI & NHBPEP, 2003). These evidence-based practices were recommended by providers and a new member on their adjunct team, the head coach. The head coach was consulted for any patients needing further education on medical information about chronic conditions, such as hypertension, diabetes mellitus, and hypercholesterolemia. The head coach worked closely with the diabetic population and improved HbA1c levels by practicing shared decision-making with patients.

### **Defining Variations of Hypertension**

To implement blood pressure goals for hypertensive patients, it is imperative for the care teams to understand the varied classifications of hypertension. The JNC 7 guidelines define prehypertension as 120-139/80-89 mmHg, Stage 1 hypertension as a range of 140-159/90-99 mmHg, and Stage 2 hypertension as a BP of 160/100 or higher (NHLBI & NHBPEP, 2003, Table 1). Ambulatory blood pressure monitoring (ABPM) is having multiple blood pressures taken during the patient's daily activities and sleep cycles; it is considered a requirement for the diagnosis of "white coat hypertension" (NHLBI & NHBPEP, 2003, p. 5). For ABPM, the patient's blood pressure

goal needs to be 135/85 mmHg or less while awake and 120/75 mmHg during times of sleep (NHLBI & NHBPEP, 2003).

Self-measurement of blood pressure (patient) was implemented to improve the patients' interest in their chronic condition and assist with medication adherence through patient feedback. The goal is for patients to have a BP of 135/85 mmHg for it to be considered controlled hypertension (NHLBI & NHBPEP, 2003). Health care providers recommend that patients purchase a blood pressure machine and a log to track measurements. Assessing how patients measure their blood pressure as well as checking their home BP monitor for accuracy is important to do at every office visit, and their measurements should be recorded in the electronic health record (NHLBI & NHBPEP, 2003).

Resistance or uncontrolled hypertension is when the patients are not able to meet their blood pressure goal despite consistently taking their prescribed (three or more) medications and following lifestyle modifications (NHLBI & NHBPEP, 2003). These patients need evaluation for any new or existing organ damage, frequent follow-ups, and realistic blood pressure goals with shared decision-making between the provider and patient (NHLBI & NHBPEP, 2003).

### **Controlling Blood Pressure Approaches**

The JNC 7 guidelines discuss the best approaches toward obtaining blood pressures effectively. It is first imperative to assess the proper technique of taking a patient's blood pressure during an office visit. The patient should be at rest for 5 minutes in a seated position, with the arm resting on a table, ensuring the arm being measured is at heart level, with both feet on a level floor and legs uncrossed (NHLBI & NHBPEP, 2003). It is encouraged to take at least two blood pressure readings per clinic visit to ensure accuracy and provide the clinicians with optimal blood pressure

baselines, with best systolic and diastolic pressure to be used for CMS measures (NHLBI & NHBPEP, 2003). Other CMS recommended practices were obtaining blood pressures taken by specialty offices the patient visits during the calendar year, with the exclusion of the emergency room or hospital admission (WellMed, 2019). Ensuring the patient has the proper hypertension diagnosis ensures effective patient outcomes. Allowing patients to monitor their ambulatory BP and home BP monitoring will determine if some patients have a diagnosis of white coat hypertension or need less prescriptive medications (NHLBI & NHBPEP, 2003).

A qualitative study performed with 5,552 hypertensive patients; they were observed at a cardiology clinic at Duke University to determine whether the definition of varying indicators made a difference in performance measurement for hypertension (Navar-Boggan et al., 2013). Blood pressure readings were obtained from electronic medical records (EMRs)- vital signs taken in triage- and the best systolic and diastolic readings and combined if readings were from the same clinic visit (Navar-Boggan, et al., 2013). A randomized EMR audit was performed on 300 patients classified as having uncontrolled blood pressure by the last visit, and documentation by the provider was reviewed for home BP measurements (Navar-Boggan et al., 2013). The CMS exclusion criteria for the CBP measure was observed and applied to during EMR BP audits (Navar-Boggan et al., 2013).

One outcome included gathering blood pressure readings during clinical visits to obtain an improved baseline blood pressure; gathering the patient's best systolic and diastolic readings were taken and combined if readings were from the same clinic visit (Navar-Boggan et al., 2013). Inclusion of home BP readings from patients improved the percentage of the CBP measure by 6% (Navar-Boggan et al., 2013).

Applying CMS exclusion criteria to chart audits including patients that were noncompliant, that had BP readings at other clinic visits within range, and patients that were prescribed two or more hypertensive medications (resistant hypertension) improved the measure by more than 10% (Navar-Boggan et al., 2013). Using the patient's average BP reading instead of the last visit reading only improved the quality measure performance (Navar-Boggan et al., 2013). Navar-Boggan and colleagues (2013, p. 826) reported,

19.3% of all patients with uncontrolled hypertension in the study population had home BP recordings at goal and were considered 'controlled,' the overall rate of hypertension control would increase 6% (from 69% to 75%)... Across the study population, reclassifying 86% of patients with uncontrolled BP as controlled results in an increase in the rate of controlled hypertension from 69% to 96%.

Patients selected for medical record reviews, 86% of patients with uncontrolled BP were only taking two antihypertensive medications and were given the classification of controlled hypertension, improving the overall rate to 96% (Navar-Boggan et al., 2013).

A systematic review with a sensitivity analysis of 46 randomized controlled trials gathered evidence pertaining to home BP measurements via telehealth to determine the best interventions implemented (Duan et al., 2017). Inclusion criteria consisted of clinical BP outcomes, quantitative values of BPs, and participants aged 18 or older (Duan et al., 2017). Exclusion criteria included studies that took blood pressure data from patient home visits, clinic follow-ups and from participants in nursing homes and dialysis facilities (Duan et al., 2017). The main interventions for this meta-analysis included hypertension management that was patient-centered without home visits or vigorous clinic follow-up (Duan et al., 2017). Other

interventions mentioned in the studies included electronic reminders, phone calls, paper mail, email, education, and counseling (Duan et al., 2017). The duration of the studies fluctuated between 1 to 60 months, leaving a median of 6 months for all studies (Duan et al., 2017).

The primary outcomes focused on were quantitative value results of BP measurements and patients reaching their blood pressure goals (Duan et al., 2017). Secondary outcome measures included changes in antihypertensive medications used and quality of life questionnaire measures (Duan et al., 2017). The sensitivity analysis was performed on the high-quality level of evidence studies (Duan et al., 2017). Duan and colleagues (2017, p. 427) state,

46 randomised controlled trials including a total of 13875 cases were identified. Compared with usual care, HBPT improved office systolic blood pressure (BP) and diastolic BP by 3.99 mmHg (95% confidence interval (CI): 5.06-2.93;  $p < .001$ ) and 1.99 mm Hg (95% CI: -2.60 to -1.39;  $p < .001$ ), respectively.

The results revealed that HBPT provided participants with better BP control for a yearly duration with associated educational support through counselling (Duan et al., 2017).

### **Medication Adherence Approaches**

CMS give primary care clinics recommendations for improving medication adherence. One of the recommendations is to provide patients with 90-day prescriptions versus the 30-day prescriptions (WellMed, 2019). CMS also has a medication adherence program that assists patients without proper funding to obtain their medications (WellMed, 2019). Unfortunately, most of the patients do not qualify for the program, or their medication wasn't covered.



