

**Continued Improvement of the Research Curriculum:**

The FM/GIM Academic Fellowship program currently offers a robust research program. However, there are several areas that will be improved over the next three years. The curriculum is described in detail below, followed by new initiatives for the next grant period.

**Overview:** The curriculum of the Research Track consists of both research and non-research components to ensure adequate preparation for the varied activities of graduates. <sup>4</sup> The *research component* consists of the following core elements: (1) two years of study in the Boston University School of Public Health for the purpose of acquiring research methodology skills, culminating in a MSc (or MPH) degree, (2) an intensive introduction to epidemiology and biostatistics during the first two months of the program, (3) academic medicine seminars, (4) a weekly Research Literature Appraisal Course, (5) a twice-monthly Research-In-Progress seminar and (6) the supervised conduct of at least two research projects. The *non-research* component includes: (1) a biweekly course on teaching methods, (2) supervised teaching experiences in primary and ambulatory care, (3) a management skills workshop and (4) a clinical primary care continuity experience.

With support from the current FM-GIM Faculty Development Grant, we added four new curricular elements during the past three years to provide fellows with better research training. These are: (1) training in qualitative research methods, (2) an Academic Seminar on primary care research networks that acquaint fellows with these potentially useful settings for performing research, (3) Field Seminars on Research in Problems of Underserved Populations; and (4) visiting professorships to introduce fellows to major figures in the world of primary care research.

Although not supported through this application, the Educator Track trains future faculty who function as education program developers and innovators, who carry out effective evaluations and studies of educational programs and methodologies, and who may have administrative roles in managing education programs. For these individuals, training in research methods and the supervised conduct of research is appropriate, along with education and training in pedagogic methods and supervised teaching experiences. Likewise, we believe that for future clinician-investigators, education and training in pedagogic methods and supervised teaching experiences are important for future faculty, who will likely be engaged in both clinical and research teaching, and possibly have roles in education/training program development and evaluation. Thus, the curricular elements for fellows in both the Research and Educator Tracks are the same, only the percent time allocations differ. In the rest of this proposal, we will describe these common curricular components. The Table 15 shows the major curricular components of the Fellowship Program and lists the percentage of training time for each component for the two tracks. Each of these components is described in detail in the following sections.

<b>Table 15. Summary Of The FM / GIM Academic Fellowship Curriculum</b>		
<b>FELLOWSHIP ACTIVITIES</b>	<b><i>% Training Time for Research Track Fellows</i></b>	<b><i>% Training Time for Education Track Fellows</i></b>
<b><i>Research Training</i></b>		
Research Methods Courses (BU School	22.5%	22.5%

<b>Table 15. Summary Of The FM / GIM Academic Fellowship Curriculum</b>		
<b>FELLOWSHIP ACTIVITIES</b>	<b>% Training Time for Research Track Fellows</b>	<b>% Training Time for Education Track Fellows</b>
of Public Health)		
Research Seminars	11.5%	11.5%
Academic Seminar (grant writing, abstracts, papers)	1.5%	1.5%
Research Literature Appraisal Course (critiquing journal articles)	5.0%	5.0%
Fellows Research-in-Progress Meeting	4.5%	4.5%
CREST Seminar (human subjects, etc.)	0.5%	0.5%
<u>Supervised research projects</u>	<u>45.0%</u>	<u>22.5%</u>
<b>Total Research Training</b>	<b>79.0%</b>	<b>55%</b>
<b>Non-Research Academic Training</b>		
Teaching Methods Seminar	3.0%	5.0%
Supervised Clinical Supervision in Primary/Ambulatory Care	3.5%	14%
Management Skills Training Seminar	2.0%	2.0%
Primary Care Continuity Practice	10.0%	20%
<b>Total Non-research Training</b>	<b>18.5%</b>	<b>45%</b>
<b>Mentoring (program and career counseling)</b>	<b>2.5%</b>	<b>2.5%</b>
<b>TOTAL TRAINING</b>	<b>100%</b>	<b>100%</b>

**Masters Programs in the School of Public Health:** The masters programs at the Boston University School of Public Health (SPH) provide the didactic framework for the research training in the Fellowship Program. The SPH provides excellent methodological training in biostatistics and epidemiology, and other important research methods and techniques commonly used in primary care research, such as survey research, observational research designs, clinical trials, economic analysis, the assessment of health status, quality of care and appropriate service utilization, and the use of computer systems in research. Courses are taught in the late afternoon and evening, permitting the trainee time during the day to be engaged in the other aspects of the fellowship, especially supervised research and research seminars, while faculty supervisors, collaborators, research subjects and materials are most easily available. The masters programs at the SPH have grown with the existing Fellowship Program with which it has been associated since 1980. The SPH considers FM-GIM fellows to be among its strongest students at the School.

