

Women in Biomedical Research: Best Practices for Sustaining Career Success

MEETING PROCEEDINGS

March 4, 2008

National Institutes of Health

Bethesda, MD

Department of Health and Human Services
National Institutes of Health

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Acknowledgments

The conference on “Women in Biomedical Research: Best Practices for Sustaining Career Success” was developed and coordinated as one of the key efforts of the larger National Institutes of Health (NIH) Working Group on Women in Biomedical Careers, co-chaired by Dr. Elias Zerhouni, Director, NIH, and Dr. Vivian Pinn, Director, Office of Research on Women’s Health (ORWH).

The Committee members who developed the conference agenda and fully participated in all aspects of the program were: Kameha Kidd, National Center for Research Resources (NCRR), Jennifer Pohlhaus (ORWH), Louise Ramm (NCRR), Joan Schwartz (NIH/OD), Janine Austin Clayton (ORWH), Mona Trempe, National Institute of General Medical Sciences (NIGMS), and Kathryn Zoon, National Institute of Allergy and Infectious Diseases (NIAID). Sylvia Parsons (NCRR) greatly facilitated the writing and editing of this report.

The Conference Committee thanks the speakers who provided a broad spectrum of examples of “best practices” to include not only those at the NIH and academic health centers, but also in private industry and in the military as well.

We thank those stakeholders who provided thoughtful comments before and after the meeting, in addition to attending the conference.

The issues and solutions discussed at the conference will provide opportunities to develop and disseminate best practices throughout the country to ensure a sustained and successful workforce that celebrates diversity.

Barbara M. Alving, M.D., M.A.C.P.
Director
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Foreword

In response to the National Academies' Report, "Beyond Bias and Barriers, Fulfilling the Potential of Women in Academic Science and Engineering," Dr. Elias Zerhouni, Director, National Institutes of Health (NIH), initiated and chaired, with Dr. Vivian Pinn as co-chair, the NIH Working Group on Women in Biomedical Careers. A highly informative and successful mentoring workshop (November 27-28, 2007) has already been one outcome of this Committee and is now published.

Since the many barriers to the ongoing career advancement of women in biomedical research are well recognized, the Committee developed the March 4, 2008, conference on "Women in Biomedical Research: Best Practices for Sustaining Career Success" to highlight best practices that are in place or under development at academic health centers, as well as in the private sector and in the military. In this conference, speakers from private industry described how their firms recognized 15-20 years ago the changing workforce demographics and the need to retain and promote the increasing numbers of talented women employees, since attrition represented a large financial and competitive cost. The speakers presented the systematic approaches to developing programs of mentoring, coaching, inclusion and buy-in by senior management that have resulted in the promotion of women and minorities to the most senior positions in their firms.

As we move forward in exploring ways to ensure opportunities for sustained career success, we recognize that multiple organizations and stakeholders must join together to coordinate efforts and to initiate programs and pilot projects to determine what works well in specific settings. These organizations include the NIH, the Association of American Medical Colleges, the Association of Professors of Medicine, academic health centers, as well as other professional societies and federal organizations.

Interactions and partnerships among these organizations can result in the widespread adoption of best practices that will stimulate future generations of women in biomedical research to see opportunities, rather than barriers, as they envision careers that extend from training to full partnership as leaders in their organizations.

Barbara Alving, M.D., M.A.C.P.

On behalf of the NIH Planning Committee for the March 4, 2008, conference

Executive Summary

Women now represent 50 percent of the medical school graduates and 50 percent of the Ph.D.s in biomedical sciences in the United States each year, yet only 32 percent of the faculty in U.S. medical schools are women. Recent studies point to a “leaky pipeline”; at every stage in the academic career ladder, there is a 10- to 15-percent attrition in the proportion of women to men. According to a recent National Academy of Sciences report, the problem stems from “unintentional biases and outdated institutional policies and structures.” For a variety of reasons, women in junior faculty posts are deciding that a tenure-track position in academic medicine isn’t a good choice for them.

The solution begins with examining the culture of the institution. Academic medicine needs to create a new culture and provide women with the mechanisms and support they need to seek and retain positions of leadership in biomedical careers. A useful first step is for the institution to conduct an honest and objective “equity check.” An assessment of current conditions will help guide the institution as it develops its own tailored plan for addressing the sustainability problem.

Models for addressing the need to recruit and retain women in high positions can be found in the private sector, which faced similar problems in attracting and retaining female “knowledge workers” 20 years ago. Accounting firms like Deloitte & Touche and Ernst & Young discovered that there is a business case to be made for retaining and promoting talented women – the company avoids the high costs of recruiting and training new workers. Consequently, they adopted a variety of new policies and programs to meet their goals. Bringing awareness of the problem to company employees and setting the right “tone at the top,” ensuring that there would be no negative consequences for breaks in service, providing mentorship programs for young women, spotlighting high-achieving women and helping them extend their reach are some of the ideas they adopted. As evidence that these measures work, women now represent 48 percent of the workforce and 51 percent of new hires at Deloitte & Touche, and 33 percent of the new partners at Ernst & Young.

The U.S. military biomedical services have also instituted successful programs to promote women to officer positions. Through training opportunities, mentorship programs, and offering a clear path for advancement and increasing challenges, 30 percent of the officers at the Naval Institute for Dental and Biomedical Research are now women.

There are also model programs to recruit and retain women in several academic institutions. The Association of American Medical Colleges has developed a worksheet to help leaders track their own expectations for women faculty, and its website contains resources addressing team building, mentoring and other diversity issues. With funding from the National Science Foundation, the University of Wisconsin at Madison created a “Women in Science and Engineering Leadership Institute” to help advance women in science careers. The Institute has held educational workshops and made changes in the culture of the University, which studies show have significantly improved the climate for women and increased the number of women in leadership positions over the last six years. Morehouse School of Medicine has three career development programs in the biomedical sciences to provide women with the skills and support they need at every stage

of their careers: A Clinical Research and Career Development Program for faculty early in their careers; a mid-career program focused on reducing attrition through mentoring and collaboration opportunities; and Executive Leadership in Academic Medicine and Senior Women Leadership Development programs to support and retain senior women in biomedical careers. Other examples of successful programs can be found at Idaho State University, the University of California at San Francisco and at Davis, and Weill Cornell Medical College.

NIH, for its part, has created the Working Group on Women in Biomedical Research Careers with a mandate to “develop innovative strategies and tangible actions that can be implemented to promote the advancement of women in research careers both within the NIH intramural community and throughout the extramural research community.” Women constitute only 23 percent of those applying for grants, although their success rate is almost identical to that of men. For extramural and intramural women alike, key issues include child care, parental leave, and workplace flexibility programs such as telework and flextime.

Participants at the “Best Practices for Sustaining Career Success” workshop were not asked to make recommendations; however, a number of common features stood out from the presentations:

- » **Analyze the programs currently being used for efficacy and “best practices”**
- » **Secure a strong personal commitment to change from top management**
- » **Employ open and transparent policies and processes for hiring, salary and promotion decisions**
- » **Reward success**
- » **Enlarge the recruiting pools by looking at non-traditional sources**
- » **Highlight the achievements of successful women and provide networking opportunities**
- » **Institute “family-friendly” policies**
- » **Look for points of commonality between women’s programs and broader diversity programs**
- » **Establish programs to address the needs of female faculty and scientists at each stage in their careers**
- » **Provide fair and equitable access to physical, financial and organizational resources**
- » **Include women on search committees**



Meeting Proceedings

I. Welcome and Goals for the Workshop

Barbara Alving, M.D., M.A.C.P., Chair, “Women in Biomedical Research: Best Practices for Sustaining Career Success,” Director, National Center for Research Resources, National Institutes of Health, Bethesda, Maryland

Dr. Alving welcomed participants to the National Institutes of Health (NIH) Working Group on Women in Biomedical Careers workshop, “Women in Biomedical Research: Best Practices for Sustaining Career Success,” and provided a brief introduction to the workshop.

In 2006, the Committee on Science, Engineering and Public Policy of the National Academy of Sciences issued the report, “Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering,” that documented what most women already knew by experience: women face barriers in hiring and promotion in many fields of science and engineering. The report called for immediate, comprehensive reform and decisive action on the part of university administrators, professional societies, government agencies, and Congress. To respond to the report, Elias A. Zerhouni, M.D., NIH Director, convened the NIH Working Group on Women in Biomedical Careers, which he co-chairs with Vivian W. Pinn, M.D., ORWH Director. The Working Group is composed of NIH leadership, intramural investigators, and extramural scientists and administrators. The full listing of Working Group members is available in Appendix A. One of the first goals was to hold a workshop to identify “best practices” for recruiting and retaining women in biomedical careers. Representatives from academia, the military, NIH, and other institutions have been invited to share their research and approaches for promoting the sustained career success of women and minorities in the biomedical sciences.

II.

