Site Visits to Selected Institutions With Innovations In Residency Training

A study conducted by staff from RAND Health
for the Medicare Payment Advisory Commission

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WORKING PAPER

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1.Introduction

In RAND's 2009 report to MedPAC, entitled "How Are Residency Programs Preparing Our 21st Century Internists?" we described how Internal Medicine (IM) residency programs are training residents in the competencies essential for delivering high quality care to our 21st century patient population. These skills include systems-based practice, practice-based (quality) improvement and learning, interpersonal and communication skills, as well as using information technology (IT) and working in community-based settings. Although we found variation among programs in attention to these topics, for the most part, teaching in these areas fell far short of the instruction recommended by the Institute of Medicine and other experts.[1]

One specific finding was that the infrastructure to support ambulatory-based training, particularly in community settings, appeared to be minimal. However, through these interviews and other sources, we also discovered that there are programs with innovative ambulatory training models. Therefore, MedPAC commissioned RAND to engage in site visits (with MedPAC staff) of four institutions with such innovations. In particular, we investigated facilitators, barriers and enablers to fostering and sustaining innovations in ambulatory training and encouraging

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[1] **Institute of Medicine.** Health Professions Education: A Bridge to Quality. Washington, DC: The National Academies Press; 2003. **Council on Graduate Medical Education.** Physician Education for A Changing Health Care Environment. Washington, DC: Health Resources and Services Administration; 1999 **Institute of Medicine.** Crossing the Quality Chasm. Washington, DC: The National Academies Press; 2001 **The Pew Health Professions Commission.** Health professions education and managed care: Challenges and necessary responses. Report on the Advisory Panel on Health Professions Education and Managed Care. 1995. **Weinberger SE, Smith LG, Collier VU, Education Committee of the American College of Physicians.** Redesigning training for internal medicine. Ann Intern Med. 2006;144:927-32.

resident physicians to choose primary care careers. The findings from these site visits are detailed in this report.

2. Methods

We compiled a list of potential Internal Medicine (IM) and Family Medicine (FM) programs based on informal conversations with medical education leaders and a review of Internet-based information about programs participating in The American College of Graduate Medical Education (ACGME) IM Educational Innovations Project (EIP),[2,3] FM's Personal Physician for Practice (P[4]) Demonstration Initiative,[4] and The Robert Wood Johnson Foundation's former program Partnerships For Quality Education.[5] We also queried experts in the field about their knowledge of innovative programs that may not be included in these lists. In consultation with MedPAC staff, we selected four sites to visit. With our choices, we aimed to achieve diversity of ambulatory training approaches, institutional and program characteristics, and geographic locale.

Between November 18th and June 22nd, 2010, RAND and MedPAC staff conducted site visits to eight programs at four institutions: **(1) The University of California, Davis,** FM, IM Primary Care, and IM Primary Care-TEACH programs in Sacramento,

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[2] The American College Of Graduate Medical Education (ACGME) accredits graduate medical education training programs, also known as "residencies."

[3] The IM Educational Innovations Project, aimed at encouraging innovation, provides selected IM programs with 10 years between accreditation site visits to enable the program to implement a proposed innovation. EIP programs submit an annual report and share their experiences and "lessons learned" with other EIP programs. More information can be found at: http://www.acgme.org/acWebsite/RRC_140/140_EIPindex.asp

[4] The Preparing the Personal Physician for Practice (P[4]) Demonstration Initiative, sponsored by the Association of Family Medicine Residency Directors and the American Board of Family Medicine, to stimulate innovations that involve family medicine residents in Patient Centered Medical Home (PCMH) models of care. More information can be found at: http://www.transformed.com/p4.cfm

[5] The Robert Wood Johnson Partnerships of Quality Education grant program, "Take Care to Learn: Teaching Clinical Care Management," which supported the development innovative initiatives that taught trainees how to manage chronic illnesses. More information can be found at: http://www.pqe.org/about.html

California; **(2) The Lehigh Valley Health Network (LVHN)** FM and IM programs in Allentown, Pennsylvania; **(3) Aurora Health Care** FM and IM programs in Milwaukee, Wisconsin; and **(4) The Oklahoma University (OU) at Tulsa School of Community Medicine** IM, FM and rural FM programs in Tulsa, Oklahoma. At each visit, we spoke with program directors, key faculty members, administrative leaders, and residents. We also toured key teaching clinics. At Lehigh Valley, Aurora Health Care and OU-Tulsa we additionally spoke to the institution's executive and financial leadership.

This report summarizes innovation foci and discussion themes that arose through these site visits, including key facilitators of these programs' successes, as well as barriers they have overcome or continue to encounter, and key issues that would need to be considered if these innovations were implemented in other settings.

3. Innovations

Innovations varied by program and institutions. However, there were several notable innovation foci:

Transforming Practices into Patient-Centered Medical Homes (PCMHs). At all four institutions visited, the main teaching primary care clinics are in the process of becoming PCMHs.[6] Directors reported that motivations for transformation were both in anticipation of future payment policies that would reward PCMHs, as well as creating better learning environments for residents.

