

Kristina M. Cordasco

Mariana Horta

Nicole Lurie

Chloe E. Bird

Barbara O. Wynn

RAND Health

1776 Main Street

P.O. Box 2138

Santa Monica, CA 90407-2138

•

MedPAC

601 New Jersey Avenue, NW

Suite 9000

Washington, DC 20001

(202) 220-3700

Fax: (202) 220-3759

www.medpac.gov

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How Are Residency Programs Preparing Our 21st Century Internists?

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

WORKING P A P E R

How Are Residency Programs Preparing Our 21st Century Internists?

A Review of Internal Medicine Residency Programs' Teaching on Selected Topics

KRISTINA M. CORDASCO, MARIANA HORTA, NICOLE LURIE,
CHLOE E. BIRD, BARBARA O. WYNN

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SUMMARY

Over the past 50 years, the practice of medicine in the United States has changed dramatically. Successful medical innovations have increased the complexity of delivering care while, at the same time, the U.S. population is aging and becoming increasingly diverse and the prevalence of chronic diseases is on the rise. In 2003, an Institute of Medicine (IOM) report on these changes noted that "clinical education has not kept pace with, or been responsive enough to, shifting patient demographics and desires, changing health system expectations, evolving practice requirements and staffing arrangements, new information, a focus on improving quality, or new technologies." The Medicare Payment Advisory Commission (MedPAC), an independent Congressional agency that advises the U.S. Congress on issues affecting the Medicare program, asked the RAND Corporation to conduct an exploratory study of how residency programs are adapting their teaching to prepare physicians to practice within the current health care delivery system, based on interviews with Internal Medicine (IM) program directors.

We conducted semi-structured telephone interviews with a randomly-selected and representative sample of 26 allopathic and osteopathic IM residency program directors. RAND worked with MedPAC to identify priority topics to be included in the interviews. Topics fall into the domains of three of the American Council on Graduate Medical Education (ACGME) common program requirements: practice-based learning and improvement; systems-based care; and interpersonal and communication skills. See Table 1ES for definitions of these program requirements and a listing of included topics by requirement. In addition, we assessed two aspects of the infrastructure that supports teaching in these competencies: the care settings through which the residents rotate and the information technology (IT) being used in these settings.

For each topic, we asked directors if his or her program teaches its residents about this topic, through either formal or informal (experiential) curricula. If the program did teach its residents about that topic, we then asked the director to describe his/her program's training. Probes were used to elicit details. After asking about the topics in each of the three core competencies, the director was asked about facilitators and barriers to education in that competency. At the end of the interview, we asked if the director perceived of any additional facilitators or barriers to improving graduate medical education.

Table 1: ACGME Common Program Requirement Definitions and Topics Included in Interviews

ACGME Common Program Requirement	Definition	Topics included in interviews
Practice-Based Learning and Improvement	The practice of investigating and evaluating the care of patients, appraising and assimilating scientific evidence, and continuously improving patient care based on constant self-evaluation and life-long learning	<ul style="list-style-type: none"> • Using Evidence-based medicine • Using Quality Improvement Methods • Using Clinical decision aids
Systems-Based Practice	The practice of investigating and evaluating the care of patients, appraising and assimilating scientific evidence, and continuously improving patient care based on constant self-evaluation and life-long learning	<ul style="list-style-type: none"> • Coordinating patient care during hospitalization, across hospital discharge, and in outpatient care settings • Using methods for improving patient safety
Interpersonal and Communication Skills	The effective exchange of information and collaboration with patients, their families, and health professionals	<ul style="list-style-type: none"> • Communicating with other health care providers • Communicating with patients, including special populations and about end-of-life care

KEY FINDINGS

In the competency of **practice-based learning and improvement**, we asked about programs' curriculum in evidence-based medicine (EBM), using decision aids, and quality improvement methods. We found that all programs are teaching their residents to use EBM through conferences at which residents present articles from the literature; the majority of programs also have formal training in searching the medical literature. Most, but not all programs are teaching residents quality improvement methods, but the curriculum varies widely; specifically, some programs have residents collect, analyze, and act on their own data, while other programs present the data to the residents

and have residents informally participate in system changes. As for the topic of clinical decision aids, although all but one program teaches residents about clinical prediction rules and most hospitals use clinical pathways or pre-printed orders prompting the physician in standard or guideline-specific care, this education is informal at most hospitals.

In the competency of **systems-based practice**, we asked about programs' education in patient care coordination, working in multidisciplinary teams, awareness of absolute and relative costs, and patient safety. We found that although residents in all programs gain ample experience coordinating patient care, the programs vary in the amount of, and approach to, any formalized training and IT support in this topic. Similarly, all the programs interviewed provide some experience working with multidisciplinary care providers, but while a few programs have formal multidisciplinary teams, more often the teams are semi-formal or informal. All but one director indicated residents are taught to be aware of the absolute and relative costs of diagnostic tests and therapeutic agents, but most commonly this teaching is informal. Two-thirds of directors indicated that their residents receive instruction, most commonly informal, in patients' share of medical charges. Finally, all programs educate their residents in patient safety issues.

In the competency of **interpersonal and communication skills**—defined as “the effective exchange of information and collaboration with patients”—we asked about programs' teaching in communicating with other healthcare providers, communicating with patients, communicating with special populations, and communicating about end-of-life issues and advanced directives. Several program directors emphasized that although they have formal sessions on interpersonal and communication skills, the main, and most effective, way that residents build these skills is through experiences and faculty modeling, mentoring, and informal feedback. Additionally, we found that two-thirds of the interviewed program directors have formal teaching in communicating with other healthcare providers and all the programs have formal teaching in communicating with patients. Most, but not all of the programs formally instruct their residents in cultural competency. Half of the programs give formal teaching in health literacy, but less than one-third provide formal teaching in using interpreters. Most of the programs provide formal teaching in communicating about end-of-life issues and advanced directives, and all directors indicated that their residents get ample experience in this topic.

We found significant variation among the programs in residents' experiences with **diverse care settings and models**. Of the seven university hospital-based programs, four have required rotations in community-based hospitals. Residents in six programs rotate through Veterans' Affairs (VA) hospitals. Eighteen of the programs have a required rotation with hospice or a palliative care service. Twenty-one of the programs have required ambulatory experiences in community settings; however, for most programs this experience is minimal in time and scope. Fourteen programs have residents perform home visits and 21 programs have a required rotation in which they experience or provide care in a nursing home or rehabilitation unit. Twenty directors reported that their residents have some experience with managed care settings and/or populations, but seven volunteered that it was a very small segment of their overall patient population. No directors reported that their residents have experience in designated medical homes.

We also found wide variation in the use of electronic medical records (EMR) and computer order entry (COE). Although all programs provide residents with some experience in using EMRs, only one program has a comprehensive EMR in both inpatient and outpatient settings and two programs have no electronic system in their primary outpatient settings.

Directors reported multiple factors acting as facilitators and barriers to improvement, including:

- (1) **Information Technology:** Having a comprehensive, or nearly comprehensive, EMR system was cited as not only key in giving residents experience in using such systems, but was also referred to as sources of data for quality improvement projects, tools for reinforcing the use of decision-support and prediction tools, methods to coordinate patient care in both the hospital and outpatient settings, and sometimes links to patient education materials. This was the most commonly-cited facilitator and barrier.
- (2) **Faculty Expertise and Time:** Almost uniformly, a "faculty champion" who spearheaded the development and implementation of a curricula was central in areas in which programs have well-developed formal curriculum. Additionally, general faculty competency, or lack thereof, was a common explanation for informal teaching being either strong or weak in various areas.
- (3) **Characteristics and resources of the program's setting:** Directors described how the settings in which the programs are based can be both assets and limiting factors in their residents' education.

- (4) **Institutional support:** Program directors varied widely in their perceptions of the support that hospital administration and other institutional leaders provide. Several directors described areas where hospital priorities aligned with educational needs but in areas where there was not this alignment, less support was evident. Overall directors viewed ACGME's leadership in, and regulation about, these competencies to be helpful in getting institutional support. Some program directors spontaneously expressed concerns about GME funding, worrying that if funds for GME were decreased, their institution may be unwilling to continue its support of residency programs.
- (5) **Competing priorities for resident time and residents' baseline knowledge and interest in these topics:** Time to teach these competencies competes with both education in other competencies and with the institution's clinical service needs, especially given increasing knowledge and skills an internal medicine resident needs to master. Further, work-hour restrictions have decreased the time by which residents have to gain these knowledge and skills. Several program directors expressed concern that if, as recent reports have recommended, work hours become even more restricted, the residency environment may become even less amenable to instruction in these competencies. Furthermore, resident baseline knowledge, skill, and interest in, these competencies facilitate or impede their educational program in these topics.
- (6) **Scarcity of research in educational and evaluation strategies for these topics:** Several directors mentioned that there is a dearth of educational methods or tools that have been validated as effective for teaching residents these competencies. Furthermore, several directors explicitly cautioned against automatically valuing formally-delivered curriculum (lectures, projects, web-based modules) over informal curriculum, as much of these topics are best taught through the experience of patient care, with skilled faculty mentoring.

In summary, although IM residency programs are adapting their curricula to prepare physicians-in-training to practice in a demographically shifting patient population and evolving health care system, there is substantial variation in programs' approaches to, and implementation of, instruction in the topics of interest. For many topics, informal teaching through faculty role-modeling and patient-focused feedback and discussions is predominant.

In general, teaching in these topics remains inconsistent and far short from that needed compared to what is recommended by various expert reports.⁴⁻⁹ Although directors varied in their enthusiasm for, and awareness of teaching methods in, these topics, they were, in general, supportive of improving curricula. However, as several program directors warned, these policy changes must be formulated so that teaching in other areas, particularly medical knowledge and patient care, are not negatively impacted. Also, heterogeneity in health care systems, settings, and residents also revealed the need for flexibility in graduate medical education policies.

In conclusion, these findings suggest that changes in graduate medical education funding policies, accreditation standards, certification exam topics, undergraduate medical education and investment in research of educational and evaluation strategies could have a significant positive impact on how well IM programs are preparing our nation's physicians to care for our 21st century population.

1. INTRODUCTION

Over the past 50 years, the practice of medicine in the United States has changed dramatically. Successful medical innovations have increased the complexity of delivering care, while at the same time, the U.S. population is aging and becoming increasingly diverse, and the prevalence of chronic diseases is on the rise.¹⁻³ In 2003, an Institute of Medicine (IOM) report on these changes noted that "clinical education has not kept pace with, or been responsive enough to, shifting patient demographics and desires, changing health system expectations, evolving practice requirements and staffing arrangements, new information, a focus on improving quality, or new technologies."⁴ The Council on Graduate Medical Education (COGME), the American Association of Medical Colleges (AAMC), the Pew Commission, the Commonwealth Fund, and others have also highlighted significant gaps between the education that student and resident physicians currently receive and the skills they need to successfully deliver quality medical care to a diverse and older patient population with multiple complex chronic diseases.⁵⁻⁹ In response to these calls for change, accrediting organizations of allopathic and osteopathic residency programs have begun incorporating new topics into curricula and accrediting standards.^{10,11}

The Medicare Payment Advisory Commission (MedPAC), an independent Congressional agency that advises the U.S. Congress on issues affecting the Medicare program, asked the RAND Corporation to conduct an exploratory study of how residency programs are adapting to prepare physicians to practice by interviewing Internal Medicine (IM) program directors.¹ RAND worked with MedPAC to identify priority topics to be included in the interviews, which are detailed in Table 1. These topics fall into the domains of three of The American Council on Graduate Medical Education (ACGME) common program requirements: practice-based learning and improvement; systems-based care; and interpersonal and

¹ MedPAC originally requested that RAND conduct a two-part study: 1) assessing the written curricula of IM programs and 2) conducting semi-structured interviews with IM program directors. However, despite sending requests to 70 programs, we were able to obtain complete written curricula from only 8 programs. Reasons for refusal included: (1) Not having the time to compile the numerous curricula components; (2) Concerns about maintaining intellectual property rights; (3) Current written curricula being out-of-date or under revision. Due to the inadequate response, MedPAC and RAND jointly decided to discontinue the assessment of written curricula.

communication skills. In addition, we focused on two aspects of the infrastructure that supports teaching in these competencies: the care settings through which the residents rotate and the information technology being used in these settings.

