

---



---

 PERSPECTIVES

## Building a Research Career in General Internal Medicine

### A Perspective from Young Investigators

*Marshall H. Chin, MD, MPH, Kenneth E. Covinsky, MD, MPH, Mary McGrae McDermott, MD, Eric J. Thomas, MD, MPH*

The intellectual and emotional rewards of a research career in general internal medicine remain powerful, but it has become increasingly difficult for junior faculty to survive in this era of national funding cuts and local institutional cost containment. Although senior investigators have systematically reviewed the general issues involved in starting a research career,<sup>1,2</sup> much practical advice for young faculty is handed down only by word of mouth. Moreover, there has been little input from young investigators. Therefore, as four junior investigators, we have pooled together the advice we have received and the lessons we have learned from the “school of hard knocks” to help others begin their research programs. As the art of writing an article has recently been reviewed,<sup>3</sup> we focus on three other topics essential to any new investigator: general rules of survival, mentoring, and grant writing.

#### GENERAL RULES OF SURVIVAL

Through our early successes and failures, we have found the following five rules to be helpful guides. These rules are not meant to be a cookbook, and we urge readers to be opportunistic and flexible when considering them.<sup>4</sup>

---

*Received from the Section of General Internal Medicine, University of Chicago, Ill. (MHC); Division of General Internal Medicine, Case Western Reserve University, Cleveland, Ohio (KEC); Division of General Internal Medicine and Department of Preventive Medicine, Northwestern University Medical School, Chicago, Ill. (MMM); and the Division of General Medicine and Primary Care, Brigham and Women's Hospital, Harvard Medical School, Boston, Mass. (EJT).*

*Presented in part at the annual meeting of the Society of General Internal Medicine, Washington, DC, May 2, 1997.*

*Dr. Chin is supported by National Institute on Aging Geriatric Academic Program Award 5K12-AG00488, Dr. Covinsky is funded by National Institute on Aging Mentored Clinical Scientist Award 1K08AG00714-01, and Dr. McDermott is a Robert Wood Johnson Generalist Physician Faculty Scholar.*

*Address correspondence and reprint requests to Dr. Chin: University of Chicago Medical Center, Section of General Internal Medicine, 5841 South Maryland Ave., MC 2007, Chicago, IL 60637.*

#### Rule 1: Know the Rules

Know what is expected of you. One hopes you will be told, but frequently you will have to ask. Your division chief, department chair, and members of your institution's promotion and tenure committee will generally be good sources for this information.

Directly ask how your success will be judged. Possible questions are, “What do I need to do over the next year to demonstrate that I am productive?” “How many publications do you expect me to have?” “When do you expect me to have my first grant?” These conversations should occur at or before the time you start your position. They should be repeated perhaps every 3 months in your first year, and every 6 months thereafter.

Actively inform your busy division chief and department chairperson about what you are doing. Before a meeting with them, send a brief memo to inform them of your clinical and research activities. Let them know about papers and grants you are preparing or have submitted. As a junior faculty member, your curriculum vitae will often not fully reflect your accomplishments of the previous 2 to 3 years.

At most institutions, there are two critical junctures at which your work will be evaluated. After two to four years, your division and department will assess your prospects for long-term success and decide whether to keep you on a research track. You must have concrete evidence of productivity by this point. Among questions they will ask are, “Are you doing work that has the potential to make an important contribution to the field?” “Are you on a path that makes it likely you will be funded as an independent investigator?” “Is it likely you will meet the criteria for advancement or tenure?”

The second critical point generally occurs after seven to nine years, when you are considered for reappointment or tenure. Generally, you will need to have a substantial publication record and demonstrate the ability to fund your work. The number of required publications varies. Approximately two first-author publications per year seems to be a reasonable minimum goal. Some institutions try to assess the quality of your publications, while others only pay lip service to quality in this area. Some institutions will consider all publications, in which case the number

of publications expected will increase, while others will consider only publications on which you are the first or senior author.

## Rule 2: Show Productivity Early

If your bosses are not convinced early that their huge investment in you is worthwhile, they may try to cut their losses. We have found several ways to demonstrate productivity early in your career.

**Finish Projects As Soon As Possible.** Completed and published fellowship projects will be early proof to people that you can bring a major task to completion.

