

Community-Based Interventions to Reduce Disparities in Management of Severe
Uncontrolled Hypertension in the Southeastern United States: A Critical Appraisal
by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
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2023

ABSTRACT

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Abstract

Background: Hypertension is the leading preventable cause of death and disability around the globe, with clinically and socially derived factors. Despite international guidelines and interventions for care, over 1.28 billion adults 30-70 years old worldwide had hypertension in 2019, and only 42% were diagnosed and treated. Similarly, over 122 million (46.7%) adults in the United States (US) had hypertension between 2017 and 2022, 25.7% had their diagnosis under control, and 38.3% were unaware. Inequities in prevalence and management rates significantly impact minority populations, specifically Black Americans. This study aims to critically appraise foundational efforts and evaluate recent adaptations of a quality improvement project, *Closing the Gap on Health Disparities and Health Outcomes in Hypertension* (CTG), aiming to reduce hypertension disparities through community-centered interventions. Methods: We conducted a comprehensive critical appraisal using the A comprehensive tool to Support rEporting and critical appraiSal of qualitative, quantitative, and mixed methods implementation reSearch outcomes (the ASSESS tool) on CTG's 2017-2019 intervention cycle. Additionally, prospective intervention analysis was conducted for CTG's Fall 2022 Intervention Cycle using descriptive statistical analysis. Participants of both evaluations were low-middle income patients of a local Federally Qualified Health Center (FQHC) who were recently diagnosed with severe hypertension of SBP \geq 180 mmHg or DBP \geq 110

mmHg, were ≥ 18 years old, and had visited one of the FQHC's nine sites in the past 12 months. Results: CTG's community-centered telephone outreach effectively re-engaged high-risk patients to primary care. Patients who participated in individualized telephone outreach and used self-monitoring blood pressure BP cuffs were more likely to decrease their blood pressure than those who did not. Conclusion: Telephone outreach and self-monitoring BP cuffs are important tools for reducing BP and health disparities for Black Americans. Further research is needed to incentivize and increase the capacity for other FQHCs and other low-resourced health centers to provide telemedicine services and free self-monitoring BP cuffs.

Dedication

I dedicate this thesis to my grandmother, 'Cucu' Miriam Gachungi, who passed away from hypertension complications. Your strength, love, and smile live on, and our shared names remain a constant reminder of the importance of this work and the fight for health equity to advance healthcare access for all!

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1. Introduction

Hypertension, also called uncontrolled blood pressure (HBP), is the leading non-infectious, preventable cause of death and disability globally (World Heart Federation, n.d.) in the United States. Despite international guidelines for care and interventions that reduce hypertension rates, a comprehensive global analysis of hypertension identified increased rates from around 650 million (1990) to around 1.28 billion (2019) in adults 30-79 years old (NCD Risk Factor Collaboration, 2021). Of the 1.28 billion, only 42% were diagnosed and treated, and over 1 billion (82%) lived in low and middle-income regions (WHO, 2021). Like global prevalence rates, over 122 million (46.7%) adults in the United States (US) had hypertension between 2017-2020 (Tsao et al., 2023). Of the 122 million, 25.7% had their diagnosis under control, and 38.3% were unaware.

Hypertension is often diagnosed in ambulatory settings as systolic blood pressure (SBP) of >130 mmHg and diastolic blood pressure (DBP) of >80 mmHg (Whelton et al., 2022). Daily blood pressure (BP) varies with normal biorhythms and activities. However, life-threatening complications occur with sustained HBP. Rightfully named as the silent killer, hypertension often does not cause symptoms. Still, it leads to complications, including stroke, cardiovascular disease (CVD), vision loss, kidney disease or failure, and sexual dysfunction (World Heart Federation, 2023 and Heart, 2022). These complications were reported as the primary or secondary cause of more

than 670,000 US deaths in 2020 (CDC, 2021). In 2021, essential hypertension and hypertensive renal disease caused 42,816 deaths in the US (CDC, n.d.).

Disproportional diagnosis, treatment, and control rates are well documented and exacerbated for minority populations. From 2017-2022, Non-Hispanic (NH) Black American females ≥ 20 years old had the highest prevalence rates (58.4%), followed by NH Black males at 57.5%, 50.3% of Hispanic males, 48.9% of NH White males, 42.6% of NH White females, 35.3% of Hispanic males, 23.9% of Mexican American females, and 20.6% of Mexican American males (Figure 1) (Tsao et al., 2023). NH Black Americans had the highest rates of hypertension but the lowest rates of hypertension control at 21.9%. In contrast, NH White Americans have the lowest prevalence and the highest control rates at 25.7%.

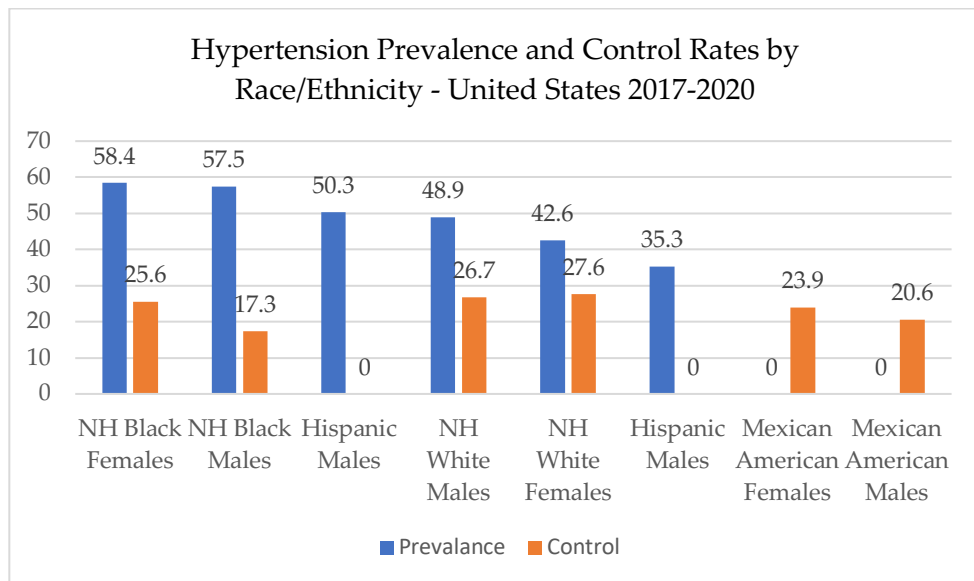


Figure 1. Hypertension Prevalence and Control Rates by Race/Ethnicity

The disproportionate burden of hypertension is clinically and socially derived (Touyz, 2022). Inequities in prevalence and control rates stem from systemic racism that limits access to healthy environments and medical systems for minorities (Bailey et al.,

2017). Multilevel factors contributing to hypertension disparities include racial/ethnic disparities, social determinants of health, and clinical approaches and interventions (Oguinni et al., 2021). Social determinants of health (SDOH) are non-clinical factors that impact health outcomes and widen health inequities (World Health Organization, n.d.). SDOHs include socioeconomic status, physical environment, social support, education, racism and discrimination, and access to quality health care (Oguinni et al., 2021 and World Health Organization, n.d.). SDOHs contribute to statistical differences in health equity across racial and ethnic groups. Black adults are often the most socially, economically, and physically burdened ethnic and racial groups and have the highest prevalence and control rates. Approaches to addressing SDOHs include SDOH assessment, implementing team, community, and evidence-based care interventions, and increasing access to self-measured BP (SBMP) and telemedicine (Oguinni et al., 2021 and White-Williams et al., 2022).