These transformations have involved multiple changes in the programs and clinics. For example, at UC Davis FM clinic, this effort began with developing a comprehensive and systematic

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[6] The American College of Physicians defines PCMH as: "a team-based model of care led by a personal physician who provides continuous and coordinated care throughout a patient's lifetime to maximize health outcomes. .... It is a model of practice in which a team of health professionals, coordinated by a personal physician, works collaboratively to provide high levels of care, access and communication, care coordination and integration, and care quality and safety." For citation and more information, see: http://www.acponline.org/running_practice/pcmh/understanding/what.htm, accessed August 27th, 2011.

approach to providing diabetes care, and most recently expanded to include maternity and well-child care and the development of additional practice registries. There is also a multidisciplinary team "huddle" at the start of each clinic half-day. At Aurora, their hospital-based clinics are undergoing a similar process, with a heavy emphasis on care-management measures such as disease-specific outcomes (e.g., diabetes control) as well as the delivery of preventive services (e.g., mammograms). At the LVHN IM clinic, in addition to developing chronic care curricula for their residents, they have enhanced patient-provider continuity through arranging residents into outpatient teams. At OU-Tulsa, in addition to arranging residents and faculty in teams, they have hired new multidisciplinary staff to be part of these teams and engaged in clinic remodeling to create shared team space.

Developing Information Technology Resources. At all four institutions, IT resources have been utilized to optimize clinic efficiency, support chronic disease management and quality improvement projects, enhance patient experiences, and teach residents to use evidence-based medicine and clinical guidelines. At programs with remote sites, tele-video conferencing allows residents in community sites to join educational sessions at the academic hub. In the case of OU-Tulsa, IT has allowed residents to interact with and learn from specialists, in a problem-based learning format, despite the region's specialist physician shortage. At Aurora, the use of real-time video monitoring (with patient consent) allows residents to receive feedback on their interactions with patients.

Working in Multidisciplinary Teams. Related to transforming practices into PCMHs, innovations also focused on teaching residents to work in multidisciplinary teams. These innovations have taken several forms. At Aurora, the IM program has developed a month-long multidisciplinary apprenticeship in which residents spend two weeks with social work and two weeks with nursing staff. At OU-Tulsa, residents on ambulatory rotations participate in formal team meetings. At UC Davis, the FM clinic, as mentioned above, has multidisciplinary team

"huddles" at the start of each clinic half-day. At several of the clinics, residents work closely with behavioral medicine specialists, pharmacists, and case managers. Residents spoke highly about the value of the informal education they get interacting with multidisciplinary team members in their continuity clinics.

Improving Patient-Provider Continuity. As mentioned above, enhancing patient-provider continuity for the residents' clinic was a common innovation in the sites visited. Continuity, meaning that the patient sees the same provider for all, or most of their visits, is important for chronic disease care and developing relationships with patients. In addition to arranging residents, faculty and patients into teams, continuity has been improved at several programs by rearranging resident schedules. Continuity is enhanced in the UC Davis primary care program by arranging residents' schedules in their second and third years of training so that they have outpatient rotations in two-month "blocks", during which they have several continuity clinic[7] sessions weekly, interchanged with two-month inpatient rotations. This schedule allows resident continuity with patients with chronic illness who need to be seen regularly (e.g., every three months). In addition, patients and residents and faculty are arranged into "firms," and each resident is partnered with another resident on an opposite block cycle. Therefore, when one resident is not on their outpatient block, but instead on inpatient rotations, their resident partner helps "fill in." In the UC Davis TEACH program, residents' schedules are arranged in their third year of training so that for eight months, instead of having blocks of outpatient and inpatient rotations, each resident has monthly general medicine inpatient responsibilities lasting only seven days at a time. Program directors report that this scheduling enhances continuity as the resident is unavailable to their continuity patients for only seven days at a time.

Separating Inpatient and Outpatient Clinical Activities.
Some programs also arranged scheduling in order to separate
inpatient and outpatient activities. In these programs the
residents do not have continuity clinic while on inpatient
rotations (e.g., half-day weekly), and have more clinic sessions
while on their ambulatory rotations. For example the LVHN IM
program redesigned schedules so that after every four weeks on
inpatient service, residents spend one week in the ambulatory
clinics.   For example, the UC Davis IM Primary Care residents
spend approximately six months, in two 3-month blocks, working
exclusively in outpatient experiences and have two half-days
weekly of continuity clinic. In the UC Davis TEACH Program, for
eight months of the third year, each resident has monthly general
medicine inpatient responsibilities lasting only seven days at a
time.