Practice-based learning and improvement is defined as "the practice of investigating and evaluating the care of patients, appraising and assimilating scientific evidence, and continuously improving patient care based on constant self-evaluation and life-long learning."¹¹ Over the past several decades, successful medical innovations have increased the complexity of delivering care. This increasing complexity has made medical care vulnerable to problems in quality; studies suggest that Americans receive approximately half of recommended care.¹² Therefore physicians must be able to assess the quality of care they provide, and to implement system changes for practice improvement.⁶ In addition, in order to achieve a high quality health system, physicians need the ability to synthesize, and apply to clinical decisions, the rapidly expanding and changing evidence base, using clinical practice guidelines and decision-aids.¹³

The second competency in which our topics were grouped is systems-based practice. Systems-based practice is defined as "an awareness of and responsiveness to the larger context and system of health care" and "the ability to call effectively on other resources in the system to provide optimal health care."¹¹ Not only has the complexity of medical care increased in the 21st century, but the complexity of the medical care system has also grown exponentially. Discontinuity in care has increased (within a hospitalization, at hospital discharge, and in outpatient care), while the proportion of hospitalizations related to exacerbations or complications of chronic conditions requiring longitudinal care has also increased. Therefore, physicians, whether they work in a hospital, a clinic, a long-term care facility, or other setting, must be able to coordinate plans of care, work with multidisciplinary support staff, and utilize systems ensuring patient safety in this complexity.^{14,15} Finally, to counter rapidly rising health care costs and increasingly limited health care resources, medical educators should teach physicians to incorporate cost and cost-effectiveness information into treatment decisions.¹⁶

Competency in interpersonal and communication skills is "the effective exchange of information and collaboration with patients, their families, and health professionals."¹¹ Effective interpersonal and communication skills are important in 21st century medical practice given the changing demographics of the country—both in terms of aging and diversity—and the increased prevalence of chronic disease. Successful

prevention and chronic disease care requires patient self-management as well as physician-guided care.¹⁷ Yet, many patients have difficulty understanding how to manage their own care, especially those who have communication challenges due to poor health literacy or limited English proficiency.^{18,19} Physician skills in cultural competency and cross-cultural communication are critical to the delivery of quality care to all patients, irrespective of their race, ethnicity, culture, or language proficiency.⁴⁻⁶

The settings in which residents gain experience, and the information technology (IT) being used in these settings, are critical components of the infrastructure necessary for achieving these three competencies. In order to be adequately prepared to practice in, and navigate patients between, various health care settings, residents need exposure and experience in diverse care settings.^{5,6} To increase quality, safety and efficiency, physicians must become facile with the tools of informatics, such as electronic medical records, computer order entry, electronic sources of medical care information and guidelines, electronic and automated communications with patients, reminder systems, and IT-supported clinical decision-making aids.^{4,6,23-25}

This report summarizes data collected via semi-structured interviews with 26 IM program directors. After detailing our methods, we report the findings of the topics organized into the three core competencies. Following the discussions of the core competency topics, we report on the programs' care settings and IT infrastructure. Lastly, we turn to reporting, from the perspective of the program directors, the facilitators and barriers to teaching these topics, before concluding with a discussion of policy implications. To give context for our findings, we also include, in the appendix, a review of a sample of medical school curricula, assessing the scope of teaching in the topics of interest and the settings for clinical rotations.

2. METHODS

We conducted semi-structured interviews with a randomly selected, representative sample of 26 program directors. We first identified all allopathic and osteopathic IM programs using the publicly accessible residency program directory on the websites of The American College of Physicians (ACP) and the American College of Osteopathic Internists (ACOI), respectively.^{26,27} We randomly selected 59 eligible programs,² stratified by those with allopathic and osteopathic accreditation. We additionally classified each program by region of the country, whether it is inside a Metropolitan Statistical Area (MSA) and by hospital type (Academic, non-Municipal Community-Based, or Municipal). We used the American Medical Association (AMA) Fellowship and Residency Electronic Interactive Database (FREIDA) to identify the number of residents in each program.²⁸ Programs were eligible for sampling if they had residents in the 2008/09 academic year and had graduated residents in June of 2008.

We sent three e-mails to the directors of sampled programs, inviting them to participate in an approximately 60-minute interview. Directors were asked to send a return e-mail or call to accept or decline the invitation. Additionally, directors of allopathic programs received an email from The Association of Program Directors in Internal Medicine (APDIM), and osteopathic programs from The American College of Osteopathic Internists (ACOI), encouraging their participation. For those who accepted, an interview time was scheduled and a second email sent containing detailed information about the interview and a list of the topics within the interview.³

² MedPAC requested RAND conduct at least 25 interviews. RAND predetermined that the minimum acceptable response rate would be 40%. We initially sent requests to 60 programs to achieve the minimum response rate with 25 responses. One of the 60 programs was later determined to be ineligible as it did not graduate residents in 2008. Therefore, our requests were sent to 59 eligible programs.

³ At the time of the interview, we asked if the director had received our email with the interview information, provided them an opportunity to ask questions, and then requested their verbal consent to proceed with the interview. If the director did not recall receiving the information email, we read the information to them before requesting consent. The Human Subjects Committee of the RAND Corporation approved the study protocol.

Table 2: Topics of Interviews

<i>Practice-Based Learning and Improvement</i>	<ul style="list-style-type: none"> • Evidence-based medicine <ul style="list-style-type: none"> ○ searching the scientific literature to answer questions ○ critiquing the medical literature and applying it to clinical decisions • Quality Improvement Methods <ul style="list-style-type: none"> ○ systematically analyzing the quality of care being provided in one's own or a group's practice ○ Implementing systems changes with the goal of practice improvement • Using Clinical decision aids
<i>Systems-Based Practice</i>	<ul style="list-style-type: none"> • Communicating and coordinating patient care: <ul style="list-style-type: none"> ○ at hospital discharge ○ among multiple providers in outpatient settings ○ across provider hand-offs in the hospital • Using methods for improving patient safety
<i>Interpersonal and Communication Skills</i>	<ul style="list-style-type: none"> • Communicating with other health care providers • Communicating with patients <ul style="list-style-type: none"> ○ communicating clearly about diagnosis and treatment plans ○ engaging patients in shared decision-making ○ educating about self-care activities ○ counseling to enhance adherence and/or behavior change • Communicating with special populations <ul style="list-style-type: none"> ○ acquiring cultural competency ○ communicating with patients with low health literacy ○ working with interpreters • Communicating with patients and families about end-of-life decisions and advanced directives
<i>Care Settings and IT Infrastructure</i>	<ul style="list-style-type: none"> • Caring for patients in: <ul style="list-style-type: none"> ○ community-based hospitals ○ Veterans' Affairs (VA) hospitals ○ Hospice or palliative care services ○ community clinics or private offices ○ home visits ○ managed care ○ medical homes • Information Technology <ul style="list-style-type: none"> ○ using electronic medical records ○ using computer-order entry

Topics for the interviews are listed in Table 2 and the interview protocol is included in Appendix B. The protocol was developed in partnership with MedPAC, with probes for information that was of particular interest to MedPAC. In addition, we pre-tested the protocol with three current IM program directors and incorporated their feedback. For each topic, we asked directors if his or her program teaches this topic, through either formal activities or through experience. If the program director indicated that they do, we asked the director to describe the instruction in this area. Probes were used to elicit details.⁴ After asking about the topics in each of three core competencies, the director was asked about enablers, facilitators, and barriers to their teaching in that competency. At the end of the interview, we asked if the director perceived of any additional facilitators or barriers to improving graduate medical education.

A board-certified IM physician familiar with residency education conducted all interviews. Each interview was audio-recorded. Based on detailed notes and after reviewing each audio-recording, using content analysis with techniques from grounded theory, we identified the range of methods and resources used for teaching residents in each topic area and the perceived facilitators and barriers.

⁴We additionally asked directors to rate their programs teaching on these topics, in relation to the preparation needed for residents' post-training practices. However, directors appeared to have wide variation in their perceptions of the preparation needed in each of these topics, which limited the validity of this data. Thus, the results of these ratings are not presented in this report.

3. SAMPLE AND INTERVIEW CHARACTERISTICS

We identified 381 eligible IM residency programs: 320 (84 percent) allopathic; 45 (12 percent) osteopathic; and 16 (4 percent) with dual accreditation. As shown in Table 3, a greater proportion of IM programs are located in the northeastern states (36 percent) compared to southern (24 percent), midwestern (27 percent), and western (13 percent) states; nearly all (97 percent) are located within an MSA. The majority of programs are located in community hospitals (61 percent), but approximately one-third are in university hospitals (37 percent), with the remaining 3 percent in municipal hospitals. Of the 290 IM programs for which FREIDA has data on program size, the number of residents per program ranges from 15 to 180, with a median of 51 residents.

Table 2 also describes the characteristics of the 59 eligible programs from which the director was invited to participate (50 allopathic and 9 osteopathic). Programs having both allopathic and osteopathic accreditation are on both lists, which resulted in over-sampling of these programs. Thus, of the 59 eligible programs that were invited to participate, 45 (76 percent) have allopathic accreditation only, 5 (8 percent) have osteopathic accreditation only, and 9 (15 percent) have both allopathic and osteopathic accreditation. Otherwise, as shown in Table 3, the programs randomly selected for invitations were approximately representative of the population of IM residency programs with respect to geography, being inside an MSA, hospital size, and hospital type.

Twenty-six (44 percent) of the 59 program directors agreed to and completed an interview between November 25 and December 29, 2008. Three additional program directors agreed to be interviewed, but we were unable to schedule times to complete the interviews. As shown in Table 2, the programs of the directors interviewed resemble the characteristics of the 59 eligible programs invited, except that program directors from the northeastern states are over-represented and we did not have representation from programs located outside of an MSA. The programs interviewed ranged in size from 15 to 128, with a median of 52, residents. Interview lengths ranged from 44 to 89 minutes, with a mean and median length of 65 and 63 minutes, respectively.

Table 3: Characteristics of all Eligible IM Programs, Programs Invited, and Programs Interviewed

	<i>All IM Programs (381)</i>	<i>Invited (59)</i>	<i>Interviewed (26)</i>
<i>Accreditation</i>			
Allopathic	320 (84%)	45 (76%)	20 (77%)
Osteopathic	45 (12%)	5 (8%)	2 (8%)
Both	16 (4%)	9 (15%)	4 (15%)
<i>Geographic Region</i>			
Northeast	138 (36%)	21 (36%)	13 (50%)
South	91 (24%)	11 (19%)	4 (15%)
Midwest	105 (27%)	20 (34%)	7 (27%)
West	45 (13%)	7 (12%)	2 (8%)
<i>Within an MSA</i>	374 (98%)	57 (97%)	26 (100%)
<i>Hospital Type</i>			
University	139 (37%)	17 (29%)	7 (26%)
Community	232 (61%)	39 (66%)	17 (65%)
Municipal	10 (3%)	3 (5%)	2 (8%)
<i>Number of Residents (median)</i>	51	48	52

4. FINDINGS

Our results are presented graphically in each section (Figures 1-4), with programs arranged randomly; however, each number represents the same program throughout the figures. When we arranged the data in order of program size, geographic region or hospital type, no patterns were observed (data not shown to protect program anonymity).

