

EXPERIENCE REPORTS

Linkage between theory-based measurement of organizational readiness for change and lessons learned conducting quality improvement-focused research

George L. Jackson^{1,2} | Christianne L. Roumie^{3,4} | Susan M. Rakley^{2,5} | Jeffrey D. Kravetz^{6,7} | Miriam A. Kirshner¹ | Pamela S. Del Monte⁵ | Michael E. Bowen⁸ | Eugene Z. Oddone^{1,2} | Bryan J. Weiner⁹ | Ryan J. Shaw^{1,10} | Hayden B. Bosworth^{1,2,10,11}

¹Center for Health Services Research in Primary Care, Durham Veterans Affairs Medical Center, Durham, NC

²Division of General Internal Medicine, Duke University, Durham, NC

³VA Tennessee Valley Geriatric Research Education Clinical Center (GRECC), Health Services Research & Development, VA Tennessee Valley Healthcare System, Nashville, TN

⁴Department of Medicine, Vanderbilt University, Nashville, TN

⁵Durham VA Medical Center, Durham, NC

⁶VA Connecticut Healthcare System, West Haven, CT

⁷School of Medicine, Yale University, New Haven, CT

⁸Departments of Internal Medicine, Clinical Sciences, and Pediatrics, University of Texas Southwestern Medical Center, Dallas, TX

⁹Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC

¹⁰School of Nursing, Duke University, Durham, NC

¹¹Department of Psychiatry and Behavioral Sciences, Duke University, Durham, NC

Correspondence

George L. Jackson, Center for Health Services Research in Primary Care, Durham Veterans Affairs Medical Center, HSR&D Service (152), 508 Fulton Street, Durham, NC 27705
Email: george.l.jackson@duke.edu

Abstract

Organizations have different levels of readiness to implement change in the patient care process. The Hypertension Telemedicine Nurse Implementation Project for Veterans (HTN-IMPROVE) is an example of an innovation that seeks to enhance delivery of care for patients with hypertension. We describe the link between organizational readiness for change (ORC), assessed as the project began, and barriers and facilitators occurring during the process of implementing a primary care innovation. Each of 3 Veterans Affairs medical centers provided a half-time nurse and implemented a nurse-delivered, telephone-based self-management support program for patients with uncontrolled hypertension. As the program was starting, we assessed the ORC and factors associated with ORC. On the basis of consensus of medical center and research partners, we enumerated implementation process barriers and facilitators. The primary ORC barrier was unclear long-term commitment of nursing to provide continued resources to the program. Three related barriers included the need to address: (1) competing organizational demands, (2) differing mechanisms to integrate new interventions into existing workload, and (3) methods for referring patients to disease and self-management support programs. Prior to full implementation, however, stakeholders identified a high level of commitment to conduct nurse-delivered interventions fully using their skills. There was also a significant commitment from the core implementation team and a desire to improve patient outcomes. These facilitators were observed during the implementation of HTN-IMPROVE. As demonstrated by the link between barriers to and facilitators of implementation anticipated through the evaluation of ORC and what was actually observed during the process of implementation, this project demonstrates the practical utility of assessing ORC prior to embarking on the implementation of significant new clinical innovations.

KEYWORDS

delivery of health care, health services research, hypertension, organizational innovation veterans

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2016 The Authors. Learning Health Systems published by Wiley Periodicals, Inc. on behalf of the University of Michigan

1 | INTRODUCTION

Despite significant evidence indicating the benefits of antihypertensive medication, lifestyle changes, and well-designed self-management support programs for patients with high blood pressure,^{1–5} approximately one-third of adults in the United States (78 million people) have hypertension.⁶ The benefit of controlling hypertension in terms of reduction in cardiovascular disease and related events has been well established for decades,^{2,7} including findings from a landmark clinical trial conducted in the Veterans Affairs (VA) health care system.⁸ However, only about half of adults with hypertension are controlled by the threshold of 140/90 mm Hg.⁶

Controlling hypertension is considered an important indicator of quality care throughout the US health care system.^{9–11} Although evidence from clinical trials demonstrates that effective patient-self management support helps patients control their blood pressure,^{12,13} such programs are not often implemented across the wide variety of clinical settings in which patients are seen.^{5,14} Paralleling the VA,¹⁴ health systems that have traditionally operated in the fee-for-service environment face barriers (eg, staffing and reimbursement) when trying to implement innovations such as patient self-management support programs.^{15,16} As a result, the VA has focused on highly partnered research that can achieve the following goals: (1) allowing developers of disease- and self-management programs to work with health system stakeholders to enhance the possibility that efforts, if successful, may have an opportunity to be implemented; (2) allowing implementation researchers to evaluate the process of implementing programs; and (3) understanding key barriers and facilitators to sustaining the program across facilities.^{14,17–21}

The Hypertension Telemedicine Nurse Implementation Project for Veterans (HTN-IMPROVE) project sought to implement nurse-delivered telephone self-management support across 3 diverse VA medical centers. The project represents a partnership between the research team that originally tested the intervention in clinical trials and operational leaders at facilities that saw a need to improve hypertension control among primary care patients.