Working in Community-Based Settings. All institutions
visited had options for continuity clinics in community-based
settings. This academic year the LVHN FM program launched an
innovation to place residents in two community sites-- a private
practice and a community-based free clinic –- as an alternative
to their hospital-associated ambulatory care clinic.   Next year
they will add a fourth rural health clinic.   In the Aurora IM
program, residents also have the option of having their
continuity experiences in a free clinic, located in the basement
of a church. At OU-Tulsa, all of their continuity clinics are at
a community-based ambulatory care clinic, or their rural health
center. At UC-Davis, residents in the TEACH track have their
continuity clinic at a community-based county-funded ambulatory
care center.

**Implementing Curricula for Teaching Quality Improvement
Methods and Delivering High-Quality Chronic Disease Care.** All
institutions had invested time and resources into improving their

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[7] In a "continuity clinic," the resident sees, in a designated ambulatory
clinic, a panel of patients multiple times over their three years of
training.

curricula in delivering chronic disease care and quality improvement methods. For example, at Aurora, residents are strongly encouraged to meet care management goals. They receive didactics on care management and they have dedicated time for looking through and analyzing the data from their panels, and then taking action to reach out to patients. They also receive grades on the different aspects of care management for their panels. Residents are involved in clinic-wide quality improvement processes, based on clinic-specific deficiencies. A similar example can be found at UC Davis, where the FM program delivers to second year residents a Chronic Disease Management Program curriculum, focusing on diabetes measures and outcomes. Residents receive registry data on their own patients and also on clinic performance. As a group, the residents decide on a measure that they are going to address as a quality improvement project for the year.

Exposing Residents to Community Issues and Community-Based Resources. Several programs expose trainees to community issues and community-based resources. At UC Davis, the IM and FM programs have a curricula designed to get residents out of the clinic and into the community in which they practice. The purpose is to give residents knowledge of the environment outside of the clinic that has, overall, a larger impact on a person's health than what is done in the clinic setting. A second purpose is to instill in residents a sense of professionalism, or culture of expectations, that includes community involvement. A third purpose is to give residents basic skills and methods, such as Asset-Based Community Development (ABCD),[8] to positively impact their community. Program leaders expressed that instilling the value of community service as an integral component of medical professionalism during residency is vital, as what is learned during residency training heavily influences practice patterns post-residency.

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[8] Asset-Based Community Development is a community-directed approach to community-based development that appreciates and mobilizes individual and community talents, skills and assets.

Similar to this experience, the OU School of Community Medicine sponsors a summer institute each year for incoming students of medicine, pharmacy, nursing, social work and, physician assistants, to introduce the community to the students. Although there are plans to expand this to residents, funding has been a limiting factor.

In contrast to these formal curricula, the Aurora FM program's approach to exposing residents to community resources is to provide modalities for them to interact with these resources through their continuity clinic. So, instead of spending time in a rotation with a community resource, they interact with them in the course of providing clinical care to their patients, both through resources in their continuity clinics and through a two-week apprenticeship with the inpatient social work service.

Working In Systems Encouraging High-Performance and Efficiency. Working in health systems that encourage high performance and efficiency was also a theme. Principles of LEAN and The Toyota Production System[9] are being used to improve performance and efficiency. Aurora Healthcare System is undergoing a process of transformation that emphasizes becoming a top performer in clinical quality while achieving growth and financial stability. A key lever that Aurora is using to achieve their quality and efficiency goals is performance measurement; care management, patient satisfaction, financial, and educational metrics are being used. Faculty and health system staff are monetarily rewarded for high performance on these metrics.

Redesigning Inpatient Teaching Units. Although the focus of our visit was ambulatory education, we also observed innovations in inpatient care. One innovation was redesigning

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[9] The Toyota Production System, and its associated LEAN principles, are management strategies and systematic approaches to improving quality while reducing costs. For examples on their use in health care see: **Nelson-Peterson DL and Leppa CJ.** Creating an Environment for Caring Using Lean Principles of the Virginia Mason Production System. Journal of Nursing Administration, 37 (6):287-294
Jimmerson C, Weber D, Sobek DK. Reducing Waste and Errors: Piloting Lean Principles at Intermountain Healthcare. Joint Commission Journal on Quality and Patient Safety, 2005; 31(5): 249-257

inpatient teaching units. At LVHN, one of their inpatient teaching units is designed so that the multidisciplinary team, including nursing, case management, and social work, rounds with the medical team each day. The purpose of this team is to both coordinate the care of the patients, including the transition of patients from inpatient to outpatient care, as well as to educate the residents on these issues. At UC Davis, the TEACH program has its own inpatient unit for its continuity clinic patients. Since these patients are uninsured and otherwise socially vulnerable, they benefit from the targeted multidisciplinary services on this unit, as well as the continuity between the TEACH inpatient unit and outpatient clinic.

4. Discussion Themes

In addition to details of innovations, several themes arose from discussions with institutional leaders, program directors and faculty, and residents.

