

## Report

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# **Using a New Evidence-Based Health Workforce Innovation Research Framework to Compare Innovations in Community Health Center and Other Ambulatory Care Settings**

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# Using a New Evidence-Based Health Workforce Innovation Research Framework to Compare Innovations in Community Health Center and Other Ambulatory Care Settings

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## Abstract

The Issue: Many healthcare organizations in the United States have pursued health workforce innovations—new staffing or team arrangements—to meet the challenges of increasing access to care, improving quality and controlling costs. While much has been written about “health workforce innovation”, the field lacks a comprehensive framework to classify existing innovations and guide the development of new research questions. This project aims to fill this gap by developing a new evidence-based health workforce innovation research framework. It also seeks to apply the model to compare health workforce innovations at community health centers and other ambulatory care settings.

Methods: After conducting an initial literature review, the researchers used data from the AHRQ Innovations Exchange to test the relevance of the innovation mechanisms in the initial typology and to add categories of drivers/motivators and outcome measures of health workforce innovation to the framework. After finalizing the framework, the researchers used it to compare health workforce innovations in community health centers (CHCs) with those in non-CHC primary care or ambulatory care settings.

Results: The health workforce innovation research framework describes key drivers of innovation, mechanisms of change, and outcome measures used to document the impact of innovations in their organizational and external contexts. The majority of health workforce innovations in CHCs were designed to increase access to care, while innovations in non-CHC ambulatory care settings included a balance of innovations designed to improve access and quality of care. Quality-driven workforce innovations generally had stronger outcome measures (as assessed by AHRQ) relative to those focused on access to care.

Discussion: This study uses a comprehensive, evidence-based framework for describing and studying health workforce innovations to make a preliminary, qualitative comparison of health workforce innovations in CHCs and other primary care or ambulatory care settings. The findings show a diversity of health workforce innovation efforts in both settings, mostly designed to increase access and quality of care. They also demonstrate a need for additional studies—both systematic and qualitative—to understand the effects of workforce innovations in different organizational and external contexts. The health workforce innovation research framework can be useful in guiding future efforts to develop research questions and build the evidence around health workforce innovations in all types of healthcare organizations.

## The Issue

In the United States, changing demographics, rising costs, and the impact of new regulations and payment models arising from the Affordable Care Act have placed unprecedented pressures on healthcare providers to increase access to care, improve quality and to control costs. To meet these challenges, some providers are forming accountable care organizations (ACOs) while others are pursuing medical homes or other novel payment and care delivery models designed to help meet these challenges. Within established organizations such as federally funded community health centers (CHCs), healthcare leaders are exercising significant latitude in developing innovative solutions for meeting their patients' needs more effectively and efficiently. One important way they are accomplishing this is through novel workforce arrangements that place health workers in new or expanded roles, new team arrangements or new locations.

The goal of workforce innovation within healthcare organizations—sometimes referred to as “skill management” or changing “skill mix” or “staff mix” (Sibbald et al. 2004, Dubois & Singh 2009)—is to improve the effectiveness or efficiency of healthcare by changing individual staff members' skills or competencies or changing the mix of staff members in a single discipline or in multidisciplinary teams. In the past decade researchers have sought to both define workforce innovation in healthcare and to create frameworks to evaluate the impact of such innovations on outcomes, including gains in population health (Sibbald et al. 2004, Dubois & Singh 2009, Friedman et al. 2014).

Innovation has been defined as “the intentional introduction and application within a role, group, or organization, of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group or wider society” (West 1990). Weberg (2009) has defined healthcare innovation as “something new, or perceived new by the population experiencing the innovation, that has the potential to drive change and redefine healthcare's economic and/or social potential”. Weberg's study of the concept of healthcare innovation also highlights the importance of studying the consequences or outcomes of healthcare innovations in context (e.g. existing financial and human resources, leadership, culture).

This body of work offers specific ideas about the mechanisms of workforce change and insight into how both institutional context (regulations, funding, culture) and organizational context (internal procedures, technology, human resources) can impact changes to staff mix, expansion of staff skills or other “innovative” workforce arrangements such as formation of interdisciplinary teams. But it has been difficult to translate the theoretical literature into a framework that describes the entire process of innovation and can be used easily to develop clear, answerable research questions. For example, another recently published typology of primary care workforce innovations by Friedman et al. (2014) paid more attention to why healthcare organizations introduced innovative health workforce arrangements, but its

categories were difficult to operationalize for research (e.g. “transformative” vs. “non-transformative” innovations). The existing work on skill mix or staff mix (Sibbald et al. 2004, Dubois & Singh 2009) has clearer categories of innovation mechanisms, but does not seek to integrate what motivates healthcare organizations to pursue workforce innovations in the first place.