For patients to be considered adherent to their medication regimen, CMS states the patient must fill their prescriptions at least 80% of the time within an annual calendar period (WellMed, 2019). As soon as the prescription is processed at the pharmacy, every day that passes is considered noncompliance. If patients wait 2 weeks to get prescriptions filled, these 14 days are counted in the 20% noncompliance days for the year (WellMed, 2019). One advantage the practice has is having a pharmacy physically connected to their office building. This pharmacy is being utilized, but only about half of their patients are using this pharmacy, which is a huge missed opportunity for the clinic. Directing the patients to the pharmacy immediately after the primary care visit is convenient and increases patient compliance.

A clinic in Miami, using an innovative approach funded by Medicare, improved their primary practice by providing transportation to their new multispecialty clinic, which consisted of a laboratory, a pharmacy, an urgent care, a dental office, and a radiology center, making convenience a priority for the elderly population (Tanio & Chen, 2013). Medication adherence for diabetic patients was evaluated using a medication possession ratio, which is the same process used by CMS. Medication adherence for diabetic patients increased from 44% to 73% within 12 months (Tanio & Chen, 2013).

Recent studies of medication adherence approaches in primary care settings have yielded positive results. Approaches to medication adherence include patient education, review of medication costs and management, electronic reminders, financial incentives, cognitive behavioral therapy, and even pharmacy telehealth visits. Most people have already experienced one telehealth visit through their insurance provider. Consulting pharmacists would help inform patients about their prescriptions and provide better medication compliance through their extensive knowledge.

A study was conducted to determine whether the availability of a pharmacist through telehealth, in a community, or in a primary care practice to assist with blood pressure management improved hypertensive care (Omboni et al, 2019). There were 76 randomized controlled trials in the meta-analysis, with each study having variability in sociodemographic and baseline characteristics (Omboni et al, 2019). Thirteen studies ( $n = 2,246$ ) focused on pharmacist interventions of medication reconciliation and hypertension management according to pharmaceutical guidelines (Omboni et al, 2019). Eight studies ( $n = 2,619$ ) focused on pharmacist interventions including management of medications, educational strategies, BP readings, reminders, and personal follow-ups (Omboni et al, 2019). Thirty-nine studies ( $n = 14,224$ ) focused on pharmacist interventions of medication knowledge and adherence, lifestyle, BP readings, electronic and paper reminders, and health care training (Omboni et al, 2019). Sixteen studies ( $n = 3,034$ ) focused on pharmaceutical interventions of patient education, prescription management, safety issues and side effects associated with medication, and lifestyle modifications (Omboni et al, 2019). Blood pressure readings, medication adherence, and quality of life were being measured for all 76 studies (Omboni et al, 2019).

The results of the 13 studies were “larger SBP reduction with the intervention ( $-6.9 \pm 12.0$  mmHg vs. control;  $p = 0.047$ )...Eight out of 13 studies assessing adherence to antihypertensive treatment reported sensitive outcomes following pharmacist’s management” (Omboni et al., Table 3). For the 8 studies, results were improved BP management with the intervention group (62.8%) compared to the control group (32.6%), yielding a  $p < .001$ , with no major significance in medication adherence (Omboni et al, 2019).

For the 39 studies, there were substantial reduction rates in systolic BP readings when performed by the pharmacist, and effectiveness of follow-ups correlated with frequency of contact, yielding better BP readings for patients with monthly follow-up calls (Omboni et al, 2019). For the 16 studies, pharmacist interventions yielded statistical significance ( $p < .001$ ) in systolic BP than regular care and improved medication adherence (Omboni et al, 2019). Having a multidisciplinary team associated with the patient's care improves overall health care.

There were 49 randomized controlled studies and meta-analyses reviewed concerning methods of improving medication adherence from January 2000 to September 2018 (Kini & Ho, 2018). Participants had to be 18 years or older, have had follow-up periods of less than 6 months, and live in the United States (Kini & Ho, 2018). A total of 49 studies were reviewed that audited nonadherence through pharmacy claims, missed refills, electronic drug devices, and self-report of adherence (Kini & Ho, 2018). There were six main interventions used by all studies to improve adherence: patient education, regimen management, pharmacy consultation, cognitive behavioral therapy, medication reminders, and financial incentives (Kini & Ho, 2018).

One study had 201 participants receive education sessions discussing risks of not taking statin medications over 6 months (Kini & Ho, 2018). The mean LDL lab value for the intervention group lowered 83 points versus the control group (73 points) after 6 months (Kini & Ho, 2018). Another study with 241 participants utilized pharmacy consultations, home BP monitoring, motivational interviewing, and reminder calls (Stewart et al., 2014). After 6 months, the participants had improved mean systolic BP readings: 10mmHg with the intervention group and 5 mmHg in the control group (Stewart et al., 2014).

One study group performed four sessions of cognitive behavioral therapy over 9 months with 82 participants on adherence to heart failure medications (Wu et al., 2008). The intervention group improved by 74% and the control group by 36% using electronic pill monitoring (Wu et al., 2008).

One trial implemented reminders via calls, letters, educational phone calls, and feedback to 21,752 participants (Vollmer et al., 2014). Using voice recognition technology, the automated calls consisted of prescription information and assistance with refills lasting no more three minutes per notification (Vollmer et al., 2014). Through randomized selection, some of the participants received pamphlets explaining the automated calls (Vollmer et al., 2014). The control group's adherence improved by 55%, and the intervention group improved by 58% over the course of one year (Vollmer et al., 2014).

### **Quality Indicators**

Quality indicators are standards of guidance for improving medical care, and quality measures assist medical professionals in quantifying the results for national comparison yielding continuous quality improvement. As guidelines are modified with new evidence-based studies, the indicators are revised as well. The National Quality Forum and the Agency for Healthcare Research and Quality create quality measure indicators that have high reliability and validity. Unfortunately, any definable term can produce diverse interpretations for individuals.

Providing a national standard of care is necessary but difficult to achieve because it depends on the sociodemographic factors of the population being served. Innovating quality indicators customary to a community served can facilitate quality measure performance. Having cultural humility awareness and being mindful of educational attainment of the region is important for patient comprehension. Focusing

on terms that have sustainability and having an interprofessional team that is adaptable to change are integral factors prior to implementation of processes.

When working on quality improvement, there is always a continuum of trial and error, but failure is the key to success. Primary care practices have attempted to tailor quality indicators more suited to their population needs in a variety of ways. A region in Slovenia consisting of 564 family practices used 35 quality indicators to assess hypertension and diabetes management over 3 years (Klemenc-Ketis et al., 2017). One of the four quality indicators reported in the study was, “Percentage of patients with hypertension with a systolic blood pressure 140/90 mmHg or lower” (Klemenc-Ketis et al., 2017, p. 213, Table 1). The indicator resulted in a low level of significance, but the limitations of the study were essential factors to consider for future reference.