2 | QUESTIONS OF INTEREST

The purpose of this paper is to describe the link between expected barriers and facilitators to implementation assessed as the project was beginning and subsequent barriers and facilitators impacting the implementation of the self-management support program. Described previously,²² we examined the readiness of the facilities to implement HTN-IMPROVE (ie, organizational readiness for change [ORC]) and potential barriers and facilitators through the implementation process. On the basis of consensus of medical center and research partners, we subsequently (at the conclusion of implementing HTN-IMPROVE) enumerated implementation process barriers and facilitators, which we describe here.

Much as individual people may have varying degrees of readiness to change behavior,²³ organizations vary in readiness to implement changes to care systems or implement new interventions. For individual people, the degree of readiness or stage of change is

influenced by perceived benefit of changing behavior (eg, stopping smoking or exercising more) and the perceived ability to make the change.²³ In 2009, Weiner published the theory of ORC,²⁴ which refers to the extent to which organizational members are prepared as a group to make changes in organizational policies and practices that are necessary to implement and support innovation use (change commitment) and their perceived ability to do so (change efficacy). Much as with individual people,²³ attributes impacting ORC include change valence (perceived value of the innovation) and information about perceived task demands, resource availability, and situational context (eg, competing demands).^{24,25} Through this paper, we are able to consider the practical utility of measuring ORC prior to implementing new programs as indicated by whether findings link to barriers and facilitators experienced during the process of implementation.

3 | METHODS

Starting in 2011, the HTN-IMPROVE project has sought to better understand the process of implementing telephone-delivered patient self-management support. The effort was approved by the Institutional Review Boards at the Durham VA Medical Center, VA Connecticut Healthcare System, and VA Tennessee Valley Healthcare System.

3.1 | Intervention and setting

Described previously,^{22,26} HTN-IMPROVE is a nurse-delivered telephone intervention focused on initiating and maintaining health behaviors related to hypertension. This practical intervention/program is based on theories of behavior change and has been demonstrated to be clinically effective in clinical trials conducted in primary care clinics of the Durham VA and Duke University Medical Centers.^{12,13,27–29} The program is organized as telephone encounters that occur approximately every 4 weeks. During each call, nurses use computer software developed as part of previous trials to efficiently gather medical and behavioral information from the participant. At each encounter, a core group of modules are activated. These modules include medication management/ difficulties encountered and adverse effects. Additional modules such as social support, knowledge, and health behaviors including smoking, weight loss, diet, alcohol use, stress, and participatory decision making are activated at specific telephone encounters.^{26,29}

Three VA medical centers located in different VA service regions (Veterans Integrated Service Networks [VISNs]) agreed to deliver the yearlong program to at least 500 patients enrolled during a 1-year period. In fiscal year 2011, the 3 academic medical centers saw between approximately 20 000 and 61 000 primary care patients. Sites were selected for inclusion based on the following: (1) perceived need on the part of primary care leadership to improve the degree of blood pressure control; (2) commitment on the part of primary care leadership to provide 0.5 full-time equivalent of nursing time to enroll patients in the program for a year and continue follow-up for a year; and (3) coming from different VISNs (ie, VA

regions). The VISN is the primary organizational unit of the Veterans Health Administration.³⁰ Having sites from different VISNs meant that the sites operate under a variety of organizational goals and processes.

Intervention software, training, and technical assistance were provided by the Durham VA Medical Center Health Services Research & Development (HSR&D) Center. Participating sites and the site principal investigators (PIs) were responsible for ensuring the program was implemented (eg, determining systems for patient referrals and coordinating efforts among involved clinical services such as primary care and nursing).

While every site had an approved study protocol, HTN-IMPROVE was implemented as a clinical demonstration project. For example, each site agreed to provide 0.5 full-time equivalent of nursing time to conduct the project, with no financial assistance coming from the research project. Each site also had flexibility on how to assign nurses to the project, refer patients to the project, and schedule patients. These decisions were made by the individual HTN-IMPROVE sites, not research investigators.

3.2 | Evaluation of organizational readiness for change prior to the start of the program

Done prior the full implementation of the program and previously described,²² our mixed-methods approach to assessing ORC used a priori semistructured interviews conducted with a sector of stakeholders ($n = 27$) across the 3 sites that included the site PI, a clinical applications coordinator (to help with electronic health record issues), an information technology coordinator (to help with intervention application), the nurse manager, and 1 or 2 nurses/midlevel providers/physicians between 2010 and 2011. Researchers iteratively identified potential facilitators of and barriers to ORC and implementation. Additionally, an ORC survey, an early version of the Organizational Readiness for Implementing Change,²² was conducted with the primary care providers (PCPs) and nurses ($n = 102$) who were at the implementation sites. This 13-item survey examined perceptions of organizational-level change efficacy and commitment to implementing HTN-IMPROVE.