Leadership and Funding

Institutional Leadership Support For High-Quality Ambulatory Training Is Critical. Having institutional leaders "buy-into" the importance of high-quality ambulatory education appears critical. Leaders in all of these programs emphasized that intensive support from institutional leaders for education in ambulatory care settings was a pivotal factor in their ability to provide high-quality, innovative training in this area. These leaders, while balancing the multiple priorities of their institutions and/or departments, have created financing mechanisms that provide the support needed for ambulatory training, even when these mechanisms are not popular with their faculty in more revenue-generating specialties. The importance of this leadership support suggests that policies and funding structures incentivizing institutional leaders to prioritize high-quality ambulatory training may be especially effective.

**Supplemental Funding May Be a Critical Enabler of Programs'
Ambulatory Training Transformations.** Three of the four
institutions pointed to supplemental funding as a critical
enabler of their innovations. In the case of UC Davis, all three
programs (FM and two IM primary care programs) have received
multiple grants from the Health Resources and Services
Administration (HRSA). The program directors reported that
without HRSA funding the two IM primary care programs could not
exist, and the FM curricula would be scaled back considerably.
The LVHN FM program was established with funds from the Poole
Trust and is currently receiving $2.5 million over five years to
establish community-based continuity experiences. The IM program
at LVHN is not currently receiving Poole Trust money but has in
the recent past. OU-Tulsa has received grant funding from The
George Kaiser Family Foundation and was recently awarded a Beacon
Grant that will fund Information Technology (IT) innovations. OU-
Tulsa's ambulatory care center was funded by state bonds.
Foundation and state funding have also been crucial to the
development and maintenance of the OU-Tulsa rural health track.
Only at Aurora Healthcare does the funding come solely from
patient care revenues (including Medicare GME funds). However,
Aurora Healthcare has a significantly more favorable payor mix
than the other three institutions, with a much larger proportion
of commercially-insured patients.

**Transforming Resident Continuity Clinics into Patient-
Centered Medical Homes (PCMHs) May Require Substantial Up-Front
Financial Investment.** In addition to the investment of faculty
and staff time, our site visits revealed that significant
financial investment may be needed in order to transform clinics
into PCMHs. For example, clinics may need to undergo significant
remodeling in order to accommodate team workspace. Computer
systems that facilitate team messaging, such as instant
messaging, and population management, such as disease registries,
may need to be acquired or built. Further, faculty may need
training, which may need to come from outside the institution
through consultants, to develop the requisite skills. For

example, OU-Tulsa faculty have received LEAN training and LVHN
faculty use the Toyota Production Model. In the sites we
visited, supplemental funding was a key enabler to receiving this
training and transforming their clinics.

**Learning About Community Issues and Resources During
Residency Training May Be Particularly Valuable, But Is Also
Costly.** "Community/Social" learning experiences, in which there is
a formal curriculum and program for residents to learn about and
interact with non-clinical community resources and activities,
were highly-valued by several programs; however, the costs of
providing these experiences was also emphasized.

The cost of implementing such a curriculum is a barrier
that a program must overcome. For the time spent in the non-
clinical settings, the hospital loses the patient care services
that would otherwise be provided by the resident. There is also
the cost to the community organization and leaders, time which is
currently being volunteered to UC Davis. There is also the cost
of sacrificing Medicare funding for these non-clinical
activities; however, this was not a factor for those institutions
that exceed their resident caps. At UC Davis, the main cost of
this program is the faculty time for developing and implementing
this curriculum. This time is substantial - with care being taken
to develop exercises that facilitate the resident actively
engaging as a partner with the community, rather than acting in
the less-educational passive observer role. (Program leaders
agreed that passive observation of community resources would not
be an effective modality for resident learning.) The Aurora IM
program has discussed developing and implementing a similar
curriculum, but has not yet done so because of the cost. At OU-
Tulsa, they are able to provide such an experience in the form of
a "summer institute" for medical students and other health
professional trainees, but they are not doing so for the
residents because they have not been able to secure funding for
this.

Institutional Needs and Structure

Health System Efficiency, Quality, and Cultural Factors May Have Important Impacts on Education. Institutional leaders and educators emphasized the educational importance of health system environmental factors. LVHN, Aurora, and OU-Tulsa leaders reported that system efficiency is being improved by using the LEAN and the Toyota Production models. Educators believe that there is a connection between the quality of the healthcare system and the quality of the education that is delivered. Further, they believe that residents will learn a great deal just by being trained in a high-quality, efficient health care system.

Another example of a system characteristic influencing education is the development of a multidisciplinary team culture. At Aurora, where reorganization as well as performance measures have been used to foster multidisciplinary care, educators discussed how such an environment contributes to high-quality education. Residents learn from faculty role-models how to work effectively in multidisciplinary teams. Similarly, LVHN has been named by Fortune Magazine as one of America's best places to work. Educators point to such an organizational culture as being not only key in fostering innovation but also for creating an optimal learning environment for trainees. Finally, several educators discussed how working in an efficient, high-quality primary care clinic demonstrates to residents the sustainable delivery of primary care. This demonstration, they believe, makes residents more likely to choose primary care careers.