Fellows are able to enroll in either the MSc or the MPH degree programs. Research Track fellows are encouraged to enroll in the MSc program for a number of reasons. First, almost all the required courses for the MSc degree are research methods courses in statistics and epidemiology that Research Track fellows need to take to gain

methodologic competencies. For the MPH degree, there are required introductory courses in each of the departments in the School of Public Health (Epidemiology, Biostatistics, Health Services, Social and Behavioral Sciences, Health Law, Maternal and Child Health, International Health, and Environmental Health). Past research-oriented fellows have reported that the amount that they have learned in these courses that would help them in their research career was little, and not worth the time commitment. Second, for the MSc degree; only 32 credit hours are required, whereas 48 credit hours are needed for the MPH degree. MSc students spend less time in course work, and thus have more time to perform their research projects. Third, the MSc program also has a thesis requirement, so that each candidate must prepare a thesis proposal, organize a multidisciplinary thesis review committee composed of faculty members from the medical and public health schools, and defend the thesis. The thesis is written in the form of a scientific article intended for publication in a peer-reviewed journal, which is excellent training for fellows. The MPH degree is an option for those few fellows for whom it is a better option for long term career preparation. This might be the case for fellows interested in the content area of one of the departments in the School of Public Health, for example, maternal and child health.

Table 16 lists the required and elective courses in epidemiology, biostatistics and other research methods courses and a brief description of their content. At a minimum, we expect our trainees to be facile with the following statistical methodologies: (1) descriptive statistics, (2) probability theory, (3) hypothesis testing, (4) measure of association and correlation, (5) multi-factor analysis of variance, (6) multiple regression, (7) logit/probit analysis, (8) discriminant analysis, (9) factor analysis, and (10) non-parametric techniques. The SPH courses emphasize the appropriate and effective use of statistical methods rather than the development of statistical theory. This approach to the instruction of statistics recognizes the methodological needs and interests of primary care clinician investigators and the increasing availability of computer-based statistical packages.

The epidemiologic training aims to provide the trainee with an understanding of epidemiologic principles developed for infectious diseases and applied to chronic diseases. Trainees become knowledgeable about and are able to utilize and critique alternative experimental and quasi-experimental strategies such as case-control studies and randomized clinical trials. They understand how to evaluate bias and confounders in study design and execution.

An important aspect of the training is the understanding and effective use of computers in research. At a minimum, trainees become experienced in the use of standard computer-based statistical packages such as SAS, SPSS, BMDP, and programs written for microcomputers such as SYS-STAT. They are taught the structure and use of relational data bases and gain experience with the use of microcomputers and other computer hardware in research.

An important methods course in the SPH curriculum is 'Health Services Research Methods'. This course addresses such methods as measuring health status, quality of care and the necessity of a health service. Decision analytic and survey research techniques are also taught. 'Health Economics' and 'Technology Assessment' also teach important aspects of research methodology. In addition to the methods courses, the SPH curriculum provides the trainees with an understanding of the health care system. These courses

familiarize the trainee with the different analytic perspectives of economists, political scientists, sociologists, lawyers, and ethicists, and other social and behavioral scientists, each of whom approaches the subject matter with a different conceptual lens and analytic tools. This exposure allows the fellow to more effectively interact with these types of investigators and constructively utilize their techniques and strategies in their research.