PRACTICE-BASED LEARNING AND IMPROVEMENT

Within the competency of practice-based learning and improvement, "the practice of investigating and evaluating the care of patients, appraising and assimilating scientific evidence, and continuously improving patient care based on constant self-evaluation and life-long learning,"¹¹ we asked about programs' teaching in evidence-based medicine, using decision aids, and quality improvement methods. Figure 1 graphically presents the results. We found that all programs interviewed are teaching their residents to use evidence-based medicine (EBM) through conferences at which residents present articles from the literature; the majority of programs also have formal teaching in searching the medical literature. Most, but not all of the programs are instructing their residents in quality improvement methods, but this teaching varies widely with some programs having residents collect, analyze and act upon their own data, while in other programs the data is only presented to the residents and they informally participate in system changes. All except one program teaches residents about clinical prediction rules and clinical pathways or ordersets (pre-printed orders prompting the physician in standard or guideline-specific care) are utilized at most hospitals; however, teaching in these subject is commonly informal and IT support for these tools is not prevalent.

Evidence-Based Medicine

All directors reported teaching their residents to use evidence-based medicine. Eighteen of the programs hold formal sessions on how to search the literature (e.g., orientation to common search engines,

searching strategies). It is common for the institution's medical librarian to lead these sessions and then be available to the residents as needed for consultation. The directors in five of the eight programs not having formal sessions on search strategies have the perception that their residents are already very skilled in this upon entering residency.

All programs reported having regular "journal clubs" or "evidence-based medicine" conferences in which residents rotate in leading a discussion about one or more articles from the medical literature. Half of the programs (n=13) provide residents with faculty mentoring or assistance from an epidemiologist or statistician in preparing this presentation. At these sessions, after the resident presents the article, attendees, with faculty guidance, discuss the article, critiquing methods and judging its applicability to their practices. Half of the programs have additional lectures on critiquing the literature and/or the basics of medical statistics and eight give additional formal evidence-based medicine assignments, requiring residents to perform literature searches and critiques based on encountered clinical problems and to present the information back to faculty and/or co-residents. In one program, the residents have a special two-week rotation in which they are not involved directly in patient care but instead participate in daily rounds with a medical team, doing literature searches on relevant topics and presenting the information obtained back to the team.

Most program directors additionally felt that this topic is also extensively taught informally through daily interactions with faculty in the course of patient care. One director reported having done faculty development on this issue to enhance this informal teaching. One program annually sends its chief residents to evidence-based medicine seminars to improve teaching in this area.

Figure 1: Findings on Formal Activities and Infrastructure For Practice-Based Learning and Improvement Topics

Program Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total	
<u>Evidence Based Medicine (EBM)</u>																												
Formal Session- Searching Literature	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X				X	X	X					18
Journal Club/ EBM Conference	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	26
Lectures on Critiqueing Literature	X				X	X			X		X		X			X	X		X				X	X	X	X	13	
EBM Assignments	X			X	X	X				X			X							X						X	8	
<u>Quality Assessment (QA) & Improvement</u>																												
Have Lectures /Computer-Based Training in QA	X		X	X			X			X	X		X					X		X	X	X					11	
Hospital administration collects, analyzes, and presents data on quality measures	X	X		X		X								X	X			X	X								8	
Each resident works on quality assessment	X		X	X	X	X	X	X		X	X	X	X	X						X		X	X	X	X	X	18	
Residents collect or are provided data on own patients				X		X	X			X			X						X			X					7	
Use Chronic Disease Registries		X					X		X	X					X			X				X					7	
Have Lectures / Computer-Based Training in Implementing System Changes	X						X			X			X						X					X	X		7	
Each resident does project implementing system change	X						X					X						X									4	
<u>Clinical Decision Aids</u>																												
Use Ordersets or Critical Pathways		X		X	X		X	X	X	X	X	X	X	X	X	X	X			X		X	X		X		18	
Formal Lectures on Clinical Prediction Tools	X	X			X					X		X													X		6	
IT Supports Clinical Prediction Tools		X			X		X		X	X		X	X							X		X					9	

Quality Improvement Methods

Quality Improvement (QI) can be broken down into two component parts: first, the systematic collection and analysis of quality data and then, based on that data, implementing system changes for the goal of practice improvement. We asked program directors about both aspects of QI.

All but one of the program directors described a mechanism through which all of their residents receive exposure to the systematic collection and analysis of data about quality of care. In 18 of the interviewed programs, every resident works individually or in small groups on a specific quality assessment or improvement project. In seven programs, the faculty or hospital administration collects and analyzes data on quality measures (such as Centers for Medicare and Medicaid (CMS) core performance measures) and then presents the data to the residents. In seven programs, residents collect or are provided with data specific to their own patients. In seven programs, the residents use or have exposure to chronic disease registries. Eleven programs have lectures specific to data collection and analysis and three use computer-based or internet instruction in place of, or as an adjunct to, in-person didactics.

Among the 18 programs requiring that every resident engage in an individual or small group project, approaches and resources vary. Four programs enhance resident engagement by having the residents choose their project areas, rather than having it assigned to them. Two programs have placed this project on a rotation (combined with systems-based practice teaching) during which residents are not responsible for direct patient care; one program has placed it within a specific ambulatory rotation that spans several months. Some programs have developed their own curricula in this area. Most often, these programs have a faculty member with a special interest in quality improvement, or the hospital's quality management department is co-leading this curricula. Four programs instead, or in addition, use the American Board of Internal Medicine's (ABIM) Performance Improvement Modules (PIMs).²⁹ These modules were developed primarily for use by post-residency physicians to fulfill recertification requirements in self-evaluation of practice performance; however, several of the modules have been made specifically available for use by residency programs. Another resource used by two of the programs is The American Osteopathic Association's (AOA) Clinical Assessment Program for Residencies; two community programs use web-based modules developed by university programs. An informal resource cited by one director is resident

interaction with a large private group practice that focuses on quality assessment and improvement, so that residents have exposure to these methods being used outside the academic setting.

In the subject of implementing system changes, seven programs have lectures or computer-based instruction, and four have resident-led projects. Ten programs have a subset, but not all, of their residents involved in designated practice-improvement projects. More commonly, programs have informal teaching in this area by involving residents in hospital-wide performance improvement initiatives (e.g., soliciting suggestions or feedback and providing information on progress).

Using Decision Aids

All except one program reported teaching their residents to use clinical prediction rules (e.g., pneumonia severity index, pulmonary embolism prediction score, risk score for unstable angina, coronary vascular disease risk score). Six have specific lectures on these tools, but, more commonly, instruction on their use is contained within disease-specific lectures (e.g., the pneumonia severity index is presented within a general lecture on pneumonia). Seven programs electronically support these tools through direct links or calculators, either embedded in their EMR or through intranet links. Additionally, five directors indicated that although their institutions do not formally provide these resources, residents commonly have some of these tools on their personal hand-held computers or access them through use of the internet.

In twenty of the programs, residents use decision aids such as clinical pathways or order sets for common hospital conditions. In nine of these programs the hospital's information technology (IT) system supports these decisions aids; at one program, the IT system supports their use only when residents rotate through the associated VA hospital.

SYSTEMS-BASED PRACTICE

Within the competency of systems-based practice, "an awareness of and responsiveness to the larger context and system of health care" and "the ability to call effectively on other resources in the system to provide optimal health care,"¹¹ we asked about programs' teaching in patient care coordination, working in multidisciplinary teams, awareness of absolute and relative costs, and patient safety. Figure 2 graphically presents the results. Program directors in all programs felt that their residents get much experience coordinating patient care; however, the programs vary in their amount of, and approach to, any formalized teaching and IT support in this topic. Similarly, all the

program directors interviewed told us that their programs provide some experience working with multidisciplinary care providers. While a few programs have formal multidisciplinary teams, more often the teams are semi-formal, or informal. All but one director indicated residents are taught to be aware of the absolute and relative costs of diagnostic tests and therapeutic agents, but most commonly this teaching is informal. Two-thirds of directors indicated that their residents are taught, most commonly through informal methods, what the patients' share of the charges will be. All programs instruct their residents in patient safety issues.

We additionally found that four of the programs have rotations specifically for teaching their residents in systems-based practice. On these rotations, in place of providing direct patient care, residents engage in health care system activities such as attending hospital committee meetings (e.g., patient safety, pharmacy and therapeutics), working with case managers to coordinate the flow of hospital patients, and working in the pharmacy or laboratory. Another program protects a half-day per week of resident time on ambulatory rotations for such systems-based practice experiences instead of teaching systems-based care on a specific rotation. Two programs, without such a rotation, require each of their residents to be active in at least one hospital committee, such as quality control, nursing liaison, or educational committees.

Patient Care Coordination

Although residents in all interviewed programs gain experience in coordinating patient care in the inpatient and outpatient environments, that experience is variable and the programs vary in their amount of, and approach to, any formalized instruction, as well as IT support in this area.

Almost all directors indicated that coordination of care involving provider handoffs within the hospital has become an area of increased attention recently. Eleven of the programs have specific lectures (commonly in orientation) on how to "sign-out" patients; one program uses a web-based module for this instruction, and two give their residents written materials to read. In six of the programs, a faculty physician or chief resident supervises sign-out sessions and provides feedback on the quality of the sign-out. In four programs, the written sign-out forms are intermittently reviewed and critiqued by the program director. Two programs have a formal system for peer-to-peer critique of sign-outs. In ten of the programs, the institution has provided a computer-based tool to specifically support the sign-out process. In

two programs, on-call residents are provided with personal digital assistants (PDAs) or laptop computers with this software.

For coordinating care at hospital discharge, residents in all the programs work with case managers and/or social workers in communicating and coordinating hospital discharge. In one program, there is a specific nurse who assists the residents in this coordination. Eleven of the programs have formal instruction in this area, and many of these have case managers lead this instruction. One program administers a test to evaluate the knowledge its residents have obtained in this area. At three programs, charts are reviewed to assess the quality of the resident discharge summaries. To facilitate shared-accountability and enhance resident education in this area, one program uses a team-based approach to discharge communication and coordination in which each of the resident team members has a different role for discharge planning and coordination (e.g., communicating with social workers, communicating with primary care provider, etc). At another program, residents rotate through a special "Discharge Team" that, separate from the primary team, takes the lead on care coordination and patient education on the day of discharge. While on this team, under the mentorship of the program director, residents learn about care coordination.

Although it was not asked about specifically, the main vehicle for inpatient provider communication with primary care doctors at most programs appeared to be the discharge summary and/or a shared computer system. We did not specifically ask about care coordination in transitions to long term care or rehabilitation services and this was not spontaneously mentioned by any of the directors.

The institution's IT system supports the communication and coordination of patient care at hospital discharge for 14 of the interviewed programs; however, the level and type of support varies. In some programs, this support is limited to dictated discharge summaries being made electronically available for providers in hospital-affiliated clinics. At two hospitals, notes are scanned into the computer system so that they are available at hospital-affiliated outpatient clinics. At five programs, the IT system assists in discharge medication reconciliation. Most comprehensively, in three programs, a summary document about the patient's hospital course is generated by the computer system and provided to the patient at discharge.

All residents have a "continuity clinic," in which they have a panel of patients for whom they are the primary care physician (PCP). One of the roles of a PCP is to coordinate the care of patients who have multiple providers (e.g., medical specialists, physical therapists, psychologists). Eight directors reported that their residents receive

didactics or attend case conferences on care coordination in the outpatient setting. IT supports outpatient communication and coordination of care in eleven of the programs. This support is limited to electronic sharing of notes between providers in seven programs. In two programs with outpatient COE, the system prompts the resident to include appropriate information when referring a patient. In two programs, providers (both medical and ancillary) send patient-care related "tasks" to one another, specifically requesting that a note or lab result be reviewed or acted upon.

Working in Multidisciplinary Teams

All the programs interviewed provide some experience working in formal, semi-formal, or informal multidisciplinary teams.

In 16 of the programs, residents have exposure at least once to working in an inpatient formal multidisciplinary team, in which non-physician personnel, most commonly nursing, social work, or pharmacy, rarely a nurse practitioner, are assigned specifically to the team and participate in the team's daily rounds. Formal multidisciplinary teams are most commonly used only on subspecialty rotations, such as intensive care units, hematology/oncology services, and inpatient geriatrics units. In four programs, formal multidisciplinary teams are used on the general medical service. Five of the programs without exposure to formal inpatient teams do have experience working in semi-formal multidisciplinary teams; this means that although they do not do rounds together, there are regularly scheduled meetings between the residents and non-medical personnel outside of rounds. Two programs have informal teams only in which multidisciplinary personnel are available for consultation or are independently assessing the patient and discussing issues with the team as needed.