There Are Tensions Between Institutional Staffing and Community Needs and Resident Educational Needs. Institutional leaders described how patient care was the necessary driver of institutional priorities; they felt that the institution was morally obligated to prioritize what is needed to serve their patients and communities over academic priorities. Program leaders and residents described how sometimes these staffing needs conflict with educational needs and priorities.

One example of patient and community needs displacing educational needs is when the demand for outpatient services overwhelms what is an educationally optimal patient load for

trainees. Given that many resident clinics are their community's safety net providers, this tension has become more pronounced with the economic recession, particularly with respect to clinics that care for uninsured patients. Some clinic directors reported not implementing educational activities that would take residents out of their clinic in order to meet this community need. Some residents reported needing to "double-book" appointments in order to try and accommodate this demand. With "double-booking" there is less time for residents to discuss their patients with faculty, and thereby receive real-time education and feedback.

Another area in which there is tension between institutional and educational needs is with inpatient services. Leaders in several of the programs spoke to how some inpatient service rotations, particularly those that were sub-specialty, were of relatively low educational value but were maintained because of the institution's need for resident labor on these rotations. The need to maintain this service to the hospitals limits programs' abilities to expand ambulatory rotations and non-clinical learning experiences.

Use of Information Technology (IT) is a Key Factor in Improving Trainees' Education. Overcoming IT barriers has been a major challenge for the programs we visited. At programs where residents rotate through multiple sites, much time is spent during orientation introducing them to the different electronic medical record (EMR) systems they will be using. This time competes with other potential orientation activities, such as introducing them to the surrounding community. In such programs it is also difficult to use the computer to track trainees' exposure to different types of illness or give them feedback on documentation and systems-based care issues, given that multiple systems would need to be accessed to get comprehensive information.

Discussions revealed that clinics with resident providers have additional information technology support needs in comparison to clinics without residents. One such need is the ability for supervising physicians to co-sign notes. Another, more challenging support is for messages (both from patients and

other providers) to be sent directly to the resident in order for the resident to be the primary provider, yet allow the attending physician to supervise and intervene in the response to these messages when necessary.   A third aspect is giving residents access to the medical record system from the multiple sites in which they practice so that they can, for example, check on examination results or respond to messages from their continuity patients even when they are at an off-site inpatient rotation. Finally, interns come into the program with various backgrounds in using Health Information Technology and thus some may need more extensive training in using it.

Multidisciplinary Teamwork is Potentially Hampered by Separate Lines of Supervision.   There were efforts at all institutions to foster teamwork between their residents and support staff (e.g., medical assistants, clerical staff). However, program leaders reported separate lines of supervision can create a barrier to this process.   In some academic hospitals, the clinic support staff members are employees of the hospital, while the faculty have university employment.   Thus, there is no formal mechanism through which the faculty can evaluate the performance of the support staff, and vice-versa, nor are they part of the hiring process for these personnel.   One site explained that they had a similar situation until a few years ago but then transitioned from having their physicians contracted through the university to being direct employees of the health system.   They believe that bringing all their staff, including physicians, mid-level providers, and support staff, under the "umbrella" of one organization has been a key facilitator in fostering teamwork.

Accreditation Factors
Collaboration and Resource Sharing Between and Within Institutions Is Beneficial, But Is Complicated by Logistics and Various Certification and Accreditation Rules.   Programs at all three institutions spoke about collaboration and sharing of resources between residency programs as a key facilitator in enabling innovative educational experiences, both for inpatient

and outpatient learning experiences. At UC Davis, the IM and FM
programs share resources for their Community Curriculum. Both
LVHN and Aurora collaborate across programs for didactic
experiences, especially in competencies that cross specialties,
such as communication, systems-based care, practice-based
learning and improvement, and professionalism.

Logistic barriers must be overcome in order to share
resources. Programs with residents at different sites must
either build in travel time for their residents to bring them to
a common location or use technology such as video-conferencing.
Further, different specialties commonly hold their didactic
experiences at different times in the day; for internal medicine
and family medicine, for example, the noon hour is a good time
for didactics, while the surgical specialties are commonly unable
to break from the operating room in the middle of the day so
early-morning or late afternoon/evening is a better time.

Some ACGME rules also potentially inhibit the sharing of
resources for clinic-based teaching across family medicine and
internal medicine residents. For example, each program (IM and
FM) has to have its own equipment (e.g., microscopes) even when
the clinics are co-located. Several IM program also noted that
the RRC for IM's program requirements are such that only board-
certified internists can supervise IM residents. This is their
interpretation of the program requirement that "the physician
faculty must have current certification in the specialty by the
American Board of Internal Medicine, or possess qualifications
judged acceptable to the Review Committee." Although one IM
program has interpreted this statement to mean that FM physicians
can supervise IM residents in the outpatient settings, clarifying
the ambiguity of this statement and others about physician
supervision may facilitate collaboration and more optimal use of
resources when setting-up community-based training.