3.3 | Determining barriers and facilitators observed during implementation

We sought to link predicted ORC and associated organizational characteristics at the beginning of the project to barriers and facilitators concerning the actual implementation process. These observations represent the consensus of the 3 site PIs (all physicians), site co-PIs from the 2 sites who filled that role (1 physician and 1 nurse), and the HSR&D research staff who lead the centralized study and provided assistance to facilities (1 health care epidemiologist with a master of health administration degree; 1 health psychologist and 1 physician who led the clinical trials that established clinical efficacy; and the social worker who served as the project coordinator who provided direct support to nurse interventionists at study sites). During the course of the project, the barriers and facilitators experienced within

and across each site were discussed during project-wide conference calls that included representatives of the sites and research staff. These observations were summarized through the process of preparing this paper.

3.4 | Defining what constitutes a “link” between anticipated barriers and facilitators and those observed during program implementation

The determination of a link is based on whether barriers and facilitators anticipated based on examination of ORC prior to the program are validated by the actual presence of those barriers and facilitators during implementation.

4 | RESULTS

Patients were enrolled in HTN-IMPROVE between April 2011 and March 2014. Despite barriers to implementation across 3 sites, sites adapted the delivery of the program to local context, more than 800 patients have received some dose of HTN-IMPROVE (at least 1 encounter). However, there were differences in both the number of patients enrolled and mean encounters per patient. Specifically, 2 sites had approximately the same number of patients enrolled, 229 and 227, respectively, with 1 site enrolling 380 patients. However, the sites with the lower number of patients enrolled had a greater percentage of patients receiving subsequent encounters (71% and 80%) than the site that had the largest number of patients enrolled (37%).

Below, we describe the link between factors impacting ORC measures prior to implementation, which were previously reported in detail,²² and barriers and facilitators to implementation actually experienced during the project, which have not been previously reported.

4.1 | Summary of ORC barriers and facilitators measured prior to program implementation

The primary ORC barrier was unclear long-term commitment of nursing to the intervention. Negative organizational characteristics likely to impact ORC included the following: added workload, competition with existing programs, implementation length, limited available nurse staff time/staff, and logistics of contacting patients and integration into existing workflow. Three barriers are reflected by these concerns: (1) addressing competing organizational demands that can impact implementation and deployment of resources; (2) being flexible in how to integrate new interventions into existing workload; and (3) recognizing different mechanisms for referring patients to disease and self-management support programs.

While ORC results suggested potential barriers to implementation, some important facilitators were noted. There was a high level of commitment to the program as reflected by a close fit with organizational values (change valence). This includes both a desire on the part of nurses to conduct nurse-delivered interventions that allow

them to fully use their skills, significant commitment on the part of the core implementation team, and desire to improve patient outcomes.

4.2 | Observed barriers to implementation noted during program implementation

The barriers described below match those that were anticipated as a result of the assessment of ORC prior to project implementation. As a result, they demonstrate the link between what was discovered/measured through the ORC assessment process and what was

experienced during actual implementation. This association is summarized in Table 1.

4.2.1 | Competing demands

In most clinical trials and grant-funded clinical demonstrations, new staff members are made available to conduct new programs. With no external resources, organizations agreed to provide 0.5 full-time equivalent of nursing time to conduct HTN-IMPROVE. As noted prior to implementation, there were key competing priorities occurring both during the time between the initial discussions about the project and implementation of the intervention (more than a year later). Most

TABLE 1 Link between preintervention organizational readiness for change and barriers and facilitators to implementation observed during the HTN-IMPROVE program

