ORIGINAL RESEARCH

Barriers and Facilitators to Evidence-based Blood Pressure Control in Community Practice

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Introduction: **The Electronic Communications and Home Blood Pressure Monitoring trial (e-BP) demonstrated that team care incorporating a pharmacist to manage hypertension using secure E-mail with patients resulted in almost twice the rate of blood pressure (BP) control compared with usual care. To translate e-BP into community practices, we sought to identify contextual barriers and facilitators to implementation.**

Methods: **Interviews were conducted with medical providers, staff, pharmacists, and patients associated with community-based primary care clinics whose physician leaders had expressed interest in implementing e-BP. Transcripts were analyzed using qualitative template analysis, incorporating codes derived from the Consolidated Framework for Implementation Research (CFIR).**

Results: **Barriers included incorporating an unfamiliar pharmacist into the health care team, lack of information technology resources, and provider resistance to using a single BP management protocol. Facilitators included the intervention's perceived potential to improve quality of care, empower patients, and save staff time. Sustainability of the intervention emerged as an overarching theme.**

Conclusion: **A qualitative approach to planning for translation is recommended to gain an understanding of contexts and to collaborate to adapt interventions through iterative, bidirectional information gathering. Interviewees affirmed that web pharmacist care offers small primary care practices a means to expand their workforce and provide patient-centered care. Reproducing e-BP in these practices will be challenging, but our interviewees expressed eagerness to try and were optimistic that a tailored intervention could succeed. (J Am Board Fam Med 2013;26:539–557.)**

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Almost 1 in 3 adults in the United States has hypertension (HTN),[1,2] a sustained blood pressure (BP) of ≥140/90 mm Hg. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP cites that a population-wide 5-mm Hg reduction in systolic BP would result in a 14% overall reduction in stroke, a 9% reduction in coronary heart disease mortality, and a 7% decline in all-cause mortality.[3] Despite these treatment benefits, BP remains uncontrolled in almost half of those with HTN.[4]

There is strong evidence that including a nurse or pharmacist as a team member in the management of HTN improves BP control.[5–9] The Electronic Communications and Home BP Monitoring (e-BP) study demonstrated that team care incorporating a pharmacist who intensified BP management strategies (eg, medications) through secure web messaging with patients resulted in almost twice the rate of BP control compared with usual care.[10] However, e-BP was implemented in a large integrated group practice with in-house pharma-

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cists and an existing patient-shared electronic health record (EHR), conditions that are not typical in community practices. In this study we sought to identify barriers and facilitators to implementing web-based pharmacist team care (web pharmacist care) in community practice settings so we could plan for an adaptation of the e-BP intervention.

Context matters when transferring evidence-based practices from one setting to another and when translating research evidence into everyday practice.[11–13] Accordingly, planning for the translation of e-BP required assessment of the resources, needs, and preferences of the communities that had expressed interest in implementing this model of care.[14] We interviewed stakeholders associated with interested community practices to better understand the challenges and opportunities of implementing e-BP in settings with contextual features very different from those of the integrated group practice for which it was originally designed. This article provides a rationale for our approach and a summary of what we learned.

Methods

Setting

Interviews were conducted in 1 Washington and 2 Idaho communities with populations between 50,000 and 90,000. These communities include practices that are members of the WWAMI (Washington, Wyoming, Alaska, Montano, Idaho) region Practice and Research Network (WPRN), a practice-based research network in the Pacific Northwest. Leaders from the WPRN member practices recommended 4 community-based primary care practices using EHRs that they believed might be willing to provide input on the translation of e-BP into community settings. All 4 practices agreed to participate. They each had between 5 and 10 medical providers, the majority of whom were family physicians; the remainder were advanced registered nurse practitioners and physician assistants. Provider practices were supported largely by medical assistants (MAs) or licensed practice nurses (LPNs). Only one clinic had a registered nurse. Two practices had clinical pharmacists who provided some clinical services such as diabetes education.

Community Practice and Patient Interviews

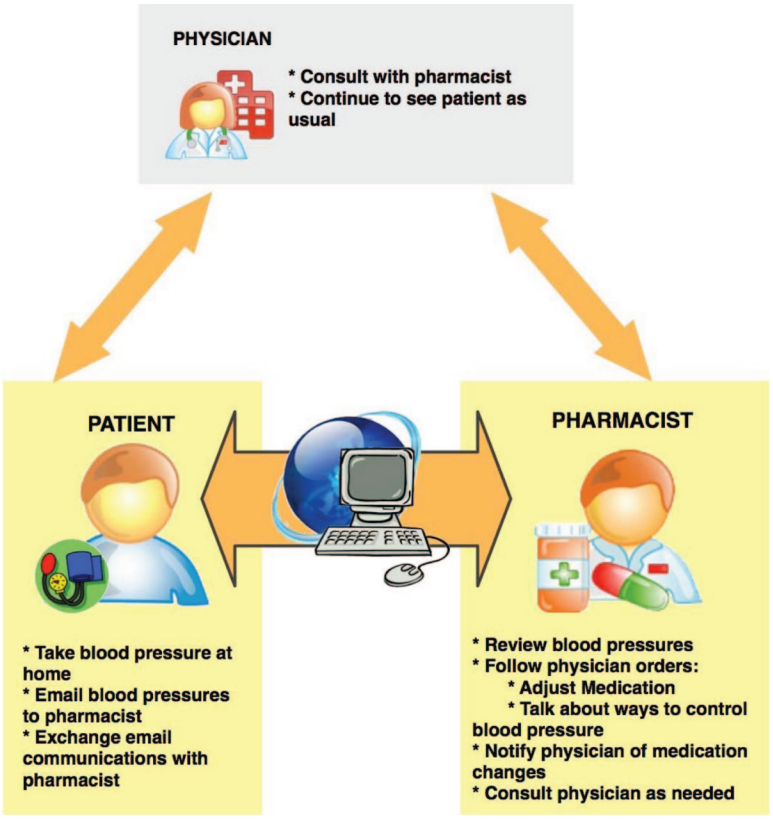
The research team interviewed medical providers (n = 8), clinical staff (LPNs and MAs; n = 9), pharmacists (1 hospital pharmacist, 3 independent pharmacists, 1 chain pharmacist, and 1 practice-based pharmacist), and patients (n = 12) associated with the 4 community-based primary care clinics whose physician leaders had expressed interest in implementing e-BP. Patients with HTN were identified through flyers placed in clinics and public places (eg, senior centers); 4 patients were 24 to 54 years old and 8 were 55 to 68 years old; there were 5 men and 7 women. The institutional review boards of the Group Health Cooperative, the University of Washington, and Idaho State University approved all study procedures.