Limitations expressed in the study included a lack of standardized indicators in Slovenian medical care with no benchmarks to reference for comparison (Klemenc-Ketis et al., 2017). Klemenc-Ketis and colleagues (2017) realized there were no quality operations or administrative support to relay data for provider feedback, and the level of clinic interest varied among the region. The lack of a structured committee or process for choosing the best indicators hindered the interest of the participants at all levels of care (Klemenc-Ketis et al., 2017). The authors discussed how the “suboptimal” approach in defining the indicators backfired; they understood why choosing indicators requires a systematic approach using the highest quality of evidence-based guidelines and that these indicators needed to be evaluated by experts for feasibility and adaptability (Klemenc-Ketis et al., 2017).

The significant limitation not discussed in the article was redefining 35 different indicators to monitor and only resulting in four indicators after 3 years of research. Concentrating on one indicator or one subject of relevant indicators provides

conciseness and maintains the project's key focus. Reflecting on the purpose of the study prioritizes the necessary interventions. Establishing Slovenia's entire health system's infrastructure by providing several indicators was not the problem. The aim of the project was supplying quality indicators to assess hypertension and diabetes management of primary care practices for the specified Slovenian region (Klemenc-Ketis et al., 2017).

Another study focused on a positive predictive value (PPV) calculation of five hypertensive quality indicators for a 9-month period for two separate primary practices in the United Kingdom region (Mabotuwana et al., 2010). Since 2004, the United Kingdom has focused on frameworks for quality outcomes and refined indicators to improve patient care (Mabotuwana et al., 2010). For this study, a systematic approach was followed to revise hypertensive indicators by forming an expert panel consisting of an administrative manager, two practitioners, and graduate nurses (Mabotuwana et al., 2010). After modifying the indicators, a 9-month evaluation cycle was agreed upon, except for the medication possession ratio (MPR) for antihypertensive medications due to the inclusion criteria standardizing a 15-month duration period (Mabotuwana et al., 2010). The first practice consisted of a sample size of 459 patients, with generalized (unreported) sample characteristics of Samoan descent living in the suburbs of a metropolitan area; the second practice consisted of 562 European patients in an urban city (Mabotuwana et al., 2010).

The significance of the indicator results was that the MPR and the consistently high BP indicator had the best overall outcomes for both practices (Mabotuwana et al., 2010). All the indicator results were obtained in 3-month intervals for comparison. For the consistently high BP indicator at the 3-month interval, 74% of hypertensive patients from the first practice met the criteria; at the 9-month interval, 49% of the

hypertensive patients met the criteria (Mabotuwana et al., 2010). For the second practice, 77% of the hypertensive patients had consistently high BP at the 3-month interval; at the 9-month interval, only 40% of patients met the criteria (Mabotuwana et al., 2010).

The MPR indicator mirrored CMS rules but with the criteria of 15 months of adherence versus 1 calendar year, and the results focused on the percentage of patients that failed to meet the 80% of adherence days (Mabotuwana et al., 2010). For the first practice, the percentage of the patients that had an MPR adherence of less than 80% yielded 86% (Mabotuwana et al., 2010). At the 9-month interval, that percentage decreased to 57%, concluding a 29% improvement in medication adherence (Mabotuwana et al., 2010). For the second practice, 81% of patients were considered nonadherent with medications at the 3-month interval; at the 9-month interval, only 57% of patients were considered nonadherent, revealing a 24% improvement in medication adherence (Mabotuwana et al., 2010).

One limitation of the study discussed how the MPR was the most consistent measure because the other measures were taken in intervals versus being measured on a long continuum (Mabotuwana et al., 2010). The cohort agreed that point-in-time measures were not valued measures of quality unless there were a series of measurements taken to obtain a true baseline for the patient.

Another limitation discussed was ambulatory blood pressure monitoring (ABPM). Measurements taken during ABPM have proven there are fluctuations in readings within 1 day, and the cohort felt this type of indicator was not a true reflection of the patients' blood pressure control (Mabotuwana et al., 2010). The recommendation of the cohort suggested not following just one quality measure or

indicator and introducing interval observation of quality measurements to yield better patient outcomes (Mabotuwana et al., 2010).

### **PDSA Cycles for Indicators**

The Plan-Do-Study-Act (PDSA) cycle is the most prevalent systematic tool used for quality improvement. The PDSA rapid cycle is used for quality improvement projects for the necessity of changing baseline interventions and redesign during the implementation process of the project (Varkey et al., 2007). The “Plan” involves having a set blueprint for the project with interventions and predicted outcomes (Christoff, 2018). The “Do” phase of the cycle involves implementing the plan, starting data collection, and documenting all progress and outcomes (Christoff, 2018). The “Study” phase consists of summarizing and evaluating the data (Varkey et al., 2007). The “Act” phase involves determining what changes need to be adopted, adapted, or abandoned to the plan (Christoff, 2018).

The PDSA cycle is used by the government and health care for quality improvement projects on a continuous basis for all specialties and levels of care. A study that provided positive outcomes using the PDSA cycle was a medication reconciliation process in an ambulatory care clinic (Varkey et al., 2007). The project consisted of several 24-hour PDSA cycles, with improved modifications to the process and with medication discrepancies decreasing by 50% for the 1-month duration of the project (Varkey et al., 2007). Before the project, the percentage of medication reconciliations was 47.3%, which improved to 92.6% by the end of the month (Varkey et al., 2007).

### **Summary of Strength of Evidence**

Reviewing the evidence of lifestyle modifications, variations of hypertension, and approaches to improve hypertension as addressed by the JNC 7 guidelines is



significant in understanding how to create the best quality indicators for hypertension. Using a systematic approach of PDSA cycles for how desired quality indicators are chosen is based on strong evidence. Looking at different systematic reviews was helpful to understand what methods were applied, assisting in the implementation process.

## **Methods**

### **Preparation**

To assure the project's success, it required improving productivity and organization, and establishing order within the practice. Utilizing the six CCM concepts helped the practice and staff members adapt to an attitude of readiness for change. The concepts that were implemented were based on research findings that yielded successful results and favored by the stakeholders.

Delivery system design and health care organization were the first concepts implemented. Defining job descriptions and organization of the health care team was the practices' first area of focus (MacColl Center for Health Care Innovation, 2007). Transparency about business performance improved communication and provided the staff with opportunity to voice concerns. Monthly staff meetings and weekly administrative conference calls with planned agendas were recommended to encourage systematic problem-solving and open communication (MacColl Center for Health Care Innovation, 2007). Another recommendation was to conduct yearly staff evaluations to assist with performance improvement by providing concise job descriptions. Giving constructive feedback allowed the staff to better meet expectations of the assigned role and improve for future career advancement. Incentives such as grocery gift cards were provided by the stakeholders when staff members displayed exceptional job performance.

Monitoring team performance and providing feedback is necessary for business growth. After working with the quality measure team, the opportunity to improve metrics and present results that could be checked frequently became the blueprint for the project. Using information systems to apply evidence-based guidelines into the plan of care with electronic reminders for the interprofessional team to improve metrics was one of the project recommendations proposed to the team (MacColl Center for Health Care Innovation, 2007). Quality measures visually quantify performance evaluation, but unfortunately the data were not being shared with all staff members due to administrative misconceptions of uninterested staff and knowledge of metrics.