**TABLE 16: RESEARCH METHODS COURSES**

Course Name	Description
EB703 – Biostatistics	<ul style="list-style-type: none"> <li>- Principles of Biostatistics</li> <li>- Interpretation of statistical analyses in clinical research and literature</li> </ul>
EB712 – Introduction to Epidemiology	<ul style="list-style-type: none"> <li>- Principles and methods of epidemiology for public health</li> <li>- Critical interpretation and evaluation of the literature</li> </ul>
EB813 - Intermediate Epidemiology	<ul style="list-style-type: none"> <li>- Simple and stratified analysis</li> <li>- Hypothesis testing</li> <li>- Parameter estimation</li> <li>- Effect modification and confounding</li> </ul>
EB852 – Statistical Methods for Epidemiology	<ul style="list-style-type: none"> <li>- Study design</li> <li>- Intermediate level data analysis techniques (confounding and interaction, stratification, multivariate techniques)</li> </ul>
EB762 – Clinical Epidemiology	<ul style="list-style-type: none"> <li>- Evaluation of diagnostic tests, decision analysis, cost effectiveness analysis</li> <li>- Critical evaluation of clinical studies and methodology</li> <li>- Outcomes assessment for clinical studies</li> </ul>
EB723 – Introduction to Statistical Computing	<ul style="list-style-type: none"> <li>- Using statistical packages mainframe and personal computers</li> <li>- Manipulating data sets</li> <li>- Basic statistical procedures, such as t-tests, chi-square tests and correlation</li> </ul>
EB805 – Intermediate Statistical Computing	<ul style="list-style-type: none"> <li>- File manipulation</li> <li>- Multiple regression</li> <li>- Analysis of variance and covariance</li> <li>- Logistic regression</li> </ul>
EB722 – Design and Conduct of Clinical Trials	<ul style="list-style-type: none"> <li>- Development, conduct, interpretation of clinical trials</li> <li>- Experimental design methods, data management, statistical analysis of trials</li> </ul>
EB721 – Survey Methods for Public Health	<ul style="list-style-type: none"> <li>- Theory and practice of conducting survey research</li> <li>- Research design</li> <li>- Sampling and data collection methods (survey, telephone) and instruments</li> </ul>
SB815 – Program Evaluation Research	<ul style="list-style-type: none"> <li>- Designing, conducting and using research that evaluates the impact of public health programs</li> <li>- Experimental and quasi-experimental studies</li> </ul>
SB721 – Behavioral Sciences and Public Health	<ul style="list-style-type: none"> <li>- Learn to diagnose a public health problem</li> <li>- Assess proposed public health strategies to address problem</li> <li>- Identify behavioral, cultural and attitudinal factors affecting</li> </ul>

	<ul style="list-style-type: none"> <li>programs</li> <li>- Critically evaluate public health programs</li> </ul>
HS811 – Health Services Research Methods	<ul style="list-style-type: none"> <li>- How to define a health service problem</li> <li>- How to conceptualize a health services research hypothesis or study <ul style="list-style-type: none"> <li>objective</li> </ul> </li> <li>- Study design methods</li> <li>- Quality assessment techniques</li> <li>- Decision analysis</li> <li>- Health status and other health outcome measurement</li> </ul>
HS837 – Measuring and Evaluation Medical Care Processes and Outcomes	<ul style="list-style-type: none"> <li>- Structure, process and outcome measurement in health services</li> <li>- Methods for evaluation of quality of health care services</li> </ul>
SB740 – Qualitative Research Methods	<ul style="list-style-type: none"> <li>- Development of research questions for qualitative research</li> <li>- Data collection</li> <li>- Data analysis</li> </ul>

\*For MSc Health Services core courses, see Table 19.

**Intensive Summer Courses in Epidemiology and Biostatistics:** In 1988, at the suggestion of Dr. Friedman, the SPH’s Epidemiology and Biostatistics Department developed the intensive summer course in research methods for academic physicians. This course is taken by fellows to ‘jumpstart’ their first research project which can then begin by the fall or early winter of their first fellowship year. To intelligently select a project and plan its experimental design, the fellows need to be exposed to basic statistical and epidemiological principles and techniques as soon as possible in their training. The summer course, now two separate courses: EB703, Introduction to Biostatistics and EB712, Introduction to Epidemiology (see Table 6), fulfills this need. Each course meets for one and one-half hours per session for 16 sessions over four weeks. Students are required to have sufficient medical and analytic background to maintain a fast pace of instruction, focused on examples drawn from the clinical literature. The size of the class is limited to facilitate interaction among students and the instructors. After the completion of this course, fellows are ready to plan research projects and to take intermediate to advanced courses in statistics and epidemiology in the fall of their first year.