Interview Guide

We developed semistructured interview guides specific to the type of interviewee (eg, medical providers, pharmacists, patients) based on the Chronic Care Model (CCM), the implementation model on which the e-BP study was based.[15] The CCM provides a conceptual framework for improving chronic health care by optimizing 6 key elements: improved health system and organizational support, self-management support, delivery system design, decision support, clinical information systems, and integration with community resources.[16] CCM-related questions explored interviewees' experiences with and attitudes about, for example, (1) the design of the delivery system (eg, How do you feel about working with other health care providers [eg, registered nurses, MAs] using protocols that you approve to adjust antihypertensive types and dosing, as was done in the e-BP study? How can you envision collaborating with these health care providers in managing your patients' hypertension?); (2) self-management support (eg, What are your thoughts about patients taking their own blood pressures?); and (3) clinical information systems (eg, What are your thoughts about the idea of pharmacists using E-mail or web sites to communicate with patients about HTN management?) Follow-up probes were tailored to different professional groups and patients and were updated as emergent themes informed subsequent interviews.

We created a pictograph that was used at the beginning of each interview to orient participants to the general concept of delivering web pharmacist care (Figure 1). Interviews lasted between 60 and 90 minutes for medical providers, staff, and pharmacists; patient interviews were approximately 30 to 40 minutes in duration.

Figure 1. Collaborative care.



Data Analysis

Template analysis, as defined and developed by King,[17] was employed to code the interview transcripts. This qualitative approach to analyzing text results in the development of a template, or a list of codes, comprising broad to more narrowly focused thematic categories. It is distinguishable from other types of text analysis in that it is not rooted in any single epistemology, and it is common to define a priori codes strongly expected to be relevant to a study's aims and objectives.[18] Like other types of text analysis, the analytic process is iterative. Investigators carefully read the text, separating data from the original context of individual cases and assigning codes to units of meaning in the text, then examine the codes for patterns and reorganize the data around central themes and relationships drawn across all the cases.[19]

Two of the investigators (LSR, EJ) independently coded a subset of interview transcripts, meeting periodically to adjudicate coding differences and create a consensus template (Table 1). LSR completed coding using the template, which incorporated categories drawn from 2 conceptual frameworks: the CCM and the Consolidated Framework for Implementation Research (CFIR).[20] The CCM categories, which had guided the construction of interview protocols, provided a starting point for coding interviewee's descriptions of the current state of HTN management in their communities, including, for example, how providers and patients were currently managing and communicating about patients' BPs. Additional codes were needed, however, to capture interviewees' descriptions of how HTN management might look in the future—that is, if e-BP were implemented—and to categorize the types of "barriers" and "facilitators" to implementation associated with stakeholders' beliefs about the intervention, the different clinics' readiness to implement, and the influence of governmental policies and regulations on the ability to implement e-BP in communities. For this, the CFIR, which "specifies a list of constructs within general domains that are believed to influence (positively or negatively) implementation," proved useful.[20] The CFIR provided a means for organizing interviewees' perceptions of (1) the characteristics of the intervention, including the relative advantages of implementing web pharmacist care versus an alternative solu-