The practice closed for half a day in November of 2019 for staff training and a mandatory staff meeting to discuss quality improvement. Fundamentals of quality measures and quality improvement proposals were presented. The presentation empowered the staff with knowledge of quality measures and how they correlated with patient care. Discussing the practice's future goals helped employees understand the new standard of expectations. Educating staff on quality measures incentivized the staff to improve percentages, patient care, and satisfaction.

### **Project Intervention**

The project intervention was carried out in seven phases from February 7, 2020, to May 21, 2020. The project intervention consisted of working with the chosen expert panel for at least 3 months to achieve optimal quality indicators and an outcome of 10% improvement in hypertension quality measures.

The first phase of the project intervention involved forming an expert panel to assist with developing the best quality indicators and associated interventions to achieve optimal success. The expert panel consisted of the head physician, a physician

assistant, the facility administrator and clinical coordinator, the quality measurement manager, and two registered nurses. Expert panel meetings were held biweekly to implement PDSA cycles as a tool for effective project feedback. Organizing PDSA cycles introduced a systematic approach to quality improvement, maintained project interest, and allowed for effective communication. The first quality indicators were prepared in advance using evidence-based research for initial assistance. This meeting was held on February 7, 2020.

Once the new indicators and proposed interventions were determined, the second phase consisted of concurrently entering the new indicators into the electronic dashboard system. The quality measure manager assisted with this phase to ensure proper placement of the indicators. Cruz granted access to the electronic dashboard for weekly monitoring of percentage results.

The third phase required attending an educational course on February 11, 2020. The course was taught by a WellMed auditor, who provided information about inclusion and exclusion criteria for quality measurements with the most recent updates. Medical assistant attendance helped with project compliance but was not mandated by administration. Reiterating hypertension interventions and demonstrating proper blood pressure technique increased staff compliance. The staff was informed of all quality measurements being monitored, with an emphasis on new hypertension indicators.

The fourth phase consisted of an expert panel meeting held on February 21, 2020, to discuss the first PDSA cycle findings to determine the need to adopt, adapt, or abandon the initial quality indicators chosen at the previous meeting. The meeting involved correspondence of project revisions to achieve identified outcomes. If the

indicators were modified, changes were made within the dashboard system and monitored until the following meeting planned for March 12, 2020.

The fifth phase entailed reviewing the second PDSA cycle findings at an expert panel meeting held on March 12, 2020, and deciding whether to adopt, adapt, or abandon the current quality indicators. Any indicator and intervention adjustments were discussed to improve anticipated outcomes. The next meeting was scheduled for April 10, 2020, to discuss the third PDSA cycle findings.

The sixth phase consisted of holding an expert panel meeting to discuss the third PDSA cycle findings. Due to the COVID-19 pandemic, the meeting was rescheduled for 2 weeks later, which was held on April 24, 2020. Metric percentages were accessed electronically every weekend during closed business hours due to social distancing precautions advised by the CDC.

The seventh phase consisted of data collection and organization of preliminary results of the project. On May 15, 2020, the results were presented to the expert panel, and evaluation of the project was analyzed by all panel members individually. The final quality measures, the improvement percentage for both measurements, and the feasibility of continuing the project, were deliberated. The project champions were elected at this final meeting. Meeting minutes and percentage outcomes were reviewed and concluded.

### ***Organizational Facilitators***

The stakeholders were interested in innovative ideas and ready for effective change. Reorganization of the administrative hierarchy and modifications applied to the EHR system were considerable changes to their microsystem. Everyone was enthusiastic and adaptable to change.

The interprofessional team, expert panel, and staff were accommodating to the project. Each intervention was given respectful consideration. The clinical coordinator and quality measure manager were essential project facilitators. Attendance was required for panel meetings, and all members participated and provided feedback. The stakeholders were welcoming and allowed me to obtain any information necessary for project implementation.

Sustainability of the project after my departure was a concern of mine. Accomplishing a project for the practice that was valuable and feasible was my primary objective. One recommendation was to have one of the part-time registered nurses oversee the project and collaborate with the quality measure manager, Cruz. The staff elected to resume interventions as project champions were chosen, and the project continues to flourish months after completion.

### ***Organizational Barriers***

The concept of value-based versus quality-based care received disapproval from panel members initially. Some of the experienced staff admitted to having difficulty grasping the idea of value-based care. One of the providers used to see 30-35 patients daily because quantity-based care was the most profitable solution for the practice. After reviewing the provider's patient satisfaction surveys, the results indicated above satisfactory care. The provider saw the highest quantity of patients annually but also had the worst percentages for both hypertensive metrics. The providers have changed their perspective on quality of care and now see 25 patients daily.

During project implementation, the practice had a high employee turnover rate. Administration was forced to remove half of the operating staff due to CDC's social distancing requirements. The practice stayed open for business, which required a vast supply of personal protective equipment (PPE). Financial stress continued to increase

due to high demands of unavailable medical supplies of hand soap, sanitizer, toiletry, and other products necessary for business function.

### ***Ethical Considerations***

All aspects of the practice were analyzed, and concepts for the project were based on collected research data. One aspect of the assessment I was not granted access to were the practice's financial expenses. Since salaries and business expenditures were not the main focus of the project, financial data restriction did not interfere with the assignment.

The main ethical concern, was keeping patient data and business documents confidential. Any patient data collection was protected with encryption on all electronic devices with double password protection. The facility had an encrypted Wi-Fi connection, and all paperwork was kept behind a locked door at the project location. The dashboard did not display any identifiable patient information.

During the expert panel meetings, the project interventions were discussed with careful consideration, keeping the patients' best financial interest in mind. Some of the recommended interventions were declined due to financial expenses but were always presented as options. The owners and expert panel gave each recommendation consideration and were respectful with each refusal.

### ***Setting and Population***

The project intervention consisted of working with the chosen expert panel for a duration of at least 3 months to achieve optimal quality indicators and an outcome of 10% improvement in hypertension quality measures. The setting for the project was a private primary care practice located on the south side of San Antonio, Texas. The population consisted of patients seen at the clinic aged 18-85 with a diagnosis of

hypertension. Inclusion and exclusion criteria mirrored CMS guidelines for simplicity and uniformity.

## **Results**

### **First Phase**

The quality indicators were presented and agreed upon by the expert panel during the first meeting. The first set of quality indicators were based on JNC 7 and 8 guidelines and the researched systematic reviews. The first quality indicator changed from MAH to medication possession ratio (MPR) greater than or equal to 80% equals 292 calendar days and it would display in green print. Patients who were at risk for failing the metric would be classified as MPR greater than or equal to 80% equals 292 calendar days, and it would display in yellow print. Patients that failed the metric would be presented as MPR greater than or equal to 20% equals 73 calendar days, and it would appear in red print. Placing the exact amount of days on the quality indicator was done to emphasize the importance of keeping a numerical track on patients to prevent metric failure.