Preimplementation Organizational Readiness for Change Barrier or Facilitator	Associated Barrier or Facilitator Observed During Program Implementation
	Barriers to Implementation
<ul style="list-style-type: none"> • Unclear long-term commitment of nursing to the intervention. • Added workload. • Competition with existing programs. • Implementation length. • Limited available nurse staff time/staff. 	<p>Competing demands:</p> <ul style="list-style-type: none"> • The VA was implementing the patient-centered medical home model that was termed the PACT. • Initial discussions and decisions about participating in HTN-IMPROVE occurred before PACT was being implemented. • HTN-IMPROVE was in line with the patient-centered principles of PACT. • However, PACT represented a significant reorganization of primary care that included new nursing roles and activities that were seen as competing demands. <p>Differing mechanisms for staffing the program (providing 0.5 nursing full time equivalents):</p> <ul style="list-style-type: none"> • Site A—Sought to provide the program at each of 5 sites using 0.1 FTE of nursing time per site. • Site B—Sought to have a single nurse provide the program to patients at 2 sites. However, this resulted in multiple different nurses making calls for varying periods. • Site C—Responded to observed competing demands by working with an established group of case managers to deliver the program. <p>Need to establish mechanism to identify, prioritize, and enroll individuals from among thousands of potentially eligible patients:</p> <ul style="list-style-type: none"> • Sites A and C—Initially focused on provider referral. Site A through reminders and templated orders in the electronic health record and site C through clinic nurses handing patients descriptions of the program. <ul style="list-style-type: none"> ◦ Referral rates from physicians were low. • Sites A, B, and C—All sites eventually adopted a population-based approach to patient referrals. A list of patients who could potentially benefit from the program was developed using data in the electronic health record. Patients were then contacted concerning potential participation. <ul style="list-style-type: none"> ◦ The population-based approach put the process primarily in the hands of nursing, as opposed to relying heavily on primary care providers.
	Facilitators of Implementation
<ul style="list-style-type: none"> • High level of commitment to the program as reflected by a close fit with organizational values (change valence). • Desire to improve patient outcomes. • Desire on the part of nurses to conduct nurse-delivered interventions that allow them to fully utilize their clinical skills. • Significant commitment on the part of the core implementation team utilize skills. 	<p>Enhanced nursing roles:</p> <ul style="list-style-type: none"> • HTN-IMPROVE takes advantage of the biopsychosocial training orientation of nursing. <ul style="list-style-type: none"> ◦ The program focuses on self-management behaviors within individual patient's biologic and social contexts with the goal of improving patient outcomes. • The population-based focus of service delivery placed nursing at the center of delivery of this program that aligns with the orientation of the nursing profession. <p>Committed core implementation team and stakeholders:</p> <ul style="list-style-type: none"> • A partnership between researchers and medical centers. <ul style="list-style-type: none"> ◦ Unlike most research studies, the individual medical centers, not the researchers, provided staff and resources for the program. • Each site had well-respected clinical champions who gained support for the program among both administrators and front-line staff. • Stakeholders were willing to make adjustments (eg, changes in staffing or referral process) to improve delivery of the program. • Commitment continued despite a longer than optimal length of time between initially agreeing to participate in HTN-IMPROVE and implementation.

significantly, the VA has been undergoing substantial reorganization of primary care using the patient-centered medical home (PCMH) model since April 2010.^{31,32} The Patient Aligned Care Team (PACT; VA term for PCMH) program includes organizing care into clearly defined teams of a PCP, registered nurse care manager, clinical associate (licensed practical nurse or medical assistant), and clerical associate (clerk). These teams are held accountable for a variety of clinical and care process metrics, which has resulted in new nursing tasks such as postdischarge phone calls and practicing during extended clinic hours. While HTN-IMPROVE is consistent with PACT principles including patient-centered self-management support and expanded clinical roles of nurses,³³⁻³⁵ conducting program activities were perceived as competing with other important PACT processes.

4.2.2 | Staffing to integrate innovations into existing workflow

Prior to implementation, there was concern about the long-term availability of staff time to conduct intervention phone calls. No direction was provided on how that time should be distributed. There could be 1 person who spent half the time or 5 people who spent 10% of their time on the project. The only guideline that was provided is that it was desirable for the same nurse to call the same patient throughout the course of the intervention. As a result, 3 distinct staffing models were employed.

Site A had 5 distinct locations of care. The goal was to make the program available at all locations. Staff nurses at each location were assigned to make intervention phone calls, with each nurse dedicating approximately 10% of their time to the project. While this allowed the project to be available across the locations, it meant that each nurse was trying to fit the project into many other duties they were trying to conduct related to their roles within the clinic. The majority of these nurses who participated in the program are also clinic nurses that are part of PACT teams. Because each clinical location had different demands on nurse time, enrollment in and staff time spent on the program was not uniform across the clinic location, as was originally intended.

Site B sought to make the program available at 2 locations but only had a single nurse do all phone calls. The nursing service assigned a nurse who was on temporary nonclinical assignments to conduct initial and follow-up phone calls. This practice resulted in multiple nurses participating in the program for different periods because nurses returned to clinical assignments or moved to other roles. Unfortunately, this made it difficult to have 1 nurse follow patients throughout the program. This lack of continuity may have contributed to the fact that this site had the lowest percentage of patients who had an initial encounter having multiple program encounters (37%).