Table 1. Coding Template and Emergent Themes*

First Level Code: CCM Domain	Second Level Code: Intervention (e-BP) Components	Emergent Themes: Barriers and Facilitators to Implementation	Third Level Code: CFIR Domain
Self-management support	Patient BP self-monitoring and training	Cost concerns (B)	Outer setting
		Accuracy concerns (B)	
		Lack of IT competence (B)	
		Improves quality of care (F)	Intervention characteristics
		Empowers patients (F)	
		Interpretation concerns (B)	Characteristics of individuals
Design of delivery system	Web-based pharmacist care	Questions about pharmacy selection (B)	Outer setting
		Lack of trust (B)	
		Lack of financial incentive (B)	
		Lack of time (B)	
		Concerns about team roles and relationships (B)	Intervention characteristics
		Empowers patients (F)	
		Patient convenience (F)	
		Saves staff time (F)	
		Additional support for patients (F)	
		Long-term cost savings (F)	
		Collaborative care benefits (F)	
		High-quality care (F)	
		Concerns about collaborative practice (B)	Characteristics of individuals
Design of delivery system, clinical information systems, self-management support	Use of E-mail or websites to support communication about BP	Lack of financial incentive (B)	Outer setting
		Lack of IT access (B)	
		Lack of IT competence (B)	
		IT access (F)	
		IT competence (F)	
		IT readily available (F)	Inner setting
		Confidentiality concerns (B)	Intervention characteristics
		Increases workload (B)	
		Convenience (F)	
		Increases efficiency (F)	
		Improves quality of care (F)	
		Increases workload (B)	Characteristics of individuals
		Patient convenience (F)	
		Empowers patients (F)	
		Neutral effect on workload (F)	
		Reduces patient costs (F)	
Decision support	JNC-based protocols	Liability protection (F)	Outer setting
		Standardizes care (F)	
		Convenience (F)	
		Low self-efficacy (B)	
		Concern about protocol (B)	
		High self-efficacy (F)	
Clinical information systems	Identifies patients with uncontrolled BP	IT issues (B)	Inner setting

*Sustainability was an overarching theme.
B, barrier; BP, blood pressure; CCM, Chronic Care Model; CFIR, Consolidated Framework for Implementation Research; e-BP, Electronic Communications and Home Blood Pressure Monitoring; F, facilitator; IT, information technology; JNC, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP.

tion; (2) the "outer setting" factors that might affect implementation, including each clinic's economic, political, and social context and relevant governmental policies and regulations; (3) the "inner setting" factors that might influence implementation, including each clinic's norms and values, and the level of resources dedicated for implementation and ongoing operations, including money, training, education, physical space, and time; and (4) the characteristics of individuals affecting implementation, including knowledge and beliefs about the intervention and beliefs in their own capabilities to perform the actions necessary to achieve implementation goals. AtlasTi, a qualitative data management program (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany), was used to facilitate the organization, management, and coding of qualitative data.

Results

Participants freely shared opinions about the shortcomings of the current health care delivery system, the fit between web pharmacist care and their aspirational views of patient-centered health care generally and BP management specifically, and their perceptions of the barriers and facilitators to implementing web pharmacist care. The coding template illustrates how e-BP components mapped onto CCM categories and how CFIR-defined domains provide a means of classifying where in the sociocultural milieu barriers and facilitators arise (eg, "outer setting", or societal "inner setting", or clinic level, or "individual level") (Table 1). Table 2 provides illustrative examples of stakeholders' quotes verbatim, arranged thematically and by CFIR domains.

Patient BP Self-Monitoring and Training

Home BP monitoring was attractive to everyone interviewed. According to the CFIR framework, this intervention characteristic would be considered a facilitator to implementation because stakeholders valued its potential to improve health care quality and empower patients. (Table 2). However, providers expressed concerns about the affordability of BP cuffs, the accuracy of patients' home BP readings, and the perceived lack of competence with information technology among older patients in their communities. These potential barriers would be categorized as CFIR outer setting factors related to patient resources (as a whole) in the community. Patients described concerns about their ability to accurately take or interpret home BP readings (a CFIR individual-level barrier related to self-efficacy), although all expressed willingness to perform home BP monitoring and most were already doing so.

Web Pharmacist Care

Because few community-based primary care clinics employ a clinic-based pharmacist and because patients fill their prescriptions at many different pharmacies, we solicited stakeholders' opinions about using clinic staff (eg, LPNs and MAs) rather than pharmacists to collaboratively manage BP. Staff reported they had worked with medication protocols (eg, for urinary tract infections and strep throat) in the past but voiced discomfort about taking on the additional responsibility of collaborative BP management because they were already stretched too thin with current duties (CFIR individual-level and inner-level clinic resource barriers).

Providers, especially those with access to an in-house pharmacist, felt pharmacists were well suited to managing HTN because of their in-depth knowledge of medications and medication management. They indicated that pharmacists would be the best choice for team BP management if they could be as readily accessible as clinic staff. Providers specified trust as the essential criterion for selecting a pharmacist team member, expressing reticence to work with a pharmacist with whom they had no established relationship.

Providers and pharmacists universally described many attractive features of web pharmacist care, including patient convenience, saving staff time, additional attention and support for patients, and long-term cost savings (facilitators related to CFIR intervention characteristics). Pharmacists described themselves as uniquely qualified to be members of the health care team because patients trust them and because they are more accessible than physicians.

Both pharmacists and providers highlighted 2 barriers to implementing web pharmacist care: the lack of financial incentive to practice collaboratively (CFIR outer setting factor), and the difficulties of implementing collaborative care among physicians who believe they need to make all decisions about patient care on their own (CFIR individual-level factor).