The second quality indicator was changed from CBP to stage 1 hypertension greater than or equal to 140/90, and it was displayed in green print. Any patient failing the metric would show as Stage 1 hypertension greater than or equal to 140/90, and it would be displayed in red print. Patients that were failing the metric received a chart audit and follow-up visit to rule out other classifications of hypertension. The inclusion and exclusion criteria for both measures aligned with CMS criteria to prevent confusion.

Intervention strategies for quality measures were proposed to the panel. Two CBP interventions were opposed: ambulatory blood pressure monitoring (ABPM) for white coat hypertension diagnosis and on-site visits for patients with elevated blood

pressure readings. The MAH intervention voted against was pharmacy consulted telehealth visits. The following interventions below were presented to the panel

### ***Interventions for Controlling Blood Pressure***

- Take at least two blood pressure readings per clinic visit (with best systolic and diastolic readings combined as allowed by CMS guidelines).
- Allow readings from home BP monitors if the patient brings the monitor to the clinic visit
- Allow ambulatory blood pressure monitoring (ABPM) to exclude patients with diagnosis of white coat hypertension.
- Schedule 1-month follow-up appointments-onsite or via telehealth or phone-for patients who have elevated blood pressure readings, newly diagnosed, or resistant hypertension.
- Have registered nurses assist with chart auditing for patients under CBP criteria and reclassify patients according to proper hypertension diagnosis.

### ***Interventions for Medication Adherence***

- Conduct a proper medication reconciliation review.
- Give 90-day prescriptions for all hypertension medication refills.
- Ask patients about pharmacy of preference, and notify them of the on-site pharmacy.
- Assist patients to the on-site pharmacy after their visit.
- Offer patients telehealth appointments with a pharmacist as an adjunct to PCP visits.
- Provide electronic prescription refill reminders via phone calls, text messages, and the patient portal.



## Second Phase

The second phase entailed entering new quality indicators into the new dashboard system on February 7, 2020, after the expert panel meeting. This phase took place at the project location in the human resources department behind locked doors after business hours. With the quality measure manager's assistance, the indicators were modified in the EHR system and were viewable by staff members with EHR access.

Entering the indicators into the computer system took an extensive amount of time. The initial indicators were purposely very descriptive but too lengthy for the provided space. By condensing the indicators to their numerical and acronym format, the indicators were able to be transferred into the data system.

The new indicator for MPR greater than or equal to 80% equals 292 calendar days was modified to  $MPR \geq 80\% = 292$  and displayed in green print. For patients at risk for failing the measure, the same indicator was supposed to display in yellow print but was not visibly friendly on the computer screen. The print was changed to black with the indicator highlighted in yellow; however, the panel quickly requested to have the indicator removed because it was diverting attention from the other indicators. The failure metric was MPR greater than or equal to 20% equals 73 calendar days; it was modified to  $MPR \geq 20\% = 73$  and displayed in red print. The other indicator was stage 1 hypertension greater than or equal to 140/90, and it was modified to  $S1HTN \geq 140/90$  and displayed in green print. The same indicator was applied for patients failing the metric, but it was displayed in red print.

The indicators were visibly displayed upon opening the patient's chart on the right side of the screen. The quality measure percentages were monitored for the next

2 weeks. At the following meeting, the first PDSA cycle findings and applied interventions were discussed.

### **Third Phase**

The third phase required attending an educational course on February 11, 2020. The course was taught by a WellMed auditor, who provided information about inclusion and exclusion criteria for quality measurements with the most recent updates. Medical assistant attendance helped with project compliance but was not mandated by administration. Reiterating hypertension interventions and demonstrating proper blood pressure technique increased staff compliance. The staff was informed of all quality measurements being monitored, with an emphasis on new hypertension indicators.

One panel member and half of the interprofessional team of providers were unable to attend the course. Providers who were unable to attend were given a summary of the information that was presented. The majority of medical assistants were present for the course but could not stay for the entire duration due to working constraints. The course lasted approximately 2 hours, packed with beneficial quality metric information.

### **Fourth Phase**

The fourth phase entailed an expert panel meeting held on February 21, 2020, to discuss the first PDSA cycle findings and review the progress on applied interventions. The expert panel discussed wanting to abandon the initial quality indicators, generate new ones, and evaluate the percentage differences. A second PDSA cycle would be completed based on the results.

The first quality indicator was changed to medication consistency greater than or equal to 80% in green print and was condensed to  $MC \geq 80\%$  for visibility purposes.

The patients failing the measure were specified into two subtypes: medication consistency for financial reasons and medication consistency for nonfinancial reasons. The two indicators were displayed as  $MC \geq 20\%$  (FR) and  $MC \geq 20\%$  (NFR) in red print. The second quality indicator was changed to controlled hypertension greater than or equal to 140/90 in green print and was condensed to  $CHTN \geq 140/90$ . Patients failing the measurement presented as uncontrolled hypertension greater than or equal to 140/90 in red print,  $UCHTN \geq 140/90$ . The charts of patients failing the metric were audited by the registered nurses to confirm the appropriate hypertensive diagnosis.

The limitations associated with interventions involved inconsistent adherence by the staff. The medical assistants were performing two blood pressure measurements for patients but started neglecting the task during hectic shifts. Due to COVID-19, one of the enforced protocols was social distancing, meaning patients were restricted from sitting in the waiting room. Patients coming in for an appointment were asked to wait in their vehicle until a representative called them by phone. All patients were asked to wear a mask at the appointment, or they were given a mask if they were not wearing one prior to seeing the provider. The medical assistants reported the task was time-consuming because of the additional cleaning requirements between each patient interaction. The providers mended the situation by helping the medical assistants perform blood pressures during the physician's visit or at the end of a patient's appointment. Allowing patients to bring home BP monitors to appointments received positive feedback and engaged the patients to comply with their plan of care. The providers were increasing televisits due to the pandemic and were able to comply with the 1-month follow-up intervention, and they mentioned positive patient response. Reminders about prescription refills via email, telephone, and telehealth visits helped patients. The providers stressed financial expenses were

the major problem with medication adherence for most of the patients. The panel hoped the indicator subtypes would reflect this concern. The interventions that were not approved were the white coat hypertension diagnosis and pharmacy telehealth visits. The next expert panel meeting was scheduled for March 12, 2020.

### **First PDSA Cycle Findings**

**Plan:** New quality indicators were entered into the dashboard system and percentages were to be evaluated before the next expert panel meeting on February 21, 2020, with an expected outcome of a 10% increase for both metrics by May 21, 2020.

**Do:** Percentages for metrics were collected weekly to compare results. I was available for questions concerning the project's progression at the workstation during business hours.

**Study:** On February 7, 2020, the MPR metric percentage was at 33%. It increased to 35% within 1 week (February 14) and improved to 36% until February 21, 2020. For the Stage 1 hypertension metric, the percentage was at 63%. It increased to 64% within 1 week (February 14) and stayed at 64% until February 21, 2020.

**Act:** The expert panel discussed whether to adopt, adapt, or abandon quality indicators based on findings. The panel decided to abandon initial indicators and proposed new ones. The new indicator would be medication consistency greater than or equal to 80% ( $MC \geq 80\%$ ), displayed in green print. The failing indicators would be medication consistency greater than or equal to 20% for financial reasons ( $MC \geq 20\%$  [FR]) and nonfinancial reasons ( $MC \geq 20\%$  [NFR]), displayed in red print.