Keynote Address

PROGRESS AND PROMISE: WOMEN IN ACADEMIC MEDICINE

Nancy C. Andrews, M.D., Ph.D., Vice Chancellor and Dean, Duke University School of Medicine, Durham, North Carolina

Dr. Andrews, the first woman dean of a top 10 medical school, was introduced by Vivian W. Pinn, M.D., NIH Associate Director for Research on Women's Health; Director, Office of Research on Women's Health (ORWH), who highlighted Dr. Andrew's 2007 article in the *New England Journal of Medicine* in which she shared her own reflections on the "newsworthiness" of her appointment and the continuing barriers to the full participation of women in academic medicine.

The scope of the problem becomes evident when one compares the rate of the increase of the number of women on medical school faculties with the number of female medical school graduates over the last 30 years. In 1972, Congress passed Title IX, which made it illegal to deny equal participation in educational programs receiving federal funds. According to data provided by the Association of American Medical Colleges (AAMC), by 2006, the percentage of female medical school graduates had reached close to 50 percent; however, the percentage of female medical school faculty grew much more slowly, reaching only 32 percent the same year. In addition, the percentage of women fell as the level of faculty positions increased, so that only 8.5 percent of department chairs were women, as of 2007. The goal may be parity, but the pipeline to reach parity may not be present.

Dr. Andrews referred to comments made by Lawrence Summers, Ph.D., former Harvard University president, who suggested three theoretical reasons for this pattern: women are unwilling to make the sacrifices demanded for success, they are unable to compete with men at the top levels of academic medicine, or they face continuing discrimination in an industry that was created by men with no consideration for the needs of women.

The challenges that women face in academic medicine are familiar: feeling invisible and underestimated, feeling isolated in a culture without women, and questioning one's perception of reality. These pressures increase over time, the pattern repeats, and the discrimination persists.

Dr. Andrews detailed strategies to address these problems, which included understanding, acknowledging and communicating the needs and barriers that prevent women from succeeding in academic medicine. The competing demands of work and family are a major factor, but it's "not just the daycare." What's needed is to establish a new culture, one that is open and transparent, where teamwork is valued, where family-friendly values are promoted, and where women have a safe place to tell their stories. Women also need a new set of supports, like the networks that men have, where they can learn survival skills and methods for achieving success. It is important that institutions be open about the gaps between men and women and take real action to close them.

Good practices in this effort begin with each institution conducting an honest and objective equity check – do women really get equal access to space, resources and responsibilities? Are they consulted and included in decision-making? Other good practices include a transparent decision process for hiring and promotion; accountability at the personal and institutional levels; establishment of a culture where women feel comfortable speaking out and challenging insensitive or demeaning comments; and deliberate recruitment and empowerment of senior women, who often experience a gradual marginalization as they rise up the academic ladder. Women should be on every search committee, and departments should enlarge their recruitment pools by keeping lists of female candidates for key roles. Institutions should also develop reentry programs for returning mothers and nontraditional candidates. Until such actions are taken, discrimination will continue, and academic medicine – as well as the patient and the nation – will pay a high price for not making use of this talent pool.

A good model for this kind of institutional equity check was developed by the Massachusetts Institute of Technology (MIT) in the late 1990s and published in 1999 as, “A Study on the Status of Women Faculty in Science at MIT.” In the introduction to the report, the authors noted:

- » Unequal treatment of women faculty impairs their ability to perform as educators, scientific leaders, and role models, and impairs their quality of life
.....
- » Discrimination starts during the hiring process
.....
- » Discrimination is largely unconscious
.....
- » Discrimination is difficult to prove because “any one case, no matter how disturbing or aberrant, can usually be ascribed to its special circumstances”
.....
- » Safeguards are needed “to prevent, detect and promptly correct the experiences that together constitute gender discrimination”
.....
- » “The heart of the problem is [that] equal talent and accomplishment are viewed as unequal when seen through the eyes of prejudice”
.....

II.**Keynote Address**

Dr. Andrews presented and elaborated on the remedial actions recommended in the report:

- » Deliberately make it easier for women to “learn the culture,” thereby preventing junior women from becoming isolated
- » Provide a safe way for women to speak out, tell their stories and be heard by enlightened people with clout
- » Be transparent about the decision process used to determine salary, space, award nominations, committee service, and advancement
- » Collect the data, show the data, and hold leaders accountable for the data
- » Deliberately recruit women for influential leadership positions at every level (program heads, department chairs, administration, chairs of key committees)
- » Replace administrators who don’t have a good track record for inclusiveness, fairness and equity
- » Anticipate the gradual marginalization of women faculty as they rise in the system and take action to prevent it
- » Communicate the message that diversity is not only the right way to do business, it is also the most successful way to do business
- » Solve the childcare problem for junior faculty (of both sexes)
- » Acknowledge that work/family balance can be difficult but important, and promote “family-friendly” policies (for both sexes)
- » Celebrate successful women in order to make role models visible
- » Educate search committees, populate them with women, and make it comfortable for those women to speak out
- » Enlarge recruitment pools by actively searching in unusual places
- » Assume that measures to promote fairness, inclusiveness and equity will need to be continued indefinitely
- » Provide for unusual entry and reentry pathways

DISCUSSION

In the discussion that followed, Dr. Andrews suggested that there was no problem with the pipeline per se – women are going to medical school and completing residency and fellowship training – but there are serious leaks in the pipeline at every stage, and it is vital to plug those leaks. The MIT study found that junior women felt included in their departments in the science schools at MIT, but as they increased in seniority, they were less likely to be consulted or given important roles than their male counterparts. Their laboratory space did not increase in parallel with that of the men. By the time they were senior, they felt very isolated.

In response to a comment from the audience, Dr. Andrews added that minority women, and minorities generally, face many of the same challenges; better data are needed on the scope of the problem, but open discussion and concerted action will be needed to reverse the situation. Duke University has one of the best records in the country for recruiting underrepresented minority students and faculty, but measures that help women may or may not help members of underrepresented minority groups – the problems are not identical. It’s not clear that minorities or women only need mentors who are minority or female; mentors of diverse backgrounds who are committed to promoting the careers of their mentees and who are in positions to do so can also be effective.

Confidence can be a significant issue for women; it affects which jobs they seek, how much research funding they apply for, and the manner in which they deal with failure. An audience member described a talent management program that coaches junior women on how to move into leadership positions, something that business does very well. Dr. Andrews agreed that such programs are vital. Perhaps most importantly, women need an opportunity to have their voices heard in committees. Other participants suggested creating opportunities that celebrate the achievements of successful women, presenting them as role models for younger women. For example, it would be valuable to generate a national list of women who are available to speak at major engagements.

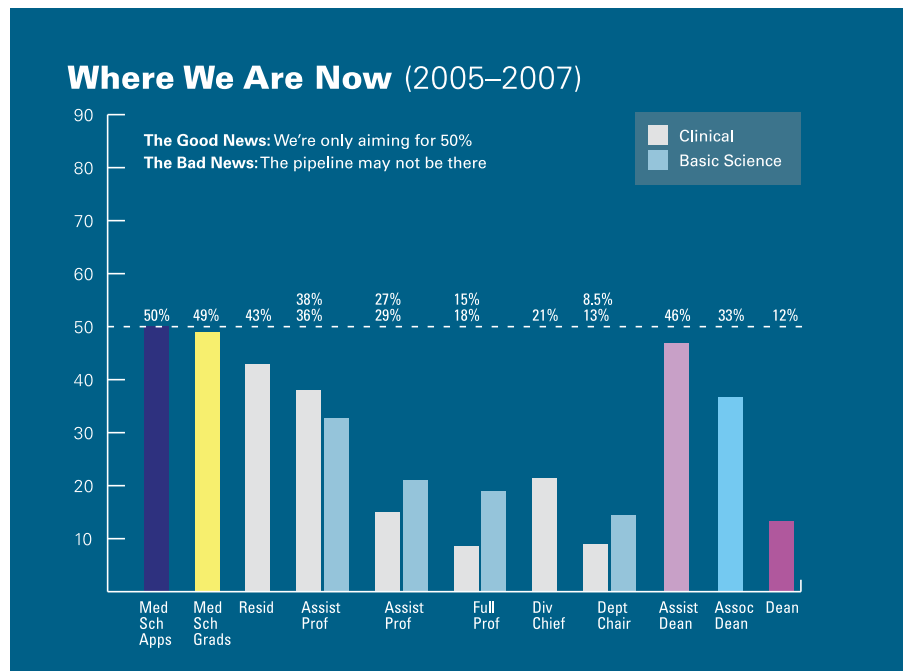


Figure 1: The percentage of women in leadership positions in U.S. medical schools drops as the level of position increases. Source: AAMC

III.

Panel One: Framing the Issues

Barbara Alving, M.D., M.A.C.P., moderator. Panel speakers described the trends of women in biomedical research careers and the implications for the field of biomedical research.

DEMOGRAPHICS OF WOMEN IN BIOMEDICAL RESEARCH: WHAT IS THE CURRENT REALITY?