Table 2. Exemplar Verbatim Quotes Organized Thematically and by Consolidated Framework for Implementation Research (CFIR) Domain

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
Patient BP self-monitoring and training (self-management support)	Outer setting	Cost	I've got several hundred people who have the [blood pressure] cuffs but a fair number of people who say &lquote;I can't afford a cuff.' (Clinic 1 provider)	Intervention characteristics	Improves quality of care	The advantage would be getting patients under better control. (Clinic 4 provider)
		Accuracy	I think the challenge will be accuracy. Physicians would like to know the blood pressures they're getting from the patient's home are actually accurate. (Clinic 2 provider)			Everything I've read is that patients that do monitor their own blood pressures statistically will take less medication than those that do not . . . So I support it. (Chain pharmacist)
			I know when I bought my cuff . . . no one had taken the time to say this is how you put it on your arm and this is where it has to be. (Patient 2)			I encourage patients all the time to take their blood pressure at home a lot and keep a record of it, because one blood pressure reading is pretty useless really. (Independent pharmacist)
		Lack of patients' IT skills	None of the old people [who] are concerned about their blood pressure know how to use the computer yet! (Clinic 4 provider)		Empowers patients	The whole idea of this outpatient clinical is that you can help people achieve their health goals by empowering them to take care of themselves and be more involved in the situation . . . I think home blood pressure monitoring is a perfect example of that and to me it's a steppingstone . . . if we can get people to do this with their hypertension, we can probably do asthma, we could probably do diabetes, we could probably do lipids. (Hospital pharmacist)
	Characteristics of Individuals	Interpretation	If it's not done right . . . that might trigger some false decisions or questions . . . . Will somebody panic if it spikes? (Patient 4)			It would encourage me to live better and make better choices with my diet and get more exercise, just to see those numbers go down to where they should be. (Patient 5)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
Web pharmacist care (delivery system design change)	Outer Setting	Questions about pharmacy selection	The reality is you've got neighborhood pharmacies that are open 9 to 4, Monday through Friday, and not part of any sort of organized system, and then you've got big chain pharmacies that have the ability that patients can travel across the country and get their medications. So how do you pick and choose in a private practice setting? Which pharmacies do you work with? We need to leave it up to our patients which pharmacy they go to. (Clinic 2 provider)	Intervention characteristics	Empowers patients	I like the team approach, I really do, and I like feeling in control, like being a bigger player in my health. (Patient 2)
			One of the things [the MDs in the clinic] all said to me was, there is such a big variation in what they perceive as the ability of a pharmacist from one pharmacist to the next, when you're talking about a retail pharmacist. (Integrated pharmacist)		Patient convenience	It's the way any of us would want to be treated if we're seeing somebody—we don't want to go in any more times than we absolutely have to, right? (Clinic 1 provider)
		Lack of trust	I don't feel like I have relationships with the pharmacists now. Because I don't use them, I don't call them for questions—there's other resources that I use. (Clinic 1 provider)			Our type of patients would love [web-based collaborative care]. With the patients it's all about access, and access to the physicians is brutal—it's not good probably anywhere and it's definitely not good in this town. (Independent pharmacist)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
			[The big supermarket chain] basically rotates their pharmacists so the pharmacist one month may not be the pharmacist next month . . . I wouldn't have the [big drugstore chain] pharmacists doing this. For one of the reasons, I can't understand them most of the time . . . and they don't stay around very long. (Clinic 1 provider)			I think it's easy access and I can get answers now instead of waiting until I go in to see the doctor, you know, a month down the road. (Patient 6)
		Lack of financial incentive, lack of time	Part of it is the financial issue because [clinic providers] get paid when the patient comes in to get their blood pressure checked and to get medicine changes and get control, that's how they make their money. (Clinic 3 provider)			I always felt somewhat hesitant to call the doctor and say you know, I really like the medicine but yet maybe it's a little too strong. Having this opportunity to work with somebody and not calling the doctor and making an appointment and taking time out of my day to do that would be very beneficial. (Patient 2)
			The barriers are obvious—time and money . . . . We don't have the time and we don't have the money. If we can solve those problems, I'm right on board. (Independent pharmacist)			You don't have to make an appointment to come in and sit down for a couple hours to fix or to glitch some little thing if you need one day's worth of something different. Sounds good to me. (Patient 9)
			Up until 6 weeks ago we were getting 500, 535 [prescriptions] a day . . . Monday through Friday, which doesn't lend itself to extra time. You know, time, time, time—I think that's probably everyone's constraint across the board. (Chain pharmacist)		Saves staff time	[Web-based pharmacist care is good.] I can see a huge benefit in that all the phone calls that our nursing staff receive constantly for refills and also for people with drug problems, a lot of that at least for hypertension would be redirected for this person and you'd never hear about it. It can potentially free the nursing staff up a little bit, not having to deal with all these phone calls. (Clinic 3 provider)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
	Intervention characteristics	Concerns about team roles and relationships	A new person on board would be an adjustment. I'm not saying it couldn't be done, but it would be an adjustment. (Patient 1)		Additional support for patients	One other benefit is just potentially their access to a pharmacist . . . to ask questions. (Clinic 4 provider)
			I take a lot of medications and they would have to have on this end, the pharmacy end, a list of that. They'd have to be aware of what else is going on besides just the blood pressure. (Patient 8)			My experience is any time you give the patient more attention, they like it. (Hospital pharmacist)
			The only negative I could see is where the physician and pharmacist explicitly disagree, like they're actually kind of in a battle about it. Then the patient may be a little bit neglected or think, well, what do I do? (Patient 5)			Patients of mine who are not well controlled to this point have failed the current model a little bit . . . if I can't get them under control it usually means they're not taking their medicines or they're not coming to see me so another model may help remedy those two problems. (Clinic 4 provider)
	Characteristics of individuals	Concerns about collaborative practice	Some of my older partners . . . they're of that old framework that &lquote;I'm the doctor, I tell them what goes on, nobody else should be involved.' (Clinic 3 provider)			Lots of patients will tell me they would rather talk to me than their doctor. Because they feel like I speak to them on their level and I take the time to listen to them. (Hospital pharmacist)
			Those physicians who are not comfortable with a collaborative practice or a protocol probably aren't going to be interested in hearing what the pharmacist has to say. (Hospital pharmacist)		Long-term cost savings	It's worth the money if you have patients that are more engaged and have better health, then they're not in the hospital so much. So it's like if you can put in the investment up front, you will see the benefits down the road. (Hospital pharmacist)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
			You get the gamut of [doctors who] are all for [team care] to the ones that think they should still be going to their [patient's] house and checking their blood pressure once a week. (Independent pharmacist)			One other thing that's value added from the pharmacist—sometimes you see blood pressure medicines written for where they haven't tried—you know they're writing for the drug reps and there's all this good medicine that's still out there that exists today that's cheap. And we should maximize some of that stuff, I mean that could be a value for people. (Chain pharmacist)
			I'll also say that there are some patients that just don't . . . want anyone treating them besides the physician. (Integrated pharmacist)	Characteristics of individuals	Collaborative care benefits	I think most pharmacists will embrace it. I think they like the interaction and the clinical aspect of the work. (Hospital pharmacist)