**Research Literature Appraisal Course:** Over the past fifteen years, program faculty have given a weekly seminar course in the SPH, in which selected articles published in refereed journals are critiqued for their experimental design and written presentation. In 2001-2002, the curriculum and educational strategy was completely revised and updated to address advances in the area of evidence-based medicine. The name of the course changed from “Journal Club” to “Critical Appraisal of the Medical Literature.” The current course focuses on research methods and their applicability to clinical and public health research. The curriculum is based the Users’ Guide to the Medical Literature (Guyatt and Rennie, eds.).<sup>5</sup> To ensure that the full range of research questions, study populations, topics in primary care research and methodologies are covered during the course of a year, the course leaders select a chapter of the book for participants to read for each session. Under the guidance of the leaders, an individual fellow for each session

selects the clinical or public health domain of interest (i.e. therapy, prognosis, diagnosis, health services), an answerable clinical question, locates a journal article that addresses the question and distributes the article a week in advance for review by other students. At the subsequent meeting of the course, the student then leads the discussion, using the format outlined in the text, including validity, results and applicability. The faculty help guide the discussion, and provide “mini-lectures” on methods issues as they arise. In addition to our fellows, students are either physician fellows from other departments or non-physician masters or doctoral-level public health students. Richard Saitz, MD, MPH, trained in teaching evidence-based medicine at McMaster University, and Karen Freund, MD, MPH, both GIM faculty members, co-direct the course.

**Qualitative Research Course and Training:** Dr. Liebschutz coordinates the formal training in qualitative research for the fellows. Most research training and research performed in primary care fellowship programs have been oriented toward quantitative methods. There is, however, increasing recognition of the value of complementing quantitative research with qualitative approaches. There is minimal training in this area nationally as opportunities to be exposed to this methodology are currently limited by the small number of faculty with expertise in this area.

A compelling argument for including instruction on qualitative research methods in a primary care research-training program is the relevance of these methods for addressing research questions in high-risk, minority, and underserved populations. Qualitative research methods can be useful for addressing questions for which traditional statistical and epidemiological methods may not be adequate, for example, in small study samples or when there is conflicting or limited data, such as the reaction of substance abusers to testing positive to HIV. Qualitative methods can be used along with quantitative methods in addressing a research question, providing greater in-depth understanding of a researchable question, such as how an intervention affects and is experienced by a population.

The principal means for teaching qualitative research methods to fellows is a School of Public Health course, "Qualitative Research Methods" SB818. In this intensive semester-long course, fellows and other participants learn about qualitative research by carrying out a small qualitative research project. Articles from a range of sources complement the activities of formulating a project, recruiting subjects, performing interviews and beginning analyses. Dr. Liebschutz also conducts a monthly elective qualitative research-in-progress seminar focusing on qualitative methods that is open to all faculty and trainees in the Schools of Medicine and Public Health who perform or are interested in performing qualitative research. This seminar provides an environment for fellows and faculty to develop skills and critical thinking in qualitative research. In addition to group experiences, Dr. Liebschutz works with individual fellows as the methods expert in qualitative projects.

**Field Seminars on Research in Problems of Underserved Populations:** Since one of the great strengths of the research conducted by FM and GIM faculty is that it focuses on medical problems of underserved urban communities, we have instituted over the past two years a formal curriculum, directed by Dr. Liebschutz, on cutting-edge research issues in the community. The curriculum consists of didactic seminars combined with field trips to community-based service providers. Each session also includes cultural competency training in applicable areas. The topics include substance abuse, domestic

violence, homelessness, immigrant and refugee health, health of African-American young men, maternal and child health, and HIV/AIDS. The seminar leaders are divided between faculty from FM (Culpepper, Jack, Fowler) and GIM (Liebschutz, David, Samet, Saitz) as well as public health researchers (Rich). The field sites selected for visits have model health care delivery services and an interest in being locations for research projects.