Evidence-based and systematic interventions to improve hypertension have been tested for over a century (Xia et al., 2022). The most common and effective interventions included medication management, diet, lifestyle change, and frequent monitoring of BP. Telephonic outreach and access to self-monitoring BP cuffs are two examples. A systematic review including 13 studies on the impact of telehealth interventions demonstrated that electronic health (eHealth) and telehealth interventions improve BP, medication adherence, and health literacy among patients with type-2 diabetes,

hypertension, or dyslipidemia (Bingham, J. et al., 2021). Additionally, Swaminathan et al.'s study on the impact of self-measured BP monitoring on hypertension management found a more significant BP reduction (17.7%) for participants who frequently checked their BP readings compared to participants who did not (3.9%) (Swaminathan et al., 2020). Despite numerous hypertension interventions, there are limited interventions that re-engage high-risk (SBP >160 and DBP >110) and low-middle-income hypertensive patients back to primary care through telephone outreach and improving access to quality care and resources. Gorina et al. remark on the difficulty of maintaining health outcomes for diabetic, hypertensive, and hypercholesterolemia patients (Gorina et al., 2018). Gorina et al. encourage continuity in creating high-quality interventions based on theoretical frameworks that “not only treat current symptoms... but also help prevent CVD.”

The Closing the Gap on Health Disparities and Health Outcomes in Hypertension

(CTG) quality improvement (QI) project in Durham County responds to Gorina et al.'s call for evidence-informed QI interventions to address hypertension disparities. Durham County is an ideal region for hypertension interventions focused on reducing disparities. Durham County is a mix of rural and urban geography with substantial geographic heterogeneity in hypertension prevalence between Black and White populations (Biola et al., 2020). CTG aims to bridge disparity gaps in hypertension management through evidence-based, community-centered, and non-pharmacological

interventions. CTG operates to (1) reduce barriers to effective care, (2) adapt, improve, and deliver evidence-based strategies for BP measurement, monitoring, and reporting, (3) design a community-tailored implementation and evaluation plan, and (4) develop a sustainability plan with community and health stakeholders (Bass Connections, n.d.). Furthermore, CTG engages in three modes of hypertension interventions: telephone outreach, distribution of self-monitoring BP cuffs and hypertension education classes conducted in collaboration with a local Federally Qualified Health Center (FQHC), staff and students at a local university, and community stakeholders.

This thesis aims to critically appraise the foundational efforts of the CTG between 2017-2019 and evaluate the subsequent adaptation of the initiative following the transition to a telephonic coaching approach in the Fall 2022 Intervention Cycle.

2. Methods

2.1 Critical Appraisal

2.1.1 Setting

CTG's efforts began in 2017 in collaboration with a local FQHC. FQHCs are federally funded nonprofit health centers or clinics that provide primary and preventive care services for medically underserved areas and populations (FQHC Associates, n.d.) FQHCs provide these services with a sliding scale fee based on patients' ability to pay. CTG's affiliated FQHC has a sliding scale fee of \$20, reflecting patients' demographics. In 2017, the FQHC served over 33,000 patients, of which 43.2% of the adults and 24.1% of the children were uninsured (Health Resources & Services Administration, n.d.). The income level of 54.7% of patients' households was $\leq 100\%$ of the Federal Poverty Guideline (FPG), and 72.3% of households were $\leq 200\%$. Nearly half (47.2%) of the patients were best served in a language other than English. A total of 38.6% (n=8,695) of the patients were diagnosed with hypertension. Of the hypertensive patients, 63% of Hispanics/Latinos, 62% of NH White, and 56% of NH Black patients' control. Over 92% of the patients were of racial and ethical minority groups.

2.1.2 Participants

The baseline cohort was patients with a last SBP ≥ 160 mmHg or DBP ≥ 100 mmHg, ≥ 18 years old, and had visited one of the FQHC's nine satellite sites in the past 12 months. This BP threshold targeted patients at the highest risk of hypertension-

related complications. Most of the cohort was female (63%, $n=148$), Black (82%, $n=193$), and uninsured (52%, $n=123$) (Table 1). The average age was 57, and substance abuse was documented in 32% ($n=75$) of the participants. Study participants were identified by the Epic© electronic health record (EHR), reported by a Uniform Data System, and manually verified by two CTG study members.

Table 1. Patient Characteristics Cohort 2017-2019 and Cohort Fall 2022

Patient Characteristic	Cohort 2017-2019 ($n=235$)	Cohort Fall 2022 ($n=345$)
Age, average years	57	52.5
Sex, n (%)		
Male	87 (37.0)	173 (50.1)
Female	148 (63.0)	172 (49.9)
Race / Ethnicity, n (%)		
NH Black	189 (80.4)	345 (100.0)
NH White	12 (5.1)	-
Hispanic	17 (7.2)	-
Other	15 (6.4)	-
Insurance Status, n (%)		
Uninsured	108 (46.0)	116 (33.6)
Medicaid	27 (11.5)	21 (6.1)
Medicare	40 (17.0)	18 (5.2)
Private Insurance	60 (25.5)	190 (55.1)
Substance Usage, n (%)		Data not collected
Any	75 (32.0)	-
Cocaine	46 (19.6)	-
Substance abuse in chart	22 (9.4)	-

2.1.3 Procedures

We used A comprehensive tool to Support reporting and critical appraisal of qualitative, quantitative, and mixed methods implementation research outcomes (the ASSESS tool) to comprehensively describe CTG’s implementation and intervention outcomes and assess the risk of bias in the implementation outcomes (Ryan et al., 2022).

We assessed five studies conducted by CTGs from 2017-2019. One author (VW) extracted data from the five articles into one ASSESS Excel toolkit using a 4-item toolkit provided by the ASSESS tool (*Table 2*). This project was determined not to constitute human subjects research and was deemed exempt as a quality improvement project by the Duke University Institutional Review Board.

We collected appraisal data in four domains (1) methods description, (2) results description, (3) methods evaluation, and (4) results evaluation (*Table 2*). With the first domain, we described the implementation strategy and the intervention implemented. Secondly, we described the results of the implementation strategies and implemented interventions. Third, we evaluated the implementation and intervention methods by

- (1) identifying the appropriate study design and methodology for each study,
- (2) responding to five questions regarding the selected study design, and
- (3) scoring each study accordingly.