**Residents and Faculty Highly Value "Protected Time" for
Continuity Clinic and Other Ambulatory Training.** The IM RRC

traditional mandate is that resident continuity clinic is scheduled once per week throughout the three years, irrespective of the nature of the rotation the trainee is completing. Trainees on inpatient services leave for a half-day to go to their continuity clinic session. While in clinic, they may be paged about the care of their inpatients and may feel pressured to return to the hospital after their clinic session to complete work on their hospitalized patients. As mentioned in the innovation section, several of the programs we visited, having received waivers from this RRC mandate, had recently converted to a schedule in which the continuity clinics are scheduled as part of "protected" ambulatory time; during their ambulatory training rotations residents are not distracted with inpatient responsibilities or learning needs and during their inpatient training rotations they were not distracted by outpatient responsibilities.

Program leaders and residents alike emphasized the learning value of this separation of activities. Program directors report that there is less competition for the residents' attention between inpatient and outpatient priorities. Continuity clinic and ambulatory learning, instead of "added chores" on top of their already-demanding inpatient responsibilities, are valued parts of the curricula. Residents who had been exposed to both types of scheduling schemes emphasized that with protected ambulatory learning time they found their ambulatory experiences to be more enjoyable and productive.

Challenges Related to Providing Experiences in Diverse Settings

Community-Based Continuity Clinic Experiences Can Be Valuable, But Have Opportunity and Financial Costs. Discussions revealed opportunity and financial costs to providing community-based continuity clinic experiences (i.e., continuity clinic not physically located on hospital or medical center property). Program leaders differed in their assessments of the value relative to the costs of providing these experiences and in their program's ability to absorb the associated financial costs.

Both the UC Davis FM and IM Primary Care programs and the LVHN IM program have explicitly chosen to limit community-based

continuity experiences. Instead, they have concentrated their
resources on creating high-quality continuity clinics and
learning experiences at the medical center. They believe that
having a high-quality experience with primary care in a high-
quality clinic is more important than exposing the residents to
community-based settings. Further, they believe that exposing
residents to alternative settings that may deliver lower-quality
care or provide a poor learning experience may be detrimental to
the effort of recruiting residents into primary care and/or into
their choosing underserved areas to practice after residency.
Finally, they point to the time investment the program needs to
make in order to set up a community continuity experience, and
believe that their limited time is best used to develop their
curricula in other ways (e.g., curricula in quality improvement
methods).

The approach and philosophy of the LVHN FM and Aurora IM
programs is strikingly different. As discussed above, the LVHN
FM program is placing a significant investment into creating four
different settings for continuity clinics, three of which are
community-based: a free clinic; a private practice; and to be
implemented next year, a rural practice. Of note, a significant
subsidy from a private foundation has enabled this investment.
The Aurora IM program has one community-based site, which is a
free clinic, in which a subset of residents have continuity
clinic. At OU-Tulsa, all residents have continuity clinics that
are separate from the hospitals and run by the OU-Tulsa School of
Community Medicine.

The financial barriers to setting up continuity experiences
in community clinics are multiple. Residency accreditation rules
require the residents to have space dedicated to them for both
clinical and educational activities. In FM, this includes a
requirement that each resident has two examination rooms
dedicated for their use during their clinical time; for IM this
is one room. In setting up the continuity clinic in a private
practice, LVHN had to build an expansion to their office to
accommodate these needs. LVHN leases this space back from the
practice so they will recoup their costs over time, but the
practice needed the ability to finance this construction. This

set-up contrasts to the LVHN FM continuity clinic at the free
clinic, which is unable to finance such a project. Because they
only have two exam rooms, only one resident at a time can have
continuity clinic.   Another potential financial barrier is lack
of clarity around the acceptability of using the primary care
exception for billing;[10] for example, the legal advisor for one
program has concluded that the Medicare primary care exception
for teaching physician billing does not apply in the private
practice setting even though it is serving as a continuity
clinic. Thus, the precepting physician needs to see each
patient, which has financial ramifications secondary to loss in
productivity.

Continuity clinics in a resource-poor community clinics
also result in educational trade-offs. Faculty and residents
spoke eloquently and passionately about how residents with
continuity clinics in these settings found their experiences to
be personally and professionally fulfilling, interacting with
patients who were grateful for the care and, despite social
difficulties, more likely to show up for follow-up visits.
Faculty pointed to examples of graduates who, having had such
continuity experiences, although going on to sub-specialty
training, were now returning to the clinic to volunteer time and
therefore expanding the clinic's services. Faculty asserted that
having a continuity experience in resource-poor clinics during
residency training was potentially pivotal in instilling a life-
long commitment to volunteering time to such clinics. However,
residents with continuity experiences in such settings have
different practice patterns than they would in other settings as
they have limited access to diagnostic and therapeutic resources.
At one clinic, for example, there is no access to colonoscopies,
even if a patient presents with blood in his stool. Residents
and faculty spoke to how having continuity clinic in such
settings facilitates learning the unique clinical skills needed
in these settings, but there was some discussion about the

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[10] Under the primary care exception, Medicare will pay a teaching
physician for low-mid level evaluation and management services provided
a resident without requiring that the physician be physically present if
certain conditions are met.

potential educational loss by not having these resources available in the continuity clinic.