Timothy Ley, M.D., Associate Director of Basic Science, Alvin J. Siteman Cancer Center; Alan A. and Edith L. Wolff Professor of Medicine, Washington University Medical School, St. Louis, Missouri

Dr. Ley presented data from the American Medical Association (AMA) and the AAMC on the demographics of women in biomedical research. Although AMA data show that the number of physician-researchers has remained fairly constant in recent years, NIH data reveal that the average age of researchers funded by NIH is increasing. Although AAMC data indicate that women now represent about half of all medical school students, there has been a much smaller change in the proportion of female medical faculty. According to the AAMC, there is a 10- to 15-percent reduction in the number of women at each stage of the academic ladder. At the current rate of improvement, Dr. Ley calculated that it may take another 50 years before women achieve full equity at the highest levels of academic medicine.

Dr. Ley emphasized the importance of studying the timing of female attrition. AAMC data show that over the past 16 years, women's verbal scores on the Medical College Admission Test (MCAT) are the same as men's, but there is a persistent, one-point and half-point gap in the physical and biological sciences, respectively. These data also show that the recent growth in enrollment in M.D./Ph.D. degree programs reflects an increase in the number of women students, while the number of men has remained roughly the same. Dr. Ley then presented his analysis of data from the NIH Office of Extramural Research. Citing the NIH Loan Repayment Program as an indicator of the early fellowship career stage, he noted that men and women have equal success rates, and women represent about half of the M.D. applicants in the program, but represent two-thirds of the Ph.D. applicants. Using mentored career development awards as indicators of the late fellowship career stage, he noted that application and success rates for men and women are identical for K23 grants (Mentored Patient-Oriented Research Career Development Award). Although the pool of women applicants for K08 grants (Mentored Clinical Scientist Research Career Development Award) is half as large as that of men, the success rates for men and women are equal. Turning to the "first-time" applicant pool for Research Program Grants (R01 and others) as an indicator of the early independent investigator career stage, he noted again that while only half as many women as men apply for these grants, their success rates are equal. Finally, Dr. Ley presented data on application and success rates by previously funded investigators as an indicator of the experienced investigator career stage. Only one-third as many women as men apply for a second or subsequent R01, although once again the success rate for women who do apply is equal to that of male applicants.

In summary, Dr. Ley said that the total number of physician-scientists is at a steady-state, but there is a core attrition for women that begins at the late post-doctoral stage and continues along the entire career path, until men outnumber women by margins of two or three to one. Because women compete as well as men at all levels, this attrition appears to occur because the career path was created by men, for men, and has not changed in response to the need for more researchers. In Dr. Ley's opinion, a dramatic change in the culture of academic medicine will be required to reverse this trend.

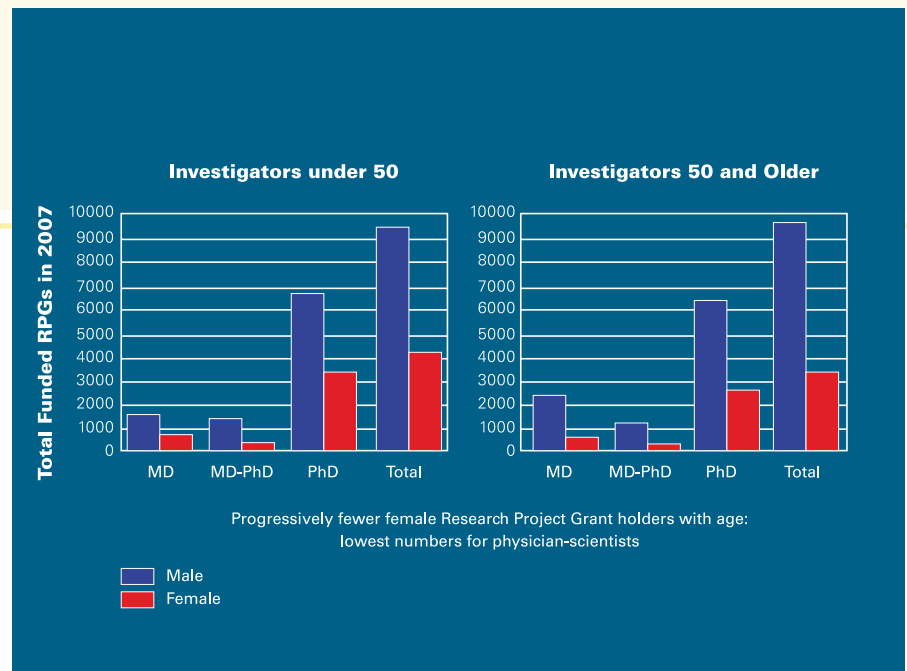


Figure 2: There are progressively fewer women holding NIH research project grants as their age increases. Source: NIH

THE REALITY OF THE DATA: EMPLOYMENT OF WOMEN WITH PHDS IN BIOMEDICAL SCIENCE

Phoebe Leboy, Ph.D., President, Association for Women in Science (AWIS), and Professor, University of Pennsylvania School of Dental Medicine, Philadelphia, Pennsylvania

Dr. Leboy reported that, according to the National Science Foundation's (NSF) Survey of Earned Doctorates, women received about half of the Ph.D.s in the biomedical sciences in 2006 (up from 39 percent in 1987), compared with 20 percent in engineering and 18 percent in physics. As a result, academic medical centers should have no problem recruiting women for faculty positions, except perhaps for women of color. However, according to data provided by the Federation of American Societies for Experimental Biology (FASEB), the proportion of women faculty in basic science medical departments plateaued at about 60 percent and is now falling. The reason for this disparity, according to the available data, is that qualified women are choosing not to seek tenure-track faculty appointments.

In general, the current "availability pool" for junior faculty positions includes women who received their degrees from 1996 to 2005, and the pool of women who are associate or full professors generally includes those who received Ph.D.s between 1986 and 1995. But while women represent 50 percent of those qualified for biomedical faculty positions, lower percentages appear at every subsequent stage of the career path. Dr. Leboy doesn't think this is simply a leaky pipeline, but rather attributes this phenomenon to women perceiving a non-level playing field. Dr. Leboy suggested several possibilities to explain why there are so few women in tenure-track positions. Some departments still don't hire women, and many women simply don't apply. A study carried out by the Association for Women in Science (AWIS) found that only 18 percent of applicants for assistant professor positions in biochemistry and molecular biology departments in medical schools were women. The non-level playing field is exemplified by the statistics provided by the NIH Office of Extramural Research which show that although women are competing exceptionally well for peer-reviewed grants and initial awards, they tend

III.**Panel One: Framing the Issues**

to have fewer grants, fewer dollars per grant, lower success rates at renewal, and fewer of the large NIH grants. Meanwhile, medical schools are increasingly emphasizing grant funding as a way to support faculty salaries.

Clearly, many female junior faculty members are deciding that tenure-track positions are not a good choice for them. According to a survey of NIH postdoctoral fellows, women report a lack confidence and tendency to underestimate their own capabilities. They also find that institutional structures and practices are unsupportive of women, or they encounter low prestige and unconscious bias, all of which have a negative effect on their publication rate and ability to compete for grants. In some cases, the very assertiveness that would be necessary to overcome these barriers is perceived as unacceptable female behavior. Solutions need to be found for these problems, which are both structural and cultural. Dr. Leboy concluded on a positive note, pointing out that there are excellent women role models in academic medicine and biomedical research.

DISCUSSION

A participant pointed out that there is not one woman principal investigator (PI) among the 20 largest NIH center grants. Dr. Leboy hypothesized that this could be due to the fact that the PIs of large center grants are chosen by their institutions. Another audience member agreed that lack of confidence and assertiveness among women scientists are major problems and believes that this often has its roots in middle school.

IV.

Panel Two: Models for Advancement in Industry

Joan Lakoski, Ph.D., moderator. Speakers from the business community addressed how they improved opportunities for women to have sustained career development and success.

DELOITTE'S EXPERIENCE WITH THE WOMEN'S INITIATIVE (WIN)

Asif Dhar, M.D., Deloitte Consulting, LLP, McLean, Virginia

Dr. Dhar reported that the professional services industry began to note many of the problems described in this conference 15 to 20 years ago. There was a shrinking "availability pool" of potential managers and highly skilled workers, as well as changes in family structure, that placed more women in the workforce. Trends showed that more and more women were entering the workforce with professional degrees, which was increasing the number of women qualified for management positions.

In response, Deloitte launched its initiative for the retention and advancement of women (WIN) in April 1993, with the goals of creating a more inclusive environment, attracting the best talent, and building the intellectual capital needed to serve its clients. Since then, the firm has implemented such innovations as formal flexible work arrangements, paid parental leave, gender awareness seminars (for men and women), women's networking forums, research on the art and science of mentoring, and annual surveys of workplace culture and women's retention, advancement and leadership. More recently, these initiatives have been formalized in the "mass career customization" program (Cathleen Benko and Anne Weisberg, *Mass Career Customization; Aligning the Workplace with Today's Nontraditional Workforce*. Boston: Harvard Business Press, 2007), which allows individuals unprecedented freedom in defining when, how, and where their work gets accomplished and what trajectory their personal careers will follow.