With this in mind, the research team set out to integrate the various streams of work in this area to develop a new, comprehensive, evidence-based framework for describing and analyzing health workforce innovation. They also sought to test the application of the framework in a context of specific interest to HRSA by using it to compare health workforce innovations in community health centers with those in other ambulatory care settings.

This project had two goals:

- 1) To develop a framework that can be used to describe the drivers/motivators, mechanisms and outcome measures of health workforce innovation so they can be used to guide future research in this area. This framework can help to identify patterns in emergent workforce arrangements, and can help researchers and planners to formulate hypotheses and study the implications of health workforce innovations in different contexts.
- 2) To use the framework to compare and contrast health workforce innovations in community health centers and other ambulatory care settings. This information can help HRSA and other policymakers to understand the implications of health workforce changes for planning, education, and labor market projections, both in CHCs and in ambulatory care more generally.

## Methods

### ***Framework Development***

The researchers began by conducting a literature search to aid in developing a typology describing the range of innovations in workforce or staffing arrangements that could be implemented in a healthcare organization. They drew on the work of Sibbald et al. (2004) and Dubois & Singh (2009) to develop a typology of mechanisms of innovation at the center of the framework, drawn from their concepts of “skill mix” or “staff mix” change—seeking to improve effectiveness or efficiency of healthcare by changing individual health workers’ skills or competencies, changing the mix of health workers in multidisciplinary teams, etc. They organized the mechanisms into three broad categories of who does certain activities in a healthcare organization, how health workers work together and where health workers work.

Next, the researchers used data from the AHRQ Innovations Exchange to test the relevance of the innovation mechanisms in the initial typology and to add categories of

drivers/motivators and outcomes of health workforce innovation to the framework. The AHRQ Innovations Exchange (<https://innovations.ahrq.gov/>) is a repository for profiles of “innovative” activities that lead to “new and better ways of delivering healthcare.” The Exchange is a particularly useful resource for framework development and testing because its profiles come from published reports or grey literature, and some are self-submitted case studies. It also includes profiles from across the health sector, including hospitals, outpatient facilities, long-term care facilities and community organizations. The researchers examined a subset of profiles (n=171) that were classified in the database as “Staffing” and/or “Team Building” innovations, assuming that these classifications were most likely to describe health workforce innovations.

The researchers conducted a qualitative analysis of information from the “Staffing” and “Team Building” profiles, using the field titled “Snapshot: Problem Addressed” to identify the domains of factors that motivate healthcare organization to pursue new health workforce arrangements (key drivers or motivators). They also analyzed the field titled “Did it Work?” to identify the levels and types of outcomes that have been measured to document the impact of health workforce innovation.

Finally, the researchers situated the drivers/motivators, mechanisms and outcome measures in their external and organizational contexts (Anderson et al. 2014, Dubois & Singh 2009). They also added “feedback” arrows from outcomes to institutional and organizational context to account for the fact that outcomes of health workforce innovations can change the external or organizational context for subsequent innovation efforts.

### ***Comparison of Workforce Innovations in CHCs and Other Ambulatory Care Settings***

After finalizing the framework, the researchers used it to compare health workforce innovations (documented in the published or grey literature or the Innovations Exchange) set in community health centers with those in non-CHC primary care or ambulatory care settings. The researchers gathered 19 examples of CHC-specific workforce innovations and 34 examples of other ambulatory care setting workforce innovations from these sources, and they used the framework to classify innovations in each setting according to the following characteristics:

- 1) Key driver(s) or motivators of innovation
- 2) Mechanism(s) of change
- 3) Outcome(s) measured to evaluate the impact of innovation