In ambulatory settings, eight of the programs give residents some, but often minimal, experience working in formal multidisciplinary teams, defined as having experiences in which the work of the resident and non-physician personnel (e.g., social work, nutritionists, pharmacists) is formally coordinated. Commonly, these experiences are on geriatrics rotations or if the resident co-leads disease-specific education classes or group visits. In programs in which there are no formal outpatient multidisciplinary teams, the directors (with the exception of one program) reported that the residents have multidisciplinary staff available for consultation—most commonly social workers and less commonly nutritionists, pharmacists, podiatrists, and psychologists—in their ambulatory continuity clinics.

Awareness of Absolute and Relative Costs

All but one director indicated that their residents are taught to be aware of the absolute and relative costs of diagnostic tests and therapeutic agents. The most common approach to this teaching is through experience during patient care and related discussion. Seven directors reported providing lectures specific to this topic. One director reported using the expertise of hospital utilization management personnel to deliver these lectures and another reported that the

graduate medical education office had hired a person specifically for educating residents in this and related billing and coding knowledge.

Seventeen of the directors reported teaching their residents to know about patients' share of medical charges; seven programs have lectures or other exercises specific to this topic. The remaining programs indicated that their resident clinics are free or have a minimal "user's fee" and, thus, their residents do not gain experience in this area. For those getting this instruction, the emphasis and content is specific to the financial and insurance status of their specific patient population. For example, in one program, residents must know the basis for their clinic's sliding-scale clinic policy and in another, where most patients obtain low-cost generics at a local retail store, all residents know the costs of the different generics at that store. In programs with a larger proportion of insured patients, instruction is in insurance co-payment policies.

Patient Safety and Patient Safety Methods

All directors reported providing formal instruction in issues pertinent to patient safety (e.g., prevention of falls, proper patient identification). This instruction is done through lectures, monthly departmental morbidity and mortality conferences, program director meetings, or, in one program, through internet resources. Two programs supplement teaching with computer-based modules that residents are responsible for completing outside of duty hours. Only six programs, however, provide lectures on theories and methods of patient safety (e.g., standardization, root cause analysis). In one program, the residents spend time in the pharmacy to see how their computer orders are translated into the dispensing of medicine, how automated measures reduce medication errors, and how physician orders can assist or impede with these measures. Four programs have all residents engage in patient-safety mini-projects, investigating the incidence of adverse events (patient falls, hospital-acquired infections) or investigating root-causes of a particular "near-miss" or adverse event.

Directors reported that informal teaching in this area is also common. One director mentioned having done faculty development to encourage and improve the quality of the informal teaching. Six programs have at least some (but not all) of their residents participate in hospital-wide patient safety committees. Three directors mentioned that if an adverse or "near-miss" incident occurred on a resident's patient, or for those who have "administrative rotations," if there is an adverse event in the hospital while they are on that rotation, then

that resident is directly involved in the investigation by participating in the root cause analysis or related activities.

INTERPERSONAL AND COMMUNICATION SKILLS

Within the competency of interpersonal and communication skills, "the effective exchange of information and collaboration with patients, their families, and health professionals,"¹¹ we asked about programs' instruction in communicating with other healthcare providers, communicating with patients, communicating with special populations, and communicating about end-of-life issues and advanced directives. Figure 3 graphically presents the results. Several program directors emphasized that, although they have formal sessions on interpersonal and communication skills, the main, and most effective, way that residents build these skills is through experiences, with faculty modeling, mentoring, and informal feedback. Additionally, we found that two-thirds of the interviewed programs have formal instruction in communicating with other healthcare providers and all of the programs have formal instruction in communicating with patients. Most, but not all programs, formally teach their residents the skills of cultural competency. Half of the programs give formal instruction in health literacy but less than one-third provide formal instruction in using interpreters. Most programs provide formal teaching in communicating about end-of-life issues and advanced directives and all directors indicated that their residents get ample experience in this topic.

Communicating with Other Health Care Providers

Although residents in all programs gain daily experience with communicating with other healthcare providers, 15 of the programs give formal instruction in skills for effectively communicating with other members of the health care team. Two programs do this primarily through a resident retreat on this topic, nine through lecture and/or role-playing exercises, three through interdepartmental panel discussions or meetings, three through web-based modules, and two through formal evaluation and feedback from nursing staff. One of the programs providing lectures includes content on conflict resolution. Four program directors mentioned having the nurses and other staff evaluate their residents on communication skills.

Figure 3: Findings on Formal Activities For Interpersonal and Communication Skills

Program Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total	
Communication Skills With Healthcare Providers	x		x		x			x		x	x	x	x		x					x	x	x	x		x	x		15
Communicating Clearly With Patients About Diagnosis and Treatment Plan	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x			x		x	x	22
Engaging Patients in Shared Decisionmaking	x	x	x	x	x	x					x	x	x								x			x		x	x	13
Patient Education		x				x					x		x			x		x						x			x	8
Counseling in Adherence / Behavior Change		x				x	x		x			x	x							x	x					x	x	10
Cultural Competency	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	24
Using Interpreters							x			x			x		x						x	x				x		7
Health Literacy			x			x		x		x	x				x	x	x	x	x	x	x			x		x		13
End-of-life Communications	x	x		x	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		22
Holding Family Meetings						x					x				x		x	x						x	x			7

Communicating with Patients

All programs reported having formal sessions for observing residents as they are communicating with patients and then giving feedback on their communication skills. In addition, 22 of the programs have a formal curriculum on communicating with patients clearly about diagnosis and treatment plans. This is done through lectures and/or role-playing, standardized patients, web-based instruction, and/or videos. Delivering difficult news was an area commonly mentioned as being taught through lectures and/or role-playing. Two directors indicated formally soliciting feedback from patients about resident communication skills and providing that information, in summary form, to the resident. Five directors reported videotaping selected resident-patient interactions and then later, with faculty and/or peers, critiquing and discussing the video. Half of the programs have formal instruction in engaging patients in shared decisionmaking, through lectures, role-playing, standardized patients, or internet modules. In one program, the department has hired a clinical psychologist specifically for teaching residents communication and shared decisionmaking skills. In one program, communication skills, in conjunction with elements of systems-based practice and practice-based learning and improvement, are the focus of a special rotation, during which residents are not responsible for patient care activities. Seven directors of programs in which there are many international medical graduates (IMG) mentioned needing to occasionally devote additional time and resources to building the communication skills of IMG residents who have difficulty with their accents, language, or culturally-appropriate interactions.

All directors indicated that their residents gain experience in providing patient education. Seven directors additionally indicated formally teaching the techniques of patient education. A few program directors referenced instruction in the general subject of how to be a good teacher; although this instruction is more focused on how to teach medical students and junior residents, they indicated that it also contains principles applicable to patient education. In three programs, residents engage in a specific patient education project or activity, such as leading or co-leading a class to educate patients about medical conditions (e.g., diabetes education classes). In eight programs, the residents interact with and receive teaching from health or nurse educators. In fifteen programs, the residents use electronically available resources for patient education; in nine programs, the computer system provides direct links to these electronic resources.

One program has a special "patient library" that the residents can refer the patients to through an "educational prescription."

Twenty of the directors endorsed teaching, formally or informally, methods to improve adherence to medications or lifestyle modifications. This is a topic of lectures in ten programs; one program uses standardized patients for this instruction. In one program, this topic is taught by a clinical psychologist.

Communicating with Special Populations

All except two directors indicated formally teaching their residents the knowledge and skills of acquiring cultural competency. A few directors mentioned that their instruction in acquiring cultural competency is specific to the cultures encountered in their patient population and not necessarily transferable into other settings. The most common method for delivering cultural competency instruction is through lectures; however, two programs use video presentations, one uses standardized patients, and one brings in community members to speak. Four programs with large proportions of IMGs also use the multiculturalism of their residents, asking them to take turns speaking about something from their own cultures.

All but three directors indicated that all their residents receive some experience using interpreters. In those three programs, their patient population is such that interpreters are rarely needed, although telephone interpreter services are available, and the residents are instructed in how to utilize them if needed. Among the other 23 programs, the extent of experience depends on the patient population. Eight directors indicated that their residents receive specific lectures in techniques on the effective use of interpreters. When provided, these lectures are often performed by the hospital's interpreter staff. In one program, the interpreters use a competency checklist evaluating residents' ability to use an interpreter effectively. One director noted that, although they had provided formal teaching in the effective use of interpreters when they used in-person interpretation, now that they have switched to an entirely phone-based system, he did not think these lectures are needed.

For communicating with patients with limited health literacy, all but three directors thought their residents get a great deal of experience in this area. Thirteen of the programs provide formal teaching in this topic: ten through specific lectures, one using a standardized patient, one using web-based resources, and one using formal mentoring when residents engage in a required activity developing patient education materials.

Communicating about End-of-life Issues and Advanced Directives

In all programs, residents have multiple experiences communicating with patients and their families about end-of-life issues. Additionally 23 of the programs provide specific lectures, role-playing, standardized patients, or web-based instruction on this topic. Seven of the programs have lectures, standardized patients, or on-line modules on holding family meetings. Residents in all the programs receive instruction in talking with patients about advanced directives. The institutions of three of the programs hold multidisciplinary Schwartz Center Rounds,³⁰ during which health care providers convene to discuss emotional and social issues that arise in being caregivers in difficult end-of-life situations.

CARE SETTINGS AND INFORMATION TECHNOLOGY INFRASTRUCTURE

We found significant variation among the programs in residents' experiences with care settings and in use of electronic medical records (EMR) and computer order entry (COE). These results are displayed in Figure 4.

Care Settings

The care settings to which the programs expose their residents vary widely. Of the seven university hospital-based programs, four have required rotations in community-based hospitals. Residents in six programs rotate through Veterans' Affairs (VA) hospitals. Eighteen of the programs have a required rotation in hospice or palliative care. Twenty-one of the programs have required ambulatory experiences in community settings (private offices or community clinics); however, for most programs this experience is minimal in time and scope. Fourteen programs have the residents perform home visits and 21 programs have a required rotation in which they experience or provide care in a nursing home or rehabilitation unit. Twenty directors reported that their residents have some experience with managed care settings and/or populations, but seven volunteered that it was a very small segment of their overall patient population. In contrast, in one program all outpatients are managed care patients. No directors reported that their residents have experience in designated medical homes; however, five directors indicated that their clinics are working toward achieving this designation or that they believe their clinics have all, or almost all, the features of a medical home.

Figure 4: Findings on Care Setting, Models and Information Technology Infrastructure

Program Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total
Care Settings and Models:																											
Community Clinic or Private Practice	x		x	x	x	x	x	x		x	x	x	x	x	x		x	x		x		x	x	x	x	x	21
Home Visits		x			x		x	x		x	x	x	x		x		x			x		x	x		x		14
Nursing Homes or Rehabilitation Centers	x	x	x	x	x	x	x	x		x	x	x	x		x	x				x	x	x	x	x	x	x	21
Palliative Care/ Hospice		x		x	x	x	x		x	x	x	x	x	x	x	x					x	x	x	x	x		18
Managed Care		x	x	x	x		x	x	x	x	x	x	x		x	x		x		x	x	x	x	x	x		20
Information Technology Infrastructure:																											
Inpatient - Comprehensive	x	x						x					x														4
Inpatient - Partial			x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	22
Inpatient - Computer Order Entry	x	x						x					x		x	x	x	x	x	x			x				11
Outpatient- Comprehensive		x					x	x						x						x		x					7
Outpatient - Partial	x		x	x	x							x	x		x	x	x	x	x		x		x	x			14
Outpatient - None						x		x			x														x	x	5
Outpatient - Computer Order Entry		x					x		x	x				x							x		x	x			8

Electronic Medical Record (EMR) & Computer Order Entry (COE)

All programs provide residents with some experience in using electronic medical records (EMRs). However, residents in only four programs use comprehensive EMRs, including computer order entry (COE), for all or the majority of inpatient care. Residents in the remaining 22 programs use a partial EMR for the majority of their inpatient work. These partial systems range from those in which all aspects except progress notes are electronic to those in which the only electronic components are laboratory and study results. Seven programs with partial EMRs have COE. At two of these 22 programs, although the program's primary hospital has a partial EMR, the residents experience a comprehensive EMR with COE when rotating through an affiliated Veteran's Affairs (VA) hospital.