The keys to success in these efforts, according to Dr. Dhar, include the commitment of Jim Quigley, Chief Executive Officer and Cathy Benko, National Managing Director, Initiative for the Retention & Advancement of Women. Leadership from the top is critical to the success of these initiatives. There is a business case to be made for these changes, which are taken not merely as a courtesy to workers, but as a marketable improvement

How Does WIN Work?

- **Innovation**
Crafting program innovations with emphasis on choice and the advancement of women in our profession
 - Mass Career Customization
 - Personal Pursuits
- **Professional Development**
Develop qualified women to give them more opportunities to succeed
 - WIMAC (Women's Initiative Manager Action Committee)
 - Leading Edge
- **Mentorship**
Researching the art and science of mentoring to determine leading practices
 - Crafting mentoring programs with supporting recognition and metrics
 - Focusing senior mentoring the most promising women in our organization
- **Eminence**
Developing research and promoting the accomplishments of our women
 - Keeping connected with the latest research on women in the workplace
 - Work with community leaders to bring women's issues to the forefront
- **Marketplace**
Helping women extend their own reach in the marketplace
 - Working Mother magazine's annual Work Life Congress
 - Fortune's Summit on the 50 Most Powerful Women



Figure 3: Deloitte and Touche's "Women's Initiative" (WIN) to Retain and Advance Women. Source: Deloitte and Touche

IV.

Panel Two: Models for Advancement in Industry

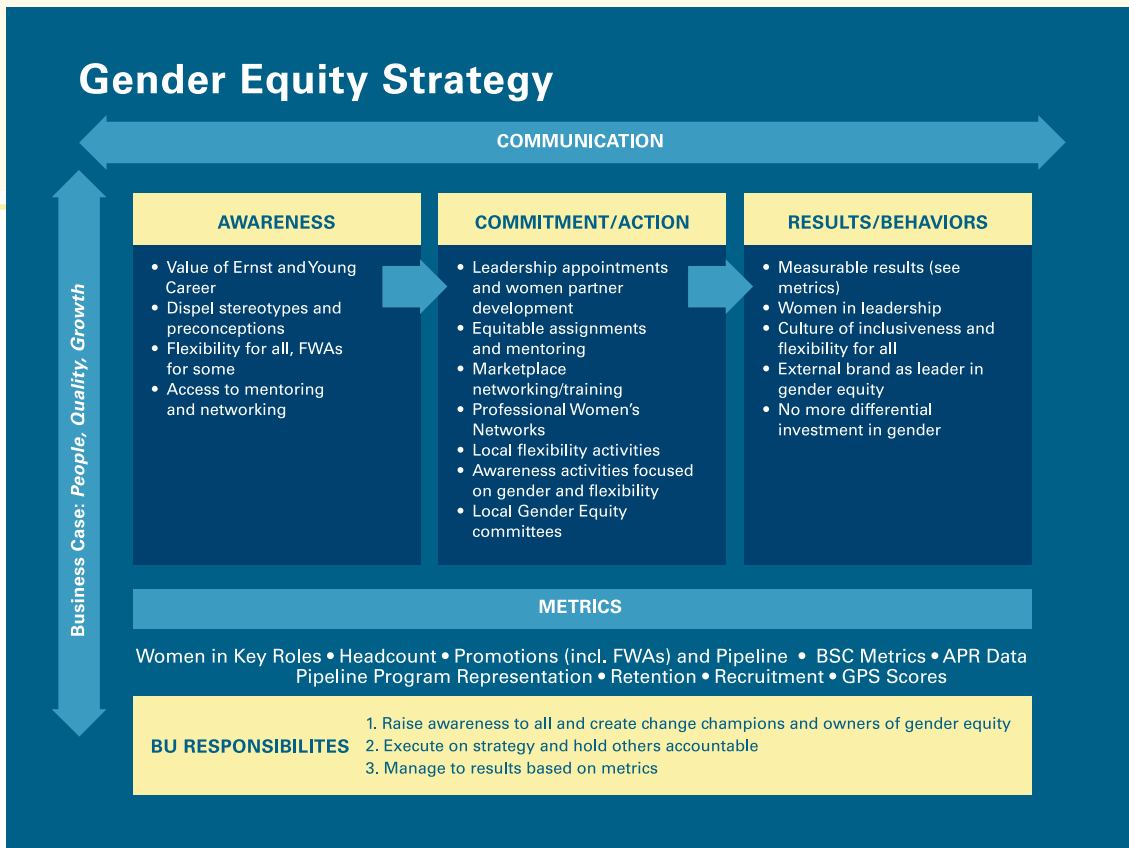
in the services that Deloitte can deliver to its customers. In 1992, only four of fifty candidates for partner were women. Today, Deloitte has the highest percentage of women directors, partners and principals among the Big Four accounting firms. Women now represent 47 percent of the firm's hires, 54 percent of its rehires, and it has eliminated the gender gap in turnovers, retaining as many women as men.

CREATING A FLEXIBLE AND INCLUSIVE CULTURE

Jo Ellen Helmer, B.B.A., Partner, Health Sciences, Ernst & Young, LLP, Chicago, Illinois

Ms. Helmer reported that Ernst & Young faced many of the same challenges 20 years ago – demographics, competition for quality workers, and client expectations – and responded in the late 1990s with a “people first” initiative designed to change the culture of Ernst & Young. Specific features included flexible work arrangements, increased communications and transparency, greater access to training and coaching, and “concierge” services to make life easier for all employees.

Success factors have included commitment from top executives, engagement of all employees, and an emphasis on measurable results. Flexibility and inclusiveness are business imperatives and avenues to greater productivity. Every partner has inclusiveness goals for his or her practice, and each one receives report cards that affect salary and resources. Ms. Helmer noted that it was particularly important to “engage the men” who have learned that they, too, can benefit from the new flexibility and inclusiveness of the workplace. Promising women need both men and women as mentors. Greater flexibility has proven to be the route to greater productivity and competitiveness for all employees. These initiatives and others have resulted in a stronger pipeline with fewer leaks: in 2007, 33 percent of new partners at Ernst & Young were women.



DISCUSSION

In the discussion that followed, several audience members said that they admired the range of initiatives and services that were available in these accounting firms, but they weren't sure how to make the case for them in biomedical research. Both Dr. Dhar and Ms. Helmer responded that "Big Medicine" is also "Big Business," and the business case for these initiatives involves the financial savings resulting from the recruitment and retention of talented workers, as well as avoiding the loss of organizational time and knowledge when a key worker is lost to attrition. In addition, many of their customers insist that they can't grow their business unless they meet these expectations. NIH may be in a position to exert similar pressure on academic medical centers. Many of these same initiatives can also be successful in addressing the challenges that face minority women, and indeed there is a growing trend for women's and diversity programs to merge.

Vision alone is not enough; success requires the commitment of people at the top, meaningful incentives and disincentives at all levels, and measurable outputs to ensure accountability.

Figure 4: Ernst and Young Develop Successful Strategy to Recruit and Retain Women. Source: Ernst and Young Flexible Work Arrangements (FWAs).

V.

Military Medical Scientists: An Air Force Perspective

Col. Debra Niemeyer, Ph.D., Deputy Assistant Surgeon General for Modernization, Office of the Surgeon General, U.S. Air Force, Falls Church, Virginia.

Col. Niemeyer began her talk by noting that her supervisor, Brigadier General Theresa Casey, is one of the few female general officers on active duty in the U.S. military. The military hasn't always recognized the need for or contributions of women in the medical sciences, and women didn't have an official home until the creation of the Women's Medical Specialists Corps in 1945, which eventually evolved into the Air Force Biomedical Science Corps (BSC). Today the BSC provides a formal career development and advancement path for female officers in 19 different biomedical specialties. Women represent 37 percent of BSC personnel; the Navy equivalent, the Naval Institute for Dental and Biomedical Research, is 30 percent female.

The Air Force encourages career development through a combination of clear and transparent requirements, continuous mentoring, and professionally challenging assignments, all with steady feedback and advice. Success factors in recruiting, retaining, and promoting women include vision and leadership from top officers, a clearly defined career track with delineated steps for advancement, and personal recognition for their achievements. They also have a network of mentors, as well as role models, available to work with them. Nevertheless, family issues and relocations do still play a role in the decision to separate from the service.

VI.

The NIH: Promoting Sustained Career Success for Women

Elias A. Zerhouni, M.D., Director, NIH, Bethesda, Maryland

Dr. Zerhouni explained that NIH's interest in the retention and advancement of women in biomedical research is part of the government's larger concern with the competitiveness of the United States in science, technology, engineering, and mathematics (STEM), in which the U.S. now ranks between 25th and 29th among the 40 nations of the Organization for Economic Cooperation and Development. From a systems perspective, this problem involves three components of the biomedical enterprise – nature, nurture and culture – and the solution must address all three components, as well. It is well known that anonymous systems are less biased; how can we make academic medicine more anonymous?