Finally, site C initially worked with its established group of nurse case managers to staff HTN-IMPROVE. The advantage of such a system is that nurses have experience working with patients over the phone and do not have competing demands faced by a clinic nurse. The site subsequently staffed the program with members of the established VA Care Coordination Home Telehealth (CCHT) program, which combines telephone monitoring of disease status with patient-self-management support.³⁶ The HTN-IMPROVE was provided by CCHT nurses as part of their regular job in such a way that the program "counts" toward CCHT performance metrics and workload. This system may have contributed to the fact that this site had the largest

percentage of patients who had at least 1 program encounter having subsequent encounters (80%).

4.2.3 | Patient referral

Approximately one-quarter of VA hypertensive patients had suboptimally controlled blood pressure in 2008 (>140/90 mm Hg).³⁷ The result is that there must be a mechanism to identify, prioritize, and enroll individuals among the thousands of potentially eligible patients. The initial protocol outlined 2 potential mechanisms with an individual-patient focus (PCP referral based on patient reminders and direct orders from PCPs) and a second mechanism that takes more of a population-management point of view (nurses calling patients from a preidentified list of patients with uncontrolled hypertension). Sites A and C began the program with a focus on individually focused reminders (eg, average blood pressure over the last year > 140/90 mm Hg). Site A built the HTN-IMPROVE program order into electronic clinical reminders for patients who have uncontrolled hypertension as a way to appropriately address or "satisfy" the reminder. Additionally, there was a "quick order" template added to the standard orders available to PCPs. Site C initially had clinic nurses had a description of HTN-IMPROVE to patients with uncontrolled hypertension to take to their PCPs for possible referral. In both cases, referrals from PCPs quickly trailed off. It is our hypothesis that this reflects that HTN-IMPROVE referrals represented another activity to already highly busy primary care encounters.^{38,39} Additionally, HTN-IMPROVE was one of multiple ways of "satisfying" the clinical reminders. As a result, sites A and C adopted the population-management approach initially embraced by site B, having program nurses call patients from a preidentified list of members of the primary care populations with uncontrolled hypertension. This approach included key principles of a population-based perspective such as identifying the group of patients that were in need of assistance achieving clinical goals, matching those individuals with available services, and systematically providing those services.⁴⁰ Additionally, the process is placed primarily in the hands of nursing as opposed to physicians and other PCPs, encouraging nurses to fully use their clinical skills.

4.3 | Observed facilitators of implementation noted during program implementation

The facilitators described below match those that were anticipated as a result of the assessment of ORC prior to program implementation. As a result, they demonstrate the link between what was discovered/measured through the ORC assessment process and what was actually observed during program implementation. This association is summarized in Table 1.

4.3.1 | Enhanced nursing roles

As noted above, the HTN-IMPROVE program adapted to circumstances by continually enhancing the role of nurses. Nurses are traditionally trained with a focus on the biopsychosocial nature of health,⁴¹ which recognizes that health status results from a combination of biological, individual behavior, and social environmental components.⁴² The HTN-IMPROVE intervention focuses on behavioral self-management support that also accounts for biological (eg, medication side effects) and social (eg, social support) aspects of patients' lives. Thereby, it fits with the perspectives of many nurses. As noted above,

nursing became even more central to the delivery of the intervention when all sites took a population-based focus. This reflects the goals of PACT/PCMH, which seek to have all nonphysician clinicians' work maximize the clinical impact within their license.⁴³

4.3.2 | Committed core implementation team and stakeholders

When researchers, including those who focus on implementation, typically approach clinics and administrators to participate in research studies, the researchers say that they will either completely staff the intervention (eg, clinical trial staff) or provide money to purchase the time of clinic staff. In this case, researchers did neither of these. Rather, researchers partnered with PCPs at each site who worked with senior primary care clinicians and/or managers who collaborated with facility stakeholders to obtain resources. As a result, core implementation teams represented the concept of having well-respected clinical champions for the program who could engage needed resources (eg, information technology to pull patient lists), convey the importance of the program to fellow clinicians, and work to maintain commitment among stakeholders.^{44,45} These stakeholders include the primary care program at each site that agreed to endorse the program and nursing service (or CCHT) that provides the staff time.

Although there have been competing demands, these stakeholders demonstrated commitment to providing patient-centered services that addresses hypertension control, which is still monitored by the VA with room for continued improvement. This commitment is reflected in the fact that each site (1) adjusted staffing patterns and individuals involved to ensure that patients begin the program and were followed up, (2) engaged new stakeholders (eg transferring the program to CCHT at site C when it became apparent they were in a position to use expertise in tele-health), and (3) used VA electronic patient data systems to identify patients with uncontrolled hypertension with the potential of benefiting from the program. Despite the hurdles, the predicted commitment to the program on the part of individual nurses, implementation teams, and stakeholders is reflected in sticking with the initiative well after the originally scheduled end date with the goal of providing patient-centered care.