In residents' outpatient settings, seven programs use comprehensive EMRs with COE; in one program, the EMR is partial but has COE; ten programs have partial EMRs without COE; and in five programs, the main ambulatory care sites do not have any electronic records. Residents in two of the programs use electronic orders for prescriptions. In two additional programs, residents with continuity practice at the affiliated VA clinics use a comprehensive medical record system, with electronic prescriptions, but those residents at the non-VA clinic do not.

Only one of the programs interviewed has comprehensive EMRs in both inpatient and outpatient settings. Among the others, four directors indicated that their institution is phasing-in comprehensive EMRs, while the remaining reported that this process has been put "on-hold" or did not indicate that it is being pursued.

REPORTED FACILITATORS AND BARRIERS

Six major themes emerged from program directors' reflections on facilitators and barriers to teaching in these topics and settings: (1) The presence or absence of IT; (2) the presence or absence of faculty expertise and time; (3) the characteristics and resources of the program's setting; (4) institutional support; (5) competing priorities for resident time and residents' baseline knowledge and interest in these topics; and (6) the scarcity of research in educational and evaluation strategies for these topics.

Information Technology

The presence or absence of IT was the most often-cited resource acting as a facilitator or barrier, respectively, for teaching in

several topics. Having a comprehensive, or nearly comprehensive, EMR system was cited as not only key in giving residents experience in using such systems, but was also referred to as sources of data for quality improvement projects, tools for reinforcing the use of decision-support and prediction tools, methods to coordinate patient care in both the hospital and outpatient settings, and sometimes links to patient education materials. Furthermore, several directors commented that not having easily accessible information about cost was the major barrier to their instruction in this topic and a few suggested that a potential solution would be for their IT system to provide information and feedback on cost and cost-effectiveness.

Faculty Expertise and Time

Faculty expertise was also mentioned often as a key determinant of the quality and quantity of teaching in these topics. Almost uniformly, a "faculty champion" who spearheaded the development and implementation of a curricula was central in areas in which programs have well-developed formal curriculum. Additionally, general faculty competency, or lack thereof, was a common explanation for informal teaching being either strong or weak in various areas. Several directors mentioned that because some of these competency areas were not emphasized in the residency programs of many of their faculty members, the informal teaching currently being done is lacking, with some faculty potentially acting as "counterproductive role-models."

Programs vary in their ability to recruit, retain, and develop faculty with expertise in these competencies. For some programs, the institution and/or department have been deliberate about recruiting faculty with expertise in particular areas (e.g., palliative care, evidence-based medicine) and/or have had access to resources to invest in faculty development. Some institutions and departments require each of their faculty to develop an area of educational expertise, providing dedicated time, salary, and/or promotion incentives for teaching and other related activities. However, because smaller programs have a smaller faculty, it is more difficult for them to have faculty with expertise in all topics. Furthermore, program directors reported varying levels of influence over the hiring of faculty; one program director shared that at her institution, faculty hiring decisions are made entirely to fill clinical care needs, without considering specific graduate medical educational needs. Some directors expressed frustration that their faculty have insufficient time protected for teaching or to engage in faculty development in deficient areas.

Some programs have attempted to overcome their department's or institution's deficiencies through interdepartmental and/or inter-institutional collaborations. For example, two directors described partnering with other residency programs in their institutions to deliver formal instruction on communicating with other health care providers. Another program combines resources with other nearby programs and a local university to be able to provide videotaped standardized patient exercises in patient communication skills. One program funds its residents to attend lectures at a nearby university program. In developing curricula, one director in a community program described collaboration with the faculty of a medical school. Finally, some directors described informal collaborations, discussions at national meetings, ACGME's Educational Innovations Project (EIP), and email list-serves.

Faculty time was another commonly-listed key determinant for having formal curricula in this area. Several program directors described curricula that they would like to develop or enhance, but they or other faculty have not had the time protected to do so. (The programs do not have the funds to provide this time.) Many directors noted that because their faculty members already are implementing curricula in the continuously expanding medical knowledge curriculum, they do not have time to teach in these other areas.

Faculty time was also noted by some directors as a barrier to informal instruction in these competencies. Directors indicated that pressures to increase clinical productivity have resulted in faculty being less able to take the additional time to discuss issues with residents as they arise in clinical care. Similarly, faculty now have less time to observe and provide feedback on residents' interpersonal and communication skills. Programs do not have funding to staff clinical sites with additional faculty who could focus on observing and providing this feedback.

Setting

Directors described how the settings in which the programs are based can be both assets and limiting factors in their residents' education. For example, residents' experiences with diverse patient populations, and the nature of that diversity, are determined by the patient populations in their institutions. Similarly, experience with different insurance and payment structures is determined by the institution and geographic area. Some directors reflected that their residents are practicing in settings that are "just not real world"; examples include having limited external pressures for productivity or

cost-efficiency, working exclusively with uninsured or under-insured populations, having scarce infrastructure in ambulatory settings, and working with non-adherent patient populations. Thus, the residents are unprepared to work in other settings and/or have had such negative experiences with ambulatory care that they choose non-ambulatory specialties and practices.

Some programs attempt to overcome the limitations of their settings by giving residents exposure to community physicians. However, directors indicated that this has become increasingly difficult to implement in recent years as community physicians and organizations are less willing or able to absorb the cost of having residents in their practices. Two directors indicated that the program now provides small stipends to community physicians as incentives. Another program primarily uses its graduates for participation and thus depends on the personal relationships that the director has cultivated and maintained.

For some programs, models of care, resources, and patient populations are not available in their immediate community (e.g., managed care, patients who are culturally/linguistically diverse). Thus, to give exposure to these settings, program directors mentioned that a rotation away from the institution would be ideal. Furthermore, a few directors described how they thought away-rotations might be utilized for teaching quality-improvement methods or system-based care at institutions that have developed expertise in these areas. However, they reported that the current restrictions of Medicare graduate medical education funding are a barrier to setting up these rotations. If a resident rotates to another hospital, the home institution loses Medicare revenue for the time spent at the other hospital.

Institutional Support

Program directors varied widely in their perceptions of the support that hospital administration and other institutional leaders provide. Several directors described areas where hospital priorities aligned with educational needs, which meant that hospital development in this area was a key factor in the program's development in this area. The implementation of EMRs was the most common example of this alignment, but quality assurance and improvement, patient safety methods, patient care coordination, and multidisciplinary teamwork were also cited. Some directors reported that their institutions have been supportive of teaching interpersonal and communication skills by providing web-based learning and/or protecting resident time for building these skills, but more often the institution was less supportive of activities in this

competency than in systems-based care or practice-based learning and improvement.

Although program directors sometimes disagreed with specific standards, they overall viewed ACGME's leadership in, and regulation about, these competencies to be helpful in getting institutional support. One program that is a member of ACGME's educational innovations project credited the requirements of that project as being key in getting increased institutional support. Another director, talking about the institutional support for teaching in systems-based practice, said "if there were a mandate, they would do it."

Some program directors spontaneously expressed concerns about GME funding. They worried that if funds for GME were decreased, their institution may be unwilling to continue its support of residency programs.

Resident Time, Baseline Knowledge, and Interest

Almost all program directors cited competing priorities for resident time as a barrier to effective teaching in these competencies. Time to teach these competencies competes with both education in other competencies and with the institution's clinical service needs. Several directors explained that in recent years the knowledge and skills an internal medicine resident needs to master, both in medical knowledge and these newly specified competencies, have grown exponentially. Yet with this increased volume of material, work-hour restrictions have decreased the time by which residents have to gain these knowledge and skills. Therefore, many directors noted that choices need to be made about the quality and the quantity of teaching in the different competencies and/or the structure or duration of internal medicine teaching. Several program directors expressed concern that if, as recent reports have recommended, work hours are restricted further,³¹ the residency environment may become increasingly "fractured" and "chaotic" and, therefore, even less amenable to instruction in these competencies.

Several directors reported that resident baseline knowledge and skill in these competencies facilitates or impedes their educational program in these topics. In evidence-based medicine, several directors indicated that because residents enter with knowledge in this topic, all that is needed is a forum and structure for them to broaden their skills and experience. However, in topics such as quality improvement methods and systems-based practice, several program directors mentioned that their residents enter completely naïve to this area. In the words of one director, "it's a new language when they get to residency." (See Appendix for information on medical school teaching in these areas.)

Residents also vary in their baseline knowledge in interpersonal and communication skills. The need to do basic or remedial instruction in this area was cited often by directors of programs having a large proportion of IMGs. This remedial instruction sometimes absorbed a significant amount of program directors' time and resources.

Lack of inherent resident interest in these topics was also cited as a barrier. Some directors explained that their residents are more interested in the topics of the medical knowledge competency, because these are the topics that are tested in the American Board of Internal Medicine (ABIM) certification examination. Furthermore, the residents do not seem to appreciate how these topics will be relevant to their post-residency practices.

Research in Educational and Evaluation Strategies

Several directors mentioned that there is a dearth of educational methods or tools that have been validated as effective for teaching residents these competencies. Thus, directors called for increased research into curricular innovations with dissemination of results that would be easily accessible. Furthermore, several directors explicitly cautioned against automatically valuing formally-delivered curriculum (lectures, projects, web-based modules) over informal curriculum, because in their opinions, much of these topics are best taught through the experience of patient care, with skilled faculty mentoring. Finally, directors pointed out that it is difficult and time-consuming to evaluate their residents in these competencies, which hinders development and targeting of educational strategies.

5. SUMMARY AND DISCUSSION

In summary, interviews with the directors of 26 randomly-selected and representative internal medicine programs revealed that, although most programs have some teaching in the selected topics, there is large variation in the extent of and approach to this teaching and, in general, falls short from that needed, as recommended in several expert reports.⁴⁻⁹

Two areas of IM residency education stood out as relative strengths, in relation to the others: teaching in evidence-based medicine and communicating with patients about end-of-life care and decisions. Although IM programs vary in the formality of their teaching in communicating with patients about end-of-life decisions, directors generally felt that their residents gained ample experience in this topic. Secondly, evidence-based medicine is an area consistently taught through formal methods (with every program having a journal club). Program directors also have the perception that many residents enter with a good foundation of skill in this area; our review of U.S. medical school curricula (detailed in Appendix A) concurred with this observation as this topic is taught universally at all schools reviewed.

In both the IM programs interviews and the review of medical school curricula, teaching in evidence-based medicine and end-of-life communications emerged as relative curricular strengths. This may belie what one program director summed up as, "one does what one does well." Repeatedly, directors reported that teaching of evidence-based medicine and end-of-life communications is facilitated by having faculty members with expertise in these areas. This underscores the potential value of faculty development, or some other method of bringing to the program faculty expertise in the other topics, as an approach for improving teaching in these topics.

For many topics (both among IM programs and medical schools), informal teaching is predominant. The significant role of informal teaching, through faculty role-modeling and patient-focused feedback and discussions, further supports the importance of faculty development and ensuring that all faculty are competent in these areas. For example, even if residents are receiving didactic instruction in shared decision-making, but faculty role-modeling does not reinforce, or may even sometimes contradict, this teaching, then it will be ineffective. Therefore, it is not sufficient for programs to have a single faculty member with expertise in a topic, but also must ensure the basic competency of all their faculty members.

