



Fighting Heart Disease and Stroke

American Stroke
AssociationSM

A Division of American
Heart Association

Mentoring Handbook

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INTRODUCTION

The American Heart Association (AHA) is highly aware of the importance of fostering the development of cardiovascular disease and stroke early career investigators and clinicians. Not only does this important group of people represent the future of cardiovascular science, but they are also the future leadership of the AHA.

The AHA has a variety of educational and mentoring programs, research and travel awards, and research grants designed specifically for early career clinicians and investigators. The AHA Early Career Investigator/Clinician Task Force identified mentoring as a key area for improvement. It is generally agreed that in every field, but perhaps particularly in the sciences and medicine, a good mentor-mentee relationship can exert a positive influence. This is especially true for individuals early in their careers.

It is clear that mentoring requires effort and collaboration. Because of the importance of mentoring, the Early Career Investigator/Clinician Task Force convened a workshop on this topic that consisted of key volunteers and staff. The discussion at the workshop drew on strengths and experiences within the AHA, derived from the annual Epidemiology Ten-Day Seminar, the biennial Hypertension summer school, and other events. This handbook is the outcome of the workshop and focuses on general and specific aspects of the mentor-mentee relationship, concerns for clinical science, basic science, population sciences, and women and minorities in the areas of cardiovascular disease and stroke.

This handbook contains useful information for mentors and mentees and provides general career advice and tips for both. We hope that this handbook will assist future generations of AHA members in their career development.

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"I owe much of my career success to the patient and friendly mentoring that I received over the years."

—Joseph S. Alpert, MD, FAHA



THE MENTORING RELATIONSHIP

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A mentoring relationship is often seen as an essential step for achieving success in politics, business, and academia. In her best-selling book, *Passages*¹, Gail Sheehy observes that “all the studies agree that the presence or absence of such a figure [ie, a mentor] has enormous impact on development [of the mentee]....[and] offers a critical leg up.” The studies reported in *Passages* document the developmental handicap that a junior professional incurs if a mentored relationship is lacking. Indeed, most successful people in different areas of human endeavor can point to an individual or mentor who was crucial to their career growth and success. The problem is that most early career clinicians and investigators are not aware of the value of a mentoring relationship.

This chapter will explain the essence of the mentor-mentee relationship and will conclude with some simple rules that may help to foster a successful mentored relationship. Our hope is that the early career clinician or investigator will be encouraged either to seek a mentor or to reexamine her or his existing mentored relationships.

The Mentor-Mentee Relationship

The mentoring relationship usually develops between an older professional, the “mentor,” and a younger colleague, the “mentee” (protégé). In Homer’s book, *The Odyssey*, Mentor was a trusted friend of Odysseus. When the latter was about to set out for the Trojan war, he entrusted Mentor with the care of his house and the education of his beloved son, Telemachus. From this epic poem came the Greek use of the word mentor to refer to a wise and faithful counselor or monitor. Today, we think of a mentor as someone who is both a counselor and a teacher and who instructs, admonishes, and assists a junior colleague in attaining success. Inherent in the background and structure of the word are the concepts of wise counsel, mutual respect, responsibility, instruction, discipline, and guidance.

What are the characteristics of the mentor-mentee relationship, and how does one distinguish it from simple career counseling, guidance, or instruction? The answer is simple in concept but complex in psychological overtones. Advising or counseling involves supplying information in a neutral fashion. Although the advice or information is given in a friendly manner, a bond does not usually develop between the supplier of the information and the recipient. Mentoring, on the other hand, implies some form of psychological bonding between the mentor and the mentee. The mentor develops a genuine interest in the mentee and feels rewarded with each success that the mentee acquires, which implies an emotional investment on the part of the mentor. The mentor not only supplies information and gives advice, but also offers critical support for the mentee during trying periods.

The mentor-mentee relationship is, in most instances, personal and almost familial in nature. The relationship is however, most successful when it does *not* recapitulate the parent-child connection. Instead, the relationship should resemble that of an older sibling or friend to a younger sibling or friend, to avoid the problems inherent in a parent-child connection. The relationship must be based on mutual trust, respect, and the expectation of hard work and dedication on the part of the

mentee and a commitment to furthering the career of the mentee on the part of the mentor.

Traditionally, the younger colleague has a single mentor. This is not always the case however, and many successful people report that they have had several mentors who have assisted them in their careers, either serially or simultaneously. In the simultaneous mentoring (mosaic) model, different mentors helped the mentee with various aspects of her or his career and even aspects of her or his personal and social life. For example, one mentor might aid the mentee in understanding the political climate of the institution or a particular organization, a second mentor might help with the purely professional aspects of the mentee's career, and a third might sponsor the mentee's introduction into society and to friends. Just as one can draw inspiration from several role models, the mentee can have several mentors interested in her or his career to provide counsel.

Does Everyone Need a Mentor?

It is a good rule in medicine, as in the rest of life, not to say "never," "always," or "everyone." Hence, to say that the only way for an individual to have a successful career is for that person to find an excellent mentor would be foolish. Indeed, some successful people have reached their career goals without a mentor. Although there are many ways to forge a successful career, most successful people will point to a mentor who helped them get to where they are. Even early career clinicians and investigators choosing a career in private practice or industry are now looking into groups with senior members who can serve as mentors.

How Does One Find a Mentor?

No hard and fast rules exist for finding a mentor. Often, the mentor-mentee relationship starts out as a boss-employee or teacher-student connection, which then develops over time into a mentoring relationship. This relationship often develops naturally between someone who is a senior faculty member

and a junior faculty member or trainee with the same research or clinical interests. At other times, a trainee or young faculty member is assigned a mentor by the hiring institution. By imparting knowledge, experience, and support, a mentor enables the mentee to develop skills much more rapidly than if this relationship is lacking. Institutions and organizations profit immensely from a mentored relationship, given that the abilities of the mentored junior employee mature rapidly. Hence, structured mentoring programs are being developed in many institutions and organizations. Some universities even require that such a relationship be spelled out before the trainee or junior faculty member is hired.

Sometimes however, the trainee or young faculty member hears about a successful mentor from friends and colleagues, approaches that individual for advice, and asks the individual to become a mentor. In choosing a mentor, the mentee not only should look for a person who has a track record of helping junior colleagues, but also should look for someone whom they trust, like, and respect. The best mentor may not be the most prominent or the most published senior faculty member. Likewise, a mid-career faculty member may be too involved in developing her or his own career to serve as mentor to a junior member. Another important general rule is for the mentor to be nearby. The mentee may find it difficult to obtain rapid feedback if the mentor is far away.



Although it helps to find commonalities with one's mentor, mentees should not limit themselves by looking for someone just like them. In particular, not enough women and minorities hold senior positions to serve as mentors for every potential mentee. Mentees should select a mentor on the basis of who is willing to become their advocate and help them with their research focus rather than on the basis of gender or ethnicity.

What to look for in a mentor:

- ~ *Respected*
 - ~ *Trusted*
 - ~ *Accomplished*
 - ~ *Accessible*
-



The Mentee

The mentor-mentee relationship is driven by the mentee. It is only successful insofar as the mentee is willing to take responsibility for and to take advantage of all that the relationship can offer. Imperative to this relationship is that the mentee should be proactive about asking for what she or he wants out of the relationship. A good mentor can anticipate the next step in the mentee's career, but no mentor is a mind reader. Below are ground rules inherent in the mentor-mentee relationship and certain tips to make the most out of the relationship.

Rules and Tips for Mentees

- The first ingredient to being a good mentee is self-awareness. At the start of your professional life, do some soul-searching. Understand your own personality and temperament, and realize that what may make your colleague happy may not make *you* happy. Don't head into a career path because you think that this is what is expected of you. Reflect on what drives you and what gets you up in the morning, and then take your cue from that.
 - Be open and honest with your mentor about your career goals, needs, and wants. Discuss requests that may seem inappropriate or counterproductive to your career. Find out how to ask for what you want and when to say no.
 - Respect your mentor. A mentee is privy to the inner workings of a mentor's laboratory and may witness private moments when the mentor is most vulnerable and lets her or his guard down. Do not gossip about your mentor or your mentor's team. Remember that you are part of that team, and anything bad you say about it undermines your mentor's ability to help you. Show loyalty. Maintain confidentiality.
 - Conduct yourself appropriately. Although some mentor-mentee relationships develop into long-lasting friendships, the relationship is, foremost, a professional one.
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- Act responsibly. A mentor-mentee relationship is personal and symbiotic; your actions reflect positively or negatively on your mentor. Make your mentor proud that you are on her or his team.
 - Prepare yourself when you meet with your mentor. Remember that her or his time is limited, as is yours, so make sure that that time is well spent.
 - Convey a sincere willingness and receptiveness to learn from your mentor. Avoid cynicism. The most difficult person to teach is one who already knows everything. Remember that you chose your mentor because she or he has more experience and wisdom than you possess at this stage in your career, and you would do well to tap into that resource.
 - Be open to criticisms. Don't fold in the face of disapproval. Take criticisms as gentle nudges to keep you on the right track. Ask for feedback from your mentor to improve yourself. Ask for an evaluation process.
 - Be fierce about your work. Develop a sense of self-worth.
 - Work hard, and be wholehearted about working hard. A successful career requires discipline and perseverance.
 - Obtain the best possible training. An institution may not be equally excellent in clinical medicine and scientific research. Depending on your goals, you may need formal training in clinical investigation or to devote time to developing skills in basic research. Position yourself for success, and never stop learning.
 - Develop and enhance your oral and written communication skills. A key ingredient to a successful career is the ability to communicate your thoughts and opinions with others. Take courses if you have to.

- Know your limitations and strengths. This is probably the most difficult tip to internalize. Know when you were successful in the past and build on those experiences. Look for similar opportunities. At the same time, look at those areas in which you may not have been the most successful. Everyone can develop a skill, but not everyone will have a natural talent for it. Go to the area where you can build on your strengths.
 - Be flexible and innovative. Know that plans change and road maps sometimes take a detour. Be adaptable, and don't be afraid to take chances with a new opportunity. Don't be afraid to set yourself up for a major discovery. However, to do so, you may need to avoid the crowds.
 - Understand that it is impossible to do everything and do it well. Delegate some responsibilities and realize that you may need to give up certain things. Decide what is important for your career and do it well.
 - Focus, focus, focus. Learn how to turn things off and focus on the task at hand. Manage your time wisely. Be efficient and well organized.
 - Build a support system around you. This includes not only your mentor, but also support from staff, secretaries, nurses, etc. They can make your life much easier. You cannot develop a successful career in isolation from others.
 - Network. Develop relationships with other faculty members within and outside your division or institution. Many research projects are now done not in the isolation of a laboratory, but are cross-disciplinary and cross-institutional. Therefore, interpersonal skills and the ability to work with others are valuable commodities.
 - Get involved with professional organizations both locally and nationally. Volunteer. Make yourself visible and known to senior members not only in your specialty, but also in other fields of cardiovascular medicine.
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- Do your own homework. As early as possible, understand the culture and structure of your institution. Know the career advancement options available and the criteria for promotion at your institution, and find out who will make decisions regarding your career or promotion. Pick visible leadership roles within your institution.
 - Develop a relationship with your chief. Learn how to promote yourself without alienating others. Let your chief know about your successes, that grant you got, and your latest publication. Learn the skills of self-advocacy and healthy competitiveness. Keep track of your academic accomplishments.
 - Create opportunities for your mentor to help you. Take the initiative. Ask for your mentor's help to be considered for specific opportunities that would contribute to your career success.
 - Once you are entrusted with a task, ensure that you deliver and deliver well. Make the most of each task. Make certain that the work you do is of the highest quality. Follow through on commitments.
 - Know when to end the formal mentoring relationship. Usually this occurs naturally, when the mentee or mentor leaves the institution. It is better, however, if the mentor and mentee can maintain a relationship at the level of colleagues or friends.
 - Keep a healthy perspective about your work. Have fun and take time off. This will prevent the "burn-out" factor. A relaxed and happy mind is also the most open to new ideas.

One final piece of advice for mentees is to realize that *you* need to take responsibility for your own career. Your mentor can only point the way. You will need to make the final decisions, and the final actions are your responsibility. Although a mentor can help guide you to define your goals, ultimately, only you can define success for yourself.



The Mentor

A mentor gives advice, counsel, and psychological support to the mentee. Compared with advising, mentoring implies a long-term relationship with advice and support that may vary as time passes. On the other hand, advising is usually transient and related only to a single moment in time. A mentor makes a long-term commitment to further the professional and at times personal development of the mentee.

The mentor must bear in mind that this relationship is critical to the professional success of the early career clinician or investigator. Therefore, a definite time commitment is required, as is persistence, and careful, attentive listening and communication. Most mentor-mentee connections are highly satisfactory if the two individuals meet for an hour every week or every other week. Some mentees require many hours of hands-on counseling, whereas others are highly successful with less nurturing. The successful mentor recognizes those individuals who need more attention and supplies the time and effort to guide the mentee as required.

The mentor must respect, support, and teach the mentee. She or he must observe and understand the mentee both professionally and personally. The “good” mentor is aware of the mentee’s long-term career and personal goals and assists the mentee in achieving these goals. The good mentor also gives timely, appropriate, and useful feedback on skills, successes, and failures. Admonishment is delivered in a way that is not psychologically damaging to the junior colleague. Positive qualities in a good mentor include trustworthiness, honesty, and a healthy dose of “emotional intelligence” or empathy. A mentor also helps to sponsor the mentee in the professional world and assists in problem solving; the mentor may even help the mentee to find employment. Finally, the mentor should be a professional and personal role model for the mentee.

Good mentors:

- ~ *Respect the mentee*
 - ~ *Teach the mentee*
 - ~ *Provide useful feedback*
 - ~ *Make themselves accessible*
-

One of the best summaries of the many roles played by a mentor comes from Morris Zelditch², who characterized the relationship as follows: “Mentors are advisors, people with career experience willing to share their knowledge; supporters, people who give emotional and moral encouragement; tutors, people who give specific feedback on one’s performance; masters, in the sense of employers to whom one is apprenticed; sponsors, sources of information about and aid in obtaining opportunities; and models of identity, of the kind of person one should be....”

The “bad” mentor (sometimes referred to as a tor-mentor) misinterprets the mentee’s potential, fails to define appropriate professional and personal limits, and may even take credit for the mentee’s work. Other qualities of the bad mentor include inappropriate praise or criticism, disregard for the mentee’s opinions, and other types of unethical and, rarely, immoral behavior. Major negative qualities include exploitation, secrecy, and dishonesty.