Using a provided criterion with five questions, we assigned a score of 0 or 1 to each question, based on (0) if the criterion was not met or (1), if met (*Appendix B*). Lastly, we evaluated the results of the implementation strategy and interventions. We calculated the sums of criterion scores and applied them to the risk of bias scoring criteria. A score of 1-2 indicated a higher risk of bias, while a score of 3-5 indicated a lower risk. A score of “unclear” was possible if the criterion did not apply.

Table 2. ASSESS Tool Domain Descriptions

Domains	Item(s)	Description
FIRST DOMAIN	1. Review of meta-analysis question	The overall question guiding the review or meta-analysis
	2. Study author, publication year	Indicate the study author name and publication year
Introduction	3. Study title	Indicate the study title
	Implementation and intervention strategy	Implementation strategy: refers to how the intervention was implemented Intervention: refers to the healthcare or public health intervention that is being implemented
	4. Rationale	For implementation strategy: the scientific background and rationale for the implementation strategy For intervention: the scientific background and rationale for the intervention being implemented
	5. Aim(s), objective(s), or research question(s)	Are there clear aims, objectives, or research questions? Indicate the primary and secondary
Methods: Description	6. Descriptions	A description of the intervention and implementation strategy
	7. Adaption	A description of any adaptation that has and/or will occur
	8. Design	The design and key features of the evaluation and any changes to the study protocol
	9. Participant types	The participants in the intervention and implementation strategy
	10. Comparison group	If experimental design, indicate the comparison group of the intervention and/or implementation strategy
	11. Context	The context in which the intervention was implemented
	12. Sites	The characteristics of the targeted 'site(s)' for implementation and/or implementation strategy
	13. Subgroups (optional)	Any sub-groups recruited for additional research tasks, and/or nested studies are described

	14. Implementation phase	Indicate whether evaluation occurred pre-, during, and/or post-implementation
	15. Process evaluation	Process evaluation objectives and outcomes related to the mechanism by which the strategy is expected to work
	16. Sample size	Rationale for sample sizes
	17. Analysis	Methods of analysis (with reasons for that choice)
	18. Sub-group analyses	Any a priori sub-group analyses
	19. Outcomes (assessment) implementation:	Acceptability, Adoption, Feasibility, Fidelity, Cost, Penetration, Sustainability
	Outcomes (assessment) intervention:	Effectiveness, Efficiency, Equity, Patientcenteredness, Safety, Timeliness
SECOND DOMAIN Results: Description	20. Outcomes (findings) implementation	Report results of implementation outcomes included in the study
	Outcomes (findings) intervention	Report results of intervention outcomes included in the study
	21. Barriers to implementation	Identify any factors examined that do or could challenge successful implementation
	22. Success of implementation	Identify any factors examined that do or could support successful implementation
THIRD DOMAIN Methods: Evaluation	23. Design	Step 1, 2, 3,
	Step 1.	Insert design type : Qualitative, Quantitative RCT, Quantitative non-randomized or Mixed Methods
	Step 2.	Insert corresponding criteria from instructions
	Step 3.	Provide score (0 or 1) to each criterion. 1 indicates that the criteria was met 0 indicates the criteria was not met
FOURTH DOMAIN Results: Evaluation	Step 4.	Sum the score from Step 3 and apply to the outcomes assessed

24. Outcomes
Bias Column

Indicate the degree of bias based on the design and methods, where 1-2 higher bias and 3-5 = lower bias. 'Unclear' if the degree of bias cannot be determined, or 'NA' for outcomes not assessed

2.1.4 Measures

The primary measures were the implementation outcomes and risk of bias levels. In addition, we used descriptive analysis to assess the risk of bias score, which we report as a mean score.

2.2 Fall 2022 Intervention Cycle

We used a prospective, pre-post cohort design and an iterative QI Plan, Do. The study, Act (PDSA) approach. The PDSA approach is a method to test quality improvement cycles and evaluate changes in implementation and intervention cycles (Guinane et al., 1994; Varkey et al., 2007; Varkey et al., 2009). The objective was to re-engage patients with severe hypertension into primary care and to improve self-monitoring of BP, BP reporting, and goal setting for lifestyle and health behavior change. We conducted a telephone outreach, where 13 CTG student ambassadors contacted patients over five months (August-December) and collected post-intervention BP readings for the following three months. Student ambassadors were trained undergraduate and graduate students from a local university and assigned about 12 patients to call. During calls, student ambassadors offered patients SMBP monitoring cuffs (Oron BP7100, Omron Healthcare Inc), asked patients to report consecutive BP

readings, and encouraged them to create Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) goals to reduce BP (SAMHSA Native Connections, 2017).

2.2.1 Setting and Sample Size

The Fall 2022 intervention cycle setting was at the same local FQHC as the 2017-2019 cycle. In 2021, the FQHC (2021) served about 33,000, and a majority (92%) were of a racial or ethnic minority group (HRSA, n.d.). Of the patients served, 49.7% of adults and 32.8% of children were uninsured. A total of 68.8% ($n=17,009$) of patients' households were $\leq 100\%$ the FPG, 97.12% were $\leq 200\%$, and 52.5% were best served in a language other than English. Of the patients served, 35.7% had hypertension. In 2022, 62.2% of hypertensive NH Black patients had controlled hypertension ($<140/90$ mmHg) compared to 64.7% of all patients.

2.2.2 Participants

The inclusion criteria were patients with SBP ≥ 160 mmHg or DBP ≥ 100 mmHg, ≥ 18 years old, and who visited one of the FQHC's nine satellite sites in the past 12 months. The 2022-2023 cohort included patients ($n=365$) who identified as Black (100%), 173 (50.1%) were male, with an average age was 52.5 (SD) years, and 116 (33.6%) were uninsured (*Table 1*). Study participants were identified by the Epic© electronic health record (EHR), reported by a Uniform Data System, and manually verified by two CTG study members.

2.2.3 Procedures

We contacted eligible patients using a three-call schedule guided by call scripts developed by physicians and community experts (*Appendix B*). Student ambassadors made calls using the latest telephone contact in patients' medical records and the Doximity app, a smartphone application that securely connects health practitioners with patients (Doximity.com). Three call attempts were made on different days before labeling the patient unreachable for each call. Call-one informed patients of the free self-monitoring BP cuffs available at the FQHC and asked about interest in joining the intervention. Patients could receive a self-monitoring BP cuff, regardless of their participation interest. Ambassadors guided patients without cuffs on where to pick cuffs up. They asked about patients' willingness to record BP readings at least twice a week before call-two and informed patients of the weekly hypertension education classes held at the FQHC. Patients who agreed to continue with the calls were scheduled a call-two approximately one to two weeks later, based on patient and ambassadors' availability.