			There's going to be a certain percentage of people that are uncomfortable with the idea of working directly with a pharmacist. (Patient 2)			If you can build the rapport with the physician . . . to establish a collaborative practice, I think the physicians are very comfortable with that. (Hospital pharmacist)
						Patients love the attention and I think that they respond better . . . if I see this patient once a month and I'm reminding them or in the case of a two-way texting going back and forth . . . if they're involved, they're going to be getting much better results. (Independent pharmacist)
						I think the patients would love it . . . they really trust us . . . sometimes they come right out and just say that they put more stock in what we have to say than the doctor. (Chain pharmacist)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
					High-quality care	I've always felt like pharmacists had the potential to be a provider and this is going to give us one more arrow in the quiver, I guess, proving that in fact we can have an impact and do all of the things that so many studies have proven—we can reduce costs, we can improve care. (Independent pharmacist)
JNC-based protocols (decision support)	Characteristics of individuals	Low self-efficacy	I would feel comfortable adding a second med or you know following those guidelines [protocols developed collaboratively], but when you get into the calcium channel blockers and stuff, then I would be like—you know, I got these readings and I'm a little nervous—but I have confidence, obviously, except to the calcium channel blockers. (Chain pharmacist)	Outer setting	Liability protection	Liability is obviously a little bit of an issue [for pharmacists doing collaborative care], but protocols give you a lot of protection against that. (Independent pharmacist)
		Concerns about protocol	As long as I had a lot of say in the protocol, and it's not even so much for accelerating as much as it would be starting new medicines . . . . I don't want a calcium channel blocker started on the patient who has severe constipation. I don't want a beta blocker started on the patient who's got a heart rate of 45—you guys know, the list goes on. (Clinic 4 provider)	Intervention characteristics	Standardized care	If you have a protocol and everybody's voted on it, you follow the protocol. If there's a question there, you always can go to the doctor. (Clinic 1 staff)
						What they have nowadays is the MAs aren't supposed to give telephone advice . . . but with the protocol, the doctors have approved it already, so that opens the MAs up so they can give that information. (Clinic 1 staff)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
				Characteristics of individuals	High self-efficacy	I think if there was a written protocol . . . if the patient meets certain guidelines, changing the medication is not going to be that big of a deal or talking with them about what's going on in their day to day life. It's not going to be a big deal for us to do that and then notify the physician. (Clinic 4 staff)
Use of email or websites to support communication about BP (clinical information systems, delivery system design change, self-management support)	Outer setting	Lack of financial incentive	If I spend half of my day on the E-mail, and I don't get paid for it, I can't keep this building open. We have bills to pay. (Clinic 3 provider)	Outer setting	IT access, competence	I do think that most patients that have the savvy to use the Internet and the technology, I think if they have E-mail, I think they think it's fun. (Hospital pharmacist)
		Lack of IT access, competence	There's definitely still a type of population we're talking about in this type of [rural] area, a big void in IT prowess. (Independent pharmacist)	Intervention characteristics	Increases efficiency	With the patient portal the advantage is I would type that into that system, the patient picks it up off that system, they could message me back, I have documentation that they received the result, which we obviously don't with a letter-based system, and there's a feedback loop that could be picked up presumably, either by the nurse or myself, regarding their questions or concerns. (Clinic 1 provider)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
			I read that 75% of . . . adults in America have access to the Internet. I'm not sure if ours is that high . . . I'm not sure that everyone has the Internet or certain patient groups, I mean the age in the study, the ages range from 25 to 75, certainly that younger crowd I think is very in tune. As you get up into the upper ages I think some are and some aren't [*laughs*] and maybe they have access and they just aren't able to use it. (Hospital pharmacist)			When they communicate with us now, on occasion we'll have to call them for questions or—so I can't just, I can't shoot an E-mail back and say you know, I gave you the wrong number or I need more information. You have to call, so, it probably would be good. (Chain pharmacist)
	Characteristics of individuals	Increases workload	I think [patient e-mail] would just be a bad idea. Because some patients . . . are very needy. And they'll just show up at the window and just expect to get right in, and if they had [the doctor's] E-mail, that wouldn't be a good thing . . . he has enough as it is . . . I think there should be a boundary. (Clinic 3 staff)		Improves quality of care	I think actually [electronic communication[would improve patient care and I think it would probably enhance visits. (Clinic 4 provider)
			Are we going to get a bunch of . . . E-mails that say I stubbed my toe, what would you like me to do? . . . We're replacing the phone with the E-mails . . . how many E-mails are we going to get in a day? (Clinic 1 staff)			I think with the medical home model, some of the newer stuff that's coming out with health care reform . . . the part that's appealing is sort of the asynchronicity of the clinic visit. Being able to still have everyone on page in between the clinic visits. (Hospital pharmacist)
			I think [patients using E-mail] might have a tendency to make the load bigger because we have quite a few needy patients. (Clinic 1 staff)	Inner setting	IT readily available	[Re: E-mail communication with patients:] We've got a network that could certainly handle that volume. (Clinic 1 provider)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
						There could be a little thing on our dashboard that comes up from E-mails . . . I think it would be very easy to incorporate that into the web page we already have. (Clinic 4 staff)
				Characteristics of individuals	More convenience for patients	What I think happens is patients, they encounter a problem, they try to get in to see the physician, it's a week and a half away. By the time they get in here it's no longer a problem . . . so it would be really nice to have them sit down and E-mail and say I just tried to take this medicine and I feel a little sick—is that normal? (Clinic 3 provider)
						I would be very open to [having E-mail exchanges with patients] because I'd rather . . . because a lot of people just don't answer their phone. (Clinic 1 staff)
						I think E-mail connection would be very helpful, especially for the younger generation. Not so much the senior population because they don't really do the computers so much. But I think having an E-mail access would really provide for more connections. (Clinic 1 staff)
						We have a patient who's really uncontrolled and she's been having to come in at least a couple times a week, you know, phone calls back and forth, and I think if she could E-mail me, that would make it easier for me. I think that would be easier for her not having to come in here. (Clinic 3 staff)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
					Empowers patients	If I was to look at it just me, I would be 'oh boy, this is going to be overwhelming and I'm going to need more help.' But I know that's coming. And so I can look at it from a perspective of what's going to help the patient and what's going to help them long term? I think that's probably why I'm open to it. I think they'll have a feeling of maybe control knowing that they can kind of take some ownership of their own health first of all but then have that connection with—maybe not necessarily the doctor but somebody who has the doctor's ear. And that just gives them a sense of security that 'okay, if I do my effort and do my part and submit this information, then we can work together and get something that's going to make me healthier.' (Clinic 3 staff)
					Neutral effect on workload	It's not going to be any different from patients calling us and saying hey, guess what my blood pressure is this—what can I do about it. But it's not going to be all drawn out into a big long story. (Clinic 4 staff)
					Reduces patient costs	It would also help with cost and nonadherence. A lot of people's hesitation about coming in is cost . . . . You tell them come back in a week or a month or 3 months, and they don't . . . . And so they become noncompliant. (Clinic 3 staff)

