

Measuring the “Whole System” Outcomes of an Educational Innovation: Experience From the Integrative Family Medicine Program

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Background and Objectives: Six family medicine residency programs in the United States collaborated on the development and implementation of an integrative family medicine (IFM) program, which is a postgraduate training model that combines family medicine residency training with an integrative medicine fellowship. This paper reports on effects of IFM on residency programs and clinical systems in which it was implemented. **Methods:** We used the Integrative Medicine Attitudes Questionnaire (IMAQ) to assess participants' attitudes toward integrative medicine before and after the program was implemented. We assessed residency program recruitment success before and after the program was implemented. We conducted interviews with key informants at each program to evaluate the effects of the IFM on the six participating residency programs. **Results:** IMAQ scores demonstrated a significant increase in the acceptance of integrative medicine after implementation of IFM. Recruiting data showed that participating programs filled at a rate consistently above the national average both before and after implementation. Analysis of interview data showed that programs became more open to an integrative medicine (IM) approach and offered a wider range of clinical services to patients. **Conclusions:** Our mixed-methods strategy for evaluation of IFM showed that implementing the program increased acceptance of IM, did not affect residency fill rates, and increased use of IM in clinical practice. The combination of quantitative and qualitative methods was an effective strategy for documenting the “systems level” effects of a new educational program.

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The Future of Family Medicine project¹ defined many of the challenges currently facing family medicine, including recruitment of quality applicants, professional satisfaction, and changing models of primary care and proposed a set of strategies for meeting these challenges. Some of the programs being implemented to meet these challenges, such as the Preparing the Personal Physician for Practice (P4) effort,² incorporate a nationwide evaluation strategy to examine the outcomes for individual residents and participating resi-

ducing programs. This paper will describe and report the evaluation of another such program—the Integrative Family Medicine Program—a postgraduate training model that combines family medicine residency training with an integrative medicine fellowship.

Evaluating the outcomes of new curricular programs can be complex and challenging. Some evaluation studies have measured participant satisfaction and increased revenue after training.^{3,4} However, there has been little evaluation of changes at the department or program level. Previous efforts to evaluate systems-level effects of innovation in educational settings have been largely done via surveys or examination of internal program data. For example, Hazzard et al conducted a preliminary assessment of the effect of implementing a 1-year geriatric fellowship program (compared to the usual 2 years) via questionnaires sent to geriatric fellowship directors.⁵ In another study, Lebensohn et al compared the proportion of US graduates applying to and filling

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residency positions at one family medicine residency to the national fill rates before and after instituting a novel 4-year residency curriculum offering several different tracks.⁶ Bazemore et al examined the effect of an international health curriculum on the geographic range of recruiting at a program after adding an international health focus and demonstrated that the innovative curriculum enabled the program to attract applicants from a much wider geographic range.⁷

This article reports on the system-level outcomes at six residency programs that implemented and participated in the integrative family medicine (IFM) program for 4 years. Rather than examining survey data alone, we assessed system change using a mixed-method approach.

Methods

Program Description

IFM is a postgraduate training model that combines family medicine residency and integrative medicine fellowship programs. Created in 2003, it is a collaborative effort between the University of Arizona Center for Integrative Medicine and six family medicine residency programs (Table 1). Beginning in 2004, the IFM program has enrolled one or two second-year residents per class from the six residencies into the Arizona Center for Integrative Medicine distributed learning fellowship. The specific curriculum components and educational strategies used are listed in Table 2. The IFM structure and content is described in detail in a previous publication.⁸

IFM's goals are two-fold. One is to implement the necessary system changes to develop and implement an accredited model for a 4-year program that combines training in integrative medicine with conventional family medicine residency training. The second is to train physicians who manifest the philosophy and practice of integrative medicine, defined as healing-oriented medicine that takes account of the whole person (body, mind, and spirit), including all aspects of lifestyle. It

emphasizes the therapeutic relationship and makes use of all appropriate therapies, both conventional and alternative. The details of the strategy for evaluating the second goal—the training of individual physicians—are described elsewhere.⁹ This report focused on evaluation of the first goal: system change in family medicine residencies.

Program Evaluation

To evaluate the effect of IFM on the residency system as a whole, three measurements were used: (1) successive measurement of attitudes of residents and faculty using a previously validated tool examining clinician attitudes toward integrative medicine,¹⁰ (2) examination of recruiting trends of new applicants at the six sites as compared to rates prior to the inception of the IFM and to concurrent national trends, and (3) qualitative inquiry based on telephone interviews with key personnel at the six residencies. Data were collected at all six sites and managed centrally at the University of Arizona Center for Integrative Medicine. This study was approved by the University of Arizona Institutional Review Board.