Proceeding calls focused on increasing BP monitoring, discussing non-pharmacological strategies to lower BP, and setting hypertension-related SMART goals. Some non-pharmacological strategies discussed in call two included sodium and alcohol reduction, physical activity, and smoking cessation. Patients were also encouraged and guided in hypertension-related SMART goal(s) and identifying a community-based accountability partner who assisted in BP and health monitoring, medication adherence,

and upholding SMART goals. Student ambassadors did not address medication titration but forwarded medication questions, and SDOH needs to FQHC staff. Barriers to accessing SMBP cuffs and completion of the intervention were also forwarded. Follow-up calls (call-three) checked in on patients' SMART goals, accountability partners, SDOH needs, and BP readings. All outreach data were recorded and stored on a secure Excel spreadsheet in a password-protected folder in Duke Box. The CTG team held weekly meetings with a leading physician at the FQHC, the Principal Investigator, and student ambassadors to review collected data and discuss any upcoming challenges.

The telephone outreach occurred over two PDSA cycles. Cycle 1 was the individualized calls and SMBP cuff distribution. Cycle 2 was follow-up calls for patients who remained uncontrolled. This project was evaluated by the Duke University Institutional Review Board and deemed exempt as a quality improvement intervention.

2.2.4 Measures

The primary outcome measures were patient re-engagement with primary care and BP reduction three months post-intervention. For process measures, we collected the number of calls attempted, patient reach and intervention enrollment, number of patients who received an SMBP cuff, number of reported BP recordings, and SDOH expression and referral. Additional data collected include participants' accountability partners and SMART goal setting.

2.2.5 Analysis Plan

We conducted descriptive statistical analyses on baseline differences between reached and non-reached patients using two-tailed t-tests for continuous variables and Chi-Square tests for categorical variables. Baseline participant characteristics were calculated as mean (SD) for continuous variables or frequency (%) for categorical variables. The process measures assessed the successful adoption of the outreach, which we reported descriptively using count and percentages.

Pre-intervention BP was the most recent BP reading in participants' EHR charts before the start of cycle 1. Patient re-engagement with care was recorded and analogous to post-intervention BP reporting. Patients who returned to the clinic after the intervention were tested for BP. These BP readings were reported to EHR and used for our analysis. We evaluated differences in participants' BP before and after the intervention using paired two-tailed t-tests.

3. Results

3.1 Critical Appraisal

3.1.1 Study Characteristics

We selected five CTG-published articles for the appraisal: (1) *Reaching the Hard-to-Reach: Outcomes of the Severe Hypertension Outreach Intervention (RTRH)* (2) *Efficacy of Hypertension Self-Management Classes Among Patients at a Federally Qualified Health Center (EHSM)* (3) *Evaluating the efficacy of telephone-based outreach in addressing hypertension control among black men with severe hypertension: An observational study (ETBO)*, (4) *Lessons from implementing community-based group classes for severe hypertension (LICB)*, and (5) *Patient expectations and preferences for community-based hypertension classes with implications for action (PEPC)*.

The study objectives and sample sizes reflected the initial CTG study in 2017. However, study methodologies differed (Table 3). RTRH and ETBO were prospective, pre-post cohort studies using the iterative (QI) PDSA approach with three 3-month cycles from August 2019 to July 2020. ESHM was a nonexperimental secondary analysis QI study evaluating CTG’s Hypertension Heroes (HH) class. Lastly, LICB and PEPC built on findings from semi-structured interviews conducted for the larger study’s assessment of the HH classes.

Table 3. Characteristics of Included Studies for Critical Appraisal

Study	Intervention (Year Conducted)	Participant Group	Study Methodology	Outcome Assessed	Risk of Bias Score	Degree of Bias
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RTRH (Biola et al., 2020)	Severe hypertension outreach (2017)	Local FQHC patients with severe hypertension ($\geq 180/110$ mmHg) ($n=265$)	Three 3-month PDSA QI cycles (Mixed Methods)	Efficacy	5	Low
ESHM (Eck et al., 2021)	Hypertension self-management group classes and SMBP cuffs (2019)	N/A	Nonexperimental QI - Secondary Analysis (Quantitative, non-randomized)	Efficacy	4	Low
ETBO (Raman, Biola, et al., 2021)	Telephone-based outreach (2019)	Black men with severe hypertension ($\geq 160/100$ mmHg) ($n=136$)	PDSA QI (Quantitative, non-randomized)	Efficacy	4	Low
LICB (Bulgin et al., 2021)	Community-based disease management classes/programs (2019)	Black men with severe hypertension ($\geq 160/100$ mmHg) ($n=12$)	PDSA QI (Mixed Methods)	Efficacy	5	Low
PEPC (Bulgin et al., 2021)	Community-based hypertension classes (2019)	Black men with hypertension who attended multiple CTG's hypertension classes ($n=7$)	Semi-structured interviews (Qualitative)	Acceptability (Expectations and Preferences)	5	Low

RTRH evaluated systolic and diastolic BP change, medication possession ratio (MPR) and scheduled and attended primary care appointments from baseline to 9 months (Biola et al., 2020). ETBO evaluated the efficacy of a telephone-based strategy for inviting high-risk patients to a weekly self-management education class and the effectiveness of the telephone (Raman, Biola, et al., 2021). ESHM evaluated the efficacy

of the hypertension classes and whether the classes were more engaging or accessible within various demographics (Eck et al., 2021). LCIB assessed the efficacy of the design of the hypertension class to generate patient interest, engagement, and attendance to improve knowledge, peer support, and self-monitoring lifestyle (Bulgin et al., 2021). Finally, PEPC assessed preferences and perspectives of the hypertension classes (Bulgin, Biola, et al., 2021).

3.1.2. Study Findings

Telephone outreach, SMBP monitoring cuffs, and hypertension classes were preferred interventions (*Table 4*). These interventions were evaluated based on their efficacy and acceptability. The efficacy of the telephone outreach was evaluated in two studies, SMBP monitoring cuffs in one and hypertension classes in one. Participant acceptability of the hypertension classes was discussed in one study that assessed patients' expectations and preferences. All five studies had a low risk of bias (*Table 3*).

3.1.2.1 Efficacy

Efficacy outcomes across interventions were similar. One study (ETBO) found telephone outreach as an effective tool to keep high-risk patients engaged in primary care (Raman, Biola, et al., 2021). Of the 136 reached patients, 81.6% had a follow-up visit with a primary care physician, compared to 69.0% of unreached patients. Two studies discussed the SMBP cuffs. One study (EHSM) found that participants who reported self-

monitored BP before attending the hypertension classes were more likely to attend multiple classes than those who did not self-monitor (Eck et al., 2021).

Four articles discussed hypertension classes. However, only two assessed how the classes impacted hypertension rates. One study (EHSM) found notable differences between those who attended multiple classes and those who attended a single class (Eck et al., 2021). Of the 27 patients who attended multiple classes in the EHSM study, 24 had a reduction in systolic or diastolic BP. In addition, multiple class attendees had an average SBP reduction of 19.1 mmHg and a DBP reduction of 14.8 mmHg. Another study (LICB) reported participants' lifestyle changes, like improved eating habits, increased exercise, improved medical adherence, increased BP monitoring, alcohol reduction, weight loss, and more, after completing all four hypertension classes.