The blood pressure indicator changed to controlled hypertension greater than or equal to 140/90 ( $CHTN \geq 140/90$ ) and would be displayed in green print; uncontrolled hypertension greater than or equal to 140/90 ( $UCHTN \geq 140/90$ ) would be displayed in red print. Findings from the first PDSA cycle are presented in Table 1.

Results for the new indicators will be presented in the section titled Second PDSA Cycle Findings.

**Table 1**

*First PDSA Cycle Findings*

Initial indicators	New indicators	Date		
		2/7/20	2/14/20	2/21/20
		%	%	%
MPR $\geq$ 80% = 292	MC $\geq$ 80%	33	35	36
MPR $\geq$ 20% = 73	MC $\geq$ 20% (FR)	67	65	64
	MC $\geq$ 20% (NFR)			
S1HTN $\geq$ 140/90	CHTN $\geq$ 140/90	63	64	64
S1HTN $\geq$ 140/90	UCHTN $\geq$ 140/90	37	36	36

*Note.* Percentage results are for the initial indicators. MPR = medication possession ratio; S1HTN = Stage 1 hypertension; MC = medication consistency; FR = financial reasons; NFR = nonfinancial reasons; CHTN = controlled hypertension; UCHTN = uncontrolled hypertension.

**Fifth Phase**

The fifth phase consisted of an expert panel meeting held on March 12, 2020, to discuss the second PDSA cycle findings and the progress on interventions. The expert panel reviewed the medication consistency indicator results and compared those to the first PDSA cycle findings. From February 7, 2020, to February 21, 2020, the indicator had a 3% increase. From February 28, 2020, to March 12, 2020, the indicator MC  $\geq$  80% had a 0% increase. The interesting finding was in the second medication consistency indicator (MC  $\geq$  20%) and its subtypes (financial reasons and nonfinancial reasons). By March 12, 2020, 63% of their patients were failing this measure, but separating this group into financial subtypes displayed that 60% of those patients were failing the metric due to financial reasons. The data were not surprising because of the social determinants of health associated with the underserved population. Unfortunately, financial considerations are not part of exclusion criteria for any insured or

noninsured patients. The panel realized the financial data do not improve the quality metrics and wished to focus on interventions that could fix the situation. The panel decided to eliminate the financial subtype and return the amount of days to the indicator.

The panel discussed talking with patients about medication adherence and realized accountability was a major issue with patients. The panel requested having patients sign a contract, agreeing to adhere to the plan of care with their medication list and dates to refill prescriptions for better compliance. Half of the panel members advocated that patients have the right to buy or not buy medications and that they should not be forced to sign a contract. Other panel members stated that this course of action would help patients take the matter seriously when obligated to sign a legal document. The compromise among the panel was to have patients sign a medication agreement and not a medication contract, with the number of days they had left to stay compliant. The indicator  $MC \geq 80\%$  was modified to medication agreement greater than or equal to 80% equals 292 calendar days ( $MA \geq 80\% = 292$ ) and was displayed in green print. The failed indicators  $MC \geq 20\%$  (FR) and  $MC \geq 20\%$  (NFR) were changed to medication nonagreement greater than or equal to 20% equals 73 calendar days ( $MNA \geq 20\% = 73$ ), and it was displayed in red print. The hypertension indicator was kept the same because the anticipated outcome of 10% improvement had been reached.

The panel agreed that the success behind this indicator was the interventions associated with the metric. Reviewing charts and providing patients with the correct diagnosis influenced the percentage outcome. The staff working together to collect two different blood pressure readings excluded some patients from the metric entirely. Seeing the patient's BP improvements increased staff interest in the project immensely.

Patients started inquiring about the reason behind taking multiple blood pressure readings during appointments, piquing their interest about metrics. Several patients purchased home BP monitors, requesting blood pressure management materials to assist with their care. The panel wished for similar success with the medication consistency interventions but feared the financial aspect might be too difficult of an obstacle to overcome. The panel stated they were seeing patients with improved medication consistency and reported patient satisfaction with 90-day medication refills. However, they suggested the percentages would improve over time and not within the 3-month duration of the project. One recommended intervention consisted of tracking patients under the failed metric to discuss their options and assist them with filling their prescriptions. This intervention was agreed on and would be discussed at the next scheduled meeting.

### **Second PDSA Cycle Findings**

**Plan:** New quality indicators were entered into the dashboard system and percentages were to be evaluated before the next expert panel meeting on March 12, 2020, with an expected outcome of a 10% increase for both metrics by May 21, 2020.

**Do:** Metric percentages were collected weekly to compare results.

**Study:** On February 28, 2020, the medication metric increased to 37% and did not improve by March 12, 2020. In comparison with the first PDSA cycle findings, the medication indicator improved by 3% and only improved by 1% during the second PDSA cycle. The indicator was modified once more, and an intervention was recommended to improve the outcome. Patients failing the indicator would be contacted for additional assistance to get their prescriptions filled, and the intervention would be reassessed at the next meeting.

On February 21, 2020, the Stage 1 hypertension indicator was at 64%, and the indicator was changed to  $\text{CHTN} \geq 140/90$ . On February 28, 2020, the measure improved to 68%; on March 6, 2020, the measure increased to 74% and stayed at this percentage through March 12, 2020. This indicator was left as is because the anticipated outcome was met.

Act: The expert panel discussed whether to adopt, adapt, or abandon quality indicators based on findings. The indicator  $\text{MC} \geq 80\%$  was modified to medication agreement greater than or equal to 80% equals 292 calendar days ( $\text{MA} \geq 80\% = 292$ ) and displayed in green print. The failed indicators  $\text{MC} \leq 20\%$  (FR) and  $\text{MC} \leq 20\%$  (NFR) were changed to medication nonagreement greater than or equal to 20% equals 73 calendar days ( $\text{MNA} \geq 20\% = 73$ ), and it was displayed in red print. The hypertension indicator was not modified. Table 2 shows the results of the second PDSA cycle.

**Table 2**

*Second PDSA Cycle Findings*

Previous indicators	Modified indicators	Date		
		2/28/20	3/6/20	3/13/20
		%	%	%
$\text{MC} \geq 80\%$	$\text{MA} \geq 80\% = 292$	37	37	37
$\text{MC} \geq 20\%$ (FR)		52	55	60
$\text{MC} \geq 20\%$ (NFR)	$\text{MNA} \geq 20\% = 73$	11	8	3
$\text{CHTN} \geq 140/90$	$\text{CHTN} \geq 140/90$	68	74	74
$\text{UCHTN} \geq 140/90$	$\text{UCHTN} \geq 140/90$	32	26	26

*Note.* Results are from the previous indicators. MC = medication consistency; FR = financial reasons; NFR = nonfinancial reasons; CHTN = controlled hypertension; UCHTN = uncontrolled hypertension; MA = medication agreement; MNA = medication nonagreement.