Integrative Medicine Attitudes Questionnaire (IMAQ). The Integrative Medicine Attitude Questionnaire (IMAQ) was conceived and developed as an instrument to examine health care provider and medical student attitudes toward integrative medicine. The IMAQ is a 29-question survey with scoring on a 7-point Likert scale regarding attitudes toward integrative med-

Table 1

Institutions Participating in the Integrative Family Medicine Program

- Beth Israel/Albert Einstein College of Medicine (New York)
- Maine Medical Center (Portland, Me)
- Middlesex Hospital (Middletown, Conn)
- Oregon Health and Science University (Portland)
- University of Arizona (Tucson)
- University of Wisconsin (Madison, Wis)

Table 2

Elements of the Integrative Medicine Curriculum

- Distributed learning (Internet-based activities, articles, textbooks, audio, botanical labs, and community experiences) curriculum through participation in the University of Arizona Center for Integrative Medicine Fellowship
 - 1,000 hours of distributed learning experiences
 - Three weeks of residential learning in Arizona distributed through PGY-2–PGY-4
- Integrative medicine patient care continuity experience
 - Continue primary care continuity clinic throughout all 4 years
 - Participation in integrative medicine “consultation” clinical experience in PGY-4 year
- Regularly scheduled interdisciplinary case conference
- Involvement of key faculty who are trained in integrative medicine and embody the philosophy of practice of integrative medicine
- Emphasis on experiential learning, including experiencing treatment modalities
- Achievement of competency in defined core curricular areas and proficiency or certification in at least one complementary/alternative medicine modality
- A commitment to self-care demonstrated by each trainee developing a self-care wellness plan and reviewing it regularly with a faculty member

PGY—postgraduate year

icine. The IMAQ was administered to a heterogeneous sample of health professionals to confirm its construct validity.¹⁰ The specific questions in the IMAQ can be viewed at www.mmc.org/workfiles/mmc_residencies/attitude+quest.pdf.

To assess attitudes toward integrative medicine at each program, IFM site coordinators were asked to distribute the IMAQ to all residents and faculty at their respective sites. This was done on paper in years 0–2 of the program (2003–2005) and then electronically, via a Survey Monkey questionnaire, in year 3 (2006). The survey process was anonymous, and participation in IMAQ testing was voluntary.

Recruitment Data. Following submission of their recruitment ranking list to the National Resident Matching Program (NRMP), program directors at each of the participating IFM sites were asked to submit a de-identified ranking list, indicating the applicant's level of interest in integrative medicine, and/or IFM, and the quality of the individual applicant. Programs were also asked to supply data on the total number of residency positions filled in the Match and the proportion of US graduates in each residency class entering from July 2000 through July 2008. Data regarding fill rates was checked against NRMP data, and any ambiguities were resolved via discussion with the program directors.

Qualitative Interviews. The IFM faculty coordinator at each site was asked to identify two–three key informants at their program to discuss the effects of the IFM program on the residency as a whole. Informants were to be in a key position at the program—department chair, residency program director, faculty, or chief resident—such that they could comment on the influence of the IFM on the residency program as a

whole. At some programs, department heads were only minimally involved in or aware of the IFM program and thus could not serve as key informants, while at others they were extremely involved. We thus felt the best strategy given the limited resources for carrying out and analyzing these interviews was to allow the site coordinators to decide who at their site could provide the most information regarding the program's effects.

Questions were initially tested with one key informant and then revised prior to the remainder of the interviews. Participants were asked during telephone interviews that lasted 30–60 minutes about changes that their organization had experienced as a result of participation in the IFM program. Sample questions can be found in Table 3. Responses were recorded using field note techniques. A total of 11 informants were interviewed at the six participating residency programs (n=11). All interviews were carried out by the same individual—a senior research associate at the Arizona Center for Integrative Medicine.

Data Analysis

IMAQ Results. Data were stored and managed at the University of Arizona using an Excel database and were analyzed using Statistical Package for the Social Sciences (SPSS) 16.0. Total IMAQ scores were calculated for each IFM program for 2003–2006. One-way analysis of variance (ANOVA) was used to calculate IMAQ score differences between the 4 years. Post hoc analysis of IMAQ responses was conducted using the Tukey HSD test. Kruskal-Wallis testing was done to verify the results of the ANOVA because of the unequal sample sizes across years.