3.1.2.2 Acceptability and Appropriateness

One study (PEPC) assessed the acceptability of the hypertension classes through patients' expectations and preferences (Bulgin et al., 2021). PEPC reported that all seven interviewed participants said they would recommend the classes to a friend.

Additionally, most of the participants enjoyed the format and educational materials of the course and the opportunities to speak with specialists. One participant preferred a lecture-style format for the class instead of the discussion-based approach used. Class coordinators also reflected the appropriateness of the classes. They observed that

repetition of class content contributed to a “constructive and comfortable learning environment for all attendees.”

3.2 *Fall 2022 Intervention Cycle*

3.2.1 Cycle Linkages

This QI study tested for changes in CTG’s initial and current efforts to address hypertension disparities through the critical appraisal of the 2017-2019 intervention cycle and prospective intervention analysis of the Fall 2022 intervention cycle. By conducting the appraisal first, we gained insight into the changes conducted through CTG’s lifespan and how these changes influenced CTG’s objectives. The appraisal provided retrospective insight into CTG’s initial efforts revealing that a patient navigator was responsible for calling all 235 identified patients, compared with 14 student ambassadors sharing the responsibility of calling 345 identified patients. The Fall 2022 prospective analysis revealed that increasing the workforce from one to fourteen resulted in almost 70% reach of the identified patient group within a three-month cycle.

Additionally, assessing bias provided greater insight into the impact of the interventions. The low-risk score revealed the intervention’s proper implementation, functioning, and ability to provide the quality of care we aim to provide to this population group.

3.2.2 Prospective Intervention: Adaptive Cycle

The telephone outreach successfully reached patients, increased access to SMBP cuffs, enabled hypertension education and setting of SMART goals, identified community-based accountability partners, and supported SDOH expression and referral. The Fall 2022 CTG team made 962 call attempts between August and December. Among all participants ($n=345$), 234 (67.8%) were successfully reached (*Table 4*). Reasons for unreached patients included non-functioning phone numbers, unavailable patients after three call attempts, or patients expressing disinterest in participating in the intervention. There were no significant differences in insurance status between reached and unreached patients ($p>0.05$) (*Table 5*).

Table 4. Fall 2022 Cohort -Patient Characteristics and Process Measure

Patient Characteristics	Total ($n= 345$)	Men ($n=173$)	Women ($n=172$)
Identified, n (%)	345	173 (50.1)	172 (49.9)
Attempts to reach	962	495 (51.5)	467 (48.5)
Calls, n (%)			
Reached (>1 call)	234 (67.8)	106 (45.3)	128 (54.7)
Enrolled (interested in more calls)	201 (58.3)	93 (46.3)	108 (53.7)
Participated (>2 calls)	72 (20.9)	34 (47.2)	38 (52.8)
Completed (>3 calls)	13 (0.04)	6 (46.2)	7 (53.8)
SMBP Cuff, n (%)			
Already had BP cuff	98 (28.4)	38 (38.8)	60 (61.2)
Received	79 (22.9)	44 (55.7)	35 (44.3)
Reported	37 (10.7)	15 (40.5)	22 (59.5)
Expressed SDOH Need, n (%)			
Food	7 (22.6)	4 (57.1)	3 (42.9)
Housing	6 (19.4)	3 (50.0)	3 (50.0)
Medication Costs	9 (29.0)	5 (55.6)	4 (44.4)
Transportation	7 (22.6)	6 (85.7)	1 (14.3)
Other (Psychiatric help,	2 (6.45)	1 (50.0)	1 (50.0)

Computer help)			
SMART Goals, n (%)	64	32 (50.0)	32 (50.0)
Physical Activity	27 (42.2)	11 (40.7)	16 (59.3)
Food Intake	25 (39.1)	12 (48.0)	13 (52.0)
Frequent BP Check	6 (9.38)	4 (66.7)	2 (33.3)
Sleep 7+ hours	2 (3.13)	1 (50.0)	1 (50.0)
Weight Related	3 (4.69)	3 (100.0)	-
Smoking Less	1 (1.56)	1 (100.0)	-
Accountability Partners, n (%)	42 (59.7)	24 (57.1)	18 (42.9)

Table 5. Fall 2022 Cohort: Reached vs. Not Reached Demographic

Patient Characteristic	Total (n=345)	Reached (n=234)	Unreached (n=111)	p-value
Age, mean (SD)	55.4	56.3 (8.59)	54.2 (8.80)	-
Sex, n (%)				.008957
Male	173 (50.1)	106 (45.3)	67 (60.4)	
Female	172 (49.9)	128 (54.7)	44 (39.6)	
Race / Ethnicity, n (%)				-
NH Black	345 (100.0)	-	-	
Insurance Status, n (%)				0.0525
Uninsured	159 (46.1)	102 (64.2)	57 (35.8)	
Medicaid	48 (13.9)	33 (68.8)	15 (31.3)	
Medicare	18 (5.22)	14 (77.8)	4 (22.2)	
Private Insurance	120 (3.47)	85 (70.8)	35 (29.2)	

Of the 234 (67.8%) reached patients, 106 were male, 128 were female, and 201 (58.3%) expressed willingness to continue calls, reaching enrolled status (Table 4). Following enrollment, 72 patients (20.9% of identified patients) completed call-two, reaching participated status. Only 13 patients (3.8%) completed the intervention (call-three). A total of 79 (22.9% of the baseline cohort) participants received SMBP cuffs from the FQHC, and 98 (28.4%) patients already had a BP monitoring cuff at the time of call-one. Reported barriers to accessing SMBP cuffs included lack of transportation and

strenuous work schedules. Only 37 patients (15 male and 22 female) reported to the student ambassador during calls two or three.

Call-two involved a hypertension education session, in which the calling student ambassador discussed methods of reducing BP and improving overall health with the participants. Additionally, SMART goals and accountability partners were identified during call-two. Of the 72 participants who completed call-two, 59 (81.9%) set SMART goals. Some goals included increasing physical activity, modifying food intake (i.e., salt and sugar reduction), frequently checking BP, and reducing smoking. Most participants set goals relating to physical activity ($n=27$) and food intake ($n=25$). A total of 43 (59.7% of call-two participants) identified accountability partners who included

- family relations (i.e., sister, daughter, mother-in-law),
- significant others (i.e., fiancé, husband, partner for 17+ years boyfriend),
- and community members (i.e., a walking partner, assistant principal, case manager, doctor).

Subsequently, ambassadors asked if patients had additional SDOH needs that may impact their health. A total of 31 participants responded yes; 19 were men, and 12 were female (Table 4). Of the 31 reported needs, the top three involved assistance with medication costs, food, and transportation. All expressed needs were responded to with either direct referrals to pre-determined resources identified by the FQHC or referred to an FQHC staff who directly contacted the patient to discuss the need.