Dr. Zerhouni noted that these problems are not new, and they are not limited to NIH. He shared an experience that occurred shortly after he and his wife immigrated to Baltimore from Algeria in 1975. His wife wished to make contacts with her fellow students at the Johns Hopkins University School of Medicine, so he asked the registrar for a list of all the third year medical students. Both Dr. Zerhouni and his wife were astonished to learn that in a class of 120, there were only seven women. Dr. Zerhouni posited that although we are still living with the echo of that inequality and there is still work to be done, progress is being made in the recognition and promotion of women. He pointed out that currently, there are six women among the directors of NIH's 27 institutes and centers, five of whom have been appointed in the past five years. Change will not come without changes in the system, but the system is not homogeneous – women are far better represented in some fields, such as pediatrics, than others. He acknowledged that multiple solutions are needed to address the diverse cultures that exist within the system, and he emphasized the importance of leadership development programs and establishment of sustainable support networks or “fan clubs” to advocate for emerging women leaders.

The NIH Office of Research on Women's Health (ORWH) functions as such a fan club, championing not only the cause of research on women's health, but also the role of women in conducting that research and in managing the research enterprise. He cited the Building Interdisciplinary Research Careers in Women's Health (BIRCWH) program, which pairs junior faculty with mentors in multiple fields of basic and clinical research, as a very successful experiment in promoting women in science, as 75 percent of the BIRCWH scholars are women. He also pointed to the ORWH reentry program that has helped 125 women and men reestablish their careers after taking time off because of family responsibilities.

Dr. Zerhouni appealed to the participants to be bold in identifying innovative concepts involving industry, the government, and academia and to be courageous in implementing them across sectors. In closing, he pointed out that the influence of the six women Institute and Center directors has fostered a positive change in culture at the NIH and that only by supporting emerging women leaders will a sustainable change throughout the STEM fields be achieved.

VII.

Panel Three: Developing Women Leaders

Diane Magrane, M.D., moderator. Speakers described models of systems and actions for creating organizational change in academic health centers and institutions conducting biomedical research.

**CREATING SYSTEMS OF ORGANIZATIONAL VITALITY—
ACTIONS FOR LEADERS**

Diane Magrane, M.D., Associate Vice President for Faculty Development and Leadership, Association of American Medical Colleges (AAMC), Washington, D.C.

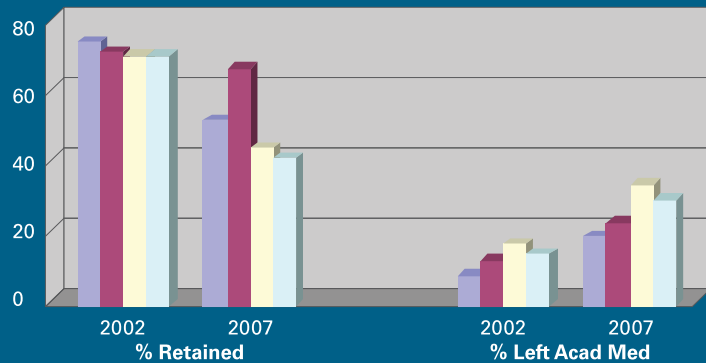
Dr. Magrane offered a definition of leadership as “a process that ordinary people use when they are bringing forth the best from themselves and others.” (James H. Kouzes and Barry Z. Posner. *The Leadership Challenge*. San Francisco: Jossey-Bass Publishing, 2007). She described how Eleanor Roosevelt recreated herself as a change agent, and Dr. Magrane called on women leaders in academic medicine to do the same. A recent AAMC report on U.S. medical school faculty retention shows that approximately 43 percent of all faculty and 45 percent of women faculty have departed from academic medicine within 10 years of their first appointment. A query of the same database to discern the outcome of 35 MD/PhDs and 254 PhD women assistant professors appointed in 1997 showed that within 10 years of their first appointment, only 35 percent of the PhDs and 20 percent of the MD/PhDs remained in academic medicine. The loss of faculty over time represents the loss of substantial financial and organizational investments made by their institutions. Conscious and systematic effort is needed to reverse this trend as a first step in the change process.

The AAMC, through the section on Faculty Development and Leadership, has developed a framework for comprehensive professional development. It recognizes the reciprocity of institutional support for programs and information that leaders provide to help women achieve the goals of leadership, and the individual contributions that women faculty must make to ensure their own success in light of institutional goals. In this scheme, the components of “organizational vitality” are: professional responsibility, personal capability, and community of practice, each of which must be addressed by both the institution and the individual. For example, it isn’t enough for institutions to expect faculty to obtain grants, conduct research and publish the results; they must also provide them fair access to protected time and laboratory resources, assistance in grant submission and compliance oversight, bridge funding between grants, and awards that recognize their achievements. The same applies to committee assignments, access to mentors and mentees, and opportunities to participate in collaborations and professional development programs. Data collected by AAMC show that retaining women faculty to the associate professor level greatly increases the chances of keeping them in academic medicine, but that they need executive training to rise to higher levels.

Keeping Faculty Present and Productive

5 and 10 Year Percent Retention and Attrition of MD/PhD and PhD Assistant Professors Appointed Fall 1997

Women MD/PhD (35)
Men MD/PhD (185)
Women PhDs (254)
Men PhD (363)



Source: AAMC Faculty Roster (report run 2/19/08 from FAMOUS database by Diane Magrane, M.D. for the NIH conference session, *Developing Women Leaders*, March 4, 2008).

Figure 5: AAMC Works to Retain Men and Women in Assistant Professor Positions.

A new resource on the AAMC website is the on-line publication, *Faculty Vitae* (www.aamc.org/facultyvitae), which addresses a variety of faculty development issues, such as team work, educational scholarship, mentoring, and diversity. The AAMC portfolio of programs ranges from early stage women in medicine programs to executive development and, most recently, a longitudinal program to enhance the work of teams of scientists, educators, and clinicians in medical schools and teaching hospitals.

ENHANCING DEPARTMENTAL CLIMATE TO PROMOTE THE DEVELOPMENT OF WOMEN LEADERS IN ACADEMIA

Jennifer Sheridan, Ph.D., Executive Director, Women in Science and Engineering Leadership Institute (WISELI), University of Wisconsin at Madison

Dr. Sheridan described several interventions instituted by the University of Wisconsin at Madison to change the organizational climate for female faculty. In this case, “climate” was defined as the organization’s structures, policies and practices; the demographics of its membership; the attitudes and values of its members and leaders; and the quality of their personal interactions. A preliminary survey of faculty in 26 biological and physical science departments taken in 2003 found that while 70 percent of female faculty thought that the climate for women was good in their departments, 90 percent of male faculty and 95 percent of department chairs thought it was positive.

To address this disparity, WISELI implemented two organizational interventions. The first was a series of workshops for search committees, introducing them to the literature on unconscious bias and giving practical tips on how to broaden the pool of candidates and overcome assumptions about female candidates. Over 250 faculty members from 79 departments throughout the university have participated in these workshops over the past four years. The second intervention targeted department chairs, involving them in three small-group sessions that focused on concrete actions to improve the climate for women. Twenty-six departments have participated in these sessions, including over a third of the STEM departments.

Repeat surveys taken in 2006 showed a slight improvement in the perception of the organizational climate for women in departments whose chair participated in these workshops. More importantly, perhaps, there was less gender disparity in these perceptions: female faculty members reported a better climate for women, and male faculty and chairs seemed to have a more realistic assessment of the climate for women in their departments. Significantly, the proportion of female department chairs in the biological and physical sciences rose from 5 percent in 2004 to over 20 percent in 2007.

VII.

Panel Three: Developing Women Leaders

Figure 1. The Climate for Women in My Department is Good (2003)

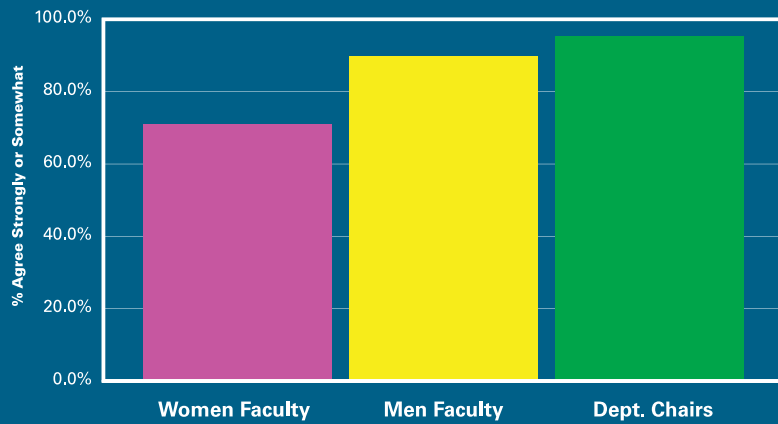
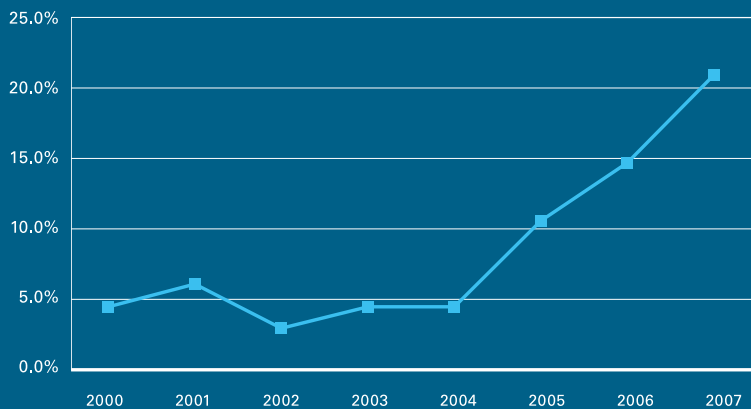