**Sixth Phase**

The expert panel meeting was scheduled for March 27, 2020; however, it was rescheduled to April 24, 2020, due to the COVID-19 pandemic. The panel discussed the third PDSA cycle results and associated interventions. The expert panel wanted to adapt both indicators for the present time and place a hold on any further PDSA cycles due to the COVID-19 pandemic. The expert panel also wished to continue the project, but because of the global impact of the pandemic, they could not promise a future timeframe.

The panel agreed that weekly tracking was not as effective as 2-week interval monitoring due to the small increment increases. Daily tracking presented with too much variation among percentage results in comparison to the 2-week interval results. The panel recommended only reporting the percentages every 2 weeks for better trend visualization. The panel agreed that data collection and verification of the data were to be monitored weekly for consistency but results were to be obtained biweekly. The panel suggested the meetings occur monthly because the percentage trends would have less result frequency, and it would decrease social gathering risks associated with COVID-19.

The intervention recommended at the previous meeting was carried out by me, the project champion. After reviewing the failed medication metric list, a spreadsheet was generated with associated patient IDs and next scheduled patient appointments. After gathering the data needed for implementation, a prompted medication questionnaire was created and posted in the waiting room. Prior to or after the appointment, I was to speak with the designated patients in the waiting room about medication adherence, opportunities to improve their possible outcomes, and the pharmacy next door for prescription convenience. Unfortunately, due to the COVID-19

pandemic, the intervention was not implemented because of the absence of patients in the waiting room due to social distancing requirements. The next meeting would be May 15, 2020, to present the data and discuss future feasibility of the project.

### **Third PSDA Cycle Findings**

**Plan:** New quality indicators were entered into the dashboard system and percentages were to be evaluated before the next expert panel meeting on April 24, 2020, with an expected outcome of a 10% increase for both metrics by May 21, 2020.

**Do:** Metric percentages were collected biweekly to compare results.

**Study:** The medication agreement indicator improved to 45% on March 26, 2020. The medication measure stayed consistent at 45% through the following week of April 10, 2020. Unfortunately, the metric percentage decreased to 40% by April 24, 2020. On March 12, 2020, the second indicator  $\text{CHTN} \geq 140/90$  was at 74%, improved to 76% by March 26, 2020, and increased to 80% by April 24, 2020.

**Act:** The expert panel discussed whether to adopt, adapt, or abandon quality indicators based on findings. Both indicators were adopted at this time, pending further modification due to social gathering limitations. There were no future PSDA cycle meetings scheduled. Table 3 shows the results of the third PSDA cycle.

**Table 3***Third PDSA Cycle Findings*

Final indicators	Date		
	3/27/20	4/10/20	4/24/20
	%	%	%
MA $\geq$ 80% = 292	45	45	40
MNA $\geq$ 20% = 73	55	55	60
CHTN $\geq$ 140/90	76	78	80
UCHTN $\geq$ 140/90	24	22	20

*Note.* MA = medication agreement; MNA = medication nonagreement; CHTN = controlled hypertension; UCHTN = uncontrolled hypertension.

**Seventh Phase**

The panel met on May 15, 2020, to view the metric percentage results, discuss the success of associated interventions, and elect project champions to continue the project. The final metric percentage for the medication indicator was 40% on April 24, 2020, with an overall improvement of 7% since February 7, 2020. The final medication indicator chosen was medication agreement greater than or equal to 80% equals 292 calendar days (MA  $\geq$  80% = 292), displayed in green print. The failed metric would display in red print as medication nonagreement greater than or equal to 20% equals 73 days (MNA  $\geq$  20% = 73).

The final metric percentage for the blood pressure indicator (CHTN  $\geq$  140/90) was 80% on April 24, 2020, with an overall improvement of 17% since February 7, 2020. The anticipated outcome of a 10% improvement in both metrics was only met with one of the indicators but was still viewed as a success by the expert panel considering the circumstances of the pandemic (see Appendix A for metric percentage results).

The panel mentioned the blood pressure interventions were essential to the metric's success. The interventions that were credited toward the metric's success

were taking multiple measurements per appointment and chart auditing by the registered nurses to reclassify the hypertension diagnoses. The providers stated the follow-up visits were tedious but were well received by patients. The patients appreciated the increased attention, and the visit allowed for questions and reiteration of their care plan. The panel reported the medication agreement interventions were effective but suggested financial solutions would have improved the metric overall.

A motion was made to continue the project's progress by electing the quality measurement manager as the project champion with assistance from the registered nurses. The motion was seconded, and all panel members voted in favor of Cruz as the new project champion. The expert panel was excited to continue this process after the business adjusts to the new patient appointment and infrastructure modifications due to the pandemic. After that meeting, the preliminary results were discussed at the interprofessional meeting, and data collection ended on May 21, 2020.

### **Project Outcomes**

One of the greatest successes was the ability to continue the project during the global pandemic. The practice had a steady increase in patient appointment cancellations due to community fear of COVID-19 and adapted their business model by implementing protocols and safety precautions to continue patient care. Some private practices had to furlough or close completely. The sustainability of the practice was due to the stakeholders' dedication and creativity. I was grateful to the stakeholders for continued allowance on the premises because without appropriate data collection, the project's outcome would have been gravely affected.

Implementation of the electronic dashboard allowed the metrics to be monitored on a regular basis and was significant toward anticipated outcomes. Being able to view archived data on the dashboard assisted with the instrument's reliability

and secured validity in the percentage results. The dashboard allows for sustainability and input simplicity for future indicator modifications. Integrating the dashboard into the EHR system provided the staff with constant visual prompts for the associated interventions and performance feedback. The metrics graded the staff comprehensively, developing a team culture to improve quality.

The project's most significant strength was improvement of staff's perceptions toward quality measures. Prior to the project's implementation, the providers reported quality measure knowledge as unnecessary and already felt overwhelmed with responsibilities. The stakeholders reported the main reason they hired a quality measurement team to focus on the metric data was to take the responsibility away from the providers. The providers' perceptions were pessimistic at first, but after teaching the fundamental knowledge of metrics with assistance from the clinical mentors, the bigger picture was quickly visualized. The ancillary staff realized the significance of the metrics as well, and everyone worked as a team to improve the quality of patient care. Generating a dashboard provided data visualization for the practice and incentivized everyone to focus on their personal contribution to the quality of medical care. Most of the interventions were successful and improved the anticipated metric outcomes.

### **Limitations**

The COVID-19 virus was declared a global pandemic by the World Health Organization on March 11, 2020, and the amount of cases rapidly increased in the United States. Two days later, on March 13, 2020, President Trump declared a national emergency and ordered businesses, schools, and universities to be closed until further notice, with more than 1,600 positive cases in each state (Villareal, 2020). The San Antonio City Council mandated a stay-at-home order until April 9, 2020, only to extend

it thru mid-May 2020. The pandemic stayed a barrier, with 2,00,00,000 cases in the United States and more than 100,000 deaths reported (Villareal, 2020).

Recommendations advised by the CDC were changing weekly, and temporary isolation was quickly becoming a new living existence. The adapted normal consisted of staying home, practicing social distancing of at least 6 ft, and risking being fined by the police for not wearing a mask in public. The virus was the biggest project limitation because it interrupted every daily living activity, requiring a sterile and solitary existence for survival.