Recruitment Data. We modeled our analysis of recruiting results on Lebensohn's methods,¹¹ comparing fill

Table 3

Sample Interview Questions

Has the IFM changed your program? If so, can you provide a description of those changes?
Has the quality of the residents you recruit changed since the IFM program began? If yes, can you describe how they have changed? Why do you think those changes have occurred?
Has the existence of the program changed intervention possibilities for patients? If yes, can you give me an example? Why do you think that this change occurred?
Is the presence of IFM helping patients feel more satisfied with their care? If yes, can you give me an example of what you've heard from them? Why do you think that this increase in satisfaction has occurred?
Has the existence of the program improved quality of care? If yes, can you give me an example? Why do you think that this improvement occurred?
Is the presence of IFM helping residents be more prepared about discussing IM with patients? If yes, can you give me an example?
How have faculty responded to the program? Can you give me an example of what you've observed and/or heard?
Do you think residents in your program practice self-care? Has this changed at all as a result of the IFM program?
Has the program changed the attitudes/culture in your residency program? If yes, can you give me an example?

rates and proportion of positions filled with graduates of US medical schools for each program from the period preceding the IFM program (2000–2003) to those during the IFM program (2004–2008). We also compared fill rates for all programs during the IFM with national averages during the same time period. Recruitment data, including rank lists, were also managed using an Excel database and analyzed with SPSS.

Interview Data. After the interviews were completed, results were analyzed via an iterative process to elicit major themes emerging from multiple informants. Three of the authors independently reviewed the interview notes and developed a list of major themes. In a series of phone discussions, consensus was reached regarding the most prevalent themes emerging from the interviews and regarding the specific language to describe these themes.

Results

IMAQ

Because surveys were distributed by site faculty coordinators rather than via a centralized mechanism, we do not have the exact denominators for the number of individuals responding each year. The number of total surveys distributed ranged from 220 to 260 each year based on calculation of the total number of residents and faculty in the six programs. Missing data from the six sites at various time points during the process prevented analysis of pre/post IMAQ results by individual programs. Therefore, IMAQ scores for the entire IFM population were used to test changes in attitudes toward integrative medicine between 2003 and 2006.

The first fellows enrolled in the IFM program in January 2004; the baseline IMAQ data were compiled in fall 2003 and thus represent the pre-intervention condition. Results are presented in Table 4. A total of 81 residents and faculty participated in pretest measures

of the IMAQ and response to posttest measurement ranged from 85 to 141 over the 3 years. Mean IMAQ scores by year are reported in Table 4.

A significant difference was found between 2003 (pretest) and 2006 (posttest Year 3) IMAQ scores ($P=.044$) in the direction of a more favorable attitude toward integrative medicine after the institution of the IFM program than existed before it. Kruskal-Wallis testing confirmed a significant difference between years 0 and 3 ($H=7.841$, $df=3$, $P=.049$)

Recruitment Data

Recruitment data for the years prior to IFM (2000–2003) compared to the years since IFM was introduced (2004–2008) are displayed in Figures 1 and 2, both for overall recruitment and for recruitment of US medical school graduates. We found that overall fill rate at the six programs, which were generally in the 80%–100% range in the pre-IFM years, remained high from 2004–2008, suggesting that the program had no negative effect on recruitment. We also found that the percentage of positions filled with US applicants, which was also in the 80%–100% range from 2000–2003 for the six sites (significantly above the national average), remained at this level from 2004–2008 despite a drop in the national average on this measure over the 2000–2008 period.

Interview Data

Two categories of information emerged from the interview data. First was a set of themes describing both the strengths of the program and areas in which the program needs to be improved. Second was the finding that for several of the areas of inquiry—in particular the effects of the IFM program on recruitment, on patient outcomes, and on resident self-care practices—informants did not feel they had sufficient data to comment. Results of this process with key themes with strong consensus from informants and representative quotes are summarized in Table 5 and in the text below.

Consistent Themes

I. Patient Care. There was clear consensus across programs and informants that the IFM program had led to improved access to integrative medicine services for patients, both in terms of consultation services and in terms of specific therapies such as osteopathic manipulation, acupuncture, and nutritional therapies. There was also consensus that patients' use of complementary and alternative medicine (CAM) was being more regularly incorporated into history taking.