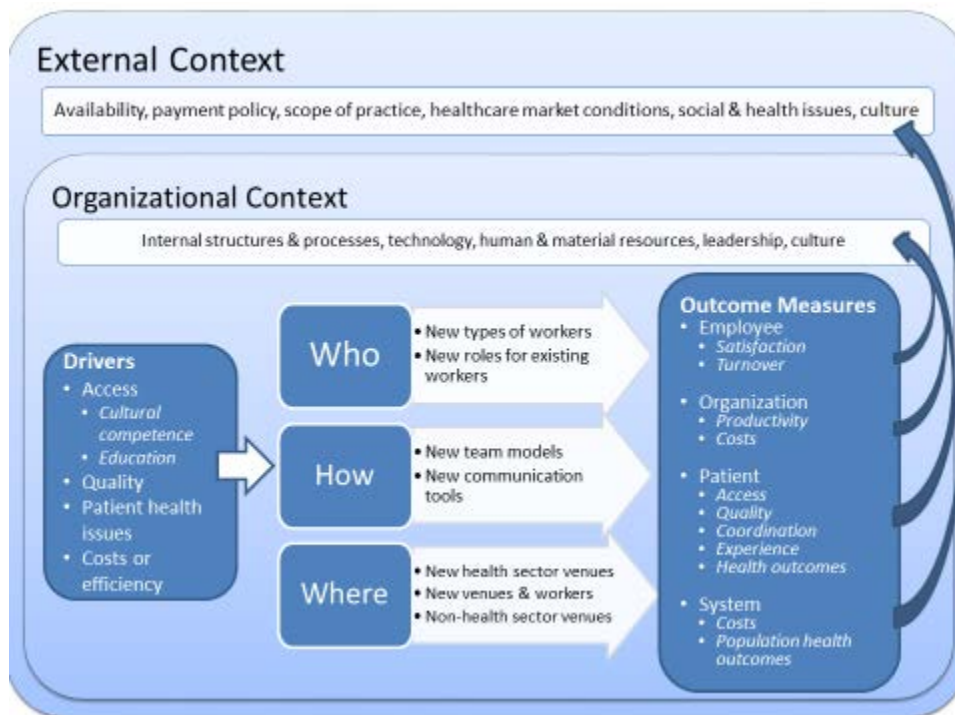
After classifying the innovations, they used this information to make comparisons between the two sets of innovations to identify commonalities and differences between CHC and other ambulatory care workforce innovations.

## Findings

### Framework

The final health workforce innovation framework is shown in Figure 1 below.

**Figure 1. Health Workforce Innovation Framework**



The final framework included four domains of key drivers or motivators of health workforce innovations:

#### 1) Access to care

- Enhancing patients' ability to receive necessary services through cultural competence, patient education or other outreach efforts.
  - Cultural competence for underserved populations (enhancing facilities' ability to care for diverse populations—e.g. interpretation, culturally tailored programs)
  - Patient education (enhancing patients' ability to care for themselves by providing information or training about their disease or other health needs)

#### 2) Quality of care

- Enhancing facilities' ability to provide appropriate and well-coordinated care, avoid errors, or improve processes.

#### 3) Patient health issues

- Improving patients' health by preventing disease or reducing its impact.

#### **4) Costs/efficiency**

- Reducing costs to the organization of staff burnout or turnover.
- Reducing costs to the organization and/or health system of patients' use of expensive services.

The literature review and AHRQ Innovations Exchange profiles demonstrated that these categories of drivers/motivators were often linked to each other, and organizations pursuing workforce innovations often considered them together. Improving access or quality were the most reported immediate goals, with the ultimate aim of improving health outcomes and/or reducing costs. For example, organizations might seek to make workforce changes to improve quality of care for frail elderly patients, with the goal of holding down future costs. They might seek to add or change staff to improve access to care for a difficult-to-reach population with the hope of improving their health and reducing overall costs (e.g. fewer emergency room visits for chronic conditions).

The typology of workforce innovation mechanisms included the following categories:

##### **Who does certain activities**

- Adding new types of health workers
  - New health worker roles that do new activities (not done before by any other health worker)
  - New health worker roles that take on existing activities (previously done by other health workers)
- Changing roles of existing health workers
  - Existing health worker roles that take on new activities (not done before by any other health worker)
  - Existing health worker roles that take on existing activities (previously done by other health workers)

##### **How health workers work together**

- New models involving multiple health workers (e.g. changes to workflow, team composition)
- New tools or strategies to improve communication and “teamwork” between multiple health workers (e.g. huddles, interdisciplinary quality improvement teams)

##### **Where health workers work**

- Having health workers do the same activities in a different venue (within the health sector)
- Shifting activities to different health workers in a different venue (within the health sector)
- Shifting activities of health workers to a non-health sector venue (e.g. churches)

As demonstrated in some of the workforce innovation examples included in the study, innovations designed to change one dimension (e.g. who does certain tasks) can also influence

another dimension (e.g. how staff members work together). For example, an initiative that has emergency medical technicians (EMTs) providing mental health screenings in patients' homes (existing health workers taking on a new activity) also involves changes to where staff members work (shifting mental health screenings from an outpatient setting to patients' homes and from behavioral health providers to EMTs). Similarly, a program adding community health workers to a chronic disease care team could also change how members of that team work together.

