Scaling and Spreading an Intervention for Hypertension Control: An Approach to Address Disparities

Executive Summary

Hypertension, a common condition affecting nearly one in two of American adults, increases the risk of heart disease, stroke, and death.[1] Compared to non-Hispanic White and Hispanic persons, African American persons are more likely to develop high blood pressure, at an earlier age, and with greater impact on health outcomes.[2,3] The Hypertension Management Program (HMP) aims to improve the quality and management of patient care, and decrease the number of patients with uncontrolled hypertension.

Key Findings

Originally developed and proven effective in a high-resource healthcare setting, this initiative replicated HMP in two high-burden settings with fewer resources. The following key findings emerged:

- HMP demonstrated statistically significant improvements in hypertension control rates and systolic blood pressure from September 5, 2018 to December 31, 2019 (16 months) at Family Health Centers (FHC), a Federally Qualified Health Center (FQHC), in South Carolina.

- Over a 10-year time horizon, results show that HMP is a cost-effective method for controlling hypertension among patients who received hypertension management visits (HMVs) across FHC.

- HMP can be implemented effectively in FQHC settings with adaptations and achieve significant improvements in hypertension control rates.

- Key actions can facilitate successful implementation, such as engaging leadership and clinic-level champions across pharmacy, provider, and nursing departments; and conducting intensive patient outreach in the initial start-up phase while new roles and referral pathways become established.

Background

Through a rigorous evaluation conducted by CDC's Division for Heart Disease and Stroke Prevention (DHDSP) in 2012, Kaiser Permanente of Colorado's (KPCO) HMP proved promising in controlling high blood pressure among KPCO's patient population and improved

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[1] Centers for Disease Control and Prevention (CDC). Hypertension Cascade: Hypertension Prevalence, Treatment and Control Estimates Among US Adults Aged 18 Years and Older Applying the Criteria From the American College of Cardiology and American Heart Association's 2017 Hypertension Guideline—NHANES 2013–2016. Atlanta, GA: US Department of Health and Human Services; 2019. Accessed March 12, 2020. https://millionhearts.hhs.gov/data-reports/hypertension-prevalence.html.

[2] Thomas SJ, Booth JN, Dai C, et al. Cumulative incidence of hypertension by 55 years of age in blacks and white: The CARDIA study. *J Am Heart Assoc.* 2018;7(14),e007988. DOI: 10.1161.

[3] Howard G, Lackland DT, Kleindorfer DO, et al. Racial differences in the impact of elevated systolic blood pressure on stroke risk. *JAMA Intern Med.* 2013;173(1):46-51. doi:10.1001/2013.jamainternmed.857 c

practice-level blood pressure control from 61% to 83% in a four-year period.[4] HMP is a team-based, integrated approach to care for patients with high blood pressure.

DHDSP's rigorous evaluation of KPCO's HMP identified 10 key program components that contributed to improving blood pressure control at the health system level (Figure 1).

Figure 1: HMP Ten Key Components

1. Integrated Care Team	**2.** Patient Registries and Outreach Lists in the EHR	**3.** No Copayment Walk-in/Scheduled Blood Pressure Checks	**4.** EHR Alerts for Blood Pressure Re-checks	**5.** Education for Nurses and Other Staff on Blood Pressure Measurement Technique
6. Promote Use of Combination Medications to Treat High Blood Pressure	**7.** Hypertension Management Visits	**8.** Promotion of Home Blood Pressure Monitoring	**9.** Specialty Department Blood Pressure Measurements with Referral to Primary Care When Needed	**10.** Incentives, Rewards, and Recognition

HMP addresses common barriers to managing hypertension, particularly among lower income and/or racial and ethnic minority patients. For example, by offering no copayment walk-in/scheduled blood pressure checks (Component 3, Figure 1), HMP addresses barriers to health care access. HMP also improves care for patients with high blood pressure by using electronic health record-based (EHR-based) registries (Component 2, Figure 1) to contact patients with uncontrolled high blood pressure, offering blood pressure management coaching visits with clinical pharmacists (Component 7, Figure 1), promoting home blood pressure monitoring (Component 8, Figure 1), and rewarding/recognizing staff (Component 10, Figure 1).