A number of teaching models for patients were described. In one program, selected high school students and family medicine residents are partnering

Table 4

One-Way Analysis of Variance of Total IMAQ Scores by Program Year

Year	n	Mean Score	SD	
2003	81	155.82	15.82	
2004	141	159.25	14.45	
2005	85	160.68	14.86	
2006	127	160.85	15.48	
Source	df	SS	MS	F
Between Groups	3	1,821.79	607.26	2.66 ($P<.05$)
Within Groups	130	98,048.82	228.02	
TOTAL	433	99,870.62		

Figure 1

Fill Rates of Integrative Family Medicine Program 2000–2008 as Compared to National Averages

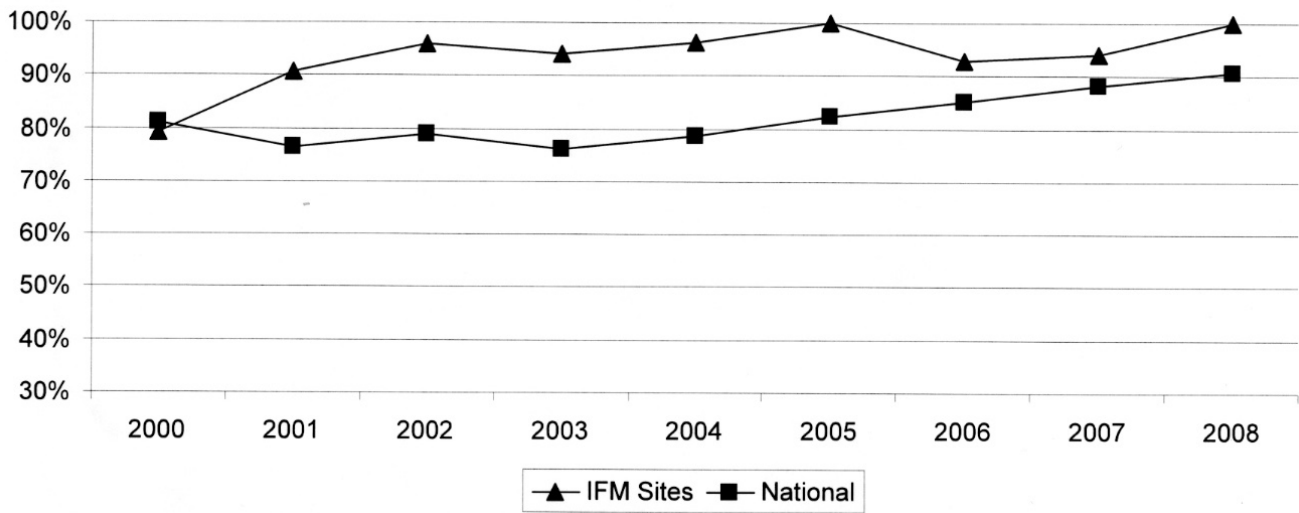


Figure 2

Integrative Family Medicine Program and National Positions Filled With US Graduates 2000–2008