The final framework also included four levels of outcome measures that healthcare organizations could use to gauge the impact of workforce innovations:

- 1) **Employee-level outcomes**
  - Employee satisfaction
  - Employee burnout
  - Employee turnover
- 2) **Organization-level outcomes**
  - Productivity (volume of visits, time per visit, etc.)
  - Costs (balance of amount spent and/or saved by the organization implementing the innovation—e.g. added or reduced staff costs, reductions in utilization)
- 3) **Patient-level outcomes**
  - Access to care (e.g. number of visits/encounters, waiting time)
  - Quality of care (e.g. rate of guideline adherence)
  - Coordination of care (e.g. number of referrals, utilization)
  - Patient experience (e.g. patient satisfaction with care)
  - Health outcomes (disease markers such as HbA1c levels, blood pressure, CD4 count)
- 4) **System-level outcomes**
  - Population health outcomes (large-scale measures of disease markers, utilization)
  - Costs (amount spent/saved by the health system because of other outcomes of the innovation—e.g. improved population health outcomes, changes in utilization)

As healthcare organizations often pursued workforce innovations for multiple related reasons, they often measured their impact on more than one outcome domain. For example, new approaches designed to improve health outcomes for patients by improving staff teamwork and communication might also increase health workers' satisfaction and/or reduce turnover. (In turn, reduced turnover might lead to lower long-run costs to the organization, even if it incurred some costs implementing the innovation.) Employee-level outcomes such as satisfaction and turnover were not cited as key drivers or motivators of health workforce innovation, but organizations sometimes measured them as another way to assess the impact of the innovation and speculate about the potential organization-level consequences such as reduced turnover costs. Most system-level outcomes were difficult to measure in the studies or Innovations Exchange profiles of health workforce innovations, as most of them took place in single organizations or networks. However, many of the profiles or articles mentioned these as



possible “downstream” impacts of the innovations, so the researchers included them here although they are rarely measured explicitly.

### ***Comparison of Workforce Innovations in CHCs and Other Ambulatory Care Settings***

The workforce innovation examples in community health centers were most frequently motivated by goals of improving access to care. In all, 13 of the 19 examples had primary goals of improving access (some with secondary emphases on cultural competence or patient education). Another 4 examples focused on both access and quality (mostly coordination of care), and only 2 examples had improving quality of care as their primary goal.

Among the access-focused workforce innovations, the researchers found several examples that added new health worker roles such as navigators, peer specialists, volunteer educators or cultural liaisons. Several other examples showed CHCs using new team models involving multiple health workers to improve access for patients with chronic diseases or other significant needs—e.g. a multidisciplinary HIV clinic, a patient self-management program for diabetes patients, and a lactation education program for minority mothers. Several CHCs also used new team models involving multiple health workers to improve cultural competence such as a community clinic for refugee women.

While access and cultural competence were the most frequent key drivers of health workforce innovation in CHCs, they also used new team models to improve quality of care—for example, an initiative involving clinical pharmacists in the care teams for patients in need of medication management. Two examples also showed CHC staff members performing the same activities in new venues to improve access and quality of care, including a program that placed case managers in emergency departments and another that moved primary care providers into a mental health center. Other than these, relatively few CHC workforce innovations had a primary focus on improving quality of care. The only other example, which involved adding a new type of health worker (“practice enhancement assistants”) to help facilities improve their guideline adherence rates, was only included in the study because it took place in a network that included CHCs, but the CHCs were not the only participants.