**Attach Yourself to Existing Projects.** Existing projects leverage your productivity in two ways. First, you can use the existing project infrastructure and patient populations for your own data collection. This can mean completing your data collection several years earlier than you otherwise would have at much lower cost.

Second, existing projects can provide data that you can analyze and publish. This is a win-win situation for both the junior investigator and the senior investigator who controls the data. The junior investigator gets a first-author publication, and the senior investigator gets to be senior author on a paper that would have otherwise gone unpublished.

**Make Yourself a Local Expert.** Develop a reputation as the local expert in your area of interest. Learn about the clinical and methodologic nuances in your research areas. Volunteer to demonstrate your expertise in high-profile activities such as grand rounds.

**Apply for Pilot Grants.** Although pilot grants do not provide much money, they are indicators of your ability to get larger grants.

## Rule 3: Focus, Focus, Focus

Focusing your research on one question or theme enhances your chances of producing a body of work that is a significant contribution. Focusing also makes it easier to write competitive grants, and it increases your likelihood of being viewed as an expert. To help focus, we suggest the following considerations. First, limit your number of minor projects. Minor projects distract you and make it difficult to complete major projects. Second, devote most of your time to your own work. This does not mean you cannot selectively involve yourself in other people's work. Collaborations can be fun and sometimes lead to other opportunities. Nonetheless, you need to show first-author publications.

Third, learn to say no to most other commitments. Never say yes immediately to substantial requests for your time. Rather, say that you will think about the commitment and get back to the asker. Learn to feel comfort-

able saying no because, "I am working on a paper that needs to be finished," "I am working on a very important grant application," or "My chief or mentor told me I cannot." Document every single teaching, clinical, and committee responsibility to demonstrate that you are a team player carrying your fair share of the division's work.<sup>5</sup> Finally, write down daily, weekly, monthly, and long-term goals. Develop a research portfolio within your area of focus. Include large and small projects, high- and low-risk studies, and long and short time horizons. You will use your time much more effectively if you think explicitly about what you need to accomplish.

## Rule 4: Know Your Resources

Besides your time and skills, your most important resource is other people. Talk to the important players at your institution early. Who else is doing projects that you could get involved in? Who has data you can use? Who has pilot project money? Much of the work general internists do is multidisciplinary and collaborative. Seek sociologists, anthropologists, economists, statisticians, subspecialty physicians, and nurses. Find one or two colleagues who will critically review drafts of your papers and grants. Do not overlook the skills and support that other junior investigators can supply.

## Rule 5: Good Ideas Are Key

Good ideas are the key to great papers and successful grant applications.<sup>6</sup> However, we have found that our ideas need nurturing, and that the best way to develop good ideas is by talking about them as much as possible. Share germinating thoughts with colleagues, ask others to read early drafts of grants and papers, and present your work at research-in-progress conferences, even if this is painful at times. Good ideas do not have to belong exclusively to you. If your mentor or a senior colleague has a great idea that they are willing to give to you (a grant idea, or an idea for further data collection on their existing project, or analysis of existing data), and it excites you, you should run with it.

## MENTORING

The relationship with a mentor can be the most important and rewarding component of a junior faculty member's career.<sup>7</sup> By working together and fulfilling mutual obligations, one learns the "rules" of academia, develops thinking and writing skills, and becomes an independent investigator. Unless you already have significant research experience, you will not go far without a good mentor.

The following advice emanates from the classic model of a one-to-one, long-term relationship between mentor and mentee. However, most of this information could be applied to the just as common, and in some cases prefer-

able, situation of having several mentors who play different roles. For example, it may be helpful to identify a junior mentor in addition to a senior mentor. The junior mentor is someone 2 to 3 years ahead of you who can provide practical advice and encouragement.

### Choosing a Mentor

The mentor-mentee relationship should be symbiotic. The mentor provides the junior faculty career advice, tips on time allocation, transmission of the "rules" and culture of academia, political advice, protection of the mentee's time for research, creation of opportunities, and methodologic advice. In return, the junior faculty provides the mentor with initiative, responsibility, creativity, honesty, feedback, respect for the mentor's time, and prompt responses to the mentor's advice and requests. Beware of entering a relationship that is only beneficial for one of the partners. If you and your mentor are not willing to live up to a similar list of obligations, then find a new mentor.