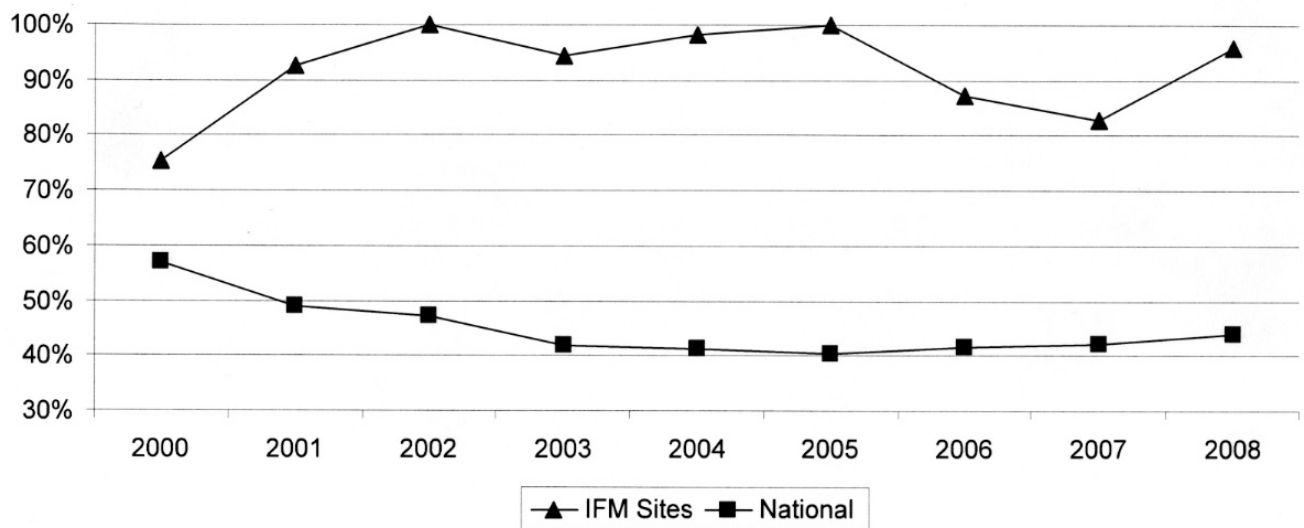


Table 5

Major Themes From Qualitative Analysis With Selected Quotes

Consistent Themes**Patient care**

- Improved access to integrative medicine services
- Patients' CAM practices were being more regularly incorporated into history taking across the program
- Lack of data on specific patient outcomes or patient satisfaction
 - The program has enabled us to offer more comprehensive consultation for patients who are interested...and [for them] there has been a significant impact
- The program has expanded the modalities of care we can offer

Faculty response

- Positive response from the faculty, even among those who were skeptical at the start of the program

Attitude/culture change

- "Openness" and "acceptance"
- Residents were graduating more prepared to discuss integrative medicine strategies with patients
 - Everyone is more open, more flexible

Future plans/major challenges

- Committed to continuing the process of integrative medicine education
- Funding challenges
- More collaboration and sharing of curriculum resources across the sites
- More effort at multi-site research on patient outcomes

Unanswered Questions**Impact on recruitment**

- Could not conclude applicants were of higher quality
 - It's hard to say. We had good residents so it's hard to know if the current is good due to the IFM

Patient satisfaction

- Future iterations of this program must gather data on patient outcomes and patient satisfaction
 - Little data about patient satisfaction

Self-care

- Lacked sufficient information to comment on residents' self-care practices
 - The results are probably mixed. There are stricter rules with respect to time now. Many are physically active but it may be lifestyle and [and not] the program

to develop an integrative health promotion curriculum that can be delivered to high school students. Another program offers community educational programs about integrative medicine approaches to cancer survivorship that have been developed and delivered by IFM residents.

In terms of weaknesses in the IFM program, there was a consensus that there was a lack of data on specific patient outcomes or patient satisfaction, and that collecting such data would be an important step in further evaluating the program.

II. Faculty and Resident Opinions. Informants at all the programs described a uniformly positive response from the faculty, even among those who were skeptical at the start of the program. "Initially the reaction was mixed; now that everyone is more aware they see the value for patients."

The terms "openness" and "acceptance" were used across almost all the sites in describing attitudes of residents and faculty toward integrative medicine as a

result of the IFM program. There was consensus that residents were graduating more prepared to discuss integrative medicine strategies with patients than they had been prior to the IFM program.

III. Future Plans/Major Challenges. There was also consensus across the sites that all were committed to continuing the process of integrative medicine education in their residency. There was less consensus regarding whether IFM was a viable long-term model for all the sites, due in large part to funding challenges and faculty turnover. There was agreement that future efforts should incorporate more collaboration and sharing of curriculum resources across the sites, as well as more effort at multi-site research on patient outcomes. There was also a sense (from three programs) of a need to provide more career options or guidance for fellows following the end of the program, including possible research fellowship opportunities and preparation for differing practice settings.

Unanswered Questions

I. Effect on Recruitment. Although recruitment data reported above showed no change in the number of applicants or fill rates, several informants felt that applicants were somehow “different” as a consequence of the IFM program. Based on available data and impressions during interviews, we could not conclude applicants were of higher quality. Several programs did report a sense that IFM had produced increased interest in their program and possibly increased prestige on a national level. But, even these informants acknowledged that this was impression only with no specific supporting data.

II. Patient Satisfaction. There was agreement across the programs that a major weakness of the IFM program was our inability to measure patient demand for integrative medicine services, satisfaction with their provision, or change in clinical outcomes as a consequence. Several informants reported a sense that a subset of patients is very interested in these services but that we need more data regarding how large a group this is and what are their specific needs. There was consensus that future iterations of this program must gather data on patient outcomes and patient satisfaction.