5 | DISCUSSION

Our experience with HTN-IMPROVE demonstrated the practical utility of assessing ORC prior to embarking on the implementation of significant new clinical innovations. We used a mixed-methods approach to examine the level of ORC (ie, change commitment and efficacy) and factors that may impact ORC. Both barriers and facilitators that were predicted through the ORC assessment were observed during the implementation of the program. Barriers included the need to fit the program into ongoing workflow through appropriate staffing and patient referral. Fitting the program occurred within an environment of competing demands. Despite these barriers to implementation, more than 800 veterans interacted with the program. This was predicted by strong commitment on the part of facility stakeholders and alignment between the clinical and organizational goals of the organization.

We propose that there is similar utility in measuring ORC as large health care systems embark on the implementation of new tools for managing the health of populations. For example, many academic

health care systems that had previously focused much of their effort on tertiary hospital and specialty medicine care have developed large networks of formally independent community hospitals and primary care practices, with a group of these becoming federally recognized accountable care organizations.⁴⁶⁻⁴⁸ These practices have their own history, culture, and capabilities,⁴⁹ much in the way that geographically dispersed VA medical centers have similar differences.^{50,51} The HTN-IMPROVE demonstrates how researchers and evaluators can use a mixed-methods approach to rigorously evaluate ORC and other factors that may impact implementation so that health care operations partners can use that information to improve implementation of new programs.

Additionally, academic medical centers, both within and outside the VA, have placed an increasing focus on population health, prevention, and self-management support.^{14,21,52,53} This includes the population of patients seen within the health system and the populations in communities that are potential patients or whose health is potentially impacted by health system programs.^{21,54-56} Our experience also offers a number of key lessons for health systems seeking to expand population-health programs. It may be appropriate to place primary responsibility for population health programs in the hands of nurses or other nonprovider clinical professionals. While integrating these programs with the work of providers is important, busy primary care and specialty providers may not have population-health programs at top of mind during clinical encounters. Professions such as nursing have a specific biopsychosocial orientation to the delivery of health care services. Individuals in these professions may be especially well placed to lead population-health programs. However, integration of the work of conducting population-health activities requires deliberate decisions concerning how to place programs within the organization's workflow and respond to local realities of clinics and practices. This includes not only who will conduct the day-to-day work of programs but also how to best target individuals who could benefit. Despite these realities, the goals of improving the outcomes for patients and other members of the population can help to meet the overall goals of organizational stakeholders.

This project has important limitations. Determination of observed barriers to and facilitators of implementation was based on consensus of key partners as opposed to qualitative interviews of the full range of stakeholders. However, the partners developing observations represent the project leadership of all facilities who were involved throughout the project and research partners who observed issues across all 3 sites. In addition, while these facilities are all in the VA health care system, they share key components with other types of frequently studied health care organizations, including academic medical centers and integrated delivery systems.

The HTN-IMPROVE represents an effort in which researchers partnered with operational leaders from 3 medical centers seeking to improve hypertension control for their population of patients. While the researchers provided input, decisions regarding the operation of the program were left up to operational leaders. This afforded the opportunity to better understand how barriers and facilitators identified during the assessment of ORC relate to what was actually experienced during program implementation. On the basis of the links described in this paper, assessing ORC prior to embarking on the

implementation of significant new clinical innovations appears to have practical utility for health care organizations.

FUNDING

This work was supported by a grant from Veterans Affairs, Quality Enhancement Research Initiative of the HSR&D Service (RRP 09-196). Dr Bosworth is supported by a VA HSR&D Senior Research Career Scientist award (RCS 08-027).

Disclaimer

The views expressed in this article are those of the authors and do not reflect the position or policy of the Department of Veterans Affairs or the US government.