Rules and Tips for Mentors

- Respect your mentee; do not infantilize her or him. Maintain the same confidential relationship that you would want if the roles were reversed.
- Listen to the opinion of your mentee. Often imaginative, creative ideas come from junior colleagues.
- Act responsibly; remember that your actions could destroy your mentee's academic career.
- Maintain cultural and gender sensitivity for your mentee.
- Strenuously avoid open or covert sexual connections with your mentee.
- Review the long-term goals of your mentee and help her or him to develop career plans appropriate for her or his goals and skills.
- Help to protect your mentee from excessive institutional demands, such as participation in an excessive number of committees.
- Provide your mentee with advice about "career enhancing" and "career killing" initiatives.
- Help your mentee navigate the shoals of institutional and professional politics.
- Inspire your mentee to overcome negative aspects of the work environment.
- Help your mentee to develop effective oral and written communication skills.
- Challenge your mentee to maintain professional and personal flexibility and fluidity.

- Inspire and challenge your mentee to become the very best professional that she or he can be.
- Assist your mentee in finding appropriate professional employment.
- Finally, rejoice in the successes of your mentee. These triumphs only can enhance your own standing.

Why Should One Consider Being a Mentor?

Besides the personal satisfaction that derives from such a close and personal human relationship, mentors obtain a number of professional benefits. Mentees often become life-long friends and colleagues. Good mentees are constantly challenging their mentors, thereby enabling both mentor and mentee to stay on top of new developments in the field. The best mentors also attract the best mentees, who help to further the standing of their mentors. As mentees go out into the world, they expand the professional network of their mentors. Finally, mentees remember their mentors, thereby keeping their memory alive even after their mentors have retired or died.

How Should the Mentored Relationship End?

Firm rules are difficult to apply here. Some of these relationships end gradually as the mentee achieves success and independence; eg, the mentee gains independent grant support or moves away from the institution. Other relationships continue over the mentor's and mentee's entire academic careers as both individuals move up the academic ladder. Often, the mentor fosters the promotion of the mentee to higher positions within the academic establishment, and the relationship gradually attenuates. What is important is to maintain open communication about the direction of the relationship.

Occasionally the mentoring relationship does not work or has ceased to become of value. Again, open and honest dialogue between the mentor and mentee is appropriate. Attempt to seek solutions to any problems, and use formal mediation if the problems are particularly difficult to resolve. Outside counseling sometimes can assist in improving a mentor-mentee relationship that is not working.

Keep written documentation of each discussion: problems discussed, problems resolved, and problems not resolved. Try to avoid confrontation; negotiation is always a better strategy. Arrive at a plan for remediation or discontinuance of the relationship. If the relationship is discontinued, try to part as friends. Get advice from the Human Resources Department or even legal advice if necessary.

Mentoring Environments and Resources

Mentoring Environments

The specific circumstances in which a mentoring relationship might exist and the resources optimally needed to support such a relationship vary considerably. In the academic world, many formal programs are established at universities or medical schools for mentoring young faculty members. Most universities specifically address the need for effective mentoring and require formal mentoring of new faculty by senior faculty members. In these settings, the mentoring relationship is organized toward ensuring the successful launching of a faculty career and supporting effective career development.

A worthwhile mentoring relationship also can develop between a member of the teaching faculty and a medical resident or clinical fellow. This relationship may not be a formalized mentored relationship, but the trainee does need sustained, supportive, and perceptive mentoring as she or he defines her or his career aspirations. With diverse lecture and practical learning experiences, the trainee may have only episodic exposure to individual faculty members. Hence, it may be ideal

for a trainee to initiate a long-term mentoring relationship early in training that then could be sustained throughout the mentee's career. However, such single mentored relationships are hard to come by, and it is more common for trainees to call upon a variety of faculty members for ad hoc or goal-specific mentoring advice.

The need for effective mentoring, however, is not limited to the traditional academic setting. Young physicians initiating their own clinical practices can be mentored effectively by colleagues and experienced associates. The obvious benefits of junior associate mentoring have contributed to the evolution of multiperson and even multispecialty professional groups. Early career clinicians and investigators entering a new professional environment should take full advantage of the professional and personal insights available from other, more senior associates in a successful and well-functioning clinical practice.

Resources

The American Heart Association (AHA) and other cardiovascular specialty groups have established a number of specific mentoring opportunities aimed primarily at early career clinicians and investigators. AHA sponsors an Early Career Development Program immediately preceding the Annual Scientific Sessions meeting. This program is directed at early career clinicians and investigators and is intended to include all of the diverse medical specialty groups that come under the umbrella of the AHA. Representative sessions include "How to Find and Work with a Mentor," "How to Advance One's Career in Academic Research (Basic, Clinical, or Population-Oriented)," "How to Enhance One's Likelihood of Being Funded," "How To Balance the Demands of Surgical Practice and One's Personal Life," etc. The AHA also hosts a Cerebrovascular Early Career Development Forum at the annual International Stroke Conference. This program provides a platform for early career investigators and clinicians to network and share ideas, build relationships with senior investigators and other science mentors, develop career paths and receive planning guidance from Stroke Council members. The AHA Research Committee also sponsors

a symposium targeted to National Research Program awardees in the final year of their Scientist Development Grant and/or Established Investigator Grant. Additionally, several councils, such as the Epidemiology Council, the High Blood Pressure Council Conference, and the Interdisciplinary Working Group on Quality of Care Outcomes, also sponsor special programs at the annual meetings to foster mentoring opportunities.

Other important mentorship opportunities exist. The National Institutes of Health (NIH) has an annual program for the Public Health Service Fellows participating in the NIH intramural research program. Other organizations, such as the Association for Women in Science, have been developed largely to support and mentor young women scientists. All of the AHA councils provide their members with opportunities to participate in the large array of council-sponsored works that provide excellent opportunities for young clinicians and investigators to develop additional specific expertise and expanded professional relationships. A number of association, academic institution, and business world websites are devoted to a description of or instruction in effective mentoring.

*For more on the AHA and its councils and awards,
please refer to the Appendix.*



Summary

Support for those who choose to pursue a biomedical career, either in a clinical or a research-oriented field, must be sponsored effectively by those already working in medicine and the biological sciences. In an environment in which a single decade can change diagnostic and treatment paradigms along with research goals, those who are new to the field need the guidance, support, and direction of those who have gone before them. Even if individual researchers can be identified as personally responsible for great advances, it really has been teams of teachers, investigators, clinicians, and other biomedical scientists who have reached major achievements in modern cardiovascular medicine. Young people who are just now considering biomedicine or are in the early stages of their careers represent the future of cardiovascular care and continued cardiovascular advancement. Mentoring is key for their career development. Mentoring is, in fact, a form of collaboration between generations in medicine, and advances have occurred because senior physicians and scientists shared their experiences and acquired insights and wisdom with those following. This model has worked well in the past and is a model that we should emulate and enhance constantly.

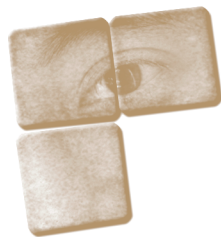
For the early career clinician and investigator, the future horizon should be viewed as unlimited. To achieve all that one hopes for in her or his medical and scientific career, one must identify role models, teachers, counselors, and mentors. The AHA has been especially effective in bringing together a diverse community of cardiovascular physicians, scientists, and investigators and remains an ideal environment in which to encourage, improve, and enhance cardiovascular research and clinical care. The AHA's continued success however, depends on the future success and effective mentoring of our younger members.

Mentoring Websites

- University of Pennsylvania School of Medicine; Guidelines for Faculty Mentoring Program: <http://www.med.upenn.edu/facaffrs/Forms/facmentprg.pdf>
- Stanford University, School of Medicine; Faculty Mentoring Program: <http://www.med.stanford.edu/school/facultymentoring/index.html>
- Virginia Commonwealth University; Faculty Mentoring Guide: <http://www.medschool.vcu.edu/intranet/facdev/facultymentoringguide/index-2.html>
- National Academy of Sciences; various mentoring handbooks: <http://search.nap.edu/nap-cgi/naptitle.cgi?Search=mentoring>
- Association for Women in Science (AWIS); information about the AWIS mentoring program: http://www.awis.org/r_mentoringmain.html<http://www.awis.org/mentoring.html>
- Mentor net;- E-mentoring network for women in engineering and science: www.mentornet.net
- American Physiological Society mentoring site: <http://www.the-aps.org/careers/careers1/mentor/index.htm>
- Science Next Wave An Electronic Network of the Next Generation of Scientists: http://nextwave.sciencemag.org/features/academic_career_issues.dtl#3
- NIH research programs: <http://grants.nih.gov/training/index.htm>

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1. Sheehy, G. *Passages: Crises of Adult Life*. Bantam ed. New York, NY: Bantam Books; 1974;1976:189.
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NOTES:

"Access to good mentoring is a critical determinant of whether early career trainees continue in academic medicine. By focusing on promoting good mentoring skills, the American Heart Association hopes to ensure the development of future generations of cardiovascular investigators."

—Michael T. Chin, MD, PhD



MENTORING CONCERNS IN BASIC CARDIOVASCULAR SCIENCE

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The Basic Scientist In Cardiovascular Biology: — A Definition

A typical definition of a scientist is "one learned in science." To extend this definition to the "basic scientist" is merely to recognize that medical schools traditionally have split the teaching of medical students into two phases. The basic sciences usually are taught during the first two years of training, and clinical-related components are taught primarily in the final two years.

Basic scientists investigate research problems related to many aspects of animal and human biology. From the standpoint of what one does every day on the job, basic scientists usually run a laboratory or direct a research facility. Due to the integrative nature of cardiovascular biology, a basic scientist may have training or expertise in a variety of disciplines. Basic scientists also are appointed solely or additionally have appointments in graduate schools, because they participate in the training of graduate students who are seeking doctoral

or master's degrees. Basic scientists also may take jobs in the pharmaceutical industry or other related businesses.

Regardless of the career path chosen, the beginning cardiovascular basic scientist must master many new skills. Acquiring these skills and developing a career is a process that requires concerted action from the early career investigator, mentor, and institution. The early career investigator must set career goals, choose an appropriate laboratory for training, develop appropriate communication and negotiation skills, learn how to network with colleagues and function professionally within the scientific community, and develop strategies for securing independent funding, while at the same time acquiring skills in technical and scientific methods. Mentors are faced with the challenge of providing a collegial, supportive, and mutually beneficial environment, promoting the early career investigator within the scientific community, managing relationships with early career investigators to maximize productivity, and aiding the early career investigator in navigating the academic advancement process. In addition, mentors must manage their time appropriately, by devoting time to mentees without sacrificing scientific progress. Challenges for institutions include providing appropriate laboratory space, startup funds, and an environment that will allow the early career investigator to become successful and independent. The following sections will address these special concerns.



Special Concerns for Early Career Investigators in Basic Science

Choosing a Laboratory

Choosing a laboratory for scientific training is probably the most critical decision for the early career investigator at the outset of training. One must think carefully, choose wisely, and, above all, not rush to make a choice earlier than necessary. Consultation with other early career investigators and trusted faculty members is essential. If they are familiar with the laboratories being considered, they can give specific advice regarding the pros and cons of each laboratory. One must consider the nature of their relationship to the laboratories under consideration, however, given that such advice may have some elements of bias. Others may help by giving general advice, even if they are not familiar with the laboratories being considered. Such an advisor may develop into a mentor and help the early career investigator focus on specific areas of interest. Given that most early career investigators will probably spend at least 2 to 3 years in a laboratory, it pays to spend the time making an informed and deliberate choice. Here are some important questions to consider:

- What is the principal investigator's (PI) track record with early career investigators? (It is helpful to locate past trainees and discuss the laboratory with them).
- How productive is the laboratory in the area of interest?
- What is the character of the laboratory in terms of the following:
 - Level of intellectual discussion
 - Physical layout (enough bench space, equipment, etc)
 - Collegiality among investigators
 - Cultural and gender diversity
- What are the performance expectations of the PI (hours worked, number of publications written, number of grants submitted, etc)?

- How well is the laboratory funded to do the research in the area of interest?
- Are working experimental models and techniques available for immediate use?
- Do active collaborations exist with other productive laboratories?
- When people leave the laboratory, what happens to their projects?

The answers to these questions will vary considerably and are unlikely to be ideal for every question. Sometimes, answers are forthcoming only by observation. Attend a laboratory meeting of prospective laboratories, if possible. The importance assigned to each answer will vary among individuals. Any potential issues should be discussed and understood before making a final decision. As with any important decision, one must gather as much information as possible and weigh it carefully. The best source of information will be senior professors or other early career investigators who are further along in their training. These individuals who provide useful advice may serve as mentors or be part of a mentoring network for the trainee.



Choosing a Department

For the early career investigator at the beginning of training, choosing a department is usually secondary to choosing a laboratory. For an investigator at the threshold of independence, choosing a department is a critical decision. The most important consideration for many when choosing a department is the scientific opportunities available. Other, less obvious things to consider are the departmental track record in supporting young junior faculty and the ability to interact with potential colleagues within the department. If possible, one should seek out individuals who previously entered the department at the same career stage and who had similar goals and ask for their opinion about their overall experience.

Additional practical issues should be considered. Those who are clinically trained and choose to pursue basic science must decide between a basic science department and a clinical department. Either choice offers advantages and disadvantages. Most notably, the majority of colleagues in a basic science department may not easily appreciate the clinical applications of basic science; however, they may have a greater understanding of the scientific tools and techniques needed to solve clinical problems.

Some investigators may choose to join a clinical department, even though their training is in basic science. Although the scientific skills of the basic researcher in a clinical department may not be fully understood by the majority, the opportunity to apply scientific principles to clinical problems is much greater, and the expertise of the investigator may be highly valued. Regardless of choice, it is important to realize that research in cardiovascular basic science is rarely a solitary endeavor. Departments often will provide an immediate formal support system for early career investigators, thereby providing sources for career advice, networking, and collaborations. Regardless of departmental choice, one should realize that good mentoring can come from many sources that cross traditional boundaries. In fact, it may be helpful to develop mentoring relationships in different departments with individuals

who can provide objective and unbiased advice. The basic researcher, whether in a clinical or basic science department, should maintain contact with and seek advice and guidance from colleagues from all departments.