In 2017, DHDSP contracted with NORC at the University of Chicago to:

- Use an adapted Systematic Screening and Assessment (SSA) and Evaluability Assessment (EA) method[5] to identify health system sites that serve patients with a higher risk of being diagnosed with high blood pressure and that demonstrated readiness to implement HMP;
- Create an implementation toolkit and provide technical assistance to the sites that were selected to implement HMP; and
- Evaluate the implementation at the selected sites.

From 2017-2020, DHDSP replicated HMP in two high-burden healthcare environments that serve patients with a disproportionately high risk of being diagnosed with high blood pressure and cardiovascular disease.

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[4] Centers for Disease Control and Prevention (CDC). Field Notes: Kaiser Permanente Colorado Hypertension Management Program. No date. Accessed August 21, 2020. https://www.cdc.gov/dhdsp/programs/spha/docs/co_hypertension_fieldnotes.pdf.

[5] Leviton L, Gutman M. Overview and rationale for the Systematic Screening and Assessment Method. *New Dir Eval*. 2010;2010(125):7-31. doi:10.1002/ev.318

HMP Site Selection and Implementation

To identify a health system for program replication, we used an adapted SSA and EA method. Using this approach, we: 1) publicized the opportunity and requested nominations from health systems; 2) conducted implementation readiness and evaluability assessments, and gap analyses; and 3) used written evaluability reports and a panel of experts to determine which sites were most ready for implementation of HMP. Sites were selected based on implementation readiness criteria.

The process yielded 26 potential sites identified for replication, three evaluability assessments, and the selection of two health systems that were invited to partner in program replication and evaluation: Family Health Centers (South Carolina), and Regional One Health (Tennessee).

At KPCO, the majority of patients were middle income, White, and insured. By contrast, at the two sites selected for implementation of HMP, a large proportion of patients were low-income, Black/African American, and uninsured. However, both sites are closed systems that offer primary and specialty care, which makes their health care delivery similar to KPCO and thus promising sites for HMP.

Family Health Centers

Family Health Centers (FHC) is an FQHC that serves the rural counties of Orangeburg, Bamberg, Calhoun, and the upper portion of Dorchester County in south central South Carolina. FHC is currently a Joint Commission-accredited Patient Centered Medical Home (PCMH). FHC operates its main site in the town of Orangeburg and has six full-time satellite sites located throughout the 2,423 square mile service area. FHC is the sole provider of comprehensive primary and preventive health care services in the service area.

In 2017, FHC's main site served 3,539 patients diagnosed with hypertension, and each satellite clinic served 500-800 patients with hypertension.[6] Of these patients, 89% were Black/African American and 21% were uninsured.

Implementation of HMP at FHC

FHC began implementation	Full implementation		End of implementation observation period
●	●		●
April 2018	September 2018		December 2019

FHC's Capacity Prior to Implementation

- The main site and six full-time satellites were all PCMH-certified.
- All but one FHC clinic had an onsite clinical pharmacist providing pharmacy retail services.
- Clinical pharmacists had an active role in hypertension management as part of FHC's hypertension coaching program.

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[6] Health Resources & Services Administration (HRSA). 2017 FAMILY HEALTH CENTER, INC. Health Center Profile. Accessed June 4, 2020. https://bphc.hrsa.gov/uds/datacenter.aspx?q=d&bid=041180&state=SC&year=2017.

- FHC implemented rewards based on clinical quality.

Regional One Health

Regional One Health (ROH) is an integrated safety net healthcare system located in Memphis, Tennessee. ROH serves a five-state region that spans a 150-mile radius from its main campus, including a portion of the Mississippi Delta. In addition to a Level 1 trauma center and acute care hospital, ROH has an outpatient clinic network consisting of 5 primary care and 25 specialty clinics throughout the metropolitan Memphis area. For HMP implementation, ROH selected the Hollywood clinic, a primary care clinic located in a high-need community with high poverty rates.

In 2018, the ROH Hollywood clinic served 1,714 diagnosed hypertensive patients. Of these patients, 96% of patients were Black/African American and 25.6% were uninsured.[7]

Implementation of HMP at ROH

ROH began implementation	Full implementation	End of implementation observation period
●	●	●
January 2019	March 2019	March 2020

ROH's Capacity Prior to Implementation

- Patient registries were used to follow clinical guidelines and address other quality measures.
- Clinical pharmacists had experience co-managing hypertensive patients with attending physicians in the outpatient clinic.
- While ROH did not have an incentive program for hypertension, it had a brand promise recognition program in which staff nominated individuals that best represented the ROH brand.