In choosing a mentor, you must have a high degree of self-awareness. Your personality, emotional needs, and work habits can be as important as the research topic. Are you someone who needs a lot of praise and positive feedback? Then find a mentor who is willing to meet frequently, who is supportive, warm, and comfortable giving constructive criticism and praise. Also, consider whether there will be ideological, religious, gender, racial, cultural, or personality barriers.<sup>8-10</sup> You also may want to consider whether you will enjoy spending time with this person. If you have mutual interests outside of medicine, or perhaps a common sense of humor, your relationship may be more enjoyable.

In choosing a mentor, take into consideration your professional skills. For example, you may need someone with the time and interest to read and edit every sentence of your papers and grants if your writing skills are not adequate. You may also want to consider whether there are methodologic skills that certain mentors, or a statistician, epidemiologist, economist, or other expert on their team, could provide to help with your research agenda.

Finally, identify potential mentors by their research interests. Read the articles and grants they have written. Note the journals they publish in and the sources of their research funding. Do you find their work interesting? Can you complement their research agenda? Remember that you need to give something in return.

Be wary of entering a relationship with a mentor who has not trained junior faculty. It may only be that they have not had the opportunity, but it may also be that previous relationships were unsuccessful. If they have mentored junior faculty, carefully examine the careers of these physicians to determine the path you might be on in 5 to 10 years.

You should also make sure the potential mentor is senior and secure enough to allow you to develop your own ideas. You can get a sense of this by looking at the

careers of past mentees, but you should also directly ask previous or current mentees about this. Find out who has been the first author on papers. If you are going to work on a larger project of theirs, find out if they will give you some feeling of ownership and control, or if they will be making all the decisions. Also, do not forget that choosing a mentor may mean choosing a larger group of people to work with—other junior faculty, statisticians, and other study personnel. Will you enjoy working with them, too? Even though the mentor may be secure and welcoming, some of these other people might feel threatened by your presence.

Also find out if a potential mentor has enough time to do the job. Ask current mentees because a previous mentee may not be aware of the mentor's current obligations. Ask how long it takes the mentor to comment on a manuscript or memorandum, how long it takes to get an appointment with him or her, and whether the mentor is always doing two or three things simultaneously. Directly ask the potential mentor how often he or she can meet with you.

Given the relative shortage of senior mentors in general internal medicine, consider choosing a mentor outside your division or outside your institution. It might be more difficult to communicate with an offsite mentor, and such a mentor will be less capable of protecting your time and providing advice about your institution. However, a mentor from another institution may be exactly the right person for you. In addition, given the instability of many hospitals in this competitive health care climate, it could be advantageous to have mentors at other institutions if your medical center undergoes dramatic change.

### Developing and Maintaining a Relationship

It is crucial to communicate frequently and effectively with your mentor. There should be dedicated one-on-one time at least every other week, but do not discount opportunities to talk to your mentor that arise in the hallway, on the way to a meeting, or in a meeting with a larger group. Seek the most effective mode of communication. For example, memoranda help organize your thoughts, improve your writing skills, provide a clear record of what you have been doing, and are more convenient and efficient than meetings. However, meetings are necessary for the discussion of intellectually complex or emotionally charged issues. In contrast, electronic mail is perfect when it is important to have rapid feedback on a matter that is objective and straightforward. Telephone conversations might be preferable when you need quick access to your mentor but the issues are more complicated. All these methods can be effective and complementary.

We have found that it is possible to become too casual about communicating with our mentors after we have been working together for awhile. Take the responsibility to actively manage your relationship by continuing a regular meeting schedule with frequent opportunity for self-assessment and feedback. Look for weaknesses in your relationship and try to change them.

Do not fall into a pattern of always deferring to your mentor's opinions or not putting forth your own projects and papers. Make sure that your ideas are thoroughly considered by your mentor, but be respectful and use common sense. Busy mentors may not hear you the first time so you may find it necessary to raise a topic at a later date or present it in a different way.

Realize that such efforts may lead to disagreements about your work, and that "constructive" criticism may cause bruised egos and hurt feelings for either the mentor or mentee. If this happens, stay calm and do not act in the heat of the moment. Think carefully before disagreeing with your mentor. Write down your concerns and share them with a colleague, partner, or other mentors, and seek out other junior faculty to compare experiences and provide perspective. Remember that academics, especially academic general internal medicine, is a small world, and your reputation for working with others may carry as much weight as the publications on your curriculum vitae.