Developing a Mentoring Network

For early career investigators in basic science, the laboratory PI usually serves as the primary mentor. The nature of basic research requires close interaction between the PI and the trainee, so often the mentoring in terms of promoting scientific skills is associated with mentoring in other areas as well. Many laboratory directors, however, may not necessarily be skilled at mentoring, even if they are gifted in teaching science. It is important to realize that one is not limited to one person as a mentor but can have multiple mentors for different purposes. In fact, developing a mentoring “network” is often desirable. This is especially true for the junior faculty investigator who has completed laboratory training but still needs guidance from more senior investigators with regard to career development.

So how does one choose mentors in basic science? There is no simple answer, but perhaps one can ask another series of questions:

- Does the mentor possess the necessary expertise in the area of interest?
- Is the mentor available to the early career investigator or junior faculty member?
- Is the mentor committed to developing the career of the early career investigator or junior faculty member?
- Does the mentor provide unbiased, appropriate advice when consulted?
- Does the mentor have enough experience and knowledge to guide the early career investigator to the next level?

Ideally, the PI of the basic science laboratory should possess most, if not all of these qualities. However, having several individuals available to the early career investigator or the junior

faculty member is usually beneficial. In fact, it may be most helpful to develop a network of individuals whose career paths have developed in an exemplary manner, even if these individuals are at different institutions, as long as they are willing to help.

Mentees in basic cardiovascular science should

- ~ Look for mentors committed to mentoring*
 - ~ Know that you might need more than one mentor*
 - ~ Realize that developing your scientific skills is key*
 - ~ Remember that ultimately you are responsible for your own career*
-



Developing Skills

All this discussion of choosing a department, laboratory, and one or more mentors is predicated on one important goal: developing the skills necessary to become an effective investigator in basic science. Once all of the other choices have been made, one can focus on skill development. The basic science investigator, at minimum, must be able to

- perform experiments.
- evaluate scientific data.
- plan a series of experiments that lead to a conclusion.
- communicate effectively.
- interact with colleagues in a professional and collegial manner.
- negotiate with reviewers and collaborating investigators.
- write grants effectively.

The importance of developing the technical skills to perform experiments, evaluate scientific data, and plan experiments is self-explanatory. Perhaps the most important skill to develop early, other than these technical skills, is the ability to communicate properly. In fact, communication is the foundation for a good mentor-mentee relationship and provides the means for transmission of essential skills in basic science. A mentor who possesses this skill often will be a good role model for mentees. If one cannot communicate ideas and results to others clearly in both oral and written form, advancement within the scientific community will be limited. Developing a professional demeanor is important when interacting with one's colleagues. This is especially true when negotiating with reviewers or functioning as one. Writing grants effectively is essential for those who wish to stay in an academic environment and is discussed in more detail below. No formula exists for developing these skills, other than continually making efforts at improvement, discussing this matter specifically with mentors, and learning from all possible sources.

Developing Independence From the Laboratory Principal Investigator

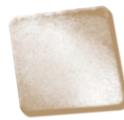
Near the end of fellowship training, the trainee must start thinking about developing independent projects and negotiate with the laboratory PI about how to transition existing projects. Obviously, the skills mentioned above, especially those involving professional demeanor and negotiation, are important in this situation. A wide spectrum of experiences exists. In some laboratories, early career investigators are not allowed to take any part of their project; in other laboratories, the investigators can take the entire project. Some laboratories divide the project between the PI and the early career investigator; in other laboratories the investigator is told that she or he can do whatever they want, but the PI's laboratory will be doing the same thing and competing directly. As mentioned above, it is worth discussing this issue before joining a laboratory. This situation does not always occur, and sometimes the situation changes.

Unfortunately, it often becomes a contest between the PI and the early career investigator as to who retains ownership of current projects, with the PI usually "winning" and hard feelings on both sides. For the early career investigator, often this is a difficult situation. He or she is usually the one who did the actual experiments, missed social outings, worked late, read all the literature, and made the initial observations. The PI is usually the one who supplied all the support, infrastructure, environment, opportunity, and scientific advice. The PI usually "wins" because of the threat of poor letters of recommendation, which are extremely important for academic advancement. As mentioned above, this difficult situation can be avoided if it is discussed frankly at the beginning, before joining the laboratory. For both parties, it is important to remember that no one has to "lose" and that it may be mutually beneficial to divide the project by areas of interest and to collaborate on areas of common interest. This is also a key point to remember if one wishes to maintain a good relationship.

Adversarial situations are sometimes unavoidable. In these situations, a good mentoring network is invaluable for soliciting advice and developing possible solutions. The importance of developing such a network cannot be overemphasized.

Becoming Part of the Community

As one's career develops, it becomes increasingly important to develop ties within the scientific community. This should go beyond developing a mentoring network. Other investigators that one meets will be long-term colleagues, and probably will review papers, grants, and candidacy for jobs and will write letters of recommendation. Meeting one's colleagues often is accomplished best by presenting and discussing one's projects in multiple forums, such as local seminars and national and international meetings. One also may get involved with local, national, and international organizations that share a common scientific interest (eg, the AHA). Getting involved in such "community service" is another outstanding way of meeting colleagues. In addition, it provides valuable insights into how organizations function in advancing the cause of science. Those considering a future leadership position should strongly consider participating in these types of activities.



Choosing a Career Path

Those considering a career in cardiovascular basic science must consider what directions to travel on a long career path. Many will consider traditional careers at academic institutions; however, others will opt for less traditional pursuits, such as working in the pharmaceutical industry or for a charitable organization. Individuals also must choose the degree to which their research directly relates to clinical medicine. Early on, one must be sure to get the appropriate training to pursue the types of careers being considered. Overall, one must find a career “niche.” To do so, one must consider the following issues, at minimum:

- Area of long-term interest in basic cardiovascular research
- Desired focus on basic mechanisms versus translational research
- Desired degree of overlap between laboratory work and clinical work (if clinically active)
- Interest in writing grants
- Interest in writing manuscripts
- Interest in running a research laboratory
- Degree of financial compensation
- Relative autonomy in choosing areas of scientific exploration
- Job security
- Time and travel commitments

The answers to most of these questions are highly personal, but also are critical for choosing the optimal career path. No one path is intrinsically better than any other, and frank self-examination is the key to making the best personal choice.

Pitfalls for the Early Career Investigator in Basic Science

Common pitfalls that can bedevil the early career investigator in basic science are worthy of special discussion. These pitfalls, discussed below, involve needing to change projects, laboratories, or institutions, having difficulty getting grants, and trying to find a job. As mentioned previously, a good mentoring network will prove invaluable for providing advice and guidance in these special situations.

Changing Projects, Laboratories, or Institutions

Sometimes the relationship with the laboratory PI does not blossom, the projects do not generate good data, or for some reason the institution does not seem to meet the professional or personal needs of the early career investigator or junior faculty member. The greatest difficulties that one faces in this situation is in deciding whether the situation will improve over time and whether any of the relationship or data can be salvaged. Obviously, this decision is personal, and many factors must be considered. If things are not working and there is no hope for improvement, the need to move on is clear. In this situation, one must be proactive in trying to address the root causes. If the root causes cannot be addressed adequately, one must be prepared to move on without hesitation. It probably will be difficult to make this decision without some discussion. A mentor distinct from the laboratory PI, one who has no vested interest in the mentee's decision and no personal or professional ties to the PI, would be very helpful. If change is necessary, be aware that most people change projects many times, and many individuals change laboratories and go on to successful careers.

Difficulty Getting Grants

For those considering a career in academia, securing grant funding is the key to future success. Although the basis for successful grants is good scientific data, writing successful grants is an acquired skill. To get an idea of how to write successful grants, it is helpful to read successful grants written by others. Of course, not everyone will be willing to provide grants for perusal, as each grant is the intellectual property of the PI. If one has good relationships with successful individuals, and these colleagues are certain that confidentiality will be maintained, then this may be less of a problem. As a junior investigator, serving on study sections often provides many insights into what kinds of grants get funded, and a mentor network can facilitate this. Probably the most important thing to do is to ask trusted senior colleagues (ie, mentors) to review the grant proposals before submission. Remember, it is better to hear the criticism locally and correct it before review than to hear it from the reviewers later on.

Finding a Job

In seeking one's first job, there are many things to consider. Learning what to look for is often done by trial and error. Failure to consider the proper aspects of each opportunity can have disastrous professional and personal consequences. One should consider the following questions, at minimum:

- Is it the right scientific opportunity?
- Are the scientific resources adequate?
- Is there good potential for scientific collaboration?
- Are there good colleagues?
- Is the division/department/institution/company/organization stable?
- If things don't work out, can one move easily?
- What are the standards for advancement?
- Are the financial resources adequate?
- Is the geographic area acceptable?

Again, the answers to these questions are specific to each individual. It helps to discuss these issues with appropriate individuals at the prospective institution. Consultation of mentors is important at this stage, because they are likely to have some useful perspectives on the appropriateness of the job and specific aspects of the job offer. If the job has no obvious pitfalls and the specifics are decided and agreed on, remember to get the specifics in writing, so that there is no misunderstanding later on.

Special Concerns for Mentors in Basic Science

Becoming a Mentor

At the junior faculty level, one is suddenly placed in the position of potential mentor for technicians, graduate students, medical students, postdoctoral candidates, clinical fellows, and others. Prior training, however, usually has not included the development of mentoring skills. The most important initial goal of the potential mentor is commitment to the development of mentoring skills and to the process of mentoring. Some of the special considerations for mentors in the basic sciences are detailed in the next sections.

Mentors in the Basic Sciences

The principal reason for being a mentor is to share knowledge and experience. As noted in other sections of this handbook, mentors can provide valuable information on how to make the most of educational experiences and what to expect as one progresses toward a new job at a university or other research institution.

As a mentor with a background in the basic sciences, you will be expected to share with your mentee your experience and knowledge on a wide range of topics. In addition to topics important to career development, you may provide guidance on personal needs of your mentee, such as those related to family and community. The topics mentioned below pertain to careers in the basic sciences, specifically:

- Laboratory skills
- Administrative skills, to include bookkeeping and laboratory finances
- Scientific method
- Ethical issues related to scientific research
- Evaluating the work of other scientists
- Career advancement
- Grantmanship and peer review
- Publishing
- Successful teaching techniques
- Professional organizations
- Networking with other scientists

Many of the above-mentioned skills are developed by “on-the-job” training. However, the mentor should not overlook the possibility that the mentee may get formal training from coursework offered by other departments of the university or training courses run by the administration. For example, beginning courses in bookkeeping are offered by many undergraduate programs and might be useful for mentees who want to one day run their own laboratory. Additionally, training in the handling of nuclear and chemical wastes usually is taught by an appropriate administrative unit on campus or at the business. In addition to numerous books and articles, web-based information is posted by professional organizations such as the American Physiological Society (see <http://www.the-aps.org/careers/careers1/mentor/index.htm> for more information). These rich sources of information should be consulted.

Mentors in the basic cardiovascular sciences should

- ~ *Maintain an orderly and professional scientific environment*
 - ~ *Make themselves accessible to mentees*
 - ~ *Encourage formal and informal training opportunities for mentees*
 - ~ *Be sensitive to hostilities and disputes that might exist between colleagues in the laboratory*
-

Troubleshooting and problem solving in the workplace are other areas in which the mentor can help guide the mentee. These are often difficult issues and may have a negative connotation. Thus, troubleshooting and problem-solving require an ability to be flexible and to treat each case individually. Compromise is often the best solution. Topics to be considered include disputes between students, technicians, and others in the laboratory; work hours; seniority within the laboratory and department; prioritization of experiments and equipment usage; rejection of grants and manuscripts; and bench and office space allotment for students, technicians, and postdoctoral fellows.

Managing the Laboratory Environment

To facilitate the development of effective mentoring skills and the transmission of essential scientific skills and to minimize the potential for development of suboptimal relationships in the laboratory, the PI/laboratory mentor must expend considerable effort managing the laboratory environment. In particular, it is essential to develop an atmosphere of mutual benefit, collegial relationships, shared enterprise, and a good work ethic. Although there is no specific formula for managing a laboratory, the PI must realize that all early career investigators will take their cue from the PI. Accordingly, it is essential for the PI to treat all with respect, demand that all treat others with respect, and demonstrate a strong work ethic and

commitment to basic scientific investigation. One also must be aware of cultural differences that make managing relationships especially challenging. Other challenges are to ensure that scientific communication of laboratory findings proceeds unimpeded and that unhealthy competition between trainees does not develop. If all workers perceive that there is mutual benefit to cooperation within the laboratory, scientific progress is likely to proceed more rapidly.

Developing the Mentor-Mentee Relationship

There are many ways to manage relationships with early career investigators in the laboratory. No one formula works for all individuals. Each investigator will require an individual program. However, some common features useful for all include the following:

- Setting performance expectations and goals
- Underscoring the importance of mentor-mentee communication, especially regarding experiments and data
- Setting standards of professional conduct and ethics

The challenge for the laboratory mentor will be to bring out the best in each early career investigator while maintaining scientific productivity. The best way to do this is to maintain a sense of fairness, objectivity, high scientific standards, and professionalism in dealing with the investigator. One also must keep the investigator focused on developing skills as a basic scientific researcher. The laboratory PI can maintain a friendly and informal relationship with the investigator, but the laboratory PI always must remember to provide appropriate feedback and direction, even if it is sometimes unpleasant.

Mentoring in the Community

Often one will be called on to provide advice and guidance to those not necessarily associated with one's own laboratory. Such requests can encompass a broad spectrum of topics. Many requests from early career investigators involve decision making, such as choosing a laboratory, troubleshooting experiments, and finding a job. Matters that seem minor to the mentor often can be overwhelming for the early career investigator. Advice from a mentor with no conflict of interest can be invaluable to the early career investigator and is usually much appreciated. The importance of such outside mentoring activities to the scientific community at large cannot be overestimated.

Fostering Independence

The hallmark of a good mentor is the development of a cadre of independent former trainees. Toward this end, it is essential that the mentor aid the mentee in becoming an independent investigator. Helping the mentee develop the skills to be independent has already been mentioned. However, the mentor can help the mentee in other ways. In particular, the mentor may allow the mentee to present data at scientific meetings, meet independently with collaborators, and plan experiments independently with minimal input from the PI. Allowing the mentee to participate independently in external scientific activities will allow the mentee to develop a distinct scientific reputation and to be viewed as a distinct entity from the PI.