Systematic analyses of the benefits of community continuity experiences (both under-resourced community clinics and well-resourced private practices) in increasing resident competency in relevant topics, and influencing post-residency practice choices, relative to the cost of the experiences (both financial and the opportunity cost) would be valuable.

There Is a Trade-off between Having a True Continuity Practice and Having Exposure To A Diversity of Settings During Residency Training. Faculty differed in their thoughts on the value of having experience in community-based ambulatory settings outside of continuity clinics. Some faculty, again, stressed that this exposure needs to be a high-quality experience so as to not "turn-off" the trainee to practicing in this setting. In addition to the investment of faculty time and resources needed to set-up and monitor these experiences, some faculty pointed out that a barrier to such experiences is that they may take the resident out of their continuity clinic. Seeing continuity clinic patients is highly-valued in the primary care (both IM and FM) residencies because (a) continuity with patients is required for learning high-quality chronic disease management and (b) continuity cultivates the patient-physician relationship that is one of the draws to primary care. Although potentially providing a diverse experience for the trainee, time in other clinical settings may reduce time available for the continuity clinic experiences. This competition of time, or opportunity cost, is increased if the alternative site is geographically distant from the continuity clinic (e.g., a rotation in a rural setting away from the medical center) so that residents are unavailable to their continuity clinic for a period of weeks.

The RRC for FM's requirement that residents have 1650 visits with continuity patients limits FM programs' flexibility to rotate residents into alternate practice settings, according to some directors. Others suggested that this requirement can still be met with alternate practice settings by the resident having more than one continuity clinic. However, this approach

would mean that the resident has only half the time, and therefore less continuity, for patients in each setting. The optimal balance of time in continuity practice versus exposure to alternative settings needs further study.

Delivering Resident Training in Rural Settings May Have Distinct Challenges. Although these site visits were not designed to specifically assess the facilitators and barriers of training residents in rural sites, and three of the four sites visited had urban programs only, program leaders and residents alluded to challenges of exposing residents to rural settings.

The first barrier urban programs face in setting up rural tracks is quality assurance, monitoring and troubleshooting. The UC Davis FM program in the recent past had a rural track, but closed it because of problems delivering a high-quality educational experience. They found that the rural faculty providers had limited infrastructure (e.g., information technology, educational space) available to them and lacked the experience needed to effectively teach, rather than just supervise, trainees. Given the long distance from the institution, the program director was limited in his ability to monitor and troubleshoot problems that arose. UC Davis FM program does, however, continue to provide opportunities for residents to do rural elective rotations. By using the same clinical sites used for student clerkship rotations in the medical school, which has a special grant providing for the set-up and monitoring of these sites, the FM program can feel comfortable about the quality of the experience.

A second related barrier to urban programs setting up rural tracks or electives is time and resources. Whenever a new track or elective is established, it is a labor and resource intensive project. With a rural site, the distance that the program director and other faculty and administrators need to travel to make these arrangements, as well as the need to consider additional logistics such as potentially providing trainees with housing during these electives, adds to the time and resource demand. In the UC Davis program, by using the same clinical sites used for student clerkships, they can "piggyback" on the

work of the medical school program. The LVHN FM program, also in the process of setting up a rural site for a continuity clinic, has obtained resources from the Poole Trust to support the time and resource expenditures.

In contrast to the UC Davis program, where a track or electives needs to be more than 90 minutes away from the urban campus, the OU-Tulsa rural tract has been enabled by geography. OU-Tulsa differs from UC Davis in that the rural site is only about a 30 minute drive from the main campus. This enables the sharing of resources between the urban and rural tracts. For example, rural track residents have their continuity clinic at the rural site even while doing inpatient training in their first year at the urban campus. Institutional oversight of this track is enabled by the relatively close distance.

However, even with its relatively favorable geography, OU-Tulsa demonstrates potential financial and operational challenges of a rural program. Foundation and State grants are essential to the survival of this program and in their ability to attract faculty. A state commission pays for 75% of the residents' salaries and foundations pay the salary of the rural track's program director and loan repayment for the program's other full-time faculty member.

A third barrier is that, for most locations (OU-Tulsa being an exception), rural electives require the resident to be absent from their continuity clinic. Therefore, the tension between having a continuity experience and having exposure to a diversity of settings, described above, is especially applicable to considering rural electives. Unlike for alternative clinical settings that are located geographically near the home institution, if a resident has a rural rotation, they may be gone from their practice and thus completely unavailable to their continuity patients for a number of weeks.