REFERENCES

- Chobanian AV. Shattuck Lecture. The hypertension paradox—more uncontrolled disease despite improved therapy. *N Engl J Med*. 2009;361(9):878–887.
- James PA, Oparil S, Carter BL, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA*. 2014;311(5):507–520.
- Bosworth HB, Oddone EZ. A model of psychosocial and cultural antecedents of blood pressure control. *J Natl Med Assoc*. Apr 2002;94(4):236–248.
- Carter BL, Bosworth HB, Green BB. The hypertension team: the role of the pharmacist, nurse, and teamwork in hypertension therapy. *J Clin Hypertens (Greenwich)*. Jan 2012;14(1):51–65.
- Zullig LL, Peterson ED, Bosworth HB. Ingredients of successful interventions to improve medication adherence. *JAMA*. 2013;310(24):2611–2612.
- Go AS, Mozaffarian D, Roger VL, et al. Executive summary: heart disease and stroke statistics—2014 update: a report from the American Heart Association. *Circulation*. 2014;129(3):399–410.
- Levy RI, Moskowitz J. Cardiovascular research: decades of progress, a decade of promise. *Science*. 1982;217(4555):121–129.
- Effects of treatment on morbidity in hypertension. II. Results in patients with diastolic blood pressure averaging 90 through 114 mm Hg. *JAMA*. 1970;213(7):1143–1152.
- Reid RJ, Fishman PA, Yu O, et al. Patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. *Am J Manag Care*. Sep 2009;15(9):e71–e87.
- Jha AK, Perlin JB, Kizer KW, Dudley RA. Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. *N Engl J Med*. 2003;348(22):2218–2227.
- Jackson GL, Weinberger M. A decade with the chronic care model: some progress and opportunity for more. *Med Care*. Sep 2009;47(9):929–931.
- Bosworth HB, Olsen MK, Dudley T, et al. Patient education and provider decision support to control blood pressure in primary care: a cluster randomized trial. *Am Heart J*. Mar 2009;157(3):450–456.
- Bosworth HB, Olsen MK, Grubber JM, et al. Two self-management interventions to improve hypertension control: a randomized trial. *Ann Intern Med*. 2009;151(10):687–695.
- Damush TM, Jackson GL, Powers BJ, et al. Implementing evidence-based patient self-management programs in the Veterans Health Administration: perspectives on delivery system design considerations. *J Gen Intern Med*. Jan 2010;25(Suppl 1):68–71.
- Dzau VJ, Yoediono Z, Ellaissi WF, Cho AH. Fostering innovation in medicine and health care: what must academic health centers do? *Acad Med*. Oct 2013;88(10):1424–1429.
- Dzau VJ, Cho A, Ellaissi W, et al. Transforming academic health centers for an uncertain future. *N Engl J Med*. 2013;369(11):991–993.
- Kupersmith J, Eisen S. A new approach to health services research. *Arch Intern Med*. 2012;172(13):1033–1034.
- Stetler CB, Mittman BS, Francis J. Overview of the VA Quality Enhancement Research Initiative (QUERI) and QUERI theme articles: QUERI Series. *Implement Sci*. 2008;3:8
- Kilbourne AM, Atkins D. Partner or perish: VA health services and the emerging bi-directional paradigm. *J Gen Intern Med*. Dec 2014;29(Suppl 4):817–819.
- Wu RR, Kinsinger LS, Provenzale D, et al. Implementation of new clinical programs in the VHA healthcare system: the importance of early collaboration between clinical leadership and research. *J Gen Intern Med*. Dec 2014;29(Suppl 4):825–830.
- Williams JW Jr, Jackson GL. Utilizing evidence to address the health and health care needs of veterans. *N C Med J*. 2015;76(5):294–298.
- Shaw RJ, Kaufman MA, Bosworth HB, et al. Organizational factors associated with readiness to implement and translate a primary care based telemedicine behavioral program to improve blood pressure control: the HTN-IMPROVE study. *Implement Sci*. 2013;8(1):106
- Prochaska JO, Redding CA, Evers KE. The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Lewis FM, eds. *Health Behavior and Health Education, Theory, Research, and Practice*. 3rd ed. San Francisco, CA: Jossey-Bass;2002:99–120.
- Weiner BJ. A theory of organizational readiness for change. *Implement Sci*. 2009;4:67
- Shea CM, Jacobs SR, Esserman DA, Bruce K, Weiner BJ. Organizational readiness for implementing change: a psychometric assessment of a new measure. *Implement Sci*. 2014;9:7
- Bosworth HB, Almirall D, Weiner BJ, et al. The implementation of a translational study involving a primary care based behavioral program to improve blood pressure control: The HTN-IMPROVE study protocol (01295). *Implement Sci*. 2010;5(1):54
- Bosworth HB, Olsen MK, Goldstein MK, et al. The veterans' study to improve the control of hypertension (V-STITCH): design and methodology. *Contemp Clin Trials*. 2005;26(2):155–168.
- Bosworth HB, Olsen MK, Dudley T, et al. The Take Control of Your Blood pressure (TCYB) study: study design and methodology. *Contemp Clin Trials*. 2007;28(1):33–47.
- Bosworth HB, Olsen MK, Neary A, et al. Take Control of Your Blood Pressure (TCYB) study: a multifactorial tailored behavioral and educational intervention for achieving blood pressure control. *Patient Educ Couns*. 2008;70(3):338–347.
- Kizer KW, Dudley RA. Extreme makeover: transformation of the veterans health care system. *Annu Rev Public Health*. 2009;30:313–339.
- Rosland AM, Nelson K, Sun H, et al. The patient-centered medical home in the Veterans Health Administration. *Am J Manag Care*. 2013;19(7):e263–e272.
- Werner RM, Canamucio A, Shea JA, True G. The medical home transformation in the Veterans Health Administration: an evaluation of early changes in primary care delivery. *Health Serv Res*. 2014;49(4):1329–1347.
- Piette JD, Holtz B, Beard AJ, et al. Improving chronic illness care for veterans within the framework of the patient-centered medical home: experiences from the Ann Arbor Patient-Aligned Care Team Laboratory. *Transl Behav Med*. Dec 2011;1(4):615–623.
- Bidassie B, Davies ML, Stark R, Boushon B. VA experience in implementing patient-centered medical home using a breakthrough series collaborative. *J Gen Intern Med*. 2014;29(Suppl 2):563–571.
- Nelson KM, Helfrich C, Sun H, et al. Implementation of the patient-centered medical home in the Veterans Health Administration: associations with patient satisfaction, quality of care, staff burnout, and hospital and emergency department use. *JAMA Intern Med*. 2014;174(8):1350–1358

