Our findings have implications for both patients and health care providers. Sample medication use has been shown to increase out-of-pocket costs for patients. Thus, sample removal and provider education may help mitigate increasing health care expenditures. In addition, clinics participating in pay-for-performance agreements with insurance companies may benefit financially. Overall, generic prescribing increased from 58% to 65.1%. According to one third-party payer (“Incent and Reward Best Practices” [internal document, part of the Pay-for-Performance agreement between Wellmark and the clinic physicians], January 2008), this clinic moved from not qualifying for a generic prescribing award to the highest level award offered in 180 days. Further study of the financial implications of sample removal from this setting should be considered.

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RESEARCH LETTER

HEALTH CARE REFORM

Improving the Clinician-Scientist Pathway: A Survey of Clinician-Scientists

There has been growing concern about an insufficient number of physicians engaged in research as their primary professional activity. Little is known about how we can increase the number of successful clinician-scientists or how to facilitate the success of those in the clinician-scientist pathway.

Methods. We surveyed a convenience sample of 16 clinician-scientists employed at 4 McGill University teaching hospitals in Montreal, Quebec, Canada. This survey consisted of 2 phases. Participants first participated in an individual, semistructured interview of approximately 15 minutes. This interview consisted of a mixture of closed- and open-ended questions concerning their experience in the clinician-scientist pathway. Participants were then e-mailed a short follow-up questionnaire consisting of open-ended questions.

Results. All 16 clinician-scientists whom we approached agreed to participate. Their ages ranged from 30 to 63 years, and approximately two-thirds were male. All participants had medical degrees, with approximately two-thirds possessing additional advanced degrees.

Participants were consistent in a number of their views concerning the clinician-scientist pathway (Figure). There was unanimous agreement regarding the importance of mentoring. Most participants also cited an early interest in research, usually occurring before or during medical school. In addition, most participants believed that there are certain character traits innate to those who are successful as clinician-scientists, including determination, curiosity, and the ability to withstand criticism.

Participating clinician-scientists consistently identified important barriers to success in the clinician-scientist pathway. Most participants found that there were economic disincentives to pursuing this pathway, with many suggesting mechanisms for overcoming this disadvantage. These mechanisms include doing clinical work at nights or on the weekends to earn money and to maintain clinical skills. When asked about the potential challenge of balancing their numerous roles, many participants suggested that certain sacrifices in family life are necessary to be successful clinician-scientists. This feeling was particularly prevalent among women. In addition, most participants have found it difficult to balance the various obligations of being a staff physician with the pursuit of their research endeavors. Furthermore, participants reported that their employment contracts do not provide.
Balance Between Research/ Clinical Work/ Family/ Administrative Tasks

"You need a primary focus. To wake on Monday and be a doctor and then on Tuesday to be a researcher is a lot more difficult than to self-identify a primary activity." (#5)

"The clinical demands are always here and now and you're forever putting off the research until tomorrow…." (#7)

"My contract stipulates 50/50 distribution between clinic and research…. It is not difficult to manage the balance—you find things difficult if you don't like them." (#8)

"Research gets squeezed between administrative work, clinic, and teaching, and it's hard to say no if you're a junior faculty so you end up agreeing to do a wide variety of different things, and it's really hard to figure out how to balance all these things and properly advance yourself and find satisfaction in what you're doing. There is no one to help figure out exactly how to properly allocate my time—no authority figure to say I shouldn't be spending more than this amount of time in that or that in this, etc…." (#9)

Difficulties in Obtaining Grants/ Proposing Research as a Clinician-Scientist

"The biggest challenge to being a clinician-scientist is not the clinic part, it's the research part—because you have to compete against PhDs who do nothing else." (#2)

"There is a difference grant committees have in terms of expectations from clinicians and researchers. Primary researchers are more likely to want to use the existing system to answer the following goals." (#4)

Economic Disincentives to Pursuing This Pathway

"One of the reasons I was able to stick with research was because I was either too stupid or too uncaring about how much money I made." (#2)

"If you're interested in becoming a clinician-scientist, you can't be a person for whom financial reward is your first priority." (#2)

Exposures to Research

"It's very important to get med students/residents exposed to research, because you will catch the 10%-15% of med students that have the right attributes for research." (#2)

"You need to have passion. I think you have to believe that passion during the first 1-2 years of med school. I would arrange for these students to go to the best-mentored labs/environment and get them the best exposures possible to give them the bug and then you hope that those who get the bug keep it—because throughout med school you don't have time to do anything—and then want to do research later on. Because you can't be told to do research, it will never work." (#11)

Fragile Early Career Environment

"What's absolutely necessary is that you take on a job as a junior faculty in the right environment. Often these people get the right training but then they start in an environment where no one is a clinician-scientist and no one has ever done anything academic and the hospital staff are unaware of the needs and requirements of a clinician-scientist and so they tell the junior staff fo take a full clinical load, and if you want to do research then that's what nights and weekends are for. That's why I think 60%-80% of clinician-scientists fail within their first 5 years." (#11)

"The early career environment is critical. If you belly up your head against the wall too often, you're just going to give up. If you've been trying for a few years and are not successful, CIHR funding is next to impossible. … The success rate in applying for CIHR grants in general is pretty low and a lot of it is based on how good you've been at getting those grants in the past. … A lot of people come in with the best intentions but if you don't get that first CIHR grant right off the bat, it becomes quite depressing." (#13)