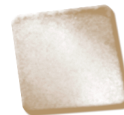
Often, the key to developing an independent scientific career is securing independent funding. The mentor should encourage the mentee to apply for grants appropriate for their level of experience. In particular, the mentor should introduce the trainee to transitional grants such as the mentored clinical scientist development award (K08) offered by the NIH or the Fellow-to-Faculty Transition Awards, the Beginning Grant-Aid, or the Scientist Development Grant offered by the AHA (at the national or affiliate level or both). Even if such efforts to obtain

funding are unsuccessful initially, the experience of writing a grant is valuable and may increase the likelihood of success in the future.

For more information on NIH development awards see <http://grants1.nih.gov/training/careerdevelopment/awards.htm>.

Additionally, the AHA Council on Basic Cardiovascular Sciences offers the Louis N. and Arnold M. Katz Basic Science Research Prize, the Melvin L. Marcus Young Investigator Awards in Basic Cardiovascular Science, and Basic Cardiovascular Sciences Trainee Travel Awards.

For more information on all AHA awards see <http://my.americanheart.org/portal/professional/research> or the Appendix



Managing Academic Careers

Mentor-mentee relationships in the basic sciences often last beyond the initial training period, proceeding well into the independent phase of the mentee's career. As the early career investigator prepares to develop an independent career, the mentor can provide invaluable assistance in choosing the appropriate job opportunity, writing the first grants, managing a laboratory, managing laboratory personnel, etc. In addition, once the mentee has become a fully independent investigator, the mentor can provide valuable advice regarding academic advancement. Specifically, the mentor can suggest activities that enhance the curriculum vitae of the applicant and can "demystify" the academic advancement process for the mentee so that steady progress can be made. Eventually, the relationship can develop into one of collaboration. Ideally, mentor-mentee relationships should be durable and mutually beneficial far beyond the initial interaction.

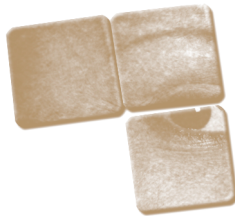


Pitfalls for Mentors in Basic Science

Allegations of Misconduct

As a mentor or PI, one may sometimes be called on to settle disputes involving members of the laboratory. These disputes can vary widely in scope and include the misuse of laboratory resources, unsafe experimental practices, hostile acts, scientific fraud, and sexual harassment. Occasionally, the mentor/PI will be the target of such allegations. As a mentor, it is best to be proactive by maintaining a healthy environment, as mentioned above. The basic science laboratory is particularly prone to allegations of misuse of resources and scientific fraud. When such allegations are made, it is best to investigate them fully, document the findings, involve outside consultants if needed, and take corrective action. In these situations, consultation with other mentors is often helpful and underscores the need for mentors at all career stages. Most institutions have set policies regarding how to deal with some of these situations and provide mechanisms by which they may be dealt with. The mentor must be aware of these policies.

For an example of an institution's policies, refer to <http://www.hms.harvard.edu/integrity/>.



Difficulty With Individual Trainees

Occasionally, the mentor-mentee relationship will not develop properly, as mentioned in the previous section. It is important that the mentor communicate to the trainee directly, both orally and in written form, that the interaction is not optimal and give suggestions for corrective action. These communications should happen periodically, in a timely fashion. A written record will document the difficulties and steps taken to improve the situation, so that no future allegations can be made about lack of feedback. If one ultimately decides that the mentee would be better served by leaving the laboratory, a written record will be useful to justify this decision.

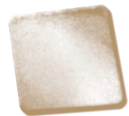
Maintaining Productivity

Even though mentoring of early career investigators and clinicians is essential to developing a cadre of future investigators in the basic sciences, the mentor is most likely to have the greatest influence on the careers of mentees if the mentor achieves success in the basic sciences. To a great degree, mentoring of mentees is a mutually beneficial experience where the mentees acquire skills and their productivity advances the scientific enterprise of the laboratory mentor. Conversely, mentoring activities cannot dominate the daily activity of the mentor at the expense of personal scientific activities, such as writing and obtaining grants, writing and reviewing manuscripts, serving on study sections, and performing experiments. Developing a balance between mentoring activities and personal scientific achievements is a daily challenge for mentors and requires ongoing assessment.

Special Concerns Regarding the Role of the Parent Institution and the Early Career Investigator's Career Development

Overall, the early career investigator's institution must provide a nurturing and supportive environment for the mentee, the mentor, and mentor-mentee relationship. With regard to the mentee, the institution should provide the wide array of intellectual and material resources necessary for career development. These include but are not necessarily limited to the following items:

- The presence of a strong, well-established research program related to the early career investigator's area of interest, including a high-quality research environment capable of fostering collaborations with the candidate.
- Provision of the appropriate space, supplies, and equipment required for the investigator's research program.
- Clear availability and access to necessary support services (eg, core facilities) and personnel (eg, administrative, secretarial, and technical) as required by the research program.
- Evidence of an unequivocal commitment to the candidate's development into an independent investigator, including protected time, faculty position (when appropriate), and training in the "survival skills" necessary for the move to independence.



With regard to the mentor, the ideal institution recognizes the importance of the mentor-mentee relationship and has provisions for protecting and rewarding successful mentors. The best institutions share many of the following common features:

- Ongoing faculty development activities centered on enhancing the training skills of the mentor.
- Metrics for assessing the quality of the mentor's training activities and provisions for providing feedback to the mentor.
- Appropriate recognition, protections and rewards for the mentor engaged in mentor-mentee relationships (salary, additional protected time, award recognition programs, etc).

With regard to the mentor-mentee relationship, the parent institution should support activities that promote the training aspects of the career development, including active training programs (MSTP programs, NIH-funded training programs, etc), intramural and extramural scientific activities (seminars, lectureships, science and teaching "fairs," etc).

Summary

The early career investigator in cardiovascular basic science is becoming an endangered species. Frequently, individuals who begin training in basic sciences leave the field for other pursuits, often asserting that they have not received appropriate training or mentoring to develop the necessary skills for an independent career in basic science. Acquiring skills in basic science is particularly challenging, as these skills often require years to master. As advances in cardiovascular basic science are the foundation for future advancements in cardiovascular medicine, the continued recruitment of early career investigators to careers in basic cardiovascular sciences is an essential goal. The combined efforts of mentees, mentors, institutions, and outside agencies such as the AHA are required to meet this essential goal.

NOTES:

*The best mentors I've had have not been in my specialty.
They were clinicians and scientists I admired, who were able to think
broadly and with whom I was able to establish a relationship
that was not based purely on their clinical interests or mine.*

—Michael Bettmann, MD, FAHA



MENTORING CONCERNS IN CLINICAL CARDIOVASCULAR SCIENCE

Michael Bettmann, MD, FAHA

Fernando Costa, MD, FAHA

David Faxon, MD, FAHA

Rose Marie Robertson, MD, FAHA

Clinical cardiovascular science involves patients in a direct way. According to the NIH definition¹, one facet of clinical research is patient-oriented research, which is conducted with human subjects or on material of human origin, such as tissues, specimens, and cognitive phenomena, and which requires investigators to interact directly with human subjects. In contrast, basic research does not include patient-oriented research as a component. Whereas the many principles common to mentoring and relevant to both mentor and mentee are discussed in other chapters, this chapter addresses the distinct and unique aspects of mentoring related to clinical work.

Clinical research is not simpler or easier than basic research. The same attention to generating an appropriate hypothesis, to determining the best study design, and to selecting the best methods of data analysis are required with either approach. Knowledge of the best experimental method or methods to use for the problem to be addressed is critical, and the successful clinical investigator will have multiple methods in her or his

armamentarium. These methods may range from careful phenotyping (a vanishing art) to physiological assessment, pharmacological intervention, evaluation of biochemical markers, and genetic investigations. However, the major difference between clinical and basic research, patient-oriented research, provides the greatest satisfaction of the clinical approach: the partnering of the investigator with the patient to understand disease better and to improve care. The intent of this chapter is to address the principles, roles, and needs of the mentee and the mentor and to address the aspects of mentoring that relate to the specific environment of clinical cardiovascular science. The focus will be on physicians, nurses, and non-medical doctor clinical scientists who have a potential or established interest in clinical research, in fields ranging from cardiology to radiology, nephrology, neurology, pediatrics, gerontology, and surgery. This chapter also is intended to address the needs of a broader group, including radiation physicists, chemists, pharmacologists, and nutritionists; in short, all professionals who are or may become interested or involved in clinical research.

People involved in clinical research will benefit from mentoring at all career levels: very early (eg, students), early, middle, and even late. These clinicians may act as mentors at any career stage from early to late. They may work in traditional academic medical centers, community hospitals, private practice or group settings, industry, or clinical research organizations. Special concerns of non-US citizens also deserve attention. This chapter is organized to address first the needs of the mentee, second, the needs of the mentor, and third, specific concerns and needs relevant to the working environment and the institution.



The Mentee

Mentees need to realize that each person is responsible for her or his own career. Mentees should choose mentors carefully and remember that more than one mentor may be needed at any time. Chapter 1 emphasizes these and other common rules and tips that apply to all mentees in all fields. Those rules certainly apply to early career clinicians.

Additionally, as early career clinicians advance in their careers, they may find certain principles to follow that depend on their career stage. The next sections offer rules and tips based on career level for mentees in clinical cardiovascular science.

Students: Medical, Nursing, Pharmacy, Applied Basic Sciences, and Other Fields

- Involve yourself in a wide breadth of opportunities. Most students will benefit from broad exposure. A summer or part-time job with involvement in an ongoing clinical project can be helpful. Ensure that the project is well defined, that you will have access to regular mentoring, and that you will be exposed to a fairly broad area. A good example is to work on a clinical trial that has very clear end points, that is well underway, and that is run by someone who has completed similar trials previously. Ask that person to provide you with exposure to various elements of the study (ie, subject recruitment, study design development, data collection, and data analysis). If your curriculum allows, take an independent study course participating in a research project.
- In your early years of training, you will have had little or no clinical training and will not be able to perform many of the procedures that are necessary parts of clinical studies. Even if your role is limited to data analysis or other tasks that seem mundane, you can learn a great deal about how studies are designed and how data are handled. If you are available, you gradually may be given more direct experience with patients. Remember that it is

permissible ethically to include a patient in a study that involves clinical procedures (from the simplest, such as placing an IV, to the more complex, such as the use of arterial lines or cardiac catheterization) only if the person performing the procedure is an expert in its use.

- Choose your mentor carefully. Both junior and senior faculty members can be effective mentors, although the former are likely to have more time to spend with you and the latter will be better able to network you into the broader investigative community. However, your mentors must be people with whom you can communicate effectively: people who will take the time to understand who and where you are in your thinking and who are committed to making time to meet with you. This may be a professor, a nurse, a private attending physician, or even a resident.
- Keep an open mind, but be aware of your career goals. Being a coauthor on a paper or playing a real role in a clinical project can be an important learning process. Such a role also can open doors, to help you to get the residency you want, to secure a future job opening, or to boost your career in other ways.
- Some individuals may have one person as a mentor for a long time, perhaps for their entire career. However, a career will go through many different stages as time passes, and some individuals will need many different mentors. Don't be afraid to stop working with a specific mentor if the relationship isn't working.

Resident/Fellow or Advanced Practice Nurse

- Specific career development guidance should be your major goal in choosing a mentor. You need to work with one or more people who can guide you in designing a clinical project, and, as you progress, can help you to look for funding sources and to establish collaborations.
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- A mentor should be able to clarify the grant process for clinical research.
 - A mentor should be a role model. You will find many possible different models for balancing clinical work and clinical research and even for including outside interests.
 - A mentor will play an important role in helping you to decide on future directions and in helping you to focus on the next level: choosing a field, getting a fellowship, or getting your first job after training. Making these decisions ultimately will be up to you, but the right mentor or mentors can help you to decide and even can help you to get the position that you want or that is the best fit for you.
 - Your needs will change as you progress up the career ladder through the steps of residency, fellowship, staff member, and senior staff member. All mentors you work with should recognize this. You may have to look for different mentors as your level and direction change.
 - Be aware of the importance of getting to know your mentors and possible mentors outside of the workplace. Attend formal and informal social gatherings such as department holiday gatherings and welcome and orientation meetings. These places are ideal to further your contact with future mentors and to develop relationships.

Early Faculty and Beyond

- A primary need at this level is to develop independence. Ensure that your mentor or mentors can help you to achieve this. Some can; others will not be able to, for various reasons. A mentor who cannot help you to achieve academic independence still may be able to help with research design, with finding funding sources, or with balancing competing demands and interests.

- Common science interests are very important, and so are interests in shared career goals. For example, a basic scientist who is a wonderful mentor for helping you to decide what you want to do with your career and who is an excellent collaborator, may not be able to help you to find the best position or source of funding within the arena of clinical research.
- Learning from other mentees and other mentee-mentor relationships is important.
- Logistic support is important. Your mentor can offer guidance on where to submit an abstract for presentation, on the best journal to which to submit a manuscript, and on which source to look to for pilot funding.
- One or more mentors can provide guidance and support throughout your career, whether you are getting started, at mid-career, or even at a senior stage. Your needs will change, but it is always good to have someone you can discuss things with, particularly regarding science, but also related to personal development.
- As you develop your career, even at a postgraduate training level, you mentor others while still being a mentee.

Special Needs of Nurses

- You may need to cast a broad net when looking for mentors. Whereas physicians probably will be able to find mentors among other physicians, you may have to look not only to nurse-researchers but also to physicians and individuals from other disciplines involved in clinical research.
 - Many people are happy to act as mentors. Don't be afraid to ask, whether the potential mentor is a junior resident or a senior professor.
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- Be honest with yourself and your mentor. Your mentor can guide you and open doors, but you are the one who ultimately has to make the decisions and put in most of the work.
 - Others are in the same position as you, even though it may not seem that way. Look for mentors among successful people in and out of nursing.
 - At times it may feel that the absence of a doctor of medicine degree puts you at a disadvantage; however, many examples exist of successful nurse-investigators, and the right mentor can help you to find the appropriate niche.

Non-Medical Doctor Clinical Scientists

Many highly effective and successful clinical investigators do not have an MD degree. Clinicians with PhD degrees, master's degree-level nurses, and pharmacists are examples of a few of the individuals who can be effective in clinical research, whether in collaboration with an investigator who is a medical doctor or on their own.

- You will need one or several mentors, with a combination of skills. Look to people with the same background and to others, such as medical doctors, who share common interests in research.
- Collaboration will be important for your success, so work with one or more mentors who will help you to learn how to work collaboratively. One such mentor may be someone you will work with directly, but you should also look to others who are successful at collaborative clinical investigation in your field or a related field.
- One of your mentors will need to be someone you can look to as a role model.