Although directors varied in their enthusiasm for different topics and awareness of teaching methods in these topics, they were, in general, supportive of improving curricula. However, as several program directors warned, any policy changes must be formulated so that teaching in other areas, particularly medical knowledge and patient care, are not negatively impacted. Also, heterogeneity in health care systems, settings, and residents also revealed the need for flexibility in graduate medical education policies.

In most topics, the teaching is inconsistent and, in general, remains far short from that needed, as outlined by various expert reports.⁴⁻⁹ Most notably, the IOM's report on education of health professionals asserts that a core competency for health professionals is the ability to "communicate, manage knowledge, mitigate error, and support decision making using information technology."⁴ Yet, only one of the interviewed programs uses a comprehensive EMR in both inpatient and outpatient settings and one-third have IT-supported decision-support. In the topic of quality improvement, few programs give residents experience with implementing system changes or teach basic safety design principles, as recommended by the IOM.⁴ Few programs provide any formal teaching in using cost or cost-effectiveness in clinical decisions. The IOM additionally recommends that "most" patient care should be conducted in multidisciplinary teams;⁴ however, only four programs have incorporated multidisciplinary teams into general medicine inpatient services. Experiences with multidisciplinary teams in outpatient settings are very limited or nonexistent. Less than one-third of the programs interviewed formally teach residents the techniques of patient education, a skill that is central to patient-centered care and essential for successful chronic disease management.^{4,17} Furthermore, in contrast to COGME's recommendation that "clinical education should occur in settings that are representative of the environment in which graduates will eventually practice,"⁵ residents in most programs have very limited experiences in community-based medicine or with working in managed care settings.

Given these marked deficiencies, we will now discuss our findings' potential implications for GME financing, accreditation bodies, the Internal Medicine certification exam, and medical school training.

GRADUATE MEDICAL EDUCATION (GME) FINANCING

Medicare is the largest explicit funder of GME activities through payments it makes to teaching hospitals for the direct and indirect costs of teaching activities.³² These interviews reveal several vehicles

through which Medicare GME funding policies are affecting, or have the potential to affect, IM programs' teaching in these topics.

Graduate medical education financing is complicated because education and patient care services are jointly produced. Currently, GME support is provided through hospital revenues from patient care activities. In areas that experiential learning through patient care is the preferred method for instruction, this financing may be appropriate. However, program directors pointed out that, for curricular areas where didactic or learning outside of patient care activities is needed, this educational time competes with the institution's clinical service needs. The time spent by attending physicians and residents in educational activities reduces the time available for revenue-generating patient care activities and thereby impacts the institution's willingness to devote resources to educational activities. Furthermore, even in topics where instruction is patient-care based, faculty time to give, and resident time to receive, quality and comprehensive feedback, conflicts with the institution's service needs. As one program director explained, "Modeling is really important in medical education. And that just doesn't happen enough with people who are really good at this kind of thing because of time pressure on attendings and the residency programs . . . Imagine if you had the resources to have two residents per attending instead of four [in the clinics] and you had the funds for that? Then you would have time for modeling, feedback, etc. You would have a whole other level you could work on with the resident in these patient communication skills."

These interviews also revealed how GME funding formulas are affecting education in these topics. Formulas that determine GME funding rely primarily on the number of residents at a given institution and do not provide an incentive for institutions to invest in the quality of their teaching, faculty, or infrastructure, beyond that needed to attract sufficient residents to fill their approved number of positions. The interviews revealed how institutions respond to incentives in this area in that several directors conveyed how their institutions are more supportive of topics in practice-based learning and improvement and systems-based care, in which there may be gains in efficiency or quality indicators, compared to the topics of interpersonal and communication skills in which there are no such gains. Program directors expressed the desire for their institutions to have incentives to invest in their faculty's knowledge and skill in these topics through mechanisms such as: providing faculty development; prioritizing teaching skills in hiring, retention and promotion decisions; and finding alternatives to

exposing their residents to faculty who might be "counterproductive role-models." Furthermore, payment mechanisms might be formulated to encourage informal teaching in topics for which this modality may be particularly effective (e.g., interpersonal and communications skills). Program directors also noted that their institutions do not have incentive to invest in outpatient settings; a prevalent theme was the relative paucity of infrastructure and formal curricula for outpatient, in comparison to inpatient, residency experiences.

Program directors pointed out that another way that GME funding policies are impacting teaching in these areas is by inhibiting rotations to other institutions. Some directors suggested that limitations in programs' settings, whether those limitations are in faculty expertise, community features or resources, or in the patient population, may be best addressed by utilizing rotations to other institutions. However, these directors also explained that Medicare generally only pays an institution only for time spent working in the hospital and hospital-associated clinics.⁵ The hospital that is paying a resident's salary does not receive Medicare funding when a resident rotates to another hospital. While there is nothing to preclude the institutions from negotiating a mutually satisfactory financial arrangement, so that the home institution recoups the costs it incurs for the salaries of residents on away rotations, the negotiations are complicated by such issues as a limit on the number of funded resident positions at an institution and Medicare rules favoring resident time spent in patient care activities over time spent in didactic activities, particularly in nonhospital settings. These complications may prevent away-rotations that would enhance resident education. Addressing these barriers would be a potential target for enhancing resident exposure to diverse patient populations and settings and for encouraging institutions to collaborate and complement each other's strengths and weaknesses.

ACCREDITATION STANDARDS

These interviews also have implications for considering accreditation standards in these topics. Program directors reported

⁵ Under certain circumstances, patient care activities in non-hospital associated ambulatory settings are reimbursed; however, the associated rules and requirements are prohibitive in their complexity. This issue is beyond the scope of this study and was not specifically discussed with the directors, except that several directors volunteered their impressions that rotating their residents into these setting was not a financially - viable option.

that their institutions did direct resources to educational activities when changes in accreditation standards mandated or encouraged this investment. Therefore, standards that further encourage institutional investment could be synergistic with GME financing considerations. Furthermore, standards addressing the competency of the teaching faculty, and their participation in faculty development, could assist in addressing the major barrier, outlined by program directors, that much of their faculty do not have the skills to engage in effective informal teaching in these topics. Third, accreditation standards that further encourage experiences in diverse settings and outpatient skills may also enhance teaching in these topics.

The theme of competing priorities for resident time, and the ability to gather a sufficient mass of residents for didactic or other formal experiences, also interacts with accreditation standards through work-hour restrictions. Although patient safety concerns secondary to resident fatigue should obviously be paramount when considering work-hour restrictions, directors emphasized the potential negative impact further work-hour restrictions could have on formal and informal resident educational experiences on these and other topics.

Another implication of this study for accreditation bodies is the potential value of systematically collecting, in the course of accreditation renewal, data on the methods and success of programs' teaching in these topics. This data would give regular updates on the progress of graduate medical education, which could not only be valuable for policymakers, but also help with the program director's expressed need to have more research, data, and guidance for curricula development in these topics.

SPECIALTY CERTIFICATION EXAM

Lack of resident interest in these topics may be a result of acculturation in the process of undergraduate medical education, or a reflection of the inherent interests of those who choose to go, and are accepted to, medical schools. However, at least some program directors felt that their residents were less interested in these topics because they are not present, or not emphasized, on the board certification exam. Although some of these topics may not be amenable to the standardized testing format of the certification exam, including them when possible may encourage resident interest.

UNDERGRADUATE MEDICAL EDUCATION

Program directors' comments on competing priorities for resident time, as well as their observations that residents enter residency with

differing or lack of baseline knowledge or skills in some topics, suggest the potential for improving instruction in these competencies in medical school. However, given that the current curricular strengths appear to be overlapping (e.g., evidence-based medicine, end-of-life communications), rather than complementary, much investment would be needed in further developing institutional capability and medical school curricula in these topics. Furthermore, although rotating medical students through settings outside of the institution does not have GME financing complications, and the institution is not dependent on students for clinical revenue, finding sites able to absorb the productivity loss associated with teaching students remains an issue. Furthermore, if this instruction were to be shifted from graduate to undergraduate education, a mechanism would be needed for ensuring these competencies in the 26% of residents that are graduates of non-US medical schools. Nonetheless, our review of medical school curricula does show that there are models for teaching medical students these topics that can be utilized as a baseline for developing medical school curricula in these topics.

RESEARCH

Program directors expressed a need for further research on the effectiveness of various methods and modalities for instruction in these topics, pointing to the importance of prioritizing funding for this research. Comparative effectiveness studies, evaluating the effectiveness of educational innovations, and developing methods for measuring resident knowledge and skills in these topics, would give the program directors the tools and data they need to improve curricula in these topics.

Limitations

This study was exploratory and its limitations should be considered when interpreting its findings. The findings should be interpreted only as a description of the range of current instruction in the various topics. Although we randomly selected programs, and the programs of the directors interviewed were approximately representative, on multiple domains, of the population of IM residency programs, given the small sample size and the semi-structured nature of the interviews, no inferences about generalizability or prevalence of curricula around a given topic can be made. A larger structured survey, informed by this study's results, would be needed to infer prevalences or differences by program characteristics (e.g., allopathic versus osteopathic, university versus community-based, etc.). Furthermore, this study aimed to gain a

broad understanding of current Internal Medicine teaching in the selected competencies. Each competency, and associated topic, could be the subject of its own study, gathering more detailed information on potential curricula elements and facilitators and barriers; if considering interventions targeting certain curricular components, in-depth studies should be done to inform that intervention. Similarly, case studies of programs and institutions that have been successful in implementing various innovative curricula would be informative.

Although, for clarity, this report assigns topics into discrete and non-overlapping categories, this portrayal may be both simplistic and somewhat artificial. For example, using clinical decision aids can be viewed as part of teaching evidence-based medicine, quality assessment and improvement methods are often taught in conjunction with system-based practice topics, and working within multidisciplinary teams is inherently linked with interpersonal and communication skills.

This study should not be interpreted as a study of the quality of the education being provided, but rather as a report on current methods being utilized. Programs with similar approaches and activities to teaching a topic may be delivering instruction at very different quality levels. For example, although all programs have journal club or evidence-based medicine conferences, the quality of those conferences may differ substantially between programs.

Similarly, as we do not know the effectiveness of various methods in achieving the various outcomes, we do not weight, or assign value to, the various methods or activities. Assessments of resident knowledge and skills, would be needed to measure effectiveness.

CONCLUSIONS

Exploratory interviews with 26 IM program directors reveal that substantial variation exists in programs' approach to and methods for implementing curricula in most of the topics of interest. In the topics of practice-based learning and improvement, although all interviewed programs are formally teaching their residents to use EBM, not all are teaching quality improvement methods, and among those that do, the curriculum varies widely. Instruction in clinical decision aids is informal at most programs. In the topics of systems-based practice, the programs varied in the amount of, and approach to, any formalized training and IT support in this topic. Few of the programs have formal multidisciplinary teams, teaching in absolute and relative costs is informal, and a minority have instruction on the theories and methods of systems to ensure patient safety. In the topics of interpersonal and communication skills, two-thirds of the interviewed program directors

have formal teaching in communicating with other healthcare providers and all the programs have formal teaching in communicating with patients. Most, but not all of the programs formally instruct their residents in cultural competency but only half of the programs give formal teaching in health literacy and less than one-third provide formal teaching in using interpreters. Most of the programs provide formal teaching in communicating about end-of-life issues and advanced directives.

In general, teaching in these topics remains far short from that recommended by various expert reports. Directors report multiple factors acting as facilitators and barriers to improvement, including: available information technology infrastructure; faculty expertise and time; the program's setting; resident baseline knowledge, skills and interest; and, relative lack of evidence in educational methods and evaluation strategies for these topics.

Changes in GME funding policies, accreditation standards, certification exam topics, undergraduate medical education and investment in researching educational and evaluation strategies for these topics could have a significant and positive impact on how well IM programs are preparing our nation's physicians to care for our 21st century population.