Figure 6: There is a Disparity in Responses among Men and Women Faculty and Department Chairs Regarding Climate for Women at the University of Wisconsin

Figure 7: The Percentage of Women Department Chairs in the Biological and Physical Sciences is Going Up. Source: University of Wisconsin

% Women Department Chairs Biological & Physical Sciences



FOSTERING LEADERSHIP – LEARNING FROM TWO INSTITUTIONS

W. Sue Shafer, Ph.D., Consultant, Women’s Careers in Science, San Francisco, California

Dr. Shafer described initiatives at Idaho State University (ISU) and the University of California-San Francisco (UCSF). The ISU program, like WISELI in Wisconsin, was funded by a grant from the NSF ADVANCE program. The UCSF program was funded by the Institution. At ISU, a study group met for six months to identify problems and possible solutions, which were then submitted to focus groups for validation and refinement. The resulting interventions included an annual research symposium to showcase the research activities of female faculty in STEM departments, organization of meetings between female candidates and female faculty, and awareness-raising receptions that included small-group discussions of mentoring, child care, parental leave, and spousal accommodations. The results included a burst of research proposals and publications and an increase in the number of female full professors from three to seven.

At UCSF, the chancellor commissioned a third-party survey of organizational climate, which found that women were more likely than men to feel that they have fewer resources and leadership opportunities, receive less mentoring and less support for life outside of work, and experience sexual harassment or discrimination. A faculty committee recommended ten systemic actions to address these findings, all of which have been enacted by the chancellor:

1. Provide high-level support
2. Establish a Chancellor’s Council on Faculty Life
3. Improve the search process
4. Provide social welcoming and orientation for new faculty
5. Improve mentoring
6. Foster leadership opportunities
7. Improve understanding of review and promotion
8. Address work/life balance issues
9. Acknowledge and properly credit collaborative research
10. Achieve salary equity

UCSF will repeat the faculty climate survey in a few years to determine if these interventions are making the expected improvements. Taken together, the ISU and UCSF initiatives are interesting experiments in creating or modifying a faculty climate to make it more inclusive and supportive for women and better able to prepare women for leadership roles. Dr. Shafer closed by listing the guidelines that these two initiatives had in common:

- » Collect data that outline the problems and that can be used to convince the skeptics
- » Know which problems you’re trying to solve
- » Obtain support from the top. (This is crucial)

VIII.

Panel Four: Models for Advancement in Academia

» Involve the faculty themselves in finding solutions

Judith Bond, Ph.D., moderator. Speakers described how academia and scientific and professional societies can promote the career success of women in biomedical research.

PROGRESS IN RECRUITING AND RETAINING WOMEN IN RESEARCH AT UC DAVIS: A DECADE OF DEFINING, REFINING AND IMPLEMENTING BEST PRACTICES

Barry Klein, Ph.D., Vice Chancellor for Research, University of California-Davis

Report of the UC Davis Chancellor and Provost Task Force on Faculty Recruitment

May 1, 2000

- Departments and programs should be rewarded for both their past and present efforts and success in hiring and retaining diverse faculty. Incentives may include, but should not be limited to:
 - The awarding of additional faculty FTE
 - Early release of FTE, and
 - Additional discretionary funds to be used for graduate student or postdoctoral diversity
- Deans, departments, and programs should be held accountable for promoting diversity.
 - Accountability may include, but should not be limited to performance evaluations of deans and department chairs and other administrators regarding recruitment and diversity
 - Failure on the part of departments and other units to make vigorous efforts to diversify the faculty should result in the withholding of additional FTE and additional recruitment-related discretionary funds until the dean is sure that future recruitments will be effective
 - The Task Force strongly believes that this two-part recommendation, above all others, will provide the necessary catalyst for change.

UC DAVIS
UNIVERSITY OF CALIFORNIA

Dr. Klein reported that his institution has been successful in increasing faculty diversity in some fields, such as engineering and veterinary science, but not as successful in others, such as the biological sciences. In 2000, a task force on faculty recruitment proposed several initiatives designed to increase diversity, with incentives for success and consequences for failure. These programs have been particularly successful at the UC Davis School of Medicine, which has significantly increased the number of female, Black and Latino hires. General best practices include hiring at the junior level, hiring in clusters, and monitoring the recruitment process to address issues early. It is also important to address work/life issues through programs such as extending the tenure clock (e.g. for child bearing or rearing), modifying active service to accommodate family needs, providing

Figure 8: Report of the UC Davis Chancellor and Provost Task Force on Faculty Recruitment. Source: University of California, Davis

opportunities for partners, and initiating career reviews to ensure equity and fairness. Successful best practices also include obtaining support from the top, listening to the points of view of female faculty, and offering women more administrative opportunities. Experience has shown that female chairs and deans serve as magnets for other women academic professionals and students.

WOMEN IN BIOMEDICAL RESEARCH

Andrew Schafer, M.D., Chair, Department of Medicine, Weill Cornell Medical College, New York, New York

Dr. Schafer, who is the Chair of the Association of Professors of Medicine (APM) Research Committee, described the elements of the Physician-Scientist Initiative launched in 2007 by APM. Beginning with a series of surveys, focus groups, and a consensus conference, APM has formulated strategic goals and timetables and is currently building coalitions to implement the plan. An important element was an application for an NIH R13 conference grant, which was funded and cosponsored by 13 NIH Institutes and Centers, to support a national consensus conference on November 15, 2007.

The results of APM's survey of 880 chairs of clinical departments and members of professional societies (published in June 2008 and available at <http://www.im.org/PolicyAndAdvocacy/PolicyIssues/Research/PSI/Pages/Physician-ScientistInitiativeRecommendationsforRevitalizingtheNation'sPhysician-ScientistWorkforce1.aspx>) show that women are not as interested in the physician-scientist career path as men: women respondents tended to be more pessimistic about considering such a career, citing problems with lifestyle, salary, and job security. On the other hand, women respondents were more positive about initiatives that would increase job security, permit part-time work, extend the tenure clock, and provide bridge funding. One major recommendation that came out of the 2007 consensus conference was that reducing the attrition of female physician-scientists will require earlier and more coordinated efforts to identify and prepare those female investigators who have a commitment to biomedical research careers. In some cases, this may require greater flexibility in time-based promotion review and tenure decisions, and gender equity in research support, including protected time, laboratory space, startup packages, and bridge funding.

WOMEN IN BIOMEDICAL RESEARCH: BEST PRACTICES FOR SUSTAINING CAREER SUCCESS

Elizabeth Ofili, M.D., M.P.H., Associate Dean for Clinical Research, Morehouse School of Medicine (MSM), Atlanta, Georgia

Models for Biomedical Scientist Career Development

- **MSM Clinical Research and Career Development Program 2002: NCCR, trans-NIH institutes** - identify highly motivated underrepresented minority faculty early in their academic career for rigorous curriculum based training in clinical research, as the foundation for outstanding academic careers in clinical investigation.
- **Executive Leadership in Academic Medicine (ELAM) from 1995** – Preparing senior women faculty at schools of medicine, dentistry and public health for institutional leadership; 522 alumnae and fellows
- **AAMC Teamworks** – Learning in teams; focus on collaboration

Dr. Ofili discussed her experience with three programs for biomedical science career development:

1. MSM's Clinical Research and Career Development Program identifies highly motivated minority physicians for curriculum-based training in clinical research, resulting in an accredited MS in Clinical Research. Enrollment is 75 percent women, and 95 percent of students continue their careers at MSM. Dr. Ofili noted that this program provides an excellent opportunity to encourage young minority physicians who don't see any other entrée into research to pursue a career as a physician-scientist. She explained that MSM has built upon this program to enter into a partnership with other universities and obtain NIH funding from the Atlanta Clinical

and Translational Science Institute (ACTSI), which further expands opportunities for students and faculty at MSM.

2. Team Works, developed by the Association of American Medical Colleges (AAMC) with support from the Robert Wood Johnson Foundation, is a six-month professional development curriculum that focuses on team-building and collaboration in research, teaching and clinical settings. While MSM has committed to providing funds for the entire women faculty who are in leadership positions within the ACTSI to participate in this program, many smaller institutions may not have the resources available to allow their faculty to do so.

3. Executive Leadership in Academic Medicine (ELAM), sponsored by the Drexel University College of Medicine in Philadelphia, is a one-year program that provides senior female faculty with the personal and professional skills they need to move into positions of institutional leadership. ELAM is the only one of these programs that specifically targets female faculty; Dr. Ofili emphasized the importance of such programs for developing the professional networks that are so important for career advancement.