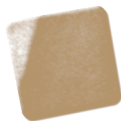
If you are a mentee in clinical cardiovascular science, you should

- ~ *Involve yourself in a wide breadth of opportunities, including early exposure to clinical studies, early in your career.*
 - ~ *Remember that you may need many layers of mentoring at any one time by a number of mentors.*
 - ~ *Collaborate with others; collaboration is key to your success.*
-

Special Concerns for Non-US Graduates

These tips are applicable both to those coming to the United States for additional training and also to graduates of institutions in other countries who are planning on spending their careers in the United States.

- Look for help with language. Mastering scientific writing and speaking is a major challenge, so look for a mentor who can help you explicitly in this regard. Many universities have special language programs for foreign students that are designed to help such students master writing and communications skills. Free courses on developing skills with software packages (eg, Powerpoint for slide preparation and Endnote or Procite for reference handling) are available within most college and universities or through the health science libraries at your location.
- Be aware of possible cultural differences between you and people whom you may choose as mentors. This will require sensitivity and awareness on your part and the ability and willingness of your mentor to be sensitive. Not every potential mentor will have the necessary abilities.



-
- More than many other mentees, you will need to have more than one mentor; you will want to seek mentoring for language, cultural, and scientific needs.
 - Don't wait until you are established to find mentors. Look for mentors as soon as you start work or even before. Remember that you may need to work with different mentors at different times in your career.

The Mentor

One of the most important aspects of a good mentor is a commitment to mentoring. Mentoring is not a passive process. Mentoring is an ongoing process that may last a few weeks or a whole career. A mentor should respect her or his mentees and treat them professionally. Chapter 1 emphasizes these and other rules and tips common to all mentors, regardless of field. However, remember that mentoring can be as beneficial for the mentor as it is for the mentee. The following sections highlight issues particular to mentors in clinical cardiovascular medicine and stroke.

The Medical Doctor

- Your time may be constrained due to your clinical commitments and research activities, but the mentoring you provide is very important.
- You do not have to be a mentor, but if you choose to be one, it is a real emotional and temporal commitment.
- Be open to opportunities to mentor both within and outside of your discipline. Viewing clinical concerns through the eyes of another discipline can expand your insights and enhance your research.
- Be a role model to the mentee for the development of collaborative behaviors.

- Many types of resources can augment your efforts, including the Early Career Investigator/Clinician Program at the annual AHA Scientific Sessions and International Stroke Conference and the Ten-Day Seminar on the Epidemiology and Prevention of Cardiovascular Disease.
- Mentoring must be its own reward. You cannot necessarily expect significant institutional support.

The Scientific Councils of the American Heart Association can provide opportunities to support the movement of clinicians throughout their careers and are rich resources for mentors and mentees. For more information on AHA Councils and membership, visit <http://my.americanheart.org/portal/professional/memberservices>. You can also find more on the AHA conferences, awards, and grants, and programs in the Appendix.

Nurses

- Be aware that you may be more necessary and in shorter supply than many other potential mentors.
 - Know where to get help. Potential sources include non-RN colleagues in clinical investigation at your institution and such other resources as the AHA Council on Cardiovascular Nursing.
 - Maintaining communication with past, current, and potential mentees, your own personal mentors, and other mentors is crucial to success for both partners in the relationship and a vital activity that assures a constant rebirth of the discipline.
-

Non—Medical Doctor Clinical Scientists

- Make yourself available as a role model. You are the living proof that working as a nonclinician in clinical investigation can be done successfully
- A major focus in a mentoring relationship is to enhance the collaborative capabilities of your mentees.
- You are part of a diverse group. If you choose to be a mentor, try to make yourself available to mentees outside of your specific area of interest.

A mentor in clinical cardiovascular science should

- ~ Realize that mentoring is a real emotional and temporal commitment.
 - ~ Be available to mentees both within and outside the discipline.
 - ~ Be a role model.
-



The Institution and its Environment

All academic and pharmaceutical institutions and other commercial enterprises rely on early-career individuals for new ideas and growth. Mentoring is not an invariable part of such institutions' approach to young professionals, but it potentially is a valuable tool. Not only can mentoring bring satisfaction to the mentor and mentee, it can enhance progress in research. Thus, providing effective mentoring should reflect enlightened self-interest on the part of the institution. An institution's attention to mentoring is one facet that should be examined when selecting the places at which one trains and works. However, it is also important for the mentor and the mentee to understand what is realistic to expect from an institution.

At the medical student level, it is appropriate for medical schools to facilitate the involvement of students in research and to make room for this experience in the curriculum, preferably as early as possible. Also useful is a formal approach to provide willing faculty members as mentors for other aspects of students' career development, including decisions about electing MD and PhD degree training, taking a year or more off during medical school to pursue research, and pursuing postdoctoral training. As students apply to residency programs, the institution should provide help in thinking through the tracks the students may take in residency.

The residency institution also should offer to provide mentors. Whereas the residency director often serves this role for many house officers, it is helpful to have identified individuals who can offer assistance with the specifics of decisions regarding research tracks and training, especially for those who choose a clinician-investigator track and for those who may "short-track" into fellowship programs to maximize their research experience.

During fellowship training, an institution should provide adequate time and resources for research training, often under the auspices of an institutional training grant. The best institutions have many such grants and allow postdoctoral

fellows to train in any area that fits their career goals, which encourages interdisciplinary training as the best way to ensure long-term career success. The fellowship director should guide individuals to mentors who will best fit their future careers. In addition, sufficient training should be provided to ensure success, ideally in formal programs such as those leading to a master of clinical investigation or master of molecular medicine degree (the names of these programs are still variable) or a master of public health degree. The training is not less rigorous than that required for the basic investigator. Although the experimental methods involved in clinical investigation are often different from those pursued in the basic sciences, these methods likewise provide information that is of clear benefit to mankind.

It is critical for the mentor to educate the new clinical investigator who seeks her or his first faculty position on appropriate matters to negotiate for in that position. Especially important in clinical research is to be certain that the new institution and department ensure that enough time and effort are protected for the research endeavors of the new faculty member and that the new member's project is not simply considered to be an "add on" to an overcommitted clinical schedule. Although the clinical investigator sometimes can benefit from having the research involve her or his patient population, this is not always the case. Adequate time must be allotted for all aspects of clinical research, including reading, thinking, and consulting, grant preparation, conducting of studies, data analysis, and manuscript preparation.

The mentor should discuss what constitutes an appropriate start-up commitment on the part of the institution in terms of research support. Although some support is likely, the support may include less equipment than a basic scientist would receive, but may instead include research nursing or research coordinator support.

In the present environment, one must recognize the constraints within which academic medical centers function. These centers must provide excellent medical care, and this requires the engagement of both full-time clinical faculty members and clinician investigators. Care must be cost effective, and high-quality, evidence-based care is expected. The mentor needs to help the mentee to find the balance between supporting overall institutional goals by being willing to postpone or modify the perfect situation for herself or himself (being thought of as a “team player” is high praise in almost all situations) and letting the institution take such precedence that the young investigator’s career development is hampered. In the best circumstances, both the institution and the individual treat each other with respect and make reasonable compromises, and the overall good of both is achieved. Although the trainee seeking a position can learn a great deal from discussion with others at an institution, the mentor plays a critical role in providing more information about the behavior of an institution toward its faculty members. Often viewed as important is that an institution live up to the commitments it makes to incoming faculty members. In fact, this should be seen as a minimum achievement. The faculty candidate may be unable to envision fully what will be needed to help her or his career progress, and the better institutions will accommodate needs that emerge after and beyond the “offer letter,” if at all possible.

As the career of the clinical investigator develops, her or his mentor plays a continuing role by assisting the mentee with progress through the faculty ranks. Although the criteria for promotion and tenure should be available and clearly delineated, room for interpretation of these standards always exists in a given institution. The mentor will help the mentee to understand what publication record, what level of grant support, what national and international presence, and what teaching and clinical performance levels are required. The mentor also will help with an understanding of the unwritten rules in a given institution and of what tenure does and does not provide. Finally, a mentor can help in the decision to move from one institution to another, when it is appropriate for career advancement.

Summary

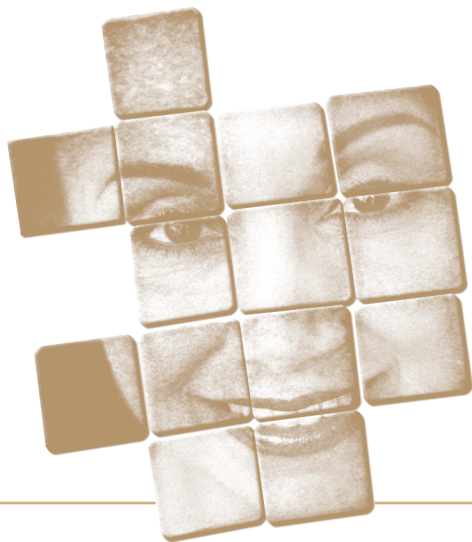
The career of a clinical investigator is extraordinarily fulfilling, because it exists at the actual interface of understanding health and disease in man and in bringing advances in science to patients. The partnership between patients or even normal subjects and the investigator is personally rewarding, and the progress that can be made is quite visible.

Reference

1. The NIH Director's Panel on Clinical Research Report to the Advisory Committee to the NIH Director: December, 1997. 1997. Available at: <http://www.nih.gov/news/crp/97report/index.htm>. Accessed September 4, 2003

NOTES:

"The long-term public health impact of time spent mentoring the next generation of clinicians, researchers, and mentors will far outweigh the impact of time spent in other professional endeavors."
—David C. Goff, Jr., MD, PhD, FAHA



MENTORING CONCERNS IN CARDIOVASCULAR POPULATION HEALTH SCIENCES

David C. Goff, Jr., MD, PhD, FAHA
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Yuling Hong, MD, PhD, FAHA

Cardiovascular population health science is a broad and multidisciplinary field. Cardiovascular population health scientists study the distribution and determinants (risk factors and promoters) of cardiovascular health states on the population level. Consequently, population scientists are interested in a variety of health outcomes, which include mortality, morbidity, health-related quality of life, and public satisfaction with medical care, health policies, and cost. In addition, population scientists study behavioral processes, risk factors, public policy determinants, political reform, and health care interventions related to screening, diagnosis, treatment, and prevention strategies. Population science is a multidisciplinary field supported by the core disciplines of behavioral sciences, biometry, environmental sciences, epidemiology, management and policy sciences, and biological and biomedical sciences.

The multidisciplinary nature of cardiovascular population health sciences poses special challenges during career development. In any multidisciplinary field, expertise in a narrow discipline

must be balanced with the ability to collaborate effectively across disciplines. The threat exists that academic advancement within a discipline may be impaired because of the need to develop expertise, at least at a working level, across disciplines. Most professional organizations and academic institutions are organized to support discipline specific activities and career development. Scientists engaged in multidisciplinary research efforts may perceive themselves to be outside of the mainstream of these organizations and institutions. The challenges posed by this aspect of pursuing a career in cardiovascular population health science have important implications for mentoring. In a discipline-focused career, the traditional mentoring model relies primarily on one-on-one mentoring. One-on-one mentoring may be less effective for promoting career development within a multidisciplinary field. Nontraditional models, such as team mentoring, may be required. Specific issues facing the cardiovascular population health scientist and the potential mentoring approaches to addressing these issues will be described in this chapter.

Mentor-Mentee Considerations

Population science presents some unique challenges for career development. Individuals interested in a career in population research should be cognizant of these unique aspects and challenges that present throughout the career life course from training through entry into professional life, career advancement, and, ultimately, to leadership issues for more senior individuals. The relationship of the mentor and mentee can be critical as one attempts to navigate the career development waters in population science.



General issues for mentors and mentees in population science to consider are as shown in the table.

Mentors	Mentees
Adequate supply of mentors	Finding appropriate mentors
Adequate availability of time for mentoring	Establishing an appropriate relationship
Credit for mentoring	Understanding responsibility for own career development
Appropriate training in mentoring skills	Appropriate work ethic
Consideration of diversity	Ability to work in teams

Some issues in common for mentors and mentees involved in population science are outlined here. Both the mentor and mentee should act with integrity. This is important on an interpersonal level, but also in relationship to the scientific effort. The mentor should provide guidance on ethical aspects of research. Likewise, the mentee should demonstrate integrity in her or his scientific work. The mentor also should provide guidance as to the multidisciplinary nature of population science. This information should include guidance on teamwork and sharing. The mentor may be essential to the identification of appropriate resources for the mentee to use.



Challenges and Opportunities for Training in Cardiovascular Population Health Sciences

Pursuing the best and most appropriate training is important in the early stages of career development for anyone in cardiovascular science. However, identifying and pursuing appropriate training for population science can be particularly difficult, because such training often must combine education in several different disciplines located in different programs. For example, medical schools usually do not provide appropriate training in the conduct of population research. Such training is often found in schools of public health. On the other hand, schools of public health may not provide adequate education in pathophysiology or biological mechanisms.

The tool kit of any population scientist includes thorough training in the quantitative aspects of epidemiology and biostatistics. Modern population science also may require a multidisciplinary approach. This may include a blending of measurement of biomarkers and genetic data with an epidemiological evaluation of phenotype and outcomes. Therefore, the modern population scientist requires broad and multidisciplinary training.

Because training is multidisciplinary and the field of population science advances rapidly, no established, set pathway exists for training. Some physicians may receive training in epidemiology and biostatistics early in their education, whereas others may receive such training only during residency, fellowship, or later in their career development. Similarly, those in doctoral programs in schools of public health should consider including training in biomedical sciences early in their education. Recognition of diverse training needs as early as possible during the education process is likely to lead to the greatest flexibility in future career development.

Therefore, the potential mentee should look for a mentor or mentors who have a high level of interest in and understanding of the education process. This individual may be a professor

for a particular course or an investigator in the field of interest. Different types of mentors may be needed at different stages of development.

The mentor should help the mentee to define career goals. These goals should include the original decision concerning whether population science is an appropriate career path for the mentee. The mentor also should help the mentee to define career goals within the disciplines of population research.

A mentor can be most useful for helping the mentee to select appropriate coursework and other training venues consistent with the mentee's career goals. This concordance between career goals and training is important. In addition, this evaluation should be considered a longitudinal process that may need refinement as the mentee progresses through training.