The seminars are clustered towards the beginning of the fellowship year so that fellows may take advantage of potential research opportunities as early as possible. Dr. Culpepper, who has extensive experience in conducting research in community health settings gives an initial didactic seminar to discuss the investigator's role and responsibilities in conducting research in underserved communities in collaboration with community organizations. Each seminar/field trip consists of an hour lecture by a local researcher, a site visit, and then a follow-up discussion with the local researcher on future directions of such research. The lectures and post-visit discussion focus on designing and conducting research in the site.

**Primary Care Research Networks:** The Institute of Medicine (IOM), in its 1996 report, *Primary Care: America's Health in a New Era* noted the PBRNs "have been successful in the past and today offer the most promising infrastructural development the IOM study committee could find to support better science in primary care." Consequently, one of its three research recommendations was "that the Department of Health and Human Services provide adequate and stable financial support to practice based primary care research networks."<sup>6</sup> Primary care PBRNs have evolved over the last 35 years. They are constituted of practicing clinicians, who join together not for a single study, but to constitute a practice laboratory in which multiple studies are performed over time. Most networks, involve the participating clinicians in selecting and refining questions, in designing data collection methods, and in interpreting results.

In the United States a variety of networks have been created, including local ones linked to either a university or state academy chapter, regional networks, and national and bi-national networks. Over 60 local and regional networks have been started in recent years. Often these networks have collaborated to undertake large studies. Most PBRN activity is carried out with marginal compensation, although networks increasingly have been successful in obtaining federal NIH, CDC contract, and private foundation support.

From a research methods perspective, PBRNs have a number of strengths and weaknesses, some of which depend on the organizational characteristics of the network involved. We are fortunate that Dr. Larry Culpepper has developed practice based research networks (PBRNs) internationally over his career, and his doctoral thesis was devoted to the conduct of an investigation in 3 networks in North America, Netherlands, and the UK. He directs the primary care PBRN curriculum. This consists of a seminar in the Academic Conference for fellows in which fellows learn about primary care PBRNs and are introduced to the particular a PBRNs they might seek to work with. During the past year we had two Visiting Professors who lead two different primary care PBRNs spend two days together discussing their work and engaging fellows in thorough discussion of conducting research in the PBRN environment.

**Clinical Research Training Program at Boston University (CREST):** In 1999, the Boston University Medical School received a T32 grant from NIH to establish a Clinical Research Training program, (CREST) to improve clinical (non-laboratory) research training for fellows in all disciplines, including medical subspecialties, surgery, and

dentistry. The CREST program includes two components already a part of the FM-GIM Academic Fellowship Program: research methodologic courses at the BUSPH and supervised research under faculty preceptors. Faculty clinical investigators from across the medical campus discuss clinical research and methodology, citing examples from their own research and experience during a bimonthly noontime CREST seminar series attended by all FM-GIM fellows. CREST Seminars include topics such as issues in the use of human subjects, research ethics, grant writing, design of data collection forms, the Cochrane collaboration, and the assessment health status and quality of care. FM-GIM fellows benefit both from the content of the presentations and from the interaction with faculty and trainees who are outside of primary care, but who use similar methods and confront similar issues in their research as do primary care researchers.

**Academic Seminar** An important component of the fellowship training is the monthly Academic Seminar, coordinated by Drs. Friedman and Jack, where important topics that relate to the fellows' future academic careers are presented. The Academic Seminars topics are listed in Table 17.

<b>Session #</b>	<b>Topic (Instructor)</b>
1.	How to Perform Research (define areas of interest; define research questions; design a study; find collaborators, data bases, and other necessary ingredients; approach to the analysis) (Staff)
2.	Grant Writing I: How to Write and Critique a Proposal (Friedman)
3.	Grant Writing II: How the NIH Works (Culpepper)
4.	How to Use the Internet in Research (Friedman)
5.	Writing an Abstract (Friedman)
6.	Presenting a Poster (Freund)
7.	Presenting an Oral Abstract (Liebschutz)
8.	Large Group Presentation (Jack)
9.	Effective Scientific Writing (How to Get Your Paper Published) (Jack)
10.	Networking, and How to Thrive at National Meetings (Ash)
11.	Primary Care Academic Careers (Friedman and Culpepper)
12.	Preparing a CV and How to Look for a Job (Friedman)
13.	Triple Threats or How to Integrate Teaching and Research with Patient Care (Liebschutz)
14.	Serving as a Journal Reviewer (Jack)
15.	Using Primary Care Research Networks in Research (Culpepper and Jack)