Due to the COVID-19 pandemic and the impact on its health system, ROH was unable to provide data for the evaluation. Therefore, the evaluation findings center on FHC's HMP implementation and outcomes.

Adaptation of HMP at FHC and ROH

While FHC and ROH already had some components of HMP fully or partially in place prior to implementation, adaptations were necessary to ensure HMP was suitable for their population and organizational context. These adaptations allowed FHC and ROH to leverage their existing capacities and tailor HMP to fit their setting and patients' needs. Two examples of FHC and ROH can be seen in Figure 2.

Figure 2: How FHC and ROH Adapted HMP

KPCO Implementation Features	FHC Implementation Adaptations	ROH Implementation Adaptations
Component 2: Patient Registries and Outreach Lists		

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[7] Regional One Health (ROH). Electronic Health Record. [Data file]. 2019. Accessed January 31, 2019.

KPCO Implementation Features	FHC Implementation Adaptations	ROH Implementation Adaptations
Medical assistants and registered nurses conducted outreach to patients with uncontrolled hypertension at their last encounter, as well as to patients who had not been seen by their primary care provider (PCP) in the past 12 months.	Clinical pharmacists conducted outreach to patients with uncontrolled hypertension at their last patient encounter, via phone call.	An outreach coordinator conducted registry-based outreach, with pharmacy students supplementing outreach efforts.
Component 7: Hypertension Management Visits (HMVs)		
Clinical pharmacists developed medication management plans that were approved by the PCP and implemented by nurses during HMVs.	Clinical pharmacists developed and implemented medication management plans during HMVs; they were not allowed to titrate medications without provider approval.	Established a collaborative practice agreement, which allowed clinical pharmacists to conduct HMVs without seeking approval for medication management plans from providers. Clinical pharmacists from the main hospital traveled to the intervention clinic one day a week.

Evaluation Findings
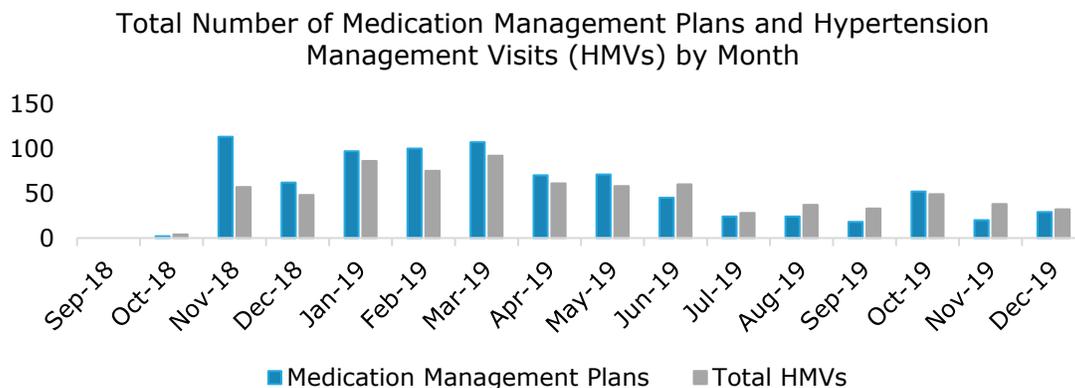
Our mixed-methods evaluation focused on five evaluation questions:

1) To what extent was HMP implemented at FHC as intended? 2) What was FHC's experience with implementing HMP? 3) What was the impact of HMP on hypertension in addition to other related outcomes? 4) What were the estimated costs of implementing HMP at FHC? and 5) What was the cost-effectiveness of HMP?

HMP Implementation at FHC

During the implementation observation period (September 2018 – December 2019), clinical pharmacists at FHC conducted a total of 11,008 registry outreach calls, which resulted in 1,035 scheduled appointments. A total of 316 patients had 758 HMVs with a clinical pharmacist. Clinical pharmacists developed 834 medication management plans in preparation for these visits (Figure 3). In addition, nursing staff conducted 865 no copayment walk-in/scheduled blood pressure checks.