Of the 345 patients in the cohort, 205 re-engaged with primary care within three months post-intervention (March 2023) and had updated BP readings in the EHR (Table

6). Updated BP readings were recorded at the FQHC or other clinic sites during patients' follow-up visits (*Table 6*). Among these patients, the mean change was -16.83 mmHg in SBP and -8.77 mmHg in DBP ($p < 0.05$). Additionally, of the 205 re-engaged patients, 37 reported BP during outreach.

Table 6. Fall 2022 Cohort Pre-Post Intervention BP Outcomes

Outcome measures	Pre-Intervention (<i>n</i>=345)	Post-Intervention (<i>n</i>=205)	<i>p</i>-value
Systolic BP mean (SD)	167.76 (15.25)	150.93 (23.66)	0.0001
Diastolic BP mean (SD)	97.54 (14.14)	88.77 (16.15)	0.0001

4. Discussion

The critical appraisal and prospective intervention analysis findings suggest that a telephone outreach intervention in partnership with a local FQHC addresses gaps in hypertension disparities by re-engaging patients with primary care and improving access to hypertension reduction resources and strategies. Telephone outreach was an important method to improve health outcomes for high-risk, under-resourced, and hardly-reached populations. Results from the critical appraisal demonstrate the successful implementation of low-risk-of-bias QI efforts from the inception of CTG's intervention. Integrating community-based stakeholders and resources with the implementation strategies led to effective and appropriate interventions aligned with participant demographics in the 2017-2019 Intervention Cycle and the Fall 2022 Intervention Cycle. Consequently, the appraised studies identified notable improvements in patients' BP, access to quality primary care, or improved hypertension knowledge. Furthermore, the critical appraisal findings filled gaps in our prospective intervention analysis, enabling assessment of implementation and intervention strategies, risk-of-bias, participants' expectations and preferences for the hypertension classes, and the appropriateness of the classes. Additionally,

CTG's Fall 2022 efforts reflect similar study success rates. Jang et al. reported a 40.6% increase in medication adherence when hypertension patients received two-phone calls and three-phone messages regarding medication information and tips for effective

self-management, compared with a 37.7% increase for those who only received a print intervention (Jang et al., 2021). Although Jang et al. and CTG's BP reduction findings are modest, even a 5 mmHg reduction of SBP reduces the risk of major CVD events by about 10% (Blood Pressure Lowering Treatment Trialists' Collaboration, 2021). Additionally, a small-scale SMBP study highlighted improved medication adherence when access to SMBP and medication management and counseling for Black patients combined (Tucker et al., 2017). Tucker et al. suggest that SMBP interventions alone are not effective for lowering BP or bettering control but most effective when paired with co-interventions, including systematic medical titration by high-level healthcare providers, education, or lifestyle counseling.

Compared with Tucker et al.'s comment on the inefficiencies in stand-alone SMBP interventions, CTG identified self-monitoring BP interventions as effective when paired with telephone outreach and education. Additionally, CTG's efforts to re-engage patients compare with studies that suggest re-engaging underserved patients back to care reduces the disparities gap (Olomu et al., 2021 and Victor et al., 2018). Olomu et al. remark that empowering patient and healthcare-provider relationship benefits include better health outcomes, improved medication adherence, quality of care, and patient safety (Olomu et al., 2021). Moreover, Olomu et al. remark that the most improvements in BP control occurred when patients received coaching from community health workers and physicians who received patient-centered communication training. CTG's Fall 2022

cohort reflects Olomu et al.'s remarks. Reached patients who received individualized sessions that informed patients on best BP reduction strategies (i.e., self-monitoring BP, setting SMART goals, and identifying accountability partners) had greater BP reduction results than non-reached ones.

Similarly, Victor et al. cluster-randomized BP reduction trial demonstrated that Black male patrons (with SBP ≥ 140 mmHg from a Black-owned barbershop) who participated in meetings regarding their hypertension with barbers and pharmacists had a mean SBP reduction of 27.0 mmHg compared to patrons who were only encouraged to participate in lifestyle modification and PCP appointments by the barbers (Victor et al., 2018). The latter patrons had a mean SBP reduction of 9.3 mmHg. Victor et al.'s findings compare with CTG's hypertension class outcomes and emphasize the benefits of community-based accountability partners. Hypertensive patients who are encouraged to get more involved with their health by community members or trusted persons have more positive outcomes.

The descriptive statistical analysis findings of the Fall 2022 intervention cycle emphasized Tucker et al. remark on the inefficiencies of stand-alone SMBP interventions (Tucker et al., 2017). For example, although 177 patients possessed a self-monitoring BP cuff, only 37 reported a BP during the intervention. This finding answered why distributing BP cuffs is insufficient to improve BP reporting, hypertension outcomes, or disparities.

4.1 Study Strengths and Limitations

This QI intervention uniquely adds to the existing literature by engaging with the newly developed ASSESS tool, supplementing limited research on telehealth interventions specific to hypertension and self-monitoring BP cuffs, and providing a comprehensive assessment of an ongoing hypertension intervention. Additionally, the CTG 2022 adaptation of engaging patients with individual student ambassadors uniquely advances approaches to providing clinical and non-pharmacological interventions to underserved, high-risk patients, an approach lacking in the literature. Furthermore, the comprehensive evaluation of CTG identified effective and appropriate methods to address hypertension disparities. Additionally, the findings demonstrated how engaging evidence-based methods to re-engage patients with primary care can improve patient and healthcare-provider relations and reduce hypertension disparities and burden.

Nevertheless, this study's limitations included gaps in assessing CTG's intervention efforts between 2019 and Spring 2022, sample size, short follow-up period, and limited telephone outreach calls. CTG's convenient sample size limited generalizability. For the telephone outreach calls, the 3-month follow-up time-limited sustained BP control rates, while the three calls limited the ability to create long-standing patient and provider relationships. Additionally, the outreach only engaged reached patients and dismissed unreached patients.

4.2 Implications for Policy and Practice

CTG's QI interventions and findings support the Centers for Medicare & Medicaid Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ) January 2022 eCQM 165 ruling (Electronic Clinical Quality Measures, n.d.). The ruling enabled patient-reported self-monitoring BP readings to count as valid and reliable measures in addition to ambulatory readings. An important step for addressing hypertension disparities. Subsequently, this ruling:

- increases earlier and a higher proportion of BP reporting, especially for low-income and low-resourced patients who face challenges accessing and receiving quality health care,
- improves efficiency in patient and provider communication regarding medication adjustments and clinical or non-pharmacological treatment options,
- and reduces required in-clinic hours to only patients with extremely high BP readings.