A. APPENDIX: MEDICAL SCHOOL TRAINING IN SELECTED TOPICS: A REVIEW OF WRITTEN CURRICULA

INTRODUCTION

Internal Medicine (IM) residency and all graduate medical education training builds on the skills and knowledge that physicians-in-training obtain in medical school. The degree of emphasis in IM residency programs on our study topics (namely, practice-based learning and improvement; systems-based care; interpersonal and communication skills) is influenced by the program directors' perceptions of the competencies that residents developed in these topical areas during medical school. To give context for our IM residency program findings, the Medicare Payment Advisory Commission (MedPAC) asked RAND to review a sample of medical school curricula to assess the scope of training in the topics of interest and the settings for clinical rotations. The structure of this appendix mirrors that of the main report.

METHODS

We used lists published on the websites of the Association of American Medical Colleges (AAMC) and the American Osteopathic Association (AOA) to identify all U.S. accredited medical schools that have been enrolling students for at least four years.³³ We classified each medical school by whether it has allopathic or osteopathic accreditation, by region of the country by Census 2000 designations,³⁴ by being within or outside of a metropolitan statistical area (MSA), by being a public or private institution, and, for allopathic schools, by the tercile of grant funding from the National Institutes of Health (NIH) as reported on the NIH website.³⁵ Out of a total of 151 medical schools, we selected a random sample of 70 schools, stratified by allopathic and osteopathic schools and programs. Descriptive statistics of the above categorizations were used to verify that the random sample was representative along these dimensions.

For each selected allopathic medical school, we obtained the curriculum as detailed in the directory on the AAMC website.³⁶ For each selected osteopathic medical school, we obtained the curriculum from each school's website. We then reviewed the curricula of each school, identifying required courses and rotations that potentially included the topics of interest. We used the same topics of interest identified for the IM residency program interviews. We reviewed required courses only as we were interested in instruction that all the students receive, recognizing that students with special interest in some areas may pursue

elective coursework. Courses were identified as being potentially applicable if they were not clearly focused on basic science or physical diagnosis skills. All "Internal Medicine," "Family Medicine," "Ambulatory Care," "Primary Care," and "Geriatrics" clinical rotations were selected when they were required.

We obtained email addresses for the person in charge of curriculum at each school through the AAMC directory and schools' websites. We emailed the contact person each school and requested syllabi and/or lecture topics for the selected courses and rotations at each school. We sent two follow-up emails if there was no response. We sent up to three reminder emails to those programs that responded that they would send materials. We assessed the curricula from all schools that provided syllabi or lecture topics for all of the requested courses. When needed for assessment of clinical settings, we augmented our data by searching school websites.

SAMPLE

We identified 151 medical schools, 124 (81 percent) allopathic and 27 (19 percent) osteopathic. Table A2 describes these schools by geography, by public versus private, by NIH funding, and by being historically African-American. As also shown in Table A2, our stratified random sample of 70 schools was representative of the 153 schools on all these dimensions. We received syllabi and/or lecture topics for all selected courses and rotations from 26 (37 percent) of the schools. In comparison to the population of all medical schools, the schools from which we received curricula were more likely to have allopathic accreditation, be a public institution, and be in the middle tercile of NIH funding.

Table A1: Characteristics of all Medical Schools, Schools from which Curricula Were Requested, And Schools from which Curricula Were Received

	<i>All Medical Schools (151)</i>	<i>Requested (70)</i>	<i>Received (26)</i>
<i>Accreditation</i>			
Allopathic	124 (81%)	57 (81%)	23 (88%)
Osteopathic	27 (19%)	13 (19%)	3 (12%)
<i>Public Institutions</i>	70 (46%)	33 (47%)	20 (77%)
<i>Geographic Region</i>			
Northeast	35 (23%)	15 (21%)	6 (23%)
South	53 (35%)	25 (36%)	10 (38%)
Midwest	40 (26%)	19 (27%)	6 (23%)
West	24 (16%)	7 (12%)	4 (15%)
<i>Within a MSA</i>	135 (86%)	60 (86%)	22 (85%)
<i>NIH Funding</i>			
Top Tercile	40 (26%)	17 (24%)	5 (19%)
Middle Tercile	41 (27%)	20 (29%)	11 (42%)
Bottom Tercile	43 (28%)	20 (29%)	7 (27%)
None	28 (18%)	13 (19%)	3 (12%)

FINDINGS

Overall Structure of Curricula

Traditionally, medical school curricula is divided into "pre-clinical" and "clinical" years. Pre-clinical years are typically the first two years, during which students learn the knowledge and skills that are the foundations of medical care through lectures, laboratory activities, and small group exercises. Then, in the third and fourth years, the "clinical years," students are placed in clinical care environments (known as "rotations" or "clerkships") and, with close supervision, learn to apply and build on this knowledge and skill set. However, medical schools are increasingly placing introductory patient care experiences into the pre-clinical years and some classroom-based courses in the clinical years. Accordingly, 17 of the 26 schools require a clinical "preceptorship" experience in the pre-clinical years, in which students shadow practicing physicians. Similarly, in 15 of the schools, classroom-based courses with variable topics are integrated into the "clinical" years. In some schools, these courses span an entire year, meeting one to two times per month, with students excused from clerkship activities for these classroom sessions. In others, these courses are concentrated into one or two weeks between clerkships.

The organization, detail, and extent of the written curricula received from the schools was highly inconsistent. At some schools, the skills and competencies that each student should obtain by graduation

(sometimes mirroring the residency core competencies) are laid out and for each course, and there is a detailed description of how the course addresses these skills and competencies. For other schools, the objectives for each course were broadly described, without details provided.

Practice Based Learning and Improvement

Evidence-Based Medicine. The curricula of all schools reviewed have instruction in evidence-based medicine (EBM). Often, this instruction is in multiple courses spanning the preclinical and clinical curriculum.

EBM is the topic of its own pre-clinical class at six of the schools reviewed. Six additional schools have a pre-clinical epidemiology and biostatistics class that includes EBM topics. At eight schools, EBM is a topic taught within one of the other pre-clinical courses.

At all schools, training in and practice of EBM is listed as an objective in one or more of the clinical clerkships. An EBM project is a required assignment in at least one of the clerkships at nine of the schools. Most commonly, the students identify a clinical question from one of their patient care experiences and search the literature to answer that question, writing a report and/or making a presentation to their peers. Six schools also have EBM as a topic in one of the classroom-based courses in the clinical years.

Quality Improvement Methods. We found an introduction to the concept of quality or quality improvement methods mentioned as an objective or a topic of specific instruction in 11 schools. At one school, there is a one-week mini-course on health care improvement in the third year, between rotations. In two schools all students participate in a Continuous Quality Improvement (CQI) project, and at a third school the students have the option of doing a CQI or EBM project.

Using Decision Aids. The curricula of three schools list using critical pathways and clinical practice guidelines as an objective in the internal medicine clerkships. Other decisions aids are not mentioned in any of the other curricula reviewed.

Systems-Based Practice

In the curricula of four schools, there is an indication of instruction in the general concepts in systems-based care. At one school, in a classroom-based course placed in the clerkship years, there are lectures in systems thinking and theory. Another school has similar instruction, with leadership skills and organizational theories in a preclinical class. In a third program, students complete a systems-

based practice paper (e.g., comparing health plans or systems, describing a system-improvement project, and discussing health care system effects on access to care) while on an ambulatory medicine clerkship. Finally, at one school, there is a specific rotation during which students follow patients from hospital admission through discharge to obtain a broad view of the system of care, including issues relevant to quality, safety, and transitions for an individual patient.

Patient Care Coordination. Learning the principles of patient care coordination is often a core objective in clerkship experiences. At 12 schools, learning about coordination of care in the outpatient setting is an objective of a family medicine or ambulatory care clerkship. At five schools, coordination between inpatient providers is listed as an objective in the IM clerkship; however, often this is in relationship to coordinating between inpatient consultation services rather than provider hand-offs. Finally, seven schools list coordination of care at discharge as a skill to be learned, ranging from generating the discharge summary to coordinating post-discharge home services. One school has all IM clerkship students complete a post-discharge follow up phone call.

Working in Multidisciplinary Teams. Ten of the schools have working in multidisciplinary teams, or learning how to collaborate with non-physician health professionals, as an objective of the clinical rotations. Three schools additionally introduce this concept in a pre-clinical course.

Awareness of Health Care Costs and Financing. Awareness of health care costs is included in, or an objective of, at least one reviewed course curricula in 15 of the schools. Among these, the emphasis in the curricula on health care costs varies widely; three schools list this topic in all the reviewed curricula, while eight schools list it just once. At two of the schools, the students engage in simulated patient exercises, in which students are provided with and have to consider cost and insurance information in their diagnostic and treatment plans.

Interpersonal and Communication Skills

In all the curricula reviewed, a significant emphasis is placed on the basics of physician interpersonal and communication skills. These skills are commonly introduced in the pre-clinical years and then practiced and built on in clinical rotations.

Communicating with other Health Care Providers. Basic skills for communicating with other health care providers, such as writing notes and making oral presentations, are commonly taught in a pre-clinical

class that simultaneously teach students techniques of patient interviewing and physical exams. Although schools have different names and formats for these courses, common names are "Clinical Skills" and "Introduction to Clinical Medicine." These skills are practiced and further developed in the pre-clinical preceptorships and clinical rotations. In all the schools, clinical rotations list the ability to function and communicate with the health care team as a key objective. During these rotations, students practice and receive feedback on writing notes, making informal and formal presentations of patient data, and, under the supervision of residents and faculty, discussing patient care with consultants.

Communicating with Patients. Among all schools reviewed, the basics of patient communication skills are introduced in a pre-clinical "Clinical Skills" class. The focus of this instruction is in eliciting a medical history from the patient. Other advanced topics, such as shared decisionmaking, patient education, and motivational interviewing, are addressed in these pre-clinical courses at nine schools.

Advanced communication skills are more commonly listed as objectives in clinical rotations. Shared decisionmaking skills are listed as a key objective or competency in at least one clinical rotation at 12 schools. The skills of providing patient education are listed in one or more clinical rotations at 13 schools and counseling patients in adherence or behavior change is listed in nine schools.

All of the medical schools use standardized patients for teaching and evaluating interpersonal and communication skills. Standardized patients are actors trained to provide the patient with pre-determined interview responses, sometime presenting a communication challenge. The student is observed by a faculty member (in person, or by video), who assesses the student's clinical skills, including communication. The standardized patient may also rate the students' communication skills.

Communicating with Special Populations. The curricula of all schools indicate training in cultural competency. In 18 schools, topics relevant to cultural competency, diversity, and/or racial issues in medicine are introduced during their clinical skills course or a parallel course. This is done through lectures, videos, readings, and, in a few schools, having community members speak on their perspectives on racial issues in the practice of medicine. The curricula of six schools contain instruction in using interpreters and four have a specific mention of working with patients with limited health literacy.

Communicating About End-of-Life Issues and Advanced Directives

In 23 of the 26 schools, communicating about end-of-life issues is included in the written curricula. The extent and approach to this education varies. Some schools have it listed as an objective of clerkships, without further detail. However, lectures, videos, and small-group discussions are also used in pre-clinical courses and classroom-based courses in the clinical years. One school has a two-week classroom course (between clerkships) that specifically addresses end-of-life issues and includes instruction on pain and palliative care topics, an orientation to pastoral care, and multicultural issues at the end of life.

Care Settings and Information Technology (IT) Infrastructure

Diverse Care Settings. Students at all schools have some clinical experiences outside the academic center; the quantity and nature of these experiences varies between schools. In 17 schools, students are initially introduced to community-based practices in a required preceptorship experiences in the preclinical years. At one school, this preceptorship site acts as a continuity clinic; the student continues going to the same clinic throughout the first three years and can elect to continue it in the fourth year.

In 12 schools, all students are assigned to a community site for their ambulatory medicine and/or family medicine rotation. In the remaining 14 schools, some students, but not all, will have a community-based ambulatory medicine or family practice placement.