Figure 3: Registry-Based Outreach

Total Number of Medication Management Plans and Hypertension Management Visits (HMVs) by Month

Legend: ■ Medication Management Plans ■ Total HMVs

Facilitators and Barriers to Implementing HMP at FHC

In both early and final implementation interviews, FHC staff held positive views on how HMP had been implemented. Integration of pharmacy staff into primary care practice occurred in many instances. There was improved collaboration and communication among staff, leading to improved care for patients.

Implementation Facilitators

- High engagement among clinical pharmacists from the start of implementation.
- Provider engagement and the subsequent referral of patients to HMP.
- Staff members' observation of improvements in patient hypertension control and the increased buy-in that came with this.
- Stable leadership from the HMP Clinical Coordinator throughout the implementation.

Implementation Barriers

> **"**HMP has worked tremendously great at bringing patients' blood pressure down to goal. The collaboration with me and the pharmacist…. It helps patients feel relieved that they have someone who really cares about them that is working to bring their blood pressure down. The pharmacist goes over medications and also helps with diet. We try to bring patients back every week until we can get them at goal.**"**
> **–Provider**

- Perception among some providers that HMP took too much time, which translated to less HMP referrals at some sites.
- Staff turnover, particularly among FHC leadership, during the implementation.
- View among some staff that HMP was a siloed, pharmacy-specific initiative.
- Time needed to conduct registry-based outreach.

Impact of HMP on Hypertension at FHC

- There were 3,941 patients included in the outcome and cost-effectiveness analyses. Patients were included if they were eligible for the HMP program, had 3 or more total encounters, including at least one encounter each in the pre-implementation and implementation periods.

- Among the 3,941 patients who were included in the analysis, 2,154 had controlled hypertension before HMP implementation and 2,273 had controlled hypertension after HMP implementation—an increase of 119 patients.
- The overall hypertension control rate increased by 3 percentage points (p<.001) after HMP implementation. Prior to implementation, the hypertension control rate was 54.66% which increased to 57.68% after implementation.
- There were statistically significant increases in hypertension control rates in 6 of the 7 clinics (Figure 4).
- Using a logistic regression model, the odds of controlled hypertension were 1.21 (95% C.I.: 1.15 to 1.28, p<.0001) times higher after HMP implementation, compared to before HMP implementation.
- Across all clinics, visits that occurred after an initial HMV were associated with a 3.9 mm Hg lower systolic blood pressure (95% C.I.: -5.5 to -2.3, p<.0001).

Estimated Costs of Implementing HMP at FHC

- Costs were assessed using an activities-based micro-costing approach to estimate the value of the resources used to implement the program.
- Total program costs for HMP were $325,532 overall and $16,277 per month across the program implementation period.
- Monthly cost per patient among all patients eligible to participate in HMP activities (n=4799) was $3.62.
- The cost of adding an additional patient was $3.07 per month.
- HMVs and registry-based outreach activities incurred the highest costs, compared to other HMP activities.

Cost-effectiveness of HMP at FHC

- Comparing a total program cost of $325,532 to the 119 additional patients achieving hypertension control yields a cost per additional patient controlled of $2,736.

Conclusion

Overall, the results from the evaluation demonstrate that HMP can be implemented effectively in a FQHC and achieve significant improvements in hypertension control rates. FHC's experience demonstrates the potential for HMP to be scaled and spread to other health care settings serving patient populations that are disproportionately affected by hypertension. Key success factors for future HMP replications include:

- Engaging leadership and clinic-level champions across pharmacy, provider, and nursing departments is important, especially at the outset.
- Intensive outreach to patients in the initial start-up phase is crucial while new roles and referral pathways become established.
- Ensuring buy-in at the system- and site-level for HMP roles and responsibilities is essential.
- Convening the leadership team overseeing HMP implementation (i.e., Hypertension Management Council) early and often is a prerequisite.
- Feeding data back to staff on HMP program metrics may help sustain momentum at sites.
- Developing a plan for retraining existing staff and onboarding new staff can help sustain staff engagement and mitigate the impact of staff turnover.

- Adapting HMP for telehealth could facilitate further replication, given that health systems have limited capacity for in-person visits amid the COVID-19 pandemic.

More Information about HMP

Lessons learned from this evaluation have been incorporated into a web-based implementation toolkit that can be used by other health systems to adapt HMP for their settings. Future adaptations may include options for telehealth visits with pharmacists and nurses.

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