Likely because so many CHC workforce innovations focused on enhancing access to care, many of the innovation examples used relatively “soft” outcome measures—for example, volume of encounters, screening rates, number of patient education sessions provided. (This is not surprising because of the difficulty of collecting more “downstream” measures such as health outcomes or costs within the same time frame and context as the workforce innovation.) A few examples included patient-level measures such as satisfaction, mental health and emergency department visits. Not surprisingly, most of the innovations located in CHCs received evidence ratings of “suggestive” (non-experimental or qualitative evidence—8 innovations) or “moderate” (at least one systematic evaluation using a quasi-experimental design—9 innovations) from AHRQ. The smaller group of innovations that focused on improving quality of

care (which included one of the two innovations with a “strong” evidence rating from AHRQ for its randomized design) had more specific measures such as guideline adherence or disease markers like viral load and CD4 count for HIV patients or glycemic control for diabetes patients.

The key drivers of workforce innovations in the non-CHC ambulatory care settings were more balanced between access to care and quality of care than in CHCs: 18 of the 34 examples were designed to improve access to care (including cultural competence and patient education), and 16 were intended to improve quality of care (including both coordination and process improvement). Fewer access-focused innovations in non-CHC ambulatory care settings included cultural competence dimensions, but several examples were aimed at helping patients with limited English proficiency. Most of the access-focused innovations changed the roles of existing health workers (e.g. community health workers supporting Latino families of children with asthma) or implemented new team models involving multiple health workers (e.g. a multidisciplinary clinic for frail, vulnerable elderly patients). Another example—a program to have emergency medical technicians conduct mental health and medication management screenings in patients’ homes—demonstrated how changing roles (EMTs doing screening) in a new venue (patients’ homes) could be combined to improve access to care.

The prevalence of quality-focused innovations among the non-CHC ambulatory care examples relative to CHCs was one of the most striking differences between the two settings. A few quality-focused innovations included new roles (e.g. health coaches, screening volunteers), but many more involved new roles for nurses and nurse practitioners. Nurses and nurse practitioners served as case managers for patients with chronic diseases across settings and (in one case) managers of a “transitional care program” designed specifically to manage the transition between inpatient and outpatient care. Other examples created new team-based models of care involving other clinicians such as pharmacists or specialist physicians (e.g. geriatricians), often in the context of care for patients with chronic illnesses. The non-CHC ambulatory examples also included one that used a multidisciplinary team to conduct a Six Sigma-inspired process improvement effort, which did not appear in any of the CHC examples in the study.

Likely because of the greater representation of quality-focused innovations, more of the workforce innovations in non-CHC ambulatory care settings had specific, quantitative ways of measuring outcomes than the CHC innovations—e.g. disease markers, hospitalizations, emergency department visits, or readmission rates. Nearly all of the quality-focused innovations used these “hard” measures (sometimes along with others). Several of the access-focused innovations used similar “upstream” measures to those used in similar examples within CHCs—e.g. encounters, services provided—but also like the CHC examples, a few found ways to measure “downstream” outcomes such as falls, mental health, glycemic control or blood pressure. A larger proportion of non-CHC health workforce innovations had evidence ratings of at least “moderate” from AHRQ relative to those introduced in CHCs: 21 received ratings of “moderate” and 5 received ratings of “strong”.

Most of the innovations in both settings fit into the “who” or “how” categories of innovation mechanisms; both settings had relatively few examples of changing where staff members work. The examples in CHCs were mostly physical relocations of staff members to other sites rather than through telemedicine or other use of technology—e.g. placing case managers in the emergency department or placing primary care providers in a mental health clinic. The researchers found more examples of using technology to relocate staff members’ activities in non-CHC ambulatory care settings—e.g. staffing an online clinic, conducting electronic consultations or being part of virtually connected teams—than CHCs.

## Discussion

This study uses a comprehensive, evidence-based framework for describing and studying health workforce innovations to make a preliminary, qualitative comparison of health workforce innovations in CHCs and other primary care or ambulatory care settings. The findings highlight the fact that healthcare organizations are using workforce innovations to address a wide range of related issues: access to care, quality of care, patient health outcomes and costs of care (both to the organization and to the health system).

As demonstrated here, the framework can be useful for comparing the drivers and mechanisms of health workforce innovations across settings, as well as assessing the effectiveness of different types of innovations in achieving their goals of improving access, quality, patient health outcomes and costs. Its outcome measure categories can also be used to assess the evidence for workforce innovations, make comparisons and identify gaps that could be addressed in future studies of health workforce innovations. It can also be used to pose new research questions that can be used to design new observational or experimental studies of health workforce innovations incorporating variables from the institutional and organizational context domains. For example, how do different leadership styles impact the ability of CHCs to add new roles or create new team models to address quality improvement? What drives innovation in CHCs vs. other ambulatory care settings? Does the effectiveness of different approaches (e.g. adding staff roles to enhance cultural competency vs. developing new multidisciplinary team models to improve coordination of care) vary according to the health needs or economic context of the patient population?