**Fellows Research-in Progress Meeting “Fellows Report”:** The FM-GIM fellows meet as a group with Drs. Friedman, Jack, Liebschutz, Berlowitz and Chetty monthly to listen to prepared research-in-progress presentations by four fellows per session. Presentations are given at various stages in the life cycle of a research project including its conceptual, study design, data collection, analysis, interpretation, and presentation phases. The goals of the Work-in-Progress meetings are (1) to help the presenting fellow deal with particular research issues the presenter raises and issues identified by the other fellows and faculty, and (2) to give all fellows experience in formulating and expressing critiques and in responding to the critiques in a “give and take” manner. To this end, the

faculty encourage maximum fellow participation by letting the fellows present their critiques and letting the presenter respond, before the faculty offer their observations. This conference has been viewed by fellows as being very helpful in developing and conducting their research and in helping them improve their research presentation and commentary skills. Dr. Liebschutz coordinates this conference.

**Visiting Professorships for Leaders in Primary Care Research:** As part of their development as academic faculty, we expose fellows to national leaders in primary care research through a “Leaders in Primary Care Research” visitation program. Each academic year, two to three visiting faculty are selected from acknowledged FM and GIM research faculty nationally and internationally, including research oriented leadership of SGIM, STFM, NAPCRG, and AHSR. The Visiting Professors conduct a series of activities during their visits. These include (1) a seminar in which they discuss critical events in the development of their careers as primary care investigators, (2) a methods-oriented presentation of their current research, (3) presentations by FM-GIM fellows of their research with commentary by the visiting professor, and (4) mentoring of each FM-GIM fellow by the visiting professor regarding the fellows’ research, research interests and career plans. To facilitate the mentoring, we provide visiting faculty with brief biographical sketches of the fellows. Through this program, we expose fellows to national role models of successful career investigators, and feedback regarding their research and career plans from senior investigators outside our Program. In addition, we expose fellows to import themes and methods in primary care research. Drs. Liebschutz and Jack are responsible for inviting the visiting professors and setting up the schedule of their visits. See Progress Report for details of visiting professors 2001-present.

**Supervised Research Training:** The performance of research is an essential component of the research training and involves approximately forty-five percent of the Research Track fellow's time commitment (see Table 15). At the beginning of the fellowship program, we provide all fellows a booklet (to be incorporated into the Website) describing the background, research interests, ongoing research projects, and available research databases of participating GIM and FM faculty. This booklet helps the fellow identify faculty with similar interests who can serve as research supervisors. This assists fellows in setting up meetings with faculty to explore potential research collaboration.

During the first months of the Fellowship, the fellows devote considerable time to reading, formulating research ideas, meeting with faculty to discuss these ideas and meeting with the Program Directors to monitor their progress. By the fall or early winter, fellows generally define at least one viable research project and a faculty member to supervise it. By this time, each fellow has an overall Fellowship Program mentor who provides guidance in selection of the research project and a faculty preceptor for the project. Under the guidance of the research supervisor, the fellow refines the research proposal. In doing so, the fellow is likely to review additional scientific literature and consult with a number of faculty members.

The next step for the fellow performing research is to write a research protocol and submit it to his/her research supervisor for review. Once the proposal is approved, the research begins. The project may involve primary data collection or use of secondary data sets. The advantage of the latter for fellows is considerable. The effort of performing the study is likely to be significantly reduced if data collection is not required. Certainly the

duration of the project will be shorter, an important consideration in a two-year training program. Practically speaking, time and cost constraints will often limit the trainee to the performance of projects using secondary data or the performance of small-scale studies. Some research may rely on secondary data sources supplemented by limited data collection by the fellow. Fellows may also utilize data recorded in medical records and other non-computerized sources.

Whatever the method of data acquisition, the fellow is responsible, under the supervision of his/her research preceptor, for study design, data acquisition and manipulation, computer and statistical analysis, and the written and oral presentation of the results. At certain points in the process the fellow is asked to present a report of work-in-progress at one of the regularly scheduled Fellow Research-in-Progress meetings. The purpose is to assist the presenter by helping the fellow with particular research issues he/she is grappling with at a particular time. The presentation also exposes his/her research plan or preliminary results to scrutiny.