The practice dropped half of their operational staff. Nonessential staff were given a 2-week visitation restriction. Patients were being seen in the parking lot and via telehealth due to limited PPE on national back order. People all around the world were losing jobs, businesses, and financial stability. It was difficult talking about medication adherence when patients expressed concern about electricity bills and purchasing basic necessities. Accurate blood pressure measurements were tough to obtain initially. Many of the patients' vital signs were elevated after seeing an empty waiting room and the staff in full PPE attire.

Other limitations consisted of excluded interventions such as ABPM for diagnosing white coat hypertension. The providers felt too many patients would be falsely diagnosed with white coat hypertension based on the pandemic and new protocols in place. The providers reported patients appearing fearful during appointment visits and having elevated vital signs in comparison to their previous visits. The providers hoped to implement the intervention at a more proper time with lower risk for false positive diagnoses.

An intervention was recommended by the panel to approach patients that failed the medication agreement metric during appointments and extend support for those

who needed assistance. Unfortunately, due to the social distancing requirements, this intervention was not implemented. Another intervention eliminated was adjunct telehealth pharmacy visits. Adding a pharmacist consultation to telehealth visits was financially expensive and difficult to swiftly obtain mandated legal requirements. The providers favored the concept of a pharmacist consultant reviewing medication reconciliations, but the financial cost of the intervention outweighed the benefit in comparison.

### **Evaluation**

#### **Recommendations**

Recommendations proposed during the microsystem assessment of the practice were accepted and applied prior to the project's conception. The stakeholders' readiness for change was significant to the project's success. Hiring two population health nurses and purchasing the electronic dashboard program were crucial for the proposed strategy. Without the stakeholders' trusted support and acceptance of the recommendations, the project would have been inconceivable.

After reviewing the analysis of the preliminary results, one recommendation was to continue the medication agreement intervention proposed by the panel. Calling patients via telephone or extending support during telehealth visits could be an alternative solution for implementation. The recommendation was discussed with the stakeholders and was put into effect during June 2020 by the quality measure team. The patients gave positive feedback by stating that the practice's increased attentiveness was appreciated during this time of required social isolation.

Another recommendation was to have a private meeting with the stakeholders of the pharmacy adjacent to their practice to discuss offering patient discounts and possible payment plans. The panel reported approaching the pharmacy stakeholders

upon the practice's grand opening, and the consideration was refused. The panel discussed approaching the pharmacy stakeholders again due to the abundant business the practice renders to the pharmacy. The panel wanted to offer the pharmacy stakeholders a negotiation that would accommodate both parties and limit financial risk, such as offering patients a pharmaceutical membership. The panel wished to cease action until the offer was mitigated and finalized by the panel.

Another recommendation suggested to the panel was to continue the panel meetings to enforce continuing indicator modifications. The objective behind the suggestion was not about the indicators but to keep integrating quality improvement by applying the tools utilized during the project to assist with future problems. Having the panel apply the PDSA cycle helped them realize that every intervention introduced should be planned carefully prior to implementation, analyzed after collecting data, and evaluated after discussing the findings to improve the decision-making process. The panel stated they would consider the suggestion.

### **Implications for Practice**

Even if the anticipated goals were not met, everyone has gained knowledgeable experience from this project. Achieving failure was important because of the lessons learned during the journey. After the third PDSA cycle, a member of the panel stated that modifying the indicators did not achieve metric success. Modifying fundamentals of the metric to make it applicable for the patient population being served was the essential objective. The indicators served more as reminders for the providers' main objective, which was to advocate preventative health care opportunities using evidence-based research to serve the public.

The expert panel has continued to conduct meetings to brainstorm future plans for metric modifications and future approaches to quality improvement. Some of the



indicators for diabetes mellitus measurements have been modified by the expert panel, which has led to percentage increases. The quality measurement team performs morning huddles to maintain open communication about the metric percentages and provides employees opportunity to suggest new methods or approaches that could benefit the practice.

The project required a doctoral-prepared nurse practitioner because the interventions and processes were gathered from evidence-based research and best practices. Investigating research studies with varying results produces evidentiary interventions proven to be effective. PDSA cycles are one of the most common techniques used for quality improvement projects. Educating the panel, performing PDSA cycles, and documenting the dissertation findings required doctoral-level expertise.

After spending a year with the practice implementing concepts for quality improvement, positive habits were established and fixed mindsets were adjusted, promoting future business success. Overall, the project did achieve success and provided a 17% improvement in the controlled hypertension quality measure and 7% in the medication agreement measure. Even with the pandemic limitations that occurred, the project remained sustainable and has provided the expert panel with extensive knowledge on quality improvement for all domains of the practice. The staff and interprofessional team enjoyed the project and felt that if the pandemic had not occurred, the project would have exceeded the anticipated outcomes.

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Appendix

Summary of PDSA Findings

Figure 1A

*Medication Agreement Measure*

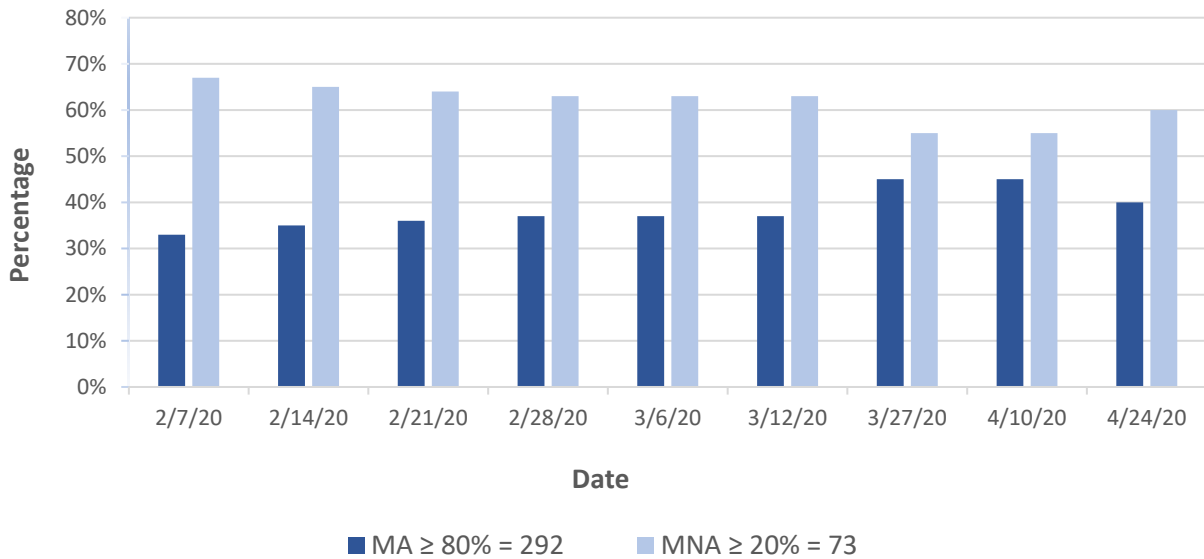


Figure 2A

*Controlled Hypertension Measure*