Challenges and Opportunities for Career Entry in Cardiovascular Population Health Sciences

Mentoring is particularly important as the mentee considers her or his first professional position. A mentor (or mentors) can be particularly helpful as the mentee considers several possibilities with various strengths and limitations, because the choice of the first professional position is of critical importance in any career development process. Some elements of this selection process are particularly relevant in population research. In the evaluation of potential first jobs, one should consider the position offered, the work environment, and the culture of the institutions. One also should be aware that a process of negotiation is important for determining the details of this first position.

The position being offered is of particular importance. Whether the position is in academia, industry, government, or any other venue, consider the rank and the track. In academia, important differences may exist between the instructor and assistant professor positions. Important differences also may exist in opportunities and expectations between schools of medicine

and schools of public health. Some initial positions may include partial appointments in more than one school or department. Such appointments may provide access to more diverse resources, but also can lead to differences in goals and expectations in the two areas, which can produce conflict with career development.

For a junior individual who wants to pursue a career in population science and whose goal is to become an independent investigator, the amount of time protected for research is of critical importance. The amount of protected time should be considered carefully, as should the reputation of the program being considered for honoring promises made in this regard.

The overall environment is very important in a first professional position. One should evaluate all of the relevant settings for professional interaction (and recognize that often multiple settings exist) in an institution. Having high-quality colleagues in all ranks in all relevant areas is important to ensure that necessary multidisciplinary expertise is available and to allow greater opportunity for one or more mentor-mentee relationships to develop.

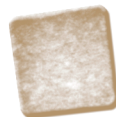
Another aspect of the environment that is important for population science is the availability of data sets. Consider both local and national databases. To get the most out of analyses of these data sets, the availability of technical support should be evaluated. This includes the presence of necessary computer hardware, software, and support personnel. Also important is the need to recognize the difference between the presence of resources at an institution and availability to a junior investigator. In some institutions such resources are present, but it is difficult for a junior investigator without grant funding to get ready access to these resources.

Mentees early in their career should

- ~ Look for mentors neutral to their decisions
 - ~ Look for institutions that foster mentoring, especially across disciplines
 - ~ Not be afraid to negotiate when considering new positions
-

The culture of the institution should be considered. Some institutions have a culture of career development; these institutions emphasize the importance of career development and have strong track records. Others do not. Individuals considering their first professional position should recognize that some of these elements are the subject of negotiation. Clearly, the title and career track should be part of the negotiation process, as should level of salary. Resources available and expectations for productivity should be explicit and may be negotiated. Usually, a start-up package will be offered, which may include support staff, computer equipment, and other resources. Consider these issues carefully, because they have an important bearing on career development. These issues should be resolved at the beginning of employment rather than being left to future discussion.

The mentee considering entry-level positions should try to find mentors in a more neutral position. A mentee is more likely to get useful advice about the negotiation process from someone not directly involved. Independent mentors may be in a better position to provide an unbiased view of the culture and track record of the institutions being considered. When considering a position, advice from more than one mentor can be helpful.



An important consideration when choosing a first professional position is whether the mentee is likely to find appropriate mentoring at the institution chosen. This can be difficult to assess, given that mentor-mentee relationships often develop in unexpected situations. Nevertheless, an institution with adequate numbers of junior and senior colleagues is the most likely to provide fertile ground for the development of such relationships.

Challenges and Opportunities for Career Advancement in Cardiovascular Population Health Science

As indicated above, career advancement can be delayed for population scientists for several reasons related to the nature of population sciences. The multidisciplinary nature of the field may require population scientists to develop expertise, at least at a working level, across several disciplines, thereby potentially harming the ability to develop national or international recognition within a specific discipline. Population research is often multicenter as well as multidisciplinary, features that can limit leadership opportunities, whether for study leadership or manuscript leadership. Population science projects may require years of work, with respect to participant recruitment and assessment, before the development of academic payoff in terms of manuscripts. Hence, manuscript-writing opportunities may be delayed. Effective mentoring can contribute to meeting the following challenges and identifying opportunities for enhancing career development.

Focus versus breadth of activities.

Mentors and mentees should work together to develop a healthy balance between focus and breadth. Early in career development, maintaining focus on a relatively narrow range of activities within a relatively narrowly defined content area is especially important. As a population scientist develops a stronger record of productivity, increasing the breadth of activities, with respect to type of activities and content area, may be reasonable. For example, epidemiologists may begin their careers working predominantly with observational

studies and may add clinical trials or health services research to their portfolios as their careers develop.

Balancing roles and responsibilities.

Population scientists may play different roles and assume various responsibilities for different types of projects. The mentor and mentee should work together to assess the distribution of roles and responsibilities to ensure that the aggregate represents a healthy combination that will support the mentee's career advancement toward the mentee's goals. It is the mentee's responsibility to define these goals. It is the mentor's responsibility to assist the mentee in this effort through reflective listening and providing advice regarding the match of activities to goals.

Multidisciplinary teamwork versus leadership.

Multidisciplinary research offers many opportunities for displaying teamwork and fewer opportunities for developing leadership. The mentor should work with the mentee and the institution to ensure that the institution values the contribution of the mentee to the multidisciplinary effort. The mentee should look for opportunities to develop a special area of research within projects, including potential new research ideas as spinoffs or ancillary studies that may offer leadership opportunities. Mentors should assist by helping mentees to identify these opportunities and promoting the interests of the mentee.

Multicenter versus single center research.

Participation in multicenter studies enhances both the challenges and the opportunities mentioned above. In addition to the issues raised above, mentors can help by assisting their mentees in the networking process and by promoting the visibility of their mentees within the study. Mentees should take responsibility for becoming actively involved in the study committee structure and proactively should seek opportunities to participate in writing groups for manuscripts and ancillary studies.

Publishing.

- Mentor and mentee should work together to identify a balance of new and established research experiences for the mentee when possible. The more established projects may offer greater opportunity for manuscript development in the near term, as data may already be available for analysis, whereas newer projects may offer greater opportunity for developing spinoff studies and for assuming important roles within the study.
- Mentor and mentee should work together to identify opportunities to lead and to participate in writing groups. The mentor should promote mentee's interests by assisting in identifying opportunities to participate in writing groups. The mentee must take responsibility for contributing in a positive and timely manner to increase the likelihood that she or he will be asked to participate in future writing groups. As the mentee's career advances, the emphasis should be on achieving a balance between first author and subsequent author publications. At more advanced career stages, the mentee should begin to mentor others, including students, fellows, and junior faculty members, in manuscript development. At many institutions, the senior (last) author position is recognized for the investigator who is mentoring others.
- Mentor and mentee should work together early to strive for a balance between the quality and quantity of publications.

Proactive versus reactive research.

Because population research projects sometimes require investments on a large scale, federal agencies may release requests for applications or proposals to address areas of special interest. Responding to these opportunities has advantages and disadvantages. Advantages include some assurance that funding will be available for some projects in the area of interest and some guidance (in the form of the text of the request) regarding the type of research that is of interest. Disadvantages include a potential distraction from the main area of interest for the scientist; the prospects that the work may result in a one-shot opportunity, especially if the request is time limited or for a limited number of projects or

sites; and the potential perception that reactive research may be less creative and less highly valued by institutions than investigator-initiated research. The mentor and mentee should work together to strive for a balanced portfolio that reflects the mentee's research interests and includes investigator-initiated research. The mentor and mentee should develop a clear understanding of the institutional culture with respect to this issue.

Identifying funding.

Population science is funded by federal agencies, including the NHLBI and the National Institute of Neurological Disorders and Stroke of the NIH and the CDC; nongovernmental organizations and charitable foundations, including the AHA; and industry. Federal funding is often the most competitive source of funding; hence, early in career development, mentors and mentees should identify and apply for research career development awards (eg, K awards from the NIH or Fellow-to-Faculty Transition awards and Scientist Development Grants from the AHA) and funding from nonfederal sources, to provide the mentee with the opportunity to establish a track record as a funded investigator. As the mentee advances, the balance of distribution of funding sources should shift toward a greater proportion of federal funding. Most institutions value federal funding more highly in the promotion and tenure review process, due to the competitive nature of acquiring federal funding.

Negotiating institutional politics.

Institutional politics and personalities can be positive or negative influences on career development at all stages. Early in career development, the mentee may be somewhat naïve with respect to the unstated issues that influence institutional policies and decisions. The effective mentor can help the mentee by sharing information and perspectives gained during the mentor's history with the institution.

When advancing careers, mentees should

- ~ *Work with mentors to identify opportunities for new research or publishing opportunities*
 - ~ *Develop, with mentors, a network*
 - ~ *Ask for advice from mentors*
-

Challenges and Opportunities for Leadership in Cardiovascular Population Health Science

As in any field, the decision to pursue leadership opportunities poses significant challenges to the cardiovascular population health scientist. Although many think of mentoring only in terms of benefits for early career development, effective mentoring also can be helpful when deciding whether to pursue leadership opportunities and when discharging subsequent leadership responsibilities.

Challenges and opportunities when seeking leadership positions in population science include the following:

Timing leadership opportunities.

Regardless of the potential of the individual involved, a decision to pursue an administrative leadership role too early in one's career may be detrimental. Administrative leadership positions require a significant commitment of time and effort. At a minimum, these positions pose an opportunity cost. They may pose a barrier to research career development. The mentee and mentor should carefully balance the potential disadvantages and advantages of pursuing leadership opportunities.

Focusing leadership opportunities.

Because most institutions are organized into discipline-based departments, cardiovascular population health scientists may be offered leadership opportunities that are more narrowly defined in terms of discipline and more broadly defined in

terms of disease content area than is reflected in their research portfolio. Meeting this challenge requires continued effort to balance disciplinary and multidisciplinary perspectives. Mentees and mentors should work together to identify successful models.

Nurturing a multidisciplinary environment.

Administrative leaders within cardiovascular population health sciences are faced with the need to nurture a multidisciplinary environment. This aspect of leadership generates challenges with respect to faculty recruitment and retention and resource allocation. A mentor can be helpful, even at this advanced stage of career development, for discussion of approaches to the promotion of a multidisciplinary environment. Expertise in nurturing a multidisciplinary environment is an important asset for an institutional leader. As a result, effort expended earlier in career development to build partnering and teamwork skills may pay additional dividends at this more-advanced career stage. Mentees and mentors should work together to develop good partnering and teamwork skills.

In addition to the challenges and opportunities leadership brings, there are other issues to consider:

Return on investment.

Leaders within an institution often are asked to provide information regarding the return on investment. This new responsibility requires more sophisticated financial management expertise than that required for grant management. An effective mentor can be helpful for discussing options and providing examples of effective approaches for accessing or developing this expertise.

Policy development and implementation.

Leaders within an institution may be competing for finite resources as institutional decisions are made regarding major investments. Leaders within cardiovascular population health sciences should strive to achieve a balance between advocating for their core needs and the needs of other disciplines with important linkages.

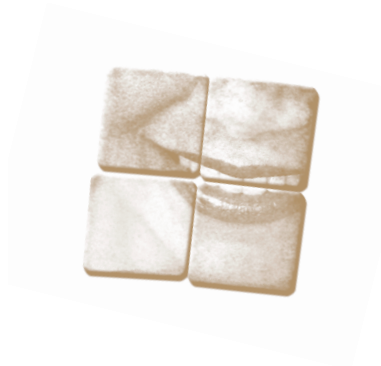
Conflict.

Conflicts may arise within many of the areas described above. Conflicts may be more likely due to the competing demands and different perspectives of the various stakeholders in cardiovascular population health sciences. Conflict prevention and resolution skills are important assets to leaders in all fields. Mentees and mentors should work together to identify opportunities to develop this expertise throughout career development.

Remember, you are never too old or established to have a mentor!

Summary

Cardiovascular population health sciences is multidisciplinary by nature. To succeed, it is important to collaborate across disciplines. Mentoring relationships can foster such collaboration and are key in contributing to the overall success and viability of both the mentor and the mentee.



Mentoring Resources for Cardiovascular Population Health Sciences

American Heart Association

AHA holds abstract sessions for young investigators at the Annual Scientific Sessions. Additionally, AHA sponsors mentoring luncheons for trainees at the Council on Epidemiology and Prevention Annual Spring Meeting. Awards that AHA offers include the following.

- **Young Investigator Awards at the Council on Epidemiology and Prevention Annual Spring Meeting**
 - Jeremiah Stamler Research Award for New Investigators
 - Roger R. Williams Memorial Award for Genetic Epidemiology and the Prevention and Treatment of Arteriosclerosis
 - Sandra Daugherty Award for Excellence in Cardiovascular Disease and Hypertension Epidemiology
 - Trudy Bush Fellowships for CVD Research in Women's Health Award

- **Young Investigator Award in the field of epidemiology at the Annual Scientific Sessions**
 - Elizabeth Barrett-Connor Research Award in Epidemiology and Prevention

For more information on these AHA research awards as well as others (at national and affiliate levels) that can fund young investigators, see <http://my.americanheart.org/portal/professional/research>.



The Annual Ten-Day Seminar on Epidemiology and Prevention of CVD is designed for health professionals planning careers in research, teaching, or practice in the area of epidemiology and prevention of CVD. Up to 20 faculty members and 32 fellows attend a series of discussions, lectures, and laboratory and tutorial sessions. Travel stipends are available for underrepresented minorities. For more information see <http://my.americanheart.org/portal/professional/conferencesevents>.

National Institutes of Health, National Heart, Lung, and Blood Institute

The NHLBI holds a Training Session at the AHA Annual Conference on Epidemiology and Prevention. Additionally, the Genetic Approaches to Complex Heart, Lung, and Blood Diseases course is an excellent training opportunity for those interested in genetic epidemiology. This course is held at the Jackson Laboratory in Maine. For more information, see <http://www.jax.org/courses/current.html>.

Centers for Disease Control and Prevention

The Centers for Disease Control and Prevention (CDC) periodically offers funding opportunities for a variety of public health issues. More information can be found at <http://www.cdc.gov/funding.htm>. In addition, CDC and the National Center for Health Statistics (NCHS) conduct various nationwide surveys and house many databases that can be used for epidemiological studies.

World Heart Federation

The World Heart Federation (WHF) offers the International Ten-Day Seminar on CVD Epidemiology and Prevention, sponsored by the Council on Epidemiology and Prevention of the WHF, WHO, and the International Federation of Cardiology (http://www.worldheart.org/science/scientific_council.html).