Continued

Table 2. Continued

Intervention Component (CCM Domain)	CFIR Domains					
	Barrier			Facilitators		
	Theme	Concern	Quotes	Theme	Benefit	Quotes
Identification of patients with uncontrolled BP	Inner setting	IT issues	No—we cannot [identify patients with uncontrolled BP]. We're using an electronic record that allows essentially no useful reporting. (Clinic 1 provider)			

BP, blood pressure; CCM, Chronic Care Model; IT, information technology; JNC, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP.

Patients expressed enthusiasm for web pharmacist care, noting that the team approach is empowering, affords convenient access to a medical professional, provides closer BP monitoring, and promotes long-term cost savings (CFIR intervention characteristics). A couple of patients voiced discomfort about working with a pharmacist they had not met face to face, and several expressed concerns about team care (CFIR individual-level factors). These latter concerns were mitigated by the trust they put in their physicians to incorporate a trustworthy team member.

Use of E-mail or Web Sites to Support Communication About BP

One of the clinics had a web-based patient portal (a secure site where patients could log on to communicate with their health care providers or use other functionalities such as making an appointment). Others were planning to add this as one mechanism for meeting meaningful use. Providers and pharmacists viewed secure E-mail very positively, noting its potential to increase efficiency of communication with patients, facilitate documentation of information exchanges, and improve quality of care by extending interactions beyond the limits of the clinic visit (CFIR intervention characteristics). Opinions were mixed about whether patients' lack of access or ability to use the web would present a major barrier. From the providers' perspective, one important barrier to implementation is the current lack of financial incentive to use secure E-mail (CFIR outer setting). Some clinic staff expressed reservations about patient E-mail because of worries that "needy" patients would take advantage of the ease of accessibility and substantially increase their workload as well as that of the providers (CFIR individual characteristics). Others felt that E-mailing was no more intrusive than telephoning and would have a neutral effect on workload. Many regarded secure E-mail as a means of reducing patient costs, increasing accessibility to patients, and promoting patient empowerment and adherence to treatment (CFIR intervention characteristics).