III. Self Care. Although teaching self care was a major curriculum objective, none of the informants felt that if there was change, it could clearly be attributed to IFM. Many of the informants felt that they did not have sufficient information to comment on residents’ self-care practices.

Discussion

Effect on Attitudes and Practice of Integrative Medicine Within Programs

The IMAQ results showed change toward greater acceptance of integrative medicine concepts. This is particularly meaningful given that baseline attitudes about integrative medicine were likely more positive than among family medicine programs in general. Thus, the IFM improved attitudes even in programs where integrative medicine was likely viewed well.

Further, the qualitative data showed that having just one–two IFM residents per year influenced the attitudes and practices of the entire residency program. This has important implications for other residency change efforts. It suggests that the addition of other optional training tracks, such as in public health or sports medicine, could influence the attitudes of entire cadres of residents in a given program.

Effects on Resident Recruitment

Analysis of recruiting trends at IFM programs shows that despite the potential “diversion” of effort and administrative resources required to implement a

new program, none of the sites experienced a decline in recruiting as measured by fill rates or percentage of US graduates in the Match program. This finding is corroborated by the analysis comparing recruiting trends prior to and during the IFM program. We were unable, however, to link individual applicants’ level of interest in integrative medicine with their overall quality as applicants. Thus, we cannot conclude that the presence of IFM led to higher-quality applicants. But, we do note that the percentage of positions filled with US applicants remained high at the six IFM programs during a period when the percentage declined nationally. This could be interpreted as a sign that the IFM program contributed to attracting US graduates to the programs.

Although several weaknesses in the IFM program were noted in the qualitative interviews, none of our informants reported concerns that their residency was harmed in any way by implementing the program. Given the extra effort the IFM program demanded from residency faculty and the open-ended nature of the interview questions (Table 3), the lack of such negative comments and the numerous positive comments could be an indicator of the program’s acceptance.

Most difficult to describe or quantify is the effect of the IFM program on the overall “culture” of the residency program. We had hoped to find changes in residents’ self-care practices, but our strategy for gathering this data was not sufficiently specific to permit drawing any conclusions. A more in-depth qualitative inquiry is needed to elucidate the nature of a change in “culture.”

Limitations

As noted, data on resident recruitment do not allow definitive conclusions regarding effects of IFM on recruitment. While we know that fill rates and recruitment of US graduates did not decline, we do not know if implementation of IFM can improve recruitment, because all participating programs began this experiment with fill rates well above the national average, creating a ceiling effect that made it difficult to show improvement.

Further, our strategy for gathering information regarding applicant interest in integrative medicine and its effect on applicant quality was limited, as it relied on overworked residency program directors to provide the data, and we were thus unable to complete this analysis. We suggest that future efforts at evaluating programs such as IFM should survey matched applicants and should rely on residency administrative staff, rather than program directors, to gather data.

A third limitation is that although the IMAQ has been validated to determine differences in attitudes between physicians toward integrative medicine at a moment in time, it has not been validated for its ability to detect

change over time. Nor was the IMAQ tested for validity regarding a correlation with behavior change. So, although we found a statistically significant difference in attitudes before and after the IFM intervention, the question of whether this is “clinically meaningful” is unanswered.

Fourth, the number of informants selected for the qualitative analysis was relatively small, and the selection process may have introduced bias in the direction of positive responses. Informants had varying levels of involvement with and knowledge of the program. Because no single category, such as department heads, was represented at all six sites, we were unable to compare responses from specific types of informants to other types or to the group as a whole. A process that included all department heads, program directors, and a site-selected “skeptic” informant would have been more complete and possibly less biased. The fact that the qualitative interviews were not taperecorded also represents a significant limitation.

Finally, the lack of a control group of residency programs for this project is another significant limitation of our methods. The IMR program will seek to recruit a set of control residency sites to provide comparison data.

Conclusions

Using the multi-site IFM, we learned a number of important lessons about the strengths and weaknesses of various evaluation approaches that may provide guidance to other residency programs in evaluating systems-level change. The most difficult questions to answer were those regarding patient satisfaction, patient clinical outcomes, and effect on quality of residency applicants. Most likely, a mixed methods model incorporating both quantitative methods and rigorous qualitative inquiry will prove the best strategy for answering these and similar questions regarding future innovations in family medicine education.¹² Centralizing data collection to ensure uniformity, and finding ways to enlist residency administrators, in addition to faculty, for site-specific data collection efforts are important strategies for the evaluation of multi-site programs.

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