While this study's findings emphasize the usefulness of the eCQM 165 ruling and interventions that bridge the gap for quality and accessible care for minority populations, there remain policy barriers to sustainably implementing QI interventions like CTG across FQHCs and other low-resource healthcare settings. Current insurance reimbursement and funding policies inadequately incentive clinicians and FQHCs to provide telehealth services. Although the Coronavirus Aid Relief and Economy Security Act (CARES) authorized and incentivized FQHCs to provide telehealth services to patients covered by Medicare, the policy was set to handle the COVID-19 pandemic and ends on December 31, 2024 (CMS, n.d.). While the eCQM 165 ruling aims to compensate

clinics financially for self-monitored BP, additional policies are needed to sustain telehealth services, especially SMBP cuffs for hypertensive patients.

Enabling patient-reported BP is a step forward in bridging the hypertension disparities gap, especially for low-income patients who are either uninsured or are likely unable to afford frequent clinic visits. Thus, the need for incentives or reimbursement opportunities for providers and FQHCs to engage with telehealth services like CTG that supplement self-monitoring BP interventions.

4.3 Implications for Future Research

Numerous research and interventions, including CTG, contribute significantly to identifying solutions that address hypertension disparities. However, there is a need for further research on how to appropriately finance or incentivize FQHCs or low-resourced health centers (globally and in the US) to provide health interventions beyond clinic hours and how to involve community members like the local barbers and student volunteers, Hypertension Heroes, and community health workers to reach the unreached populations. Additionally, more research is needed to understand better why patients with SMBP cuffs continue not to report or monitor their BP and how telephone outreach can serve as a remedy.

5. Conclusion

Hypertension disparities disproportionately impact Black patients on a global and local scale. This essay critically appraised and evaluated CTG's efforts to address these disparities. We identified that CTG's low-risk of bias interventions are effective and acceptable for addressing disparities in hypertension management for Black patients and significantly reducing SBP and DBP by re-engaging patients to primary care, providing access to SMBP cuffs, and educating patients on non-pharmacological strategies that encourage patients to act on their health and improve hypertension outcomes. Additionally, community-based, and team-centered telephone outreaches improve patient and healthcare-provider relationships by promoting personalized and extended communication and allowing providers to address additional SDOH needs that may impact patients' health outcomes. Nonetheless, further research must account for and re-engage the unreached populations to provide similar effective interventions while identifying how FQHCs and other low-resourced health centers can advance telehealth services to improve BP outcomes for high-risk or hardly-reached patients.

Appendix A. Call Scripts

Suggested script for Call #1:

1. “Hello, my name is _____ and I am calling from *****.
May I please speak to _____?”

(Once you get the right person on the phone) Hi there! How are you today?

I am calling because you had very high blood pressure at your last visit, so we wanted to reach out to you about ways you can improve it.

High Blood Pressure can put you at increased risk of heart attack or stroke. We want to make sure you have all the tools you need so that does not happen.

Do you currently have a way to check your Blood Pressure at home?”

- If **YES**: proceed to #3 skipping the [After you get your BP cuff]
- If **NO**: proceed to #2

(If the person does not wish to be called again to discuss Blood pressure or Heart Health related topics, you may end here.)

2. “**Would you like to get a FREE blood pressure kit from Lincoln that would let you monitor your Pressure at home?**

For patients who’d like a home kit ask: “**Would you be willing to check your BP at least twice a week if we give you a free BP cuff to check it with?**”

“**Would you be able to come to **** to pick one up at the Front desk?**”

- **If YES**: “When you come to the Front Registration desk, ask the person sitting there to find your name on the Hypertension Outreach list. (It’s in a locked drawer to their right.) They can sign out your BP cuff kit to you. If you would like to see if a staff member could walk you through how to use it, please ask the Front desk staff if there is someone available for that. Or you and I can talk through it during our next call.”
- **If NO**: “**What can I do to help make it easier for you to get a Blood pressure cuff?**” (We’d like to know if the patient offers up another ***bsite, or if they live far from the clinic. Please note on the “Patient needs communication” section and we will try to figure something out for them.)

3. [After you get your BP cuff], “**Could we talk on the phone at least two more times over the next few weeks to discuss your blood pressure readings and help you with resources that might help lower your blood pressure?**”

If **YES**: “**Great, when is a good time for you?**” [Find a day/time that works for the patient AND FOR YOU.]

If **NO**: Go to #4

4. “Would you be interested in attending Lincoln’s FREE Zoom ‘Hypertension Heroes’ class on Tuesdays at 6PM? There are doctors on there every week to help answer questions, help you make goals and give you information about how to control your BP.”

- Do you have access to a phone/tablet/computer that can show videos?
- Would you like Lincoln to send the link for the class to your email? (If so, take down their email and put it on the “Patient Needs Communication” spreadsheet.)
- **You can also find the link to class on the *** YouTube site, or Facebook page.**

“Thank you for speaking with me today, I really appreciate your time. I hope you will keep coming to Lincoln for your care. We want to help you keep your blood pressure under control. Have a nice day!”

Suggested script for Call #2:

Hi there,

This is _____ calling on behalf of the team at **** to follow up on your blood pressure. Is this patient name? Is now a good time to talk?

- If YES: proceed to #1
- If NO: Ask, “Is there a better time when I can call back when you will be available to talk?” If they do not want to participate, encourage them to follow up with their primary care provider at Lincoln about their high blood pressure.

1. “Have you picked up your BP cuff kit at * yet?”**

- If YES: “Wonderful! Do you know roughly when you got it? (date)”
- If NO: Try to help figure out how they’d like to get one and then skip to # 3.

“Do you know how to use your cuff?”

- If YES: Ask them to walk you through how they use it and add tips/adjustments as needed
- If NO: “Could we go over how to use it together? One of the pages in the packet was about how to take an accurate BP at home.” [Refer to page 4 of booklet]

(E.g. Both feet flat on ground, legs uncrossed, cuff on bare arm, palm towards ceiling, tubing to machine coming out ½ inch above elbow crease in middle of arm. Smoking, talking, using your arm, or needing to pee will all increase BP.)

2. “Have you been able to check your blood pressure recently? Could you tell me your two most recent blood pressure readings?”

- If they have the cuff in front of them, see if they will take a recording with you on the phone (coach them through correct technique) and read it out to you to document.

Advise patient to refer to their “Rainbow card” to interpret results. (Came in the bag w/cuff)

Top # (Systolic)	Bottom # (Diastolic)	What do I do with this Blood Pressure (BP) ?
Less than 120	Less than 80	Great! Recheck regularly, keep eating healthy foods!
120-139	80-89	Can you eat more vegetables, eat less sodium or get more exercise? See provider in 3-6 months
140-159	90-99	Changes may be needed. Call your provider to get an appointment in the next 1-3 months. Can you eat more vegetables, eat less sodium, get more exercise?
160-179	100-109	A medication or other change is needed. Check daily and see your provider within the 2-4 weeks.
180+	110+	If you feel well, check again in a few hours and see your provider in next 1-3 days. If you feel unwell (chest pain, headache, vision changes, fatigue), go to the Emergency Department right now.
See your provider if your resting Heart Rate is often above 115 or below 55.		