For planners and managers, it is also important to understand how certain contextual factors—either in the broader institutional context or specific to the organization—can facilitate the adoption of certain innovative approaches, or how factors such as culture, incentives or organizational resources can mediate or moderate the association between different innovative workforce approaches and the outcomes they are intended to address. For example, does the impact of certain new team models using existing workers on health outcomes differ in the presence or absence of specific additional resources (e.g. technology)? Or does the impact of adding a new role to a facility (e.g. a social worker) change depending on the existing culture or

leadership style within the organization? The framework can also be used to examine how changing payment incentives influence both organizations' choices and the effectiveness of different workforce innovations—or even study how these evolve over time as incentives change. (If we assume that outcomes of innovation change the context for subsequent innovation attempts, how can we see this the next time an organization seeks to make a change to its workforce?)

New data sources such as a revised version of the National Ambulatory Medical Care Survey (which includes questions about staff roles and tasks for the first time) will present an opportunity for larger scale empirical studies of the prevalence and distribution of some of the “innovative” workforce approaches in CHCs and other ambulatory care facilities examined in this study. But this study also demonstrates the utility of using of case studies and other more qualitative methods to capture the “stories” of innovative workforce approaches in context and over time. The AHRQ Innovations Exchange database was particularly useful for this purpose because its innovation profiles included some that were not “successful” in achieving their goals like most studies published in the peer-reviewed or grey literature, but still helped to advance understanding about what worked or didn't work in a particular context. This highlights the need for case studies and data sources that include both quantitative and qualitative data, as well as contextual information to create more robust opportunities for learning about workforce innovation—what works, contextual factors that were important to success even if they were difficult to measure quantitatively—than quantitative data alone.

The second part of this study uses the health workforce innovation framework to contribute to the evidence base comparing CHCs and other ambulatory care facilities. Past studies have found that CHCs and other ambulatory care facilities perform comparably on ambulatory care quality measures (Goldman et al. 2012), avoidable hospitalizations and costs of care (Gurewich et al. 2011). But the factors that explain the relative parity in performance, despite the fact that CHCs serve patients who have more chronic disease and socioeconomic complexity, are still being explored. At least one study has explored workforce differences between CHCs and other ambulatory care facilities, finding greater roles for nurse practitioners and physician assistants in CHCs (vs. physician offices), especially in patient education (Hing et al. 2011). While the examples examined in this study are not necessarily comprehensive, they present an opportunity for richer comparisons between how CHCs and other ambulatory care facilities use their staff members, try out new roles and team arrangements, and relocate staff members to meet their patients' needs.

The many access-focused innovations in CHCs are likely a function of the population that they serve. CHC patients are significantly more likely to be poor, uninsured, or on Medicaid than the general population, and CHCs are known to serve a disproportionate number of minority patients (Shi et al. 2010, Proser et al. 2015). CHCs are also more likely to serve patients with chronic conditions such as diabetes, obesity, hypertension and anxiety (Shi et al. 2010). In this context, the emphasis of many CHC workforce innovations on increasing access (or access and

coordination for patients with chronic conditions) makes sense. The strong emphasis on access to care likely reflects the fact that CHCs' first goal in providing care to diverse, high-need patients is often to help patients find the care they need in the first place. Non-CHC ambulatory care practices may see this need as less critical because their patients are more able to access care without extra support. On the other hand, the disparity in examples of coordination-focused innovations between CHCs and non-CHC ambulatory care facilities is somewhat surprising. The two types of facilities actually see about the same proportions of new and established patients (Shi et al. 2010), so it could be argued that both would benefit similarly from workforce innovations that seek to improve quality by coordinating care for patients across settings.

While the categories of access-driven vs. quality-driven were useful for comparing CHC and non-CHC ambulatory care workforce innovations, it is important to note that organizations rarely pursued access or quality as ends in themselves. Instead, organizations implemented workforce innovations designed to improve access or quality with the ultimate goals of improving health outcomes (both for individual patients and for the population) and reducing costs (both for the organization and the health system). Health outcomes and costs were less useful for putting innovations into categories because they were the ultimate "key drivers" of health workforce innovation; they motivated every innovation. Their inclusion in the framework is critical for this reason, although the key drivers of access and quality may be more useful for comparing what organizations think they need most (increased access or improved quality) when pursuing health workforce innovations.