Medication Management Protocols based on the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP

Pharmacists and clinic staff generally endorsed the use of protocols to guide medication management,

although one pharmacist expressed nervousness about adding calcium channel blockers specifically (CFIR individual self-efficacy). Pharmacists noted that protocols provide protection against liability (CFIR outer setting), while staff commented on the advantages of using protocols to standardize care (CFIR intervention characteristics). Providers wanted assurance they would have substantial input into the development of the protocol and that any protocol developed would protect their patients from medication errors (CFIR individual characteristics).

Clinical Information Systems

All the clinics had EHRs, although none were positioned to use them to electronically identify, track, and manage patients with uncontrolled HTN as proposed (CFIR inner setting barriers). However, clinics were interested in using their EHRs as registries to manage chronic conditions like HTN and saw this as one mechanism for meeting meaningful use.

Sustainability: An Overarching Theme

Concern about sustaining the proposed intervention once extramural funding had ended emerged as an overarching theme. One provider explained, "I'm just projecting ahead that if I've got 5 clinics . . . and each clinic has devoted a quarter time person . . . then I've got to suddenly defend $60,000 in expenditures or more; that poses a challenge." Stakeholders repeatedly expressed frustration about sustaining web-based team care in a fee-for-service environment. They were critical of reimbursement policies, noting that services most beneficial for patients, such as working with pharmacists who can provide education about how medications work to control their conditions, are not eligible for reimbursement. However, at least one medical provider was hopeful that reimbursement for this kind of care will be the "the wave of the future."

Despite pharmacists' enthusiasm about web pharmacist care, retail pharmacists wondered how they would find time and money to support or sustain its implementation. A pharmacist who reported filling up to 535 prescriptions a day stated this "doesn't lend itself to extra time." At least one pharmacist hoped that participating in the community-based intervention would yield evidence demonstrating the value of web pharmacist care and serve as a basis for reforms to sustain this evidence-based, patient-centered practice.

Discussion

Translating evidence into practice requires investigating real-world settings to identify the many contextual variables that will influence the implementation process. Our qualitative approach to planning for implementation aligns with recommendations to anticipate and work to address likely barriers, identify and work with key community stakeholders to gain a thorough understanding of their contexts, and collaborate to design/adapt interventions based on iterative, bidirectional information gathering.[21,22] This qualitative case study was intentionally limited in scope to enable in-depth investigation of stakeholders' readiness to collaborate in the implementation of an evidence-based intervention. Because of the small samples of key staff, providers, pharmacists, and patients interviewed, our findings may not generalize across all practice settings.

Collecting qualitative contextual data about the primary care practices and communities interested in implementing a CCM-based model of BP control, however, illuminated intervention design features requiring adaptation. For example, not all practices had an in-house pharmacist who could be easily incorporated into a practice team to support BP management—a key feature of the e-BP delivery system. Because some clinics lacked this inner setting resource, we explored stakeholder preferences for restructuring care using different team members, such as clinic-based medical assistants, but lack of time (CFIR inner setting) and the confidence of MAs (CFIR individual level) were barriers. We learned that although most practices had little opportunity to directly engage pharmacists in patient care, stakeholders valued their expertise and were interested in exploring ways to incorporate community pharmacists into the health care team. Stakeholders did express concern about working with pharmacists they may never have met face to face or with whom they had no established relationship. As reported in previous research, facilitating the building of trust in care teams that incorporate community-based pharmacists or operate outside of an integrated system is a challenge and needs to be addressed.[23–25] In addition, although an initial prerequisite for participating in the e-BP community implementation was having an existing EHR, at the time of our interviews only one site had an existing patient web portal with secure E-

mail. Other technological options for supporting secure, asynchronous communication between patients and pharmacists will need to be found or technical assistance will need to be provided to help clinics set up patient web portals.

Even at this early stage of exploration and planning sustainability arose as an issue of concern. Sustaining web pharmacist care once grant funding had ended was a key concern for physician leaders. Our interview findings suggested several potential mechanisms for sustainability and future dissemination. For example, several clinics interested in participating in web pharmacist care were affiliated with a hospital that is developing a clinically integrated network (similar to an accountable care organization), which rewards team-based care models that improve quality and efficiency.[26] Some were planning to participate in pay-for-performance initiatives, which financially reward physicians who meet quality targets such as controlled BP rates among patients with HTN.[27] Pharmacists already can bill for Medicare Part D medication management,[28] and this model could be expanded to include chronic conditions.

The incorporation of CCM and CFIR domains into our coding template provided a ready-made framework of constructs and definitions for organizing information relevant to the implementation of each intervention component and identifying and categorizing the kinds of implementation barriers we faced (eg, individual, institutional, societal). The main benefit of approaching a qualitative data set with a set of a priori constructs at hand is that it can speed up the initial coding process. The drawbacks are that by attending to predefined constructs, researchers may overlook material that does not fit neatly into them, or the predefined constructs may not be the best way of characterizing the data.[29] Use of the CFIR and CCM conceptual frameworks did not constrain our ability to capture the unique observations made by our stakeholders or identify emergent themes; in fact, the approach holds promise as a model for programmatic study of the factors influencing the translation of similar health interventions into community-based practices. As observed by Feldstein and Glasgow,[30] developers of the Practical, Robust Implementation and Sustainability Model (PRISM) for integrating research findings into practice, it is the absence of conceptual frameworks in implementation research that has impeded progress in improving program implementation.