Dr. Ofili concluded that these programs, taken together, cover the entire timeline of an academic career: the Morehouse program helps physician-scientists start their careers in a very supportive environment, TeamWorks offers midcareer scientists the support they need to reduce the attrition seen in the AAMC data presented earlier in the day, and ELAM helps prepare senior women faculty to transition into and excel in leadership roles.

Figure 9: Morehouse School of Medicine (MSM): Models for Biomedical Scientist Career Development. Source: Morehouse School of Medicine, Atlanta, Georgia

IX.

Panel Five: Best Practices Initiatives at NIH

Kathryn Zoon, Ph.D., moderator. In this panel session, speakers from NIH discussed the development of programs for the intramural and extramural communities to ensure opportunities for the sustained career success of women in biomedical research.

BUILDING AN EVIDENCE BASE TO ADDRESS CHALLENGES IN THE CAREERS OF WOMEN IN SCIENCE

Raynard Kington, M.D., Ph.D., Deputy Director, NIH, Bethesda, Maryland

Dr. Kington reported on the task of building an evidence base to address the challenges in the careers of women in science. He stated that the NIH Subcommittee on Research on the Efficacy of Programs to Reduce Gender Bias has gathered information on a wide variety of programs that address career development for female faculty and scientists, ranging from local to national and from the small and modest to the large and ambitious. However, most of these programs are relatively new, and there has been little or no rigorous analysis of their efficacy or results. Dr. Kington then posed the question of what we can learn from examining current patterns of career choices. He pointed to the extraordinary increases in the proportion of women faculty in psychiatry and students in the veterinary sciences in recent years, and contrasted these changes to the stagnant proportion of female faculty in engineering and computer science. He noted that there has been little rigorous analysis of why these trends have emerged.

Dr. Kington addressed the question of inherent bias in existing measures of success and the need to develop alternative measures of scientific impact, noting that, on average, women publish fewer papers than men do, but the papers they do publish tend to be more widely cited. He pointed out that there are many disparities in awards and honor society membership, as well. Another factor that has been purported to play a role in career disparities is time spent on service. Dr. Kington pointed to a 2003 faculty climate survey from the University of California–Berkeley which indicated that women value mentoring and community building more highly than men do and may focus more of their time there. He also shared a preliminary analysis of a 1999 national survey of post-secondary faculty that specifically addressed committee service but noted that as of yet, they were not able to document striking differences between the service of men and women.

To address the lack of data, 18 NIH Institutes, Centers, and Offices have signed on to a Request for Applications published by the National Institute of General Medical Sciences entitled, “Research on Causal Factors and Interventions that Promote and Support the Careers of Women in Biomedical and Behavioral Science and Engineering,” the goal of which is to build the evidence base to help inform policy and the development of effective interventional strategies. Dr. Kington closed by insisting that evidence matters, both in making a case and in documenting results.

IX.

Panel Five: Best Practices Initiatives at NIH

CAREER-RELATED EXTRAMURAL POLICIES AND ACTIVITIES

Walter Schaffer, Ph.D., Senior Scientific Advisor for Extramural Research,
NIH, Bethesda, Maryland

Participation of Women in NIH Extramural Programs (2004)

- **Summary:**

Women near parity with men in training and career development mechanisms

Women receive about 25% of the R01s

- equal success rates on new applications
- slightly larger awards

Gains in other types of awards, but not as dramatic as for R01s

The NIH continues to be concerned about instances of bias in our review and award system

Full slide set: <http://report.nih.gov/index.aspx?section=NIHResearch>

Dr. Schaffer presented data from the Office of Extramural Research (OER) on the participation of women in NIH extramural research. The data, which are available on the OER website noted on the slide, indicate that women are participating at increasing rates in pre- and post-doctoral programs, and they represent a steady but not equal number of recipients of more advanced grant support. The proportion of R01 grants awarded to women has risen from 21 to 25 percent since 1998, women's success rates are almost identical to those of men, and the size of initial grants made to women is slightly larger. However, the success rate of women on their first renewal is slightly lower than for men. A few important policy questions to emerge in recent years are whether the indirect portion of NIH research grants can be used to cover child and family care costs, whether grant funds to attend conferences can be used to cover child care, and whether parental leave can be extended

Figure 10: Women are Gaining But Have Not Yet Reached Parity in NIH Grant Awards. Source: NIH

to cover National Research Science Award training grants. In each case, policies are driven by federal cost accounting standards. Such expenditures must be aligned with those of the home institution. The OER web site now features an FAQ which clarifies the answers to many of these questions (http://grants.nih.gov/training/faq_childcare.htm)

NATIONAL LIBRARY OF MEDICINE PILOT ACTIVITIES TO ENHANCE BIOMEDICAL CAREERS

Valerie Florance, Ph.D., Deputy Director for Extramural Programs, National Library of Medicine (NLM), NIH, Bethesda, Maryland

Dr. Florance described the lessons learned from 20 years of NLM-supported biomedical informatics research training programs at 20 different sites, five of which are run by women. Nearly 40 percent of their trainees are women. NLM has tested a pilot program for caregiver support at its training programs, with the following results:

- » Extended leave for childbirth or adoption. The specific policies vary from site to site, but in most cases, NLM trainees would be permitted to take up to 60 days of unpaid leave after the birth or adoption of a child. This program was implemented in July of 2007.
- » Caregiver leave (30 days at half pay). Again, the policies vary at different organizations, and in some case there was no policy that addressed this type of program; however, program managers indicated that this would be a beneficial option, so the program was implemented in July of 2007.
- » Child care at conferences. Although program directors didn't see the need for such a program and other complications arose preventing implementation of a program to provide child care at NIH training conferences, NLM is working with all parties to address what is widely seen as a pressing need.
- » Primary Care Technical Assistance (PTCA) Supplements. This National Institute of Allergy and Infectious Diseases (NIAID) program provides supplemental funding for postdoctoral research scientists who are taking care of a child or sick family member. These funds enable NIAID R01 grantees to hire a mid-to-senior level technician to fill in while the caregiver needs to be away from the laboratory. NLM is considering implementing such a program for its grantees, as well.

In short, local program directors and administrators play a key role in the success of new initiatives, but diverse institutional regulations and the absence of staff awareness of problems are important limiting factors.

NLM Pilots for Caregiver Support (2007)

- Birth or Adoption Leave:
 - » Extended unpaid leave for birth/adoption (up to 60 days). This extends the existing allowance of 30 days.
 - » Feedback from programs: 2 or 3 could have used it in the past 5 years
 - » Implemented July 2007
- Caregiver Leave:
 - » Extend paid leave to care for child or sick family member (half pay, 30 days)
- Rules of this institution's graduate program apply
- Implemented July 2007

Figure 11: National Library of Medicine Pilots Caregiver Support to Staff. Source: National Library of Medicine

IX.**Panel Five: Best Practices Initiatives at NIH**

INTRAMURAL NIH INITIATIVES

Joan Schwartz, Ph.D., Assistant Director, Office of Intramural Research, NIH, Bethesda, Maryland

Dr. Schwartz described various initiatives that have been proposed or implemented to assist NIH Intramural researchers. NIH has two on-campus child care facilities at its main campus and two centers at satellite campuses, but with over 1,000 names on the waiting list, NIH is looking for ways to expand the service. A new child care center has been designed but has not yet been funded. NIH has a subsidy program that helps lower-income employees pay for off-campus day care and is looking at the possibility of reserving space at off-campus child care facilities. To address the need for family leave, NIH has a voluntary leave transfer program that allows colleagues to contribute their annual leave to a worker who has a family or health emergency, and there is a proposal to create a leave bank, offering more flexibility, for the same purpose. Finally, Dr. Schwartz presented a program similar to the PCTAS (funded through NIAID) in which a tenure-track or tenured investigator may hire a temporary laboratory manager while he/she is on extended leave.

To assist in recruiting dual-career couples, NIH has helped establish a regional consortium of universities and research institutions to assist in spousal/partner employment called the Mid-Atlantic Higher Education Recruitment Consortium or M-A HERC. NIH is developing an information package on flexibility programs, such as telework and alternative work schedules, and the infrastructure to encourage use of these programs. A trans-NIH committee is addressing mentoring in the Intramural Program, including how to ensure that all employees have mentoring opportunities, how to evaluate the effectiveness of individual mentors, and how to strengthen mentoring skills. Courses are also available on leadership skills, assertiveness training, and how to succeed at NIH.

Responder: **Jeremy Berg, Ph.D.**, Director, National Institute of General Medical Studies, NIH, Bethesda, Maryland

Dr. Berg cautioned researchers not to underestimate the power of data, both in convincing skeptics and in convincing leadership. After all, the challenge is to encourage leaders to take decisive actions rather than conduct yet another study. He also agreed that women's problems are part of the larger issue of diversity. With millions of baby boomers retiring in the near future, there will be a large number of open positions at the top, and it behooves the community to be ready to take advantage of this opportunity.