It is not surprising that finding satisfying measures of the impact of innovations designed to increase access to care is more difficult than measuring the impact of quality-driven workforce innovations (which can also be problematic). Attribution of "downstream" outcomes such as disease markers and utilization relies on a variety of assumptions for both categories, but measuring outcomes of access to care is particularly challenging. It often requires data beyond the time frame and/or setting of the innovation being studied, the links between additional visits or other "upstream" measures and disease outcomes are unclear, and sometimes the most important outcomes may be non-events such as avoided emergency department visits.

As more healthcare organizations seek to collect "big data" to track workforce changes and an increasing variety of outcome measures (patient experience, costs, health outcomes), researchers may find new ways to link health workforce innovations and population-level health outcomes and/or costs over time. But for the moment, studies seeking to understand the mechanisms by which different health workforce innovations influence disease markers may be the most useful next steps to building the evidence base. For example, does adding a community health worker to a diabetes management program improve patients' glycemic control? If so, how is the change happening? What are the CHWs doing, or what is it about their

presence that causes patients' glycemic control to improve? What can we learn from this program that could be replicated in other facilities or tested on a larger scale?

While the forces that shape the future for CHCs and other ambulatory care facilities are constantly changing, two factors that are almost certain to impact both settings in the future are the growing diversity of the US population and the growth of insurance coverage under the Affordable Care Act. The United States is projected to become a majority-minority population within the 21<sup>st</sup> century, and uninsured rates are at their lowest levels in many years. In this context, CHCs and other ambulatory care settings may be able to learn valuable lessons from each other's workforce innovation experiences to improve both access and quality for their patients. CHCs may be able to offer lessons or advice to other ambulatory care settings about staffing changes that help an increasingly diverse population (including growing numbers of limited English proficiency patients) gain access to healthcare, and non-CHC ambulatory care facilities' experiences with team-based care coordination models may offer important insights for CHCs seeking to coordinate care for their patients, which may be especially critical as many organizations in both groups are participating in initiatives such as accountable care organizations that place a high premium on coordination of care across settings.

### ***Limitations***

This project was limited by the fact that using published literature and databases to study "workforce innovation" is challenging because of the variety of search terms and descriptors that can be applied to studies that fit into the workforce innovation framework we developed. When the terms "workforce" and "innovation" are used in the literature, they do not have consistent operational definitions, and many articles that describe "workforce innovations" as defined in the framework may not use those terms to describe them. Thus, it is difficult to capture every possible dimension of "workforce innovation" in the literature even with many different search terms or data sources. This may result in gaps in the comparison of CHC and non-CHC innovations presented here.

For example, it is highly likely that CHCs are more engaged in technology-facilitated relocation of services than they appear in the AHRQ Innovations Exchange and "workforce innovation" literature included in the study. HRSA incentivizes the use of technology including advanced electronic health records and telemedicine, and their increasing use has been documented in other reports (Davis et al. 2010, Shin et al. 2014). This may be because telemedicine isn't always considered a "workforce" or "staffing" innovation, so it might not be included in existing literature reviews or "staffing" profiles in the AHRQ Innovations Exchange.

## Conclusions

Healthcare organizations across all settings are feeling pressure to increase access to care, improve quality and control costs. Workforce innovation is a popular but loosely defined means for achieving these goals. The new, more comprehensive framework for studying health workforce innovation developed here will help researchers develop and test hypotheses about how particular innovations—i.e. addition of new staff members such as interpreters or social workers; new roles for existing staff; new models for multidisciplinary teams—impact such measurable outcomes as patient satisfaction, hospital admission rates or disease biomarkers. As more empirical data becomes available, the framework will be useful for identifying patterns in emergent workforce arrangements, as well as understanding their implications in different contexts.

Preliminary comparisons between health workforce innovations in CHCs and non-CHC ambulatory care facilities suggest several ways that the two groups can learn from each other. In particular, CHCs' experiences using innovations to increase access and cultural competency for needy patients can inform other ambulatory care facilities' efforts to serve an increasingly diverse population, and other ambulatory care facilities' experiences coordinating care across settings could be informative for CHCs operating in a funding environment that increasingly rewards coordination. This information can help policymakers understand the implications of health workforce changes for planning, education, and labor market projections.

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