Ideal Pathway to Becoming a Clinician-Scientist

"It was as if I didn't get into the MD/PhD program—my friends that got in are still stuck in residency training and found it difficult to pick up where they had left off." (#1)

"CIP (Clinical Investigator Program) is a more natural, organic progression—only once you're super-specialized do you go off and do research training. The intellectual process in the MD/PhD program seems to be more disjointed… in medical school you're supposed to do both and learn this extremely broad amount of information and then you have to go off and do your PhD in an extremely focused field, etc… It makes a lot more sense to start broad and then gradually focus yourself over time." (#2)

"Your research is so much better if you know what you're looking for. If you've done your residency, you know what clinical problems exist and you can ask the right questions, but if you do research beforehand you don't really understand the problems that exist…. You have a very different understanding of disease when you're an established clinician." (#6)

Mentoring

"I had a mentor at every step along the way and that was vital to my success." (#4)

"Mentoring is crucial. My ideas wouldn't have gone anywhere without mentors to organize and offer a pragmatic perspective to those ideas." (#7)

appropriate delineation of their various responsibilities. Consequently, time management represents an overbearing concern.

In the follow-up questionnaire phase of the study, we identified several additional trends. Most participants reported the need to increase funding, particularly during residency, as a key issue. The majority of participants also described a difficult environment for fledgling clinician-scientists as a major obstacle to success, highlighting the need for mentoring and better protection of research time.

**Comment.** The results of this survey have several implications. First, most successful clinician-scientists reported an early interest in research. Consequently, the crux of our efforts to train the next generation should focus on identifying potential clinician-scientists early in their training. Since 1997, there has been an encouraging increase in interest in research among medical students. We must continue efforts to maintain this trend via research scholarships. Second, we need to address the lack of formal mentoring programs by setting clear goals and proper evaluation methods. We also need to foster an early-career environment supportive of the needs of clinician-scientists. Third, there is a need to increase funding in the clinician-scientist pathway. This increase should include financial incentives, such as loan repayment programs, as well as increased research funding. Finally, we need to better protect their time for research. This protection should include clear delineation of their responsibilities in their contracts, as well as decreasing their administrative responsibilities.

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How Efficient Is Procalcitonin-Guided Antibiotic Use in Acute Respiratory Tract Infections in Primary Care?

The antibiotic prescription for acute respiratory tract infections is still used with caution because there is no effective way to distinguish between viral and bacterial infection. Briél et al. evaluated whether antibiotic therapy guided by procalcitonin reduces the use of antibiotics without increasing the restriction of activities experienced by patients compared with a standard therapy based on current guidelines. However, this primary end point—the restriction of activities as experienced by patients—is patient dependent and hard to replicate from one setting to another. It is not possible to capture its content and construct. Does it means work absence, no leisure time activity, lying in bed?

The restriction of activities based on the condition of being sick is likely to be biased toward the education level of the patients. Even so, the unbalanced distribution of less-educated patients in the control group did not increase the number of days with restricted activity.

Surprisingly, the intervention caused a remarkable reduction in the antibiotic prescription. It seems that physicians needed a tool to prevent themselves from prescribing antibiotics. As a matter of fact, the lack of antibiotic use did not cause any symptoms of ongoing or relapsing infection at 28 days, suggesting that patients did not need them anyway.

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Even More to Do and Even Less Time: Resident Education and the Future of Primary Care

As internal medicine residents at an urban academic medical center who are interested in primary care, we face many of the challenges discussed in the article by Fiscella and Epstein. Their review of the patient-centered medical home supports increased efficiency of the primary care environment through increasing roles of ancillary staff. Given that a minority of medical trainees are entering primary care careers, it is important to consider whether the changes proposed by Fiscella and Epstein can increase internal medicine resident interest in primary care fields by providing a more appealing work environment. This is especially important because, unfortunately, internal medicine resident satisfaction with their continuity clinic is suboptimal. In our own institution, residents state that primary reasons for their dissatisfaction with their continuity clinic are inadequate ancillary staff and time to provide quality care.

While we look forward to the advanced medical home, we remain concerned about the ability of current training programs to prepare us to participate in the patient-centered medical home. Practice redesign requires strong physician leadership to implement new systems of care. Unfortunately, current residents do not receive the training in systems of care. For example, in a survey we conducted of more than 200 residents from 17 Chicago-area institutions, only 20% considered themselves well informed about systems-based practice. The majority of residents (72%) thought that their knowledge of systems-based practice affected their ability to care for patients.

While our current training programs do not focus on producing leaders who can reform primary care, we believe that residents are interested in these areas. These interests need to be formally cultivated by our internal medicine residency programs to produce the leaders who will improve primary care and support the development of and practice in the new patient-centered medical home.

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In reply

Kleczek and Baumert make 2 related and important points. They argue that residency work environment affects trainees’ decisions to enter primary care and that residency training should reflect future practice. We agree on both counts. Residency training sites serve large numbers of poor, minority, and uninsured patients, and faculty are dedicated to insuring high-quality care. Yet, despite increasingly early exposure to patients and faculty, fewer students and residents pursue careers in primary care and even fewer work with underserved patients.

This paradox may result from a hidden curriculum that undermines the very skills and values that faculty aspire to