Responder: **Joan Goldberg**, Executive Director, American Society for Cell Biology (ASCB), Bethesda, Maryland

Ms. Goldberg advised NIH to learn what it can from professional and scientific societies like ASCB, which has 30 years' experience in mentorship and recognition programs that help to create a more welcoming climate for women in science. ASCB programs provide mentoring support, career advice, recognition awards, and referral of speakers and award candidates – activities that enhance the environment and career development for both male and female students. It is very important to provide information on how to succeed and to help women overcome their sense of isolation. A critical mass of women is also needed on committees and NIH study sections, both for women to feel comfortable making their opinions known and for them to be heard.

DISCUSSION

Women make up 30 to 35 percent of the members of study sections that perform peer review for NIH grants, compared with only 25 percent of the grant recipients. The major bottleneck for women seems to be at the transition from postdoctoral scientist to first faculty appointment, in large part because female postdoctoral scientists don't apply for the positions. Dr. Schwartz noted that a survey of postdoctoral fellows at the NIH revealed that female postdoctoral scientists are less confident than male postdoctoral scientists, although they rate themselves just as highly. However, this doesn't seem to hold for foreign female postdoctoral scientists, for reasons that are just beginning to be examined.

The National Institute of General Medical Sciences is currently developing a strategic plan that will address, among other things, individual careers and the distribution of bridge funding by grantee institutions. It might be useful to include these and other strategies in the strategic plans of other institutes or for NIH as a whole. To avoid duplication of effort, this strategic plan should be based on a central library or collection of existing programs, as well as rigorous analysis of their strengths and weaknesses.

Panelists agreed that it would be useful to determine the alternate choices being made by women who are not continuing in an academic career and the reasons for their choices.

X.

Conclusion and Next Steps

Dr. Barbara Alving stressed the importance of having the participants leave this conference with a goal to creating change. She summarized the remarks from the presenters, panelists, and participants.

1. Get a strong personal commitment from top management

- » Ensure accountability at both the personal and institutional levels
- » Provide incentives for positive results, consequences for non-compliance, and metrics for objectives

2. Understand, acknowledge, and communicate the needs and barriers that prevent women from succeeding in academic medicine

- » Start with an objective equity check or faculty survey
- » Involve the faculty in finding solutions. State clearly what problems are being addressed and how the interventions will work
- » Offer gender awareness seminars for men as well as women, and especially for department chairs
- » Conduct repeat surveys to track progress and target remaining problems
- » Establish meaningful, quantifiable metrics with which to measure success
- » Make the business case – what are the costs of attrition and the cost savings of the proposed intervention?
- » “Never underestimate the power of evidence” (Jeremy Berg, Director, NIGMS)

3. Employ transparent policies and decision processes for hiring, salary, and promotions

- » Conduct equity workshops for search and tenure committees
- » Include more women on hiring and tenure committees
- » Conduct a survey of what the department expects of female faculty, and what programs or information it provides to help them achieve those goals
- » Give women a clearer sense of what it will take to survive, thrive, and succeed in academic medicine
- » Strive for salary equity

4. Enlarge the recruiting pools

- » Maintain lists of qualified women candidates
- » Institute reentry programs
- » Hire women at the junior level and in clusters
- » Monitor recruiting carefully

- 5. Create mechanisms to celebrate the achievements of successful women and help them network with other women**
 - » Maintain referral lists of women for research symposia speakers
 - » Organize meetings between female candidates and female faculty
 - » Hold social welcoming and orientation sessions for new faculty
 - » Conduct awareness-raising symposia
 - » Ensure proper acknowledgement and credit for collaborative research

- 6. Institute a wide range of programs to address the needs of female faculty at each stage in their careers**
 - » Provide focused training in clinical research for young faculty
 - » Engage women in team building and other professional development in mid-career
 - » Encourage leadership training to prepare more senior women for management and administrative positions

- 7. Address “lifestyle” issues that impact work such as:**
 - » Flexible hours and telework opportunities
 - » Paid parental leave
 - » Child and family care
 - » Concierge service for all employees
 - » Tenure clock extension
 - » Spousal hiring opportunities

- 8. Look for points of commonality between programs for women and broader diversity programs such as:**
 - » Recruiting
 - » Training
 - » Sustaining workforce

- 9. Provide fair and equitable access to physical, financial, and organizational resources and support which include:**
 - » Office and laboratory space, graduate assistants
 - » Proposal submission, financial monitoring
 - » Bridge financing, matching grants

- 10. Continue studying the issues but don’t let that stand in the way of action**
 - » Conduct research on the best ways to increase women’s confidence and assertiveness in developing their careers in biomedical research and continue to identify the psychosocial forces that are playing a role in their choices and success
 - » Evaluate the effectiveness of interventions

X.**Conclusion and Next Steps**

Dr. Alving noted that the organizations involved in workforce development need to continue to publish what private and public institutions, including NIH, are doing to promote a diverse workforce. She reiterated the need to recognize that women and minorities share common workforce issues and that minority women face particular challenges. She noted the benefits of consolidating efforts that address the needs of all under-represented groups at once. Dr. Alving concluded by emphasizing that development of a strong and diverse workforce is an economic and competitiveness issue for the U.S. and requires ongoing, active collaborations among NIH and other federal agencies in partnership with professional organizations and academic health centers.

APPENDIX A

NIH Working Group on Women in Biomedical Careers

Co-chairs

Elias A. Zerhouni, M.D.

Director, NIH

Vivian W. Pinn, M.D.

Director, Office of Research on Women's Health;
Associate Director for Research on Women's Health, NIH

Institute and Center Directors

Barbara Alving, M.D., M.A.C.P.

Director, National Center for Research Resources

Jeremy Berg, Ph.D.

Director, National Institute of General Medical Sciences

Patricia Grady, Ph.D., R.N., F.A.A.N.

Director, National Institute of Nursing Research

Story Landis, Ph.D.

Director, National Institute of Neurological Disorders and Stroke

Donald Lindberg, M.D.

Director, National Library of Medicine

Lawrence Tabak, D.D.S., Ph.D.

Director, National Institute of Dental and Craniofacial Research

Office of the Director

Raynard S. Kington, M.D., Ph.D.

Deputy Director, NIH

Ruth L. Kirschstein, M.D.

Senior Advisor to the Director, NIH

Janine Austin Clayton (formerly Smith), M.D.

Deputy Director, Office of Research on Women's Health

Catherine Manzi, J.D.

Attorney Advisor, Public Health Division, DHHS,
Office of the General Counsel

Joyce Rudick

Director, Programs and Management,
Office of Research on Women's Health

Lawrence Self

Director, Office of Equal Opportunity and Diversity Management
(Ex-Officio)

Intramural Research

Michael Gottesman, M.D.

Director, Office of Intramural Research;
Deputy Director for Intramural Research, NIH

Joan Schwartz, Ph.D.

Assistant Director, Office of Intramural Research

Edward Giniger, Ph.D.

Investigator, National Institute of Neurological Disorders and Stroke

Catherine Kuo, Ph.D.

Postdoctoral Fellow, Cartilage Biology and Orthopedics Branch,
National Institute of Arthritis and Musculoskeletal and Skin Diseases

Elaine Ostrander, Ph.D.

Chief & Senior Investigator, Cancer Genetics Branch,
National Human Genome Research Institute

Ira Pastan, M.D.

Chief, Laboratory of Molecular Biology, National Cancer Institute

Kathryn Zoon, Ph.D.

Scientific Director, National Institute of Allergy and
Infectious Diseases

Extramural Research

Norka Ruiz Bravo, Ph.D.

Director, Office of Extramural Research;
Deputy Director for Extramural Research, NIH

Walter Schaffer, Ph.D.

Senior Scientific Advisor for Extramural Research,
Office of Extramural Research

J. Taylor Harden, Ph.D.

Assistant to the Director for Special Populations,
National Institute on Aging

Pamela Marino, Ph.D.

Program Director, Pharmacology, Physiology, and Biological
Chemistry Division; Co-Director, Pharmacology Research Associate
Program, National Institute of General Medical Sciences

Belinda Seto, Ph.D.

Deputy Director, National Institute of Biomedical Imaging
and Bioengineering

Staff to Working Group

Amy Bany Adams, Ph.D.

Special Assistant to the NIH Director

Joslyn Yudenfreund Kravitz, Ph.D.

AAAS Science & Technology Policy Fellow,
Office of Research on Women's Health

Jennifer Reineke Pohlhaus, Ph.D.

AAAS Science & Technology Policy Fellow,
Office of Research on Women's Health

APPENDIX B

Workshop Planning Committee

Chair:

Barbara Alving, M.D., M.A.C.P.

Director, National Center for Research Resources, NIH

Members:

Janine Austin Clayton (formerly Smith), M.D.

Deputy Director, Office of Research on Women's Health, NIH

Kameha Kidd, Ph.D.

Health Science Policy Analyst,
National Center for Research Resources, NIH

Joslyn Yudenfreund Kravitz, Ph.D.