A fourth potential barrier is providing residents with an adequate exposure to clinical conditions. We spoke with some residents who intend to practice in rural settings after finishing residency, asking why they were training in urban settings. They had the impression that training in rural settings would not have provided them with the same opportunity

to care for the volume and breadth of patient conditions found in urban medical centers. Thus, they believed their preparation for rural practice was better by having trained in an urban area. At OU-Tulsa this issue is addressed by having the rural track residents have all their first year of training, with the exception of their continuity clinic, at the urban campus. Representatives from OU-Tulsa opined that practicing in a rural setting during training is important for physicians who will practice there post-training, as practicing without access to specialists and other urban resources is very different and therefore a skill that should be acquired during residency training.

In summary, because we visited only one rural program, we are limited in our ability to comment on the facilitators and barriers to establish, maintain and attract residents to rural residency programs. However, conversations with leaders at OU-Tulsa, where they have a successful program, and at UC Davis, where they had a program in the past, support some interesting observations. UC Davis leaders reported that major reasons for closing down their rural program and not establishing a new one is that the distance between the program hub and the rural site made it difficult and labor-intensive for the program director to do what was needed to ensure a good educational experience for the rural residents. At OU-Tulsa, however, the rural program is only about a 30 minute drive from the program hub, and one could hypothesize that this difference in geography may be a key factor.[11] Further investigation would be needed to test this hypothesis. These site visits gave "glimpses" into some of the potential barriers of exposing trainees to rural settings. Rather than providing information that can be reliably interpreted, these glimpses point to a need to examine this topic separately.

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[11] The OU-Tulsa rural program also has an experienced rural medicine educator as program director, which is also likely key factor in its success.

Building a Primary Care Workforce

    Finances, Lifestyle, Prestige, Balanced By Quality Mentorship, Drive Medical Student / Resident Choices About Primary Care. Residents spoke consistently about their considerations in choosing, or not choosing, to practice primary care and whether they would practice in underserved areas. Reasons given for not choosing primary care were finances, lifestyle, prestige, wanting to have "mastery" in a field, and feeling more comfortable with hospital, rather than outpatient, medicine.

    Expected earnings was a prominent theme, with consideration of their medical school debts a common factor. Other lifestyle factors, such as the attractiveness of "shift-work" and not being committed to staying in one geographic location for an extended time period were also identified as important considerations. Feeling overwhelmed and frustrated with the "paperwork" burden that comes with the current practice of primary care was also commonly mentioned. We also heard from residents about how during medical school they felt discouraged from pursuing primary care, by either being directly told, or given the impression more indirectly, that it is more prestigious to sub-specialize.

    Residents spoke about sub-specializing, or choosing hospital medicine, because it was a more comfortable choice. They spoke about the preference for pursuing a specialty so they could feel "mastery" over a single organ system or subspecialty; they were overwhelmed by the breadth of knowledge needed in the practice of primary care medicine, and the frequent updating across broad areas needed to keep pace with ongoing changes in medicine. Similarly, given that their training at this point had been mostly inpatient, those that were not sub-specializing spoke of being more comfortable becoming a hospitalist, at this point, than practicing outpatient medicine.

    Those who were choosing primary care often spoke about having had a pivotal experience, either in medical school or in residency, which "turned them on" to primary care. They spoke about having exceptional mentorship experiences. The timing of these experiences differed between FM and IM residents. FM

residents, of course, have made the decision prior to matching into residency, and thus it was medical school experiences that were most influential for them. For IM residents, this decision was more likely made, or at least solidified, during residency training, and thus, although they may have had a pre-disposition or leaning towards primary care, residency experiences were most crucial in this decision.

5. Conclusions

In conclusion, although approaches differed, several innovation foci emerged from our site visits, including: transforming practices into Patient-Centered Medical Homes (PCMHs); developing IT resources; working in multidisciplinary teams; improving patient-provider continuity; separating inpatient and outpatient clinical activities;   working in community-based settings; implementing curricula for teaching quality improvement methods and delivering high-quality chronic disease care; exposing residents to community issues and community-based resources; working in systems encouraging high-performance and efficiency; and redesigning inpatient teaching units.   Further, we found several factors to be critical enablers to innovations in ambulatory training. These factors include leadership, finances, institutional needs and structure, and ACGME RRC accreditation factors. In sum, innovations in ambulatory training require resources and commitment. This commitment needs to be both at the program and institutional levels. Leadership is a key enabler. At the programs visited, supplemental funding has also been a necessity.

Several areas are in need of further study. ACGME rules, most notably those pertaining to continuity clinic timing and infrastructure, required patient volume, and faculty oversight, may act as barriers to innovation. It may be valuable to examine such rules and weigh their effects in ensuring a minimum quality standard versus their potential for stifling innovation. Other areas in need of study are the costs and benefits of community-based and rural training experiences. With respect to building a

primary care workforce, the quality of continuity training could be important for encouraging residents to go into primary care. However, medical school experiences, and financial considerations are also fundamental motivators.