36. Chumbler NR, Haggstrom D, Saleem JJ. Implementation of health information technology in Veterans Health Administration to support transformational change: telehealth and personal health records. *Med Care*. Dec 2011;49(Suppl):S36–S42.
37. Fihn SD. VA's approach to value: population health, performance measurement and quality improvement [presentation slides—2009 AcademyHealth Annual Research Meeting]. <http://www.academyhealth.org/files/2009/sunday/fihn.pdf>. Accessed May 8, 2011.
38. Yarnall KS, Pollak KI, Ostbye T, Krause KM, Michener JL. Primary care: is there enough time for prevention? *Am J Public Health*. 2003;93(4):635–641.
39. Ostbye T, Yarnall KS, Krause KM, Pollak KI, Gradison M, Michener JL. Is there time for management of patients with chronic diseases in primary care? *Ann Fam Med*. May–Jun 2005;3(3):209–214.
40. Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. *Milbank Q*. 1996;74(4):511–544.
41. Jackson GL, Lee SY, Edelman D, Weinberger M, Yano EM. Employment of mid-level providers in primary care and control of diabetes. *Prim Care Diabetes*. 2011;5(1):25–31.
42. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129–136.
43. Arend J, Tsang-Quinn J, Levine C, Thomas D. The patient-centered medical home: history, components, and review of the evidence. *Mt Sinai J Med*. 2012;79(4):433–450.
44. Borbas C, Morris N, McLaughlin B, Asinger R, Gobel F. The role of clinical opinion leaders in guideline implementation and quality improvement. *Chest*. 2000;118(2 Suppl):245–325.
45. Kaplan HC, Brady PW, Dritz MC, et al. The influence of context on quality improvement success in health care: a systematic review of the literature. *Milbank Q*. 2010;88(4):500–559.
46. Berwick DM. Making good on ACOs' promise—the final rule for the Medicare shared savings program. *N Engl J Med*. 2011;365(19):1753–1756.
47. Tallia AF, Amenta PS, Jones SK. Commentary: academic health centers as accountable care organizations. *Acad Med*. 2010;85(5):766–767.
48. Epstein AM, Jha AK, Orav EJ, et al. Analysis of early accountable care organizations defines patient, structural, cost, and quality-of-care characteristics. *Health Aff (Millwood)*. 2014;33(1):95–102.
49. Sussman AJ, Otten JR, Goldszer RC, et al. Integration of an academic medical center and a community hospital: the Brigham and Women's/Faulkner hospital experience. *Acad Med*. 2005;80(3):253–260.
50. Jackson GL, Yano EM, Edelman D, et al. Veterans Affairs primary care organizational characteristics associated with better diabetes control. *Am J Manag Care*. 2005;11(4):225–237.
51. Yano EM, Simon BF, Lanto AB, Rubenstein LV. The evolution of changes in primary care delivery underlying the Veterans Health Administration's quality transformation. *Am J Public Health*. 2007;97(12):2151–2159.
52. Jackson GL, Krein SL, Alverson DC, et al. Defining core issues in utilizing information technology to improve access: evaluation and research agenda. *J Gen Intern Med*. 2011;26(Suppl 2):623–627.
53. Jackson GL, Powers BJ, Chatterjee R, et al. The patient centered medical home. A systematic review. *Ann Intern Med*. 2013;158(3):169–178.
54. Washington AE, Coye MJ, Boulware LE. Academic health systems' third curve: population health improvement. *JAMA*. 2016;315(5):459–460.
55. Oddone EZ, Boulware LE. Primary care: medicine's Gordian knot. *Am J Med Sci*. 2016;351(1):20–25.
56. Peterson TA, Bernstein SJ, Spahlinger DA. Population health: a new paradigm for medicine. *Am J Med Sci*. 2016;351(1):26–32.

How to cite this article: Jackson GL, Roumie CL, Rakley SM, et al. Linkage between theory-based measurement of organizational readiness for change and lessons learned conducting quality improvement-focused research. *Learn Health Sys*. 2017;1:e10013. <https://doi.org/10.1002/lrh2.10013>