Behavioral Genetic Association

The Behavioral Genetic Association (BGA) offers the International Workshop on Methodology of Twin and Family Studies annually in Boulder, Colo, in March. This workshop provides a good training opportunity for those interested in behavioral genetics and genetic epidemiology (<http://bga.org/training.html>).

International Genetic Epidemiology Society

Those interested in genetic epidemiology will find the International Genetic Epidemiology Society (IGES) annual meeting and Genetic Analysis Workshop (GAW) to be highly beneficial for career development (<http://www.genepi.org>).

Summer Schools on Epidemiology

The following institutions offer summer training sessions:

- John Hopkins Bloomberg School of Public Health; Graduate Summer Institute of Epidemiology and Biostatistics (http://www.jhsph.edu/Dept/EPI/Degree_Programs/Summer_Institute/index.html)
- University of Michigan School of Public Health Graduate Summer Session in Epidemiology (<http://www.sph.umich.edu/epid/GSS>)
- Erasmus Summer Programme (<http://nihes.nl>)

Agency for Healthcare Research and Quality

The Agency for Healthcare Research and Quality (AHRQ) funds research to enhance quality, appropriateness, and effectiveness of health care services and access to those services. More information can be found at <http://www.ahrq.gov/fund>. In addition, AHRQ has Grant On-Line Databases (GOLD), a searchable database of grants funded by AHRQ (<http://www.gold.ahrq.gov>).

National Academy of Sciences

The National Academy of Sciences (NAS) offers grant opportunities in the fields of behavioral and social science, health and medicine, policy, and research issues, among other scientific topics (<http://www.nas.edu>).

Centers for Medicare and Medicaid Services

The Centers for Medicare and Medicaid Service (CMS) funds a wide range of research. Current research priorities include monitoring and evaluating CMS programs, improving managed care payment and delivery, improving fee-for-service payment and delivery, following future trends influencing its programs, strengthening Medicaid, monitoring state children's health insurance and state programs, meeting the needs of vulnerable populations, analyzing outcomes, quality, performance, and building research capacity. For more information, see <http://www.cms.gov/researchers/>.

World Health Organization

The World Health Organization (WHO) offers wide-range grant opportunities, including research training grants. See <http://www.who.int/tdr/grants> for details.

For a more complete list of resources and funding opportunities see the Appendix.



NOTES:

*"The AHA Mentoring Handbook offers strategies for a successful career
in cardiovascular medicine through the art of mentoring."*

—Joanne Ingwall, PhD, FAHA



MENTORING WOMEN AND UNDERREPRESENTED MINORITIES

Joanne Ingwall, PhD, FAHA

Rosalind Fabunmi, PhD

Kathryn Taubert, PhD, FAHA

Karol Watson, MD, PhD, FAHA

The institutional structures and career paths now in place in our medical schools, hospitals, and large clinical practices have evolved over many decades. They reflect the customs and mores that have been useful for the career development of those who have led the biomedical community, namely white men. This model is often referred to as “the white male model.” All others (women and underrepresented minorities [URM]) have been and are fewer in number in the academic community.

To achieve excellence in institutional education and research, institutions must train and hire a diverse faculty and staff and provide opportunities for early career development that are tailored to all. As the percentages of women and URM physicians, physician scientists, and scientists grows, awareness is increasing of the importance of investing in the career development of women and URMs, beginning with medical and graduate schools and continuing throughout early career paths. Establishing career development programs in our academic medical centers not only recognizes the value of a

diverse faculty and staff for clinical care, education, and research at the institutional level, but also emphasize the value of the potential contributions of each member of the biomedical community.

Due to the increased clinical, research, and administrative demands being made today, many young physicians and scientists feel isolated, believe that opportunities for advancement in their careers are few or even unattainable, and believe that salary inequities exist for equal work. Whether perceived or real, *women and URM*s feel this sense of isolation and these barriers to success more acutely than do white men. This chapter addresses the problems we are facing in creating a profession that is truly diverse, discusses some of the reasons that the AHA is interested in this problem, and offers some strategies for a successful career in cardiovascular medicine through the *art of mentoring*.

The Magnitude of the Problem

Although representation of women and URM

s in medicine has improved during the past decade, many specialties, particularly cardiovascular medicine, remain dominated by white men. A large disparity exists between women and URMs who choose careers in cardiovascular science compared with those in medicine as a whole. The number of female medical school graduates in the United States increased during the last generation (from 13.4% in 1975 to 42.4% in 2000), but very few women chose to become cardiologists. For example, 39% of internal medicine residents are female, but only 10% of cardiology trainees are female.¹

For cardiovascular medicine to remain a robust discipline, the current homogeneity of clinicians must be reversed. The AHA believes that this can be achieved with improved mentoring. The numbers given below speak to the magnitude of the problem far better than can words.

The Table² presents both the numbers of female physicians in cardiovascular disease (total and by race/ethnicity) and the race/ethnicity breakout of all physicians in cardiovascular disease.

Physician Characteristics and Distribution in the United States

Total female physicians	195537
Total female physicians in cardiovascular disease	1766

Race/ethnicity of female physicians in cardiovascular disease	
White	928
Black	64
Hispanic	62
Asian	251
Other	103
American Indian /Alaskan Native	3
Unknown	355

Total physicians in cardiovascular disease	22989
White	12351
Black	436
Hispanic	863

Why the AHA Is Interested in Mentoring

The AHA is committed to increasing diversity in its leadership and the leadership of the professions of cardiovascular medicine. Attention is paid to ensuring diversity in terms of gender, race, and ethnicity in selecting chairpersons and plenary speakers at Scientific Sessions and members of AHA committees, task forces, councils, officers, staff, and the board of directors.

Great racial, ethnic, and gender diversity occurs among those at risk for cardiovascular disease and stroke, and many advantages exist to diversifying cardiovascular medicine. For example, more effective communication and trust are likely between clinician and patient when clinicians reflect the gender and racial diversity in the patient population being served. By encouraging academic medical centers and private practice groups to develop mentoring programs, the AHA believes that the number of future leaders from among women and URM will increase.

The AHA also believes that increasing diversity in the practice of cardiovascular medicine will improve clinical care for many populations at risk of cardiovascular disease and stroke. This is central to the AHA mission.

Also central to that mission is the need to educate the public about cardiovascular risk factors and how to manage disease for specific populations. Effective communication with the public both for education and fund raising requires an active diverse body of spokespersons.

The AHA has a Women and Minorities Leadership Committee responsible for facilitating inclusiveness at all levels of the AHA, including involvement of all segments of the community in AHA activities at all levels and participation of women and minorities in leadership positions.

The Importance of Establishing a Mentoring Relationship for Women and Minorities

Earlier chapters of this book have emphasized how important both having a mentor and being a mentor can be to one's career. For women and URMs, this is particularly true. It is the mentee's responsibility to actively seek out the mentor. Because of the lack of role models for women and URMs, mentees may not find a mentor like themselves. It is not necessary or practical for mentees to expect to find mentors of their same race, ethnicity, or gender, but it is necessary and practical to develop a mentoring relationship as early as possible. This relationship should be a high priority. Having more than one mentor, or layering of mentors, helps to ensure that the diverse needs of the mentee, which change over time, are met. This process is especially important for women trying to balance demands of family with career development.

Sometimes an early career investigator, clinician, or junior faculty member may be reluctant to go to a senior person to ask for guidance, out of fear that the possible mentor is too famous, too busy to be willing to make the investment in caring about another's career, or unwilling to mentor someone of another gender, race, or ethnicity. Entering into a mentoring relationship requires willingness on the part of both parties. A mentor/mentee relationship does not always "click," but all too often, early career investigators, clinicians, and junior faculty miss opportunities for good mentoring because of misplaced reluctance to ask. A possible mentor can miss out on the benefits of mentoring because of a lack of courage to nurture someone to move up the ladder, fear that the junior person could become a competitor, or discomfort felt when nurturing someone not like oneself. It takes courage in addition to skill to be a good mentor. Both mentor and mentee need to take a chance!

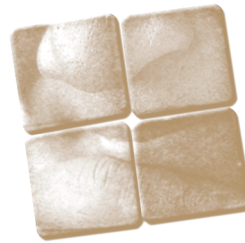


Take-home messages for mentees:

- ~ *Establish mentoring relationship(s) early in your career.*
- ~ *Do your homework about your possible mentor and the institution you are joining.*
- ~ *Know that finding a role model like yourself may not be possible.*
- ~ *Take a chance and ask!*

Take-home messages for mentors:

- ~ *Recognize the value of mentoring even if you did or do not have one.*
 - ~ *Be flexible about your mentoring style. One style does not fit all.*
 - ~ *Do your homework about what is involved in mentoring and the particular mentee.*
 - ~ *Take a chance and say yes!*
-



Rules and Tips for Early Career-Women

Do not be afraid to pick a male mentor.

Many studies, especially in the business world, have concluded that “women mentoring women” can be an effective tool for career advancement. But in academic cardiovascular science, too few women are available to serve in this important role. One may find it necessary to choose a male mentor. Fortunately, the number of cases of sexual harassment has declined dramatically over the last few decades, in large part due to increased sensitivity to the issue and the fact that leaders of our academic institutions no longer tolerate such behavior. These factors make it easier for a woman to ask a man to be her mentor.

Face all issues head-on.

A mismatch of gender (or race and ethnicity) in the mentor/mentee relationship should not be ignored in problem-solving discussions. Issues surrounding gender, race, and ethnicity can be barriers to career advancement that must be dealt with directly. Ignoring these issues does everyone a disservice.

Choose your work environment carefully.

Because women remain the primary caregiver for children and elderly parents, knowing the institutional policies with regard to maternity and personal leave is important. Also important is to know whether the leaders practice these policies without prejudice. Do your homework and ask the right questions before picking your laboratory, your residency and fellowship programs, or your first job.

Be careful about becoming “overloaded.”

Career advancement requires you to be a good citizen and to serve on committees. This service work is an essential part of networking that allows you to expand your horizons, to become known by those in leadership positions, and to meet peers. Committee service also provides the opportunity to learn how to lead and to influence policy and practice. However, being the token woman on too many committees can be counterproductive. This practice remains all too common in

academic medical centers and hospitals. Consider your time commitments before agreeing to serve in any leadership capacity. Also, you must periodically reevaluate how you spend your time, and, if necessary, make adjustments. You will be respected for it, and you will get more done.

Define your own success.

You are striving toward goals that are yours and yours alone. Be clear about your definition of success and balancing work and family in your own vision. Do not let others define success for you. You may discover that you choose to balance work and family issues differently from your mentor or that you wish to seek a nontraditional career path. Your mentor need not be a role model for all aspects of your life. Your mentor does need to be supportive of your decisions.

Network.

Networking is a very effective tool for career development. Knowing that you are not alone is important for surviving and thriving. Especially because so few women are in cardiovascular medicine, women should seek out activities in appropriate AHA Councils (and other professional groups) and should make an effort to attend events held for women cardiologists, neurologists, and cardiovascular scientists (see the side bar). This helps you and others.



The AHA councils have several activities for women. The Arteriosclerosis, Thrombosis, and Vascular Biology Council has a Women's Leadership Committee whose activities include a networking luncheon at their annual spring meeting and presentation of a women's mentoring award and an early career investigator award for women. This council also has a luncheon at the annual AHA Scientific Sessions with a motivational speaker.

The Clinical Cardiology Council has a Women in Cardiology Committee. This committee awards travel grants to female fellows, who are invited to attend a dinner at the annual AHA Scientific Sessions. Additionally, these travel grant recipients benefit from a speaker training session to enhance presentation skills. Other activities of the Women in Cardiology Committee at Scientific Sessions include a women's mentoring award and a Women in Cardiology Luncheon.

Be a role model.

Remember that, no matter what stage in your career, you are a role model for others. It is important to act and live up to the part. You help others as well as yourself if you win awards and gain other measures of recognition. Your success can encourage others. Take every opportunity to nominate other women for awards and honors.



Rules and Tips for Early-Career Underrepresented Minorities

Beware of overloading.

Have you noticed that the same representatives of race and ethnicity serve on all the committees? This is the result of an imbalance between institutions wanting to have minority representation of all on their decision-making bodies (a desirable goal) and the inability to recruit and retain URMs (a failure). This is a vicious cycle; without successful role models in senior positions, few junior people will choose to enter the field. In spite of the real need to be heard in decision making committees, tasks forces, etc, nonetheless, it is important to choose your service commitments wisely. Consider impact, whether you will have opportunity to be heard, and your total time commitment to such activities. Decide how much time you can afford to give to these activities.

Join minority organizations.

Just as described for women, networking is an important defense against feeling isolated and a useful offense for furthering your career. Take advantage of opportunities to learn how others have solved problems that you are facing and to develop strategies to effect change useful for your community. Learn from your peers which institutions, programs, and laboratories nurture people of all races and ethnicities.

Choose more than one mentor.

With so few URMs in cardiovascular medicine in academic medical centers, it is especially difficult for minorities to find someone like themselves to serve as a mentor. Choosing a senior person in your institution to help guide you through the early career decision-making process is crucial, even if this mentor is not like yourself. Choosing someone outside of your own institution as one of your mentors (in addition to a local mentor) can be helpful for planning what you should do next and where you should go for the next round of training.

Take advantage of being a minority.

Talented minorities have many opportunities. This fact should work to your advantage. Seize these opportunities. Although you need to guard against serving on too many committees, being recognized by those in leadership positions provides you opportunities for “fast tracking.” Look around for unexpected and unconventional opportunities in professional and governmental organizations in which your talents may be leveraged for your community even more than would be so in an academic medical center or practice.

If you are interested in doing research, you can find out more about AHA funding opportunities at <http://my.americanheart.org/portal/professional/research>. The goal of the AHA National Center is that 6% of awarded research dollars go to fund applications from underrepresented ethnic groups. Additionally, take advantage of NIH-sponsored supplements to existing grants to fund salaries of URMs and apply for junior faculty-level training grants for URMs. For more information on those programs, visit <http://grants1.nih.gov/training/extramural.htm>.

Be a role model and advocate.

No matter how junior you may feel, always remember that you are a role model and can mentor your peers and those who are junior to you. Take every opportunity to share what you have learned with those who are following in your footsteps. Support and be an advocate for others.

Carefully consider choosing between an academic career and community-based practice.

Many URM physicians have a strong desire to return to and serve her or his own community both as a physician and as a role model. You may help your community even more when you are successful in another way! Carefully consider all of your choices.