Finally, develop a plan that leads to your independence or to a more collegial relationship. Specifically, this could mean writing grants and papers with other colleagues, or with your mentor as a coinvestigator and you as the principal investigator. You could also consider developing new lines of research that do not involve your mentor, or even involve moving to another institution.

## GRANT WRITING

Obtaining research funding is necessary for tenure and promotion in an academic research career. To write grants successfully, you must think through each detail of the research protocol and convince reviewers of the merit of your ideas.<sup>11</sup> The following advice summarizes aspects of grant writing that we have found most helpful.

### Identifying Funding Opportunities

Mentors and colleagues are often your best resource for targeting funding opportunities. However, we have also found the Internet to be useful for identifying extramural funding opportunities (Table 1).

### Intramural Versus Extramural Funding

Intramural grants provide experience writing grants and helpful pilot funding for getting research programs

started. These applications tend to be relatively short and are usually less competitive than extramural funding sources. The resultant data may be used in later extramural grant applications to demonstrate your ability to carry out the proposed research.

It is usually necessary, however, to obtain extramural funding for promotion and tenure. Extramural grants are more competitive, but typically provide more money for longer periods of time than funding obtained from intramural grant applications.

We have found career development awards to be especially valuable sources of extramural funding during the first several years of our careers. Many of these awards are specifically designed to protect research time, and they are sometimes less competitive for junior faculty members than other funding sources. Career development awards are offered by the American Cancer Society, the American Heart Association, the National Institutes of Health (NIH), the Robert Wood Johnson Foundation, and others.

### Hospital Funding Sources

Increasingly, hospitals are providing funds for quality improvement studies. If you are asked to do research supported by these funds, inquire whether the work will yield generalizable and, hence, publishable results. It is inevitable and acceptable that some of the work done with internal funding will be unpublishable, but try to make at least half of this effort go toward publishable work. Other potential advantages of quality improvement funding are that the work could generate ideas for grants, and through this work you may become more valuable to the institution. However, these quality improvement responsibilities may consume time that could otherwise be devoted to your own research projects.

### Getting Started

Begin your grant application early. For example, it took one of us 6 months to write a career development award, and another one of our grants was funded 2 years after initial submission because of required revision and resubmission. Read the grant instructions and the funding agency's brochure or program announcement early on. Highlight the aspects of your grant proposal that are consistent with the objectives of the funding organization. Obtain copies of successful grant applications from your

Table 1. Internet Addresses for Funding Sources

Funding Category or Agency	Internet Address
Foundation Center	<a href="http://www.fdncenter.org">http://www.fdncenter.org</a>
NIH World Wide Web address	<a href="http://www.nih.gov">http://www.nih.gov</a>
Agency for Health Care Policy and Research Grantsweb	<a href="http://www.ahcpr.gov">http://www.ahcpr.gov</a>
	<a href="http://web.fie.com/cws/sra/resource.htm">http://web.fie.com/cws/sra/resource.htm</a>

mentor and colleagues. In addition, NIH will release copies of recently funded research projects on request. Read these successful applications to determine how grantees presented their ideas and what arguments they used to convince reviewers of the importance of their study.

After reading the instructions and thinking through your proposal beyond the rudimentary stage, do not hesitate to call the appropriate program officer at the funding agency. Program officers convey the funding agency's objectives, delineate what the grant review committee is looking for, answer specific questions about the application, and let you know if your idea is promising.

### Specific Aims Section

We initially underappreciated the importance of the specific aims section of the grant application in which the research questions and hypotheses are outlined. If this section is not well written, nothing else in the grant will save you. Ensure that each specific aim represents a well-focused and explicit research question. As the methods section is written, keep referring back to the specific aims to ensure that the specific aims and methods sections are consistent.

The specific aims section should be written as if it is the only section reviewers will read. Most grant review committees consist of 8 to 15 reviewers, 2 or 3 of whom are generally assigned to a particular grant proposal. Reviewers may not have time to read in detail the proposals to which they were not assigned. Most reviewers will read the specific aims section, however, and it is therefore important to clearly communicate the research questions and their importance in the specific aims.