In conducting the research, the fellows will carry out tasks often performed by a research assistant in a funded project: data collection, data abstraction from clinical records, data coding, computer data entry and file manipulation, and computer programming for statistical analysis. We believe it is important for fellows to perform, under supervision, research assistant tasks so that they are aware of the steps required to perform research. In the long run this experience should enable them to better design future studies and better supervise research staff. Nonetheless, the faculty can provide their staff to assist the fellow, primarily by helping him/ her learn how to perform these research tasks. They may help in recruiting study participants, in designing data collection forms and in collecting data, etc.

At the conclusion of each research project, the fellow prepares oral presentations of the study in a short, research meeting presentation format, and/or in the poster presentation format also used at professional meetings. The purpose of this exercise is to give the fellows a realistic experience in scientific research presentation, and to prepare them for actual presentations of their research at professional meetings. Developing skills in written presentation of research is also critically important for the budding researcher. To prepare fellows for this task, Academic Seminar sessions are devoted to the subject including: (1) didactic presentations of alternative formats for presenting research information: the scientific abstract, journal article, review paper, book or monograph, or editorial, and (2) critiques of abstracts and journal-type articles written by fellows based on their research. The Research Literature Appraisal Course engages fellows in critical analysis of research articles in the medical literature. At the end of their training, we expect fellows to have written at least one abstract for each of their research projects. We expect them to prepare at least one article per project that is suitable for publication in a refereed journal within one year of graduating.

During the course of the Program, fellows in the Research Track are expected to conduct at least two research projects. (Fellows in the Education Track are required to perform only one scientific research project). The nature of the projects and their timing is subject to the approval by their mentor. These projects should involve different types of research methodology, topics, and preceptors. In general, we recommend that a fellow get a single project started as soon as possible after commencing the program and that consideration of a second potential project be delayed. However, some background

reading and consultation with faculty on the subject of potential second projects could be initiated earlier, as long as it would not detract from the principal objective of successfully initiating the first project. Once the first project is well on its way, the fellow can begin planning for the second, while simultaneously carrying out the first.

In helping fellows choose their research projects, their mentors will prioritize ones that address the needs of medically underserved, urban populations. The focus is on the care of individuals who live in the inner city, particularly special populations defined by ethnicity (minority), primary language (often non-English), culture (often foreign), and economic status (often poor). In their research projects, fellows will gain experience in performing research involving such populations, addressing the important health issues confronting these populations, and using research methods appropriate to the populations.

Part of the requirements for the research project for Research Track fellows is development of a grant proposal based on a research project. Fellows have two sessions on grant writing in the Academic Seminar series. By the beginning of the second year of fellowship, Research Track fellows meet with their mentor to decide on which project to base a grant proposal. Then the trainee, under the guidance of the research supervisor, writes a grant proposal. Ideally, the fellows will write a proposal that is submitted for funding (especially for a K award), but that is not a requirement. One of the 2002 graduating fellows secured a K award shortly after graduation based on the grant proposal he wrote during his fellowship. The principal purpose, however, of the grant writing exercise is to familiarize fellows with the grant-writing process under the supervision of faculty who have experience in obtaining grant funding.

**Non-Research Training Curriculum:** An important objective of the Research Track in the FM-GIM Academic Fellowship Program is to maximize the amount of time the trainee devotes to research training. However, we believe that research-oriented faculty also need some non-research training during their fellowship in (1) *pedagogical skills* and (2) *management skills*. Fellows rarely have had formal training in teaching methods or have had supervised teaching experiences prior to their fellowship. At a minimum, a successful investigator has responsibility, to train the investigators of the future. Many will also be engaged in some clinical teaching or supervision during their careers. It is also important to learn management skills such as personal time and work management, project and staff management, program administration, and budget preparation and financial management. Thus, the need to protect the research-oriented trainee's time so that he or she can pursue research and research training should be balanced against the value of training in teaching and management methods. This can be adequately served in the Program by a time commitment of not more than 10% to the development of pedagogic and management skills. The pedagogical skills and management training are described in the following sections.