Exposure to rural medicine is an explicit part of the curricula at a few of the schools. One school requires all students to do a two-month preceptorship in a rural community practice between the first and second year of instruction, with the explicit goal of observing the practice of medicine in the community. Another school has an extended interdisciplinary rural medicine block as part of its third year curriculum. Some other schools have a four-week rotation in the fourth year in which students can elect to be placed in an urban or rural community practice.

As part of the ambulatory medicine and geriatrics clerkship, two schools require experiences in private community faculty offices, nursing homes, rehabilitation clinics, hospice, and home care agencies. Two additional schools require home visits as part of this clerkship. One school requires a clerkship in rehabilitation medicine.

Some schools require students to experience non-clinical community settings or activities. Examples include participating in an Alcoholics Anonymous (AA) meetings, homeless shelters, and community health fairs.

Electronic Medical Record (EMR) & Computer Order Entry (COE). The curricula of four schools listed the appropriate use of EMR as a key objective in its clinical rotations. For the remainder of the schools, the syllabi did not mention the EMR or only indicated that orientation to the hospital or clinic system is provided. We could not discern from curricula the features of the EMR(s) that students are using in clinical experiences.

DISCUSSION

Of the topics of interest, those most consistently appearing in the curricula of the reviewed medical schools are instruction in EBM, the basics of communication skills, cultural competency, and communicating about end-of-life issues. The first three of these topics are explicitly stated as standards in accreditation by The Liaison Committee on Medical Education (LCME).³⁷

Schools appear, from their written curricula, to be highly varied in the inclusion of other topics. At several schools, one particular topic is highly emphasized and developed. For example, at a few schools, the provision of cost-effective care is integral to all curricula reviewed. At other schools, curricula in systems-based care, quality, and end-of-life issues are emphasized. As in the IM residency programs that were interviewed in this study, the focus on these topics may reflect the interests and expertise of the institution's faculty. Other institutional or community factors may also be acting as facilitators and/or barriers to innovation in developing the curricula in these topics. Exploring the etiologies behind these differences would inform policies to encourage inclusion of these topics.

LIMITATIONS

The written curricula also vary in detail and quality, which is a limitation of this assessment. Furthermore, this assessment is based on written objectives for courses, without assessment of the implementation or effectiveness of the implemented curricula. For example, although the written objectives of a clerkship may include students learning and practicing the delivery of evidence-based, culturally sensitive, cost-effective, and patient-centered care, the extent to which these curricular elements are implemented may be incomplete or ineffective. Similarly, faculty may be consistently teaching these topics during patient care, even though they are not written explicitly into the curricula. Assessing the competency of medical students in these topics

would be needed to get the most accurate measure of medical school teaching.

Another limitation of this data is in the limited response rate of the medical schools; the schools that responded to our request may not be representative of the total population of U.S. medical schools. Further, this sample is limited to U.S. medical schools and thus is not a reflection of the education of international medical school graduates (IMGs). Given that 26 percent of all residents graduate from non-U.S. medical schools³⁷ and, as several IM program directors noted, that the undergraduate medical education of IMGs may be quite different in the topics of interest, there is a need to understand IMG knowledge and skill in these topics.

NEXT STEPS

This exploratory analysis of medical school written curricula shows some areas of commonality, but also much variability, in the emphasis given to the topics of interest. The next steps would be to explore whether this variability is also present in the implemented curricula, the factors that have led to actual variability, and the characteristics of the programs that have been most successful in developing skills and knowledge in practice-based learning and improvement; systems-based care; interpersonal and communication skills.

B. APPENDIX: INTERVIEW PROTOCOL

Appendix B – Interview Protocol

Preparing Physicians for 21st Century Challenges- Interview Protocol –IM Programs

Introduction

In this interview, we will be asking about your program's training in engaging in practice-based learning and improvement, system-based practice, and interpersonal and communication skills. We will be asking individual topics within each domain, asking if your program provides training in these topics, for details on that training, and then how well you think your program prepares your residents in these areas. At the end of each section, we will additionally ask about enablers, barriers and facilitators that you and/or your program have experienced in approaching training in these topics. We will end with giving you the opportunity to comment in general with about enablers, barriers and facilitators to innovation in graduate medical education.

RAND will not disclose your identity or specific information that identifies you to anyone outside of the research team. We will destroy all information that identifies you at the end of the study. The risks to you by participating to you are minimal. However, there is a small professional risk to you by expressing your impressions and opinion of your program's curriculum. To minimize this risk, we will be safeguarding your identify and the identity of your institution. You do not have to participate and can decline to answer any question or stop the interview for any reason at any time.

Do you have any questions? Is it ok to proceed?

Before beginning, I would also like to ask for permission to record this interview. This recording will only be used to ensure that our notes are accurate and the recording will be accessible only to study personnel, without identifying information, and will be destroyed at the end of the study. If you would like us to turn off the recording at any point you can just let us know. Is it ok if we begin recording?

Practice-based learning and improvement

In this first section, we would like to ask you about your program's training in engaging in practice-based learning and improvement.

Of note, we define training as both the formal elements– lectures, conferences, projects, etc , and informal training, through clinical experiences or interactions with faculty, staff and patients.

	(a) Does your program train its residents in	(b) (If yes) Can you describe your program's training in this subject? (specific probes to be used if not spontaneously mentioned)	(c) (If Yes) In preparing your residents for their practice after they finish training, do you believe that the preparation your program provides in this subject is _____
First I would like to ask about your training in Quality Improvement Methods. We have broken this training into its two component parts - 1) Systematically analyzing the quality of care being provided in one's own or a group's practice and 2) Implementing system changes with the goal of practice improvement			
Systematically analyzing the quality of care being provided in one's own or a group's practice	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Disease registries? Lectures? Project? – Individual or Small group?)	Excellent Very Good Good Fair Poor
Implementing system changes with the goal of practice improvement	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures? Project? – Some or all residents)	Excellent Very Good Good Fair Poor
Now I am going to ask about how you teach evidence-based medicine			
Searching scientific literature to answer questions	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures?)	Excellent Very Good Good Fair Poor
Critiquing medical literature and applying it to clinical decisions	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures? Journal Club?)	Excellent Very Good Good Fair Poor
Using electronic medical records	<input type="checkbox"/> Yes <input type="checkbox"/> No	(At all sites, some sites, no sites Inpatient v. Outpatient)	Excellent Very Good Good Fair Poor
Using computer-order entry	<input type="checkbox"/> Yes <input type="checkbox"/> No	(At all sites, some sites, no sites Inpatient v. Outpatient)	Excellent Very Good Good Fair Poor
Using clinical prediction rules or decision-aids to guide care	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Clinical Pathways, Ordersets, Prediction Rules IT supported?)	Excellent Very Good Good Fair Poor

Are there other areas in which your program trains residents in practice-based learning?

No Yes (please specify)

In the areas of practice-based learning and improvement that you indicated your training to be excellent or very good (remind respondent of these areas), what have been key resources or factors that have facilitated your program's ability to provide this training? (probe for details as needed)

In the areas of practice-based learning and improvement that you indicated your training to be less than very good, or that you do not provide this training, what have been some of the barriers that have prevented the establishment or improvement of your training in these areas? (probe for details as needed)

Systems-Based Practice

In this section, we would like to ask you about your program's training in engaging in system-based practice.

Again, we define training as both the formal elements– lectures, conferences, projects, etc , and informal training, through clinical experiences or interactions with faculty, staff and patients.

	Does your program train its residents in	(If yes) Can you describe your program's training in this subject?	(If Yes) Presently, in preparing your trainees for their post-residency practices, do you believe the training your program provides in this subject is _____
Using methods for improving patient safety	<input type="checkbox"/> Yes <input type="checkbox"/> No	Lectures/Projects Lectures on theories, methods?	Excellent Very Good Good Fair Poor
In the next 3 questions, I'd like to ask about how your program trains its resident to communicate and coordinate patient care across 3 different types of transitions – first, across provider hand-offs in the hospital, secondly at the time of hospital discharge, and thirdly, for patients in the outpatient setting, who have not been hospitalized but have multiple providers.			
Communicating & coordinating patient care across provider hand-offs in the hospital	<input type="checkbox"/> Yes <input type="checkbox"/> No	Lectures ? IT based?	Excellent Very Good Good Fair Poor
Communicating & coordinating patient care at hospital discharge	<input type="checkbox"/> Yes <input type="checkbox"/> No	Lectures ? IT based?	Excellent Very Good Good Fair Poor
Communicating & coordinating patient care among multiple providers in outpatient settings	<input type="checkbox"/> Yes <input type="checkbox"/> No	Lectures ? IT based?	Excellent Very Good Good Fair Poor
Working in multidisciplinary teams	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Inpatient – round together, scheduled meetings? Outpatient - Scheduled Meetings or Projects?)	Excellent Very Good Good Fair Poor
Working in managed care settings	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures/ Didactics Experience)	Excellent Very Good Good Fair Poor
Working in “medical homes”	<input type="checkbox"/> Yes <input type="checkbox"/> No		Excellent Very Good Good Fair Poor
Knowing absolute or relative costs of various treatments & diagnostic tests	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures?)	Excellent Very Good Good Fair Poor
Knowing how much patients have to pay out-of-pocket for various treatments & diagnostic tests	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures?)	Excellent Very Good Good Fair Poor
Now I would like to ask about the different settings in which your residents gain experience. Do your residents have any required experiences in:			
A Community Clinic or Private Practitioner's Office?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Conducting Home Visits?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Providing Hospice or Palliative Care?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Nursing Homes or Rehabilitation Units?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Are there other areas in which your program trains residents in systems-based practice?

No Yes (please specify)

In the areas of systems-based practice that you have indicated your training to be excellent or very good (remind respondent of these areas), what have been key resources or factors that have facilitated your program's ability to provide this training? (probe for details as needed)

In the areas of systems based practice that you indicated your training to be less than very good, or that you do not provide this training, what have been some of the barriers that have prevented the establishment or improvement of your training in these areas? (probe for details as needed)

Section 4 - Interpersonal and Communication Skills

In this section, we would like to ask you about your program's training in interpersonal and communication skills.

Again, for each section we define training as both the formal elements– lectures, conferences, projects, etc , and informal training, through clinical experiences or interactions with faculty, staff and patients.

	Does your program train its residents in	(If yes) Can you describe your program's training in this subject?	(If Yes) Presently, in preparing your trainees for their post-residency practices, do you believe the training your program provides in this subject is _____
Communicating with other healthcare providers (physicians and non-physicians)	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Communicating clearly with patients about diagnosis and treatment plans	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Engaging patients in shared decision-making	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Providing patient education about self-care activities	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures/ training on how to do patient education? IT resources?)	Excellent Very Good Good Fair Poor
Provide counseling to enhance adherence or behavior change	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Communicating with patients with low health literacy	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Acquiring cultural-competency	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Working with interpreters	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor
Communicating with patients about end-of-life decisions or palliative care	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training? Teaching in advanced directives?)	Excellent Very Good Good Fair Poor
Communicating with the patients' family and significant others such as holding family meetings	<input type="checkbox"/> Yes <input type="checkbox"/> No	(Lectures or other specific training?)	Excellent Very Good Good Fair Poor

Are there other areas in which your program trains residents in interpersonal and communication skills?

No Yes (please specify)

In the areas of interpersonal and communication skills that you have indicated your training to be excellent or very good (remind respondent of these areas), what have been key resources or factors that have facilitated your program's ability to provide this training? (probe for details as needed)

In the areas of interpersonal and communication skills that you have indicated your training to be less than very good, or that you do not provide this training, what have been some of the barriers that have prevented the establishment or improvement of your training in these areas? (probe for details as needed)

Section 5- Conclusion

I would like to end with asking if you think there are other general enablers and facilitators or barriers to innovation in graduate medical education that you have not already mentioned?

Finally, are there any topics of questions that were not covered in this interview that you think should be or would like to comment upon?

Thank you very much for your time. This information is very helpful. Although I believe we have everything we need, if we have any details that need clarification, would it be ok for us to contact you again?

Yes No

Thank you again and have a nice day.

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