Role of the Mentor for Women and URMs

Mentors have the responsibility to work within the structures of her or his own institution to ensure a “level playing field for all” and to create an environment that leads to success. As the percentage of women and URMS increases in our medical centers, it will be necessary to redefine the criteria for academic success to reflect different styles of leadership. Also, it may be necessary to broaden our definitions of scholarly achievement.

Rules and Tips for Mentors

- Create a system whereby a faculty member has annual reviews of her or his career progress with the department chair, including a discussion of faculty member’s goals and departmental expectations, preferably independently of negotiating salary.
 - Apply all rules and guidelines consistently, fairly, and as transparently as possible, especially with regard to allocation of resources and promotion.
 - Encourage women and URMs to apply for positions of leadership.
 - Empower search committees for leadership positions to choose qualified leaders from women and URMs.
 - Provide opportunities for senior leaders to develop their leadership skills.
 - Provide opportunities for promising junior faculty to develop leadership skills by providing leadership courses designed to address the junior faculty leader.
 - Require leaders of departments, divisions, centers, etc, to be evaluated on how well they nurture the careers of women and URMs.
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- Create a community in which young women and URMs have role models like themselves.
 - Create a culture in which mentoring is rewarded and career development of all is recognized as good business.
 - Open doors for your mentee. Connect your mentee with the right professional contacts and activities (speaking, peer review, writing, etc).
 - Recruit members of minority groups into fellowship training programs.
 - Establish faculty partners/mentors (planned mentoring) and offices for career development with special focus on career development of those in minority groups.
 - Practice policies of nondiscrimination, and do not tolerate discrimination in any form.
 - Create a culture in which work and family balance is valued.
 - Be an advocate for other women and look out for negative tactics, such as unhealthy competition among women, not giving credit where due, tokenism, conscious and unconscious support for policies that maintain barriers to success for women, and promoting conflict between genders within the institution.
 - Mentors should use their influence to encourage institutions and professional organizations to hold social networking functions for minorities. Graduate and medical student bodies should take the initiative and do the same thing.
 - Support the mentee in her or his career decisions. Only the mentee can decide what career path is appropriate and she or he should be supported not penalized for any changes in career path.

Summary

Women and URMs are few among the academic community, so it is important for institutions to recruit and foster the development of these individuals. Great racial, ethnic, and gender diversity exists in populations at risk for cardiovascular disease and stroke, and many advantages exist to diversifying cardiovascular medicine. Institutions must train and hire a diverse faculty and staff and provide opportunities for all groups to excel. By encouraging academic medical centers and other institutions to develop mentoring programs, AHA believes that the number of future leaders from women and URMs will increase.

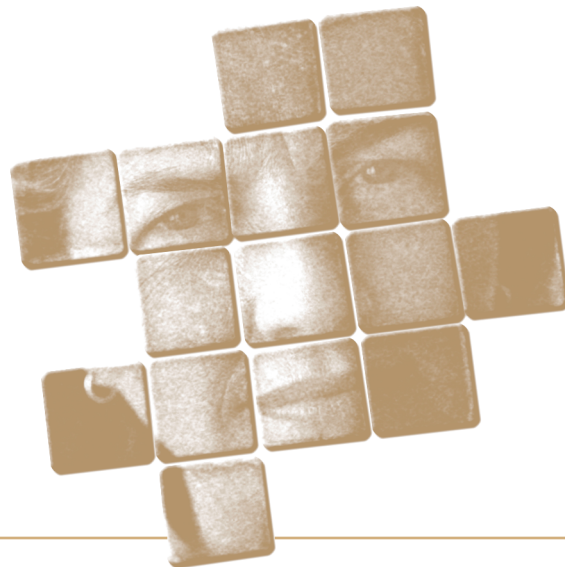
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1. Fye WB. President's Page: Women Cardiologists: Why so Few? *JACC*. 2002;40:384-386.
2. American Medical Association. Physician Characteristics and Distribution in the US. 2002-2003 ed. *AMA Press*. 2002:36-38.

"I am where I am today because someone took an interest in my career. I may have had a very different career if someone had not taken the time to show me why they loved being in academics."

—Susan D. Tiukinhoy, MD, MS





RESOURCES

American Heart Association

The American Heart Association is a national voluntary health agency whose mission is to reduce disability and death from cardiovascular diseases and stroke.

The AHA has 13 councils:

- Arteriosclerosis, Thrombosis, Vascular Biology
- Basic Cardiovascular Sciences
- Cardiopulmonary, Perioperative, and Critical Care
- Cardiovascular Surgery and Anesthesia
- Cardiovascular Disease in the Young
- Cardiovascular Nursing
- Cardiovascular Radiology and Intervention
- Clinical Cardiology
- Epidemiology and Prevention
- High Blood Pressure Research
- Kidney in Cardiovascular Disease
- Nutrition, Physical Activity, and Metabolism
- Stroke

Each scientific council conducts multidisciplinary efforts that lead toward a better understanding of the heart, the circulatory system, the brain, and the interdependent organs. In turn, these efforts ensure that sound medical and scientific knowledge underlies the efforts of AHA to reduce the impact of heart disease and stroke. The AHA has also commissioned three Interdisciplinary Working Groups (IWGs). These groups

are formed to serve as a focal point for a new science area or for an area that is spread out through several Councils. These groups are Atherosclerotic Peripheral Vascular Disease, Functional Genomics and Translational Biology, Quality of Care and Outcomes Research.

Council Awards for Early Career Clinicians and Investigators

The AHA councils sponsor many awards for early career clinicians and investigators. The list below is a representation of some of the awards available. For a complete listing of all opportunities visit

<http://my.americanheart.org/portal/professional/memberservices>.

Arteriosclerosis, Thrombosis, Vascular Biology

- Young Investigator Prizes in Thrombosis
- Irvine H. Page Young Investigator Research Awards
- ATVB Scientific Sessions Merit Travel Awards for Young Investigators

Basic Cardiovascular Sciences

- Louis N. and Arnold M. Katz Basic Science Research Prize
- Melvin L. Marcus Young Investigator Awards
- Basic Cardiovascular Sciences Trainee Travel Awards

Cardiopulmonary, Perioperative, and Critical Care

- Cournand and Comroe Young Investigator Award
- Junior Investigator Travel Stipends

Cardiovascular Surgery and Anesthesia

- Vivien Thomas Young Investigator Awards
- Junior Investigator Travel Stipends

Cardiovascular Nursing

- Martha N. Hill New Investigator Awards

Cardiovascular Radiology and Intervention

- Melvin Judkins Young Clinical Investigator Award
-

Clinical Cardiology

- Laennec Young Clinician Awards
- Samuel A. Levine Young Clinical Investigator Awards
- Women in Cardiology Travel Grant Program

Epidemiology and Prevention

- Elizabeth Barrett-Connor Research Awards
- Jeremiah Stamler Research Award for New Investigators
- Trudy Bush Fellowships for Cardiovascular Disease (CVD) Research in Women's Health

High Blood Pressure Research

- Annual Aventis Pharma Hypertension Research Clinical Fellowship Program
- Merck New Investigator Awards
- Merck New Investigator Awards/Latin America
- New Investigator Award for US Fellows, supported by an educational grant from Aventis Pharma
- New Investigator Award for US Fellows, supported by an educational grant from Pharmacia
- New Investigator Award/Japan, supported by an educational grant from Pharmacia

Kidney in Cardiovascular Disease

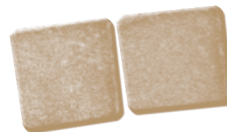
- Young Investigator Award (managed by the American Society of Nephrology)

Nutrition, Physical Activity, and Metabolism

- Nutrition, Physical Activity, and Metabolism Young Investigator Award

Stroke

- Student Scholarships in Cerebrovascular Disease
- Robert G. Siekert New Investigator Award
- Mordecai Y.T. Globus Young Investigator Award



Funding Opportunities

The AHA National Center and affiliates offer different early career research awards, including predoctoral and postdoctoral fellowships, Beginning Grants-in-Aid, Fellow-to-Faculty Transition Awards, and Scientist Development Grants. For more information on these awards, see <http://my.americanheart.org/portal/professional/research>.

Membership Opportunities

The AHA offers an Early Career Membership package. For more information on AHA membership, see <http://my.americanheart.org>. Additionally, an early career clinician or investigator is required to serve on the AHA Science Advisory and Coordinating Committee, the AHA Research Committee, and all council leadership committees.

AHA Conferences

- The Annual Ten-Day Seminar on Epidemiology and Prevention is designed for health professionals planning careers in research, teaching, or practice in the area of epidemiology and prevention of CVD. Up to 20 faculty members and 32 fellows attend a series of discussions, lectures, and laboratory and tutorial sessions. Travel stipends and grants are available.
- The AHA hosts an Early Career Development Program at the AHA Scientific Sessions. This program provides a forum for early career investigators and clinicians to network with other investigators and includes workshops, breakout sessions, and a poster reception.



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- The AHA also hosts a Cerebrovascular Early Career Development Forum at the annual International Stroke Conference. This program provides a platform for early career investigators and clinicians to network and share ideas, build relationships with senior investigators and other science mentors, develop career paths and receive planning guidance from Stroke Council members.
 - The AHA Research Committee offers a symposium targeted to National Research Program awardees in the final year of their Scientist Development Grant and/or Established Investigator Grant. The program includes poster sessions, a scientific presentation by an eminent scientist, and networking time for attendees and AHA Research Committee members.
 - The Hypertension Summer School attracts and motivates early career clinicians and investigators into research in hypertension and cardiovascular disease. This conference provide trainees with an opportunity to interact with experts in the science and practice of hypertension medicine to assist them in choosing mentors, programs, and careers.

Other AHA meetings also provide awards and travel stipends for meeting attendance. For more information on these and other conferences visit <http://my.americanheart.org/portal/professional/conferencesevents>.

Mentoring Websites

Below are links to some websites of other institutions that offer mentoring programs and resources

- University of Pennsylvania School of Medicine; Guidelines for Faculty Mentoring Program: <http://www.med.upenn.edu/facaffrs/Forms/facmentprg.pdf>
- Stanford University, School of Medicine; Faculty Mentoring Program: <http://www-med.stanford.edu/school/facultymentoring/index.html>

- Virginia Commonwealth University; Faculty Mentoring Guide: <http://www.medschool.vcu.edu/intranet/facdev/facultymentoringguide/index-2.html>
- National Academy of Sciences; various mentoring handbooks: <http://search.nap.edu/nap-cgi/naptitle.cgi?Search=mentoring>
- Association for Women in Science (AWIS); mentoring program information: <http://www.awis.org/mentoring.html>
- Mentor net; E-mentoring network for women in engineering and science: www.mentornet.net
- American Physiological Society mentoring site: <http://www.the-aps.org/careers/careers1/mentor/index.htm>
- Science Next Wave An Electronic Network of the Next Generation of Scientists: http://nextwave.sciencemag.org/features/academic_career_issues.dtl#3
- NIH research programs: <http://grants.nih.gov/training/index.htm>

Other Funding Resources

National Institutes of Health/

National Heart, Lung, and Blood Institute

The National Institutes of Health (NIH) supports biomedical research and research training through a variety of grant mechanisms. The NIH consists of 16 institutes that fund research grants, including the National Heart, Lung, and Blood Institute (NHLBI), which funds projects related to cardiovascular disease. For detailed information, go to <http://grants1.nih.gov/grants/oer.htm>.

The NHLBI holds a NHLBI Training Session at the AHA Annual Conference on Epidemiology and Prevention. Additionally, the Genetic Approaches to Complex Heart, Lung, and Blood Diseases course is an excellent training opportunity for those interested in genetic epidemiology. This course is held at the Jackson Laboratory in Maine. For more information, see <http://www.jax.org/courses/current.html>.

In addition, the NIH offers an electronic search engine to query funded NIH grants from 1972 through the present, the Computer Retrieval of Information on Scientific Projects (CRISP). See <http://crisp.cit.nih.gov> for more information.

Centers for Disease Control and Prevention

The Centers for Disease Control and Prevention (CDC) periodically offers funding opportunities for a variety of public health issues. More information can be found at <http://www.cdc.gov/funding.htm>. In addition, CDC and the National Center for Health Statistics (NCHS) conduct various nationwide surveys and house databases that can be used for epidemiological studies.

Agency for Healthcare Research and Quality

The Agency for Healthcare Research and Quality (AHRQ) funds research to enhance quality, appropriateness, and effectiveness of health care services and access to those services. More information can be found at <http://www.ahrq.gov/fund>. In addition, AHRQ has Grant On-Line Databases (GOLD), a searchable database of grants funded by AHRQ (<http://www.gold.ahrq.gov>).

United States Department of Agriculture

The United States Department of Agriculture (USDA) offers grants for food assistance and nutrition research programs. See <http://www.ers.usda.gov/Briefing/FoodNutritionAssistance/funding/> for details.

National Academy of Sciences

The National Academy of Sciences (NAS) offers grant opportunities in the fields of behavioral and social science, health and medicine, policy, and research, among other scientific topics (<http://www.nas.edu>).

Centers for Medicare and Medicaid Services

The Centers for Medicare and Medicaid Services (CMS) funds a wide range of research. Current research priorities include monitoring and evaluating CMS programs, improving managed care payment and delivery, improving fee-for-service payment

and delivery, following future trends influencing CMS programs, strengthening Medicaid, monitoring state children's health insurance and state programs, meeting the needs of vulnerable populations, analyzing outcomes, quality, and performance, and building research capacity. For more information, see <http://www.cms.gov/researchers/>.

White House Fellows

Founded in 1964, the White House Fellows program is America's most prestigious program for leadership and public service. White House Fellowships offer exceptional young men and women first-hand experience working at the highest levels of the federal government. See <http://www.whitehouse.gov/fellows/> for more information.

American Diabetes Association

The American Diabetes Association (ADA) funds some studies related to diabetes, obesity and cardiovascular diseases. See <http://www.diabetes.org/main/professional/research/research.jsp> for more information.

World Health Organization

The World Health Organization (WHO) offers wide-range grant opportunities, including research training grants. See <http://www.who.int/tdr/grants> for details.

World Heart Federation

The World Heart Federation (WHF) offers the International Ten-Day Seminar on CVD Epidemiology and Prevention, sponsored by the Council on Epidemiology and Prevention of the WHF, WHO, and International Federation of Cardiology (http://www.worldheart.org/science/scientific_council.html).

Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation (RWJF) funds a variety of projects that serve its mission to improve the health and health care of all Americans (<http://www.rwjf.org/applying/index.jhtml>).