### Methods and Preliminary Data Sections

Convince the reviewers that you and your team are capable of carrying out the research. Show pilot data that demonstrate your experience with the proposed techniques. Pilot data need not be published, and it may be appropriate to describe pilot data from your mentor that demonstrate his or her capacity to help you complete the project. Include a conceptual framework.

Specify why the chosen methods and study population are the best for your project. Compare and contrast alternative methods to convince reviewers that the selected design is the best. Ensure that the statistical methods are appropriate for the proposed research questions and data collected. If special statistical techniques are required, recruit a statistician with the relevant expertise for your team and get him or her involved early.

### Promoting the Research Proposal

Market or promote the research proposal. Reviewers must be convinced of the importance and timeliness of the research. Include a sentence or two in your specific

aims section on the significance of the research. If the proposed project will lead to a reduction in health care costs, include this statement in the proposal. Sprinkle summary statements stating the significance of the work throughout the proposal. These statements can be bolded or underlined for reviewers who may be skimming the proposal.

### Finishing Touches

A professional-appearing proposal will help convince reviewers that you are conscientious and meticulous. It is better to shorten the proposal than to submit an application with tiny print and crammed writing. Tables, figures, and project timelines often illustrate important components of the research proposal clearly and conserve space.

Obtain a list of the reviewers who will read the grant application. Anticipate reviewers' criticisms and address them within the proposal. Assume that the reviewers will identify all weaknesses in your proposal and offer potential solutions. Discuss potential alternative methods if your research does not proceed as planned. Cite the reviewers' own work when appropriate.

### Do Not Get Discouraged

Competitive grant applications such as NIH R01 awards are unlikely to be funded on the first submission. Do not be discouraged. If it appears that the study section found your research questions important, respond to their criticisms and resubmit the application. It is also a good idea to develop more than one grant application simultaneously. By always working on a grant proposal, one can help ensure a steady stream of funding.

## SUMMARY

To survive academically in a clinician-investigator track, junior research faculty must develop a focused, independent program of investigation that addresses important questions with creative, valid methodologies. Appreciation for the rules of the game, good mentorship, and effective grant-writing skills are invaluable in making the transition from new faculty to established investigator. Although we strongly believe that young researchers should study the issues they passionately care about, we hope that knowledge of these guidelines will make it easier for them to balance practicality with idealism.

---

*We thank our mentors and colleagues who have helped us learn and develop many of the ideas in this article.*

## REFERENCES

1. Applegate WB. Career development in academic medicine. *Am J Med.* 1990;88:263-7.

2. Goldman L. Blueprint for a research career in general internal medicine. *J Gen Intern Med.* 1991;6:341-4.
3. Welch HG, Froehlich GW. Strategies in writing for a physician audience. *J Gen Intern Med.* 1996;11:50-5.
4. Bland CJ, Schmitz CC. Characteristics of the successful researcher and implications for faculty development. *J Med Educ.* 1986;61:22-31.
5. Fisher R, Ory R. *Getting to Yes: Negotiating Agreement Without Giving In.* Boston, Mass: Houghton Mifflin Company; 1981.
6. Kahn CR. Picking a research problem: the critical decision. *N Engl J Med.* 1994;330:1530-3.
7. Schapira MM, Kalet A, Schwartz MD, Gerrity MS. Mentorship in general internal medicine: investment in our future. *J Gen Intern Med.* 1992;7:248-51.
8. Levinson W, Kaufman K, Clark B, Tolle SW. Mentors and role models for women in academic medicine. *West J Med.* 1991;154:423-6.
9. Ochberg RL, Barton GM, West AN. Women physicians and their mentors. *J Am Med Women Assoc.* 1989;44:123-6.
10. The American College of Physicians. Promotion and tenure of women and minorities on medical school faculties. *Ann Intern Med.* 1991;114:63-8.
11. Cuca JM. NIH grant applications for clinical research: reasons for poor ratings or disapproval. *Clin Res.* 1983;31:453-63.



## ANNOUNCEMENT

### **SGIM Website**

Please visit the Society of General Internal  
Medicine on their World-Wide Website.  
SGIM is located at

**<http://www.sгим.org>**