3. “Do you have a minute to go over some things that affect blood pressure & heart health?”

If the patient has the Booklet, you can refer them to the bottom of the first page:

1. **Get moving! (30 minutes of exercise, like walking or dancing most days)**
2. **Focus on healthier foods. (Eat vegetables every day, nuts, try to eat fish at least once a week.)**
3. **Check Labels!-- Limit foods with more than 400mg of Sodium per serving and drinks that are sugary.**
4. **Take your medicines. Talk to your doctor if you have concerns about your meds.**
5. **Check your blood pressure at least twice a week, more often before medical visits.**
6. **Drink less than 2 beers/alcoholic drinks per day (more can raise your blood pressure).**
7. **Quit smoking if you smoke – 1-800-QUIT NOW (800-784-8669) can help.**
8. **Sleep 7 hours or more per night. Talk to your doctor for tips.**

4. **“Would you like to set a health-related Goal for the week that we can talk about next time?”** Like maybe eating 1 extra serving of vegetables every day, or walking for a certain amount of time 5 out of 7 days this week, for instance?

5. **“Is there someone in your life that you could share your health-related Goals with this week, or after these calls are over? Like a friend, relative, hair stylist/barber, pastor, or your doctor? People often find they are more able to reach their goals when they have someone to keep them accountable.”**

6. **“While I am calling you today about your blood pressure, we also care about other things that affect your health.”**

“Are you able to reach your medical provider when you need to?”

- **If Yes, please proceed to the next question.**
- **If No, see if the patient is interested in signing up for MyChart where s/he can:**
 - Send messages to provider or care team
 - See lab results and office notes
 - Request appointments or nonurgent medical advice

7. **“Things like not having enough food or reliable transportation or a safe place to live can make it hard to stay healthy. Would you like help with: Cost of medicines, Housing, Transportation, or Food?” (Yes/No)**

If Yes, ask for details and record them in the “Patient needs communication” spreadsheet. Make sure that the person feels heard by reflecting some of what you heard and making an empathetic statement. “It sounds like you are having a tough time with housing. I am sorry to hear that. Can I see if I have phone numbers or addresses to offer you, and then also involve someone on Lincoln’s Social Work team who will reach back out to you at this number?”

*Please use the Excel **Resource list** in our shared Box online to give info about resources that might help. Also let the PATIENT know that they can call ***-***-**** for an appointment to discuss their needs, or YOU/the STUDENT can email ***** with details of the concern.*

Emergent concerns should prompt a 911 or 988 (Suicide prevention) call.

8. Set up a time for your next call with the patient. Thank them again for participating.

Suggested script for Call #3:

"Hi there, Is this _____?"

This is _____ calling on behalf of the team at Lincoln Community Health Center to follow up on your blood pressure. Is now a good time to talk?

[SKIP TO #3 IF NO SMART GOAL WAS SET LAST CALL]

1. "Last time we spoke, you set a SMART goal relating to your health. How did that go?"

- *The patient may just need you to listen and to be reminded that someone is holding them accountable. Remember that SMART goals are specific to the individual. If they are struggling, encourage them to think about the best ways for them to make progress that fits their lifestyle/circumstances.*
- *If the patient made and was successful with a goal that fell within a week's timeframe, ask if they would like to make a new goal or try to reach their previous goal again.*

2. "Did you share your SMART goal with your Accountability partner?"

- If Yes, congratulate them and suggest sharing this week's goal w/them too.
- If No, see if they are interested in attending Zoom class to discuss health goals with other Lincoln patients with high blood pressure. If they want to attend Zoom, take down their email and/or direct them to Lincoln's YouTube Channel or Facebook page.

3. "How has your Blood Pressure been this week?"

Do you have any questions or concerns about taking your blood pressure?

- *Document any Qs/concerns, if patient needs follow up call, put in "Patient Needs Communication" spreadsheet.*

4. Could you tell me your two most recent blood pressure readings?"

(If they need you to call back some other time, please do so.)

Advise patient to refer to their "Rainbow card" to interpret results. (Came in the bag w/cuff)

Top # (Systolic)	Bottom # (Diastolic)	What do I do with this Blood Pressure (BP) ?
Less than 120	Less than 80	Great! Recheck regularly, keep eating healthy foods!
120-139	80-89	Can you eat more vegetables, eat less sodium or get more exercise? See provider in 3-6 months
140-159	90-99	Changes may be needed. Call your provider to get an appointment in the next 1-3 months. Can you eat more vegetables, eat less sodium, get more exercise?
160-179	100-109	A medication or other change is needed. Check daily and see your provider within the 2-4 weeks.
180+	110+	If you feel well, check again in a few hours and see your provider in next 1-3 days. If you feel unwell (chest pain, headache, vision changes, fatigue), go to the Emergency Department right now.
See your provider if your resting Heart Rate is often above 115 or below 55.		

5. FOLLOW UP ON ANY NEEDS IDENTIFIED IN PRIOR CALLS.

6. "Thank you so much for participating in this project. Would you like me to call you again in a week to see how you are doing with your goal/s or your blood pressure or would you prefer to end our calls here?"

- WANTS CALL #4: Set up a time for your next call with the patient. Ask if there is a topic they would like to learn about in the next call so you can provide that.
- WANTS CALLS TO END: **“It has been a pleasure speaking with you, I hope you will continue to let *** care for you.”**

Appendix B: ASSESS Tool Risk of Bias Measure Criterion

METHODS: EVALUATION	
Design	Follow steps 1, 2, and 3
Step 1	Insert design type: Qualitative, Quantitative RCT, Quantitative non-randomized, or Mixed methods
Step 2	Step 2 insert 5 corresponding criteria from instructions
Qualitative criteria	1.1. Is the qualitative approach appropriate to answer the research question?
	1.2. Are the qualitative data collection methods adequate to address the research question?
	1.3. Are the findings adequately derived from the data?
	1.4. Is the interpretation of results sufficiently substantiated by data?
	1.5. Is there coherence between qualitative data sources, collection, analysis, and interpretation?
Quantitative, RCT criteria	2.1. Is randomization appropriately performed?
	2.2. Are the groups comparable at baseline?
	2.3. Are there complete outcome data?
	2.4. Are outcome assessors blinded to the intervention provided?
	2.5. Did the participants adhere to the assigned intervention?
Quantitative, non-randomized criteria	3.1. Are the participants representative of the target population?
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?
	3.3. Are there complete outcome data?
	3.4. Are the confounders accounted for in the design and analysis?

	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?
Mixed methods criteria	4.1. Is there an adequate rationale for using a mixed methods design to address the research question?
	4.2. Are the different components of the study effectively integrated to answer the research question?
	4.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?
	4.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?
	4.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?
Step 3	Provide score (0 or 1) to each criteria where 1 indicates that the criteria was met and 0 indicates the criteria was not met

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