The e-BP study demonstrated that team-based care could be delivered using secure E-mail connected to an EHR. Interviewees affirmed that web pharmacist care offers a promising strategy for small primary care practices to expand their workforce and provide patient-centered care, and they expressed eagerness to implement it in their settings. They characterized web-based collaborative health care as "the right thing to do" and expressed hope that participation in a successful implementation would yield hard evidence to support significant changes in the way that health care is delivered and reimbursed. Reproducing e-BP in small primary care practices will be challenging, but our interviewees expressed optimism that a tailored intervention would succeed.

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References

1. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988–2008. JAMA 2010;303:2043–50.
2. Hsiao CJ, Cherry DK, Beatty PC, Rechtsteiner EA. National Ambulatory Medical Care Survey: 2007 summary. Natl Health Stat Report 2010;(27):1–32.
3. Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003;42:1206–52.
4. Belletti DA, Zacker C, Wogen J. Hypertension treatment and control among 28 physician practices across the United States: results of the Hypertension: Assessment of Treatment to Target (HATT) Study. J Clin Hypertens (Greenwich) 2010;12:603–12.
5. Carter BL, Bosworth HB, Green BB. The hypertension team: the role of the pharmacist, nurse, and teamwork in hypertension therapy. J Clin Hypertens (Greenwich) 2012;14:51–65.
6. Carter BL, Rogers M, Daly J, Zheng S, James PA. The potency of team-based care interventions for hypertension: a meta-analysis. Arch Intern Med 2009;169:1748–55.
7. Chisholm-Burns MA, Kim Lee J, Spivey CA, et al. US pharmacists' effect as team members on patient care: systematic review and meta-analyses. Med Care 2010;48:923–33.
8. Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T. Interventions used to improve control of

blood pressure in patients with hypertension. Cochrane Database Syst Rev 2010;(3):CD005182.
9. Walsh JM, McDonald KM, Shojania KG, et al. Quality improvement strategies for hypertension management: a systematic review. Med Care 2006; 44:646–57.
10. Green BB, Cook AJ, Ralston JD, et al. Effectiveness of home blood pressure monitoring, Web communication, and pharmacist care on hypertension control: a randomized controlled trial. JAMA 2008;299: 2857–67.
11. Berwick DM. Disseminating innovations in health care. JAMA 2003;289:1969–75.
12. Hoff T, Sutcliffe KM. Studying patient safety in health care organizations: accentuate the qualitative. Jt Comm J Qual Patient Saf 2006;32:5–15.
13. Weiner BJ, Amick HR, Lund JL, Lee SY, Hoff TJ. Use of qualitative methods in published health services and management research: a 10-year review. Med Care Res Rev 2011;68:3–33.
14. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. Milbank Q 2004;82:581–629.
15. Robert Wood Johnson Foundation. Improving chronic illness care, c2006–2013. Available from: http://www.improvingchroniccare.org/change/index.html. Accessed July 13, 2013.
16. Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. Milbank Q 1996;74:511–44.
17. King N. Template analysis. In: Cassell C, Symon G, editors. Qualitative methods and analysis in organizational research. London: Sage Publications; 1988: 118–34.
18. Waring T, Wainwright D. Issues and challenges in the use of template analysis: two comparative case studies from the field. Electr J Business Res Methods 2008;6:85–94.
19. Starks H, Trinidad SB. Choose your method: a comparison of phenomenology, discourse analysis, and grounded theory. Qual Health Res 2007;17:1372–80.
20. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009;4:50.
21. Gonzales R, Handley MA, Ackerman S, O'Sullivan P S. A framework for training health professionals in implementation and dissemination science. Acad Med 2012;87:271–8.
22. Glasgow RE, Emmons KM. How can we increase translation of research into practice? Types of evidence needed. Ann Rev Public Health 2007;28:413–33.
23. Kucukarslan S, Lai S, Dong Y, Al-Bassam N, Kim K. Physician beliefs and attitudes toward collaboration with community pharmacists. Res Social Adm Pharm 2011;7:224–32.
24. Lauffenburger JC, Vu MB, Burkhart JI, Weinberger M, Roth MT. Design of a medication therapy management program for Medicare beneficiaries: qualitative findings from patients and physicians. Am J Geriatr Pharmacother 2012;10:129–38.
25. McGrath SH, Snyder ME, Duenas GG, Pringle JL, Smith RB, McGivney MS. Physician perceptions of pharmacist-provided medication therapy management: qualitative analysis. J Am Pharm Assoc 2010; 50:67–71.
26. Berwick DM. Making good on ACOs' promise–the final rule for the Medicare shared savings program. New Engl J Med 2011;365:1753–6.
27. Rosenthal MB, Dudley RA. Pay-for-performance: will the latest payment trend improve care? JAMA 2007;297:740–4.
28. Barnett MJ, Frank J, Wehring H, et al. Analysis of pharmacist-provided medication therapy management (MTM) services in community pharmacies over 7 years. J Manag Care Pharm 2009;15:18–31.
29. King N. Template analysis: themes and codes. April 27, 2007. Available from: http://hhs.hud.ac.uk/w2/research/template analysis/technique/themesandcodes.htm. Accessed July 13, 2013.
30. Feldstein AC, Glasgow RE. A practical, robust implementation and sustainability model (PRISM) for integrating research findings into practice. Jt Comm J Qual Patient Saf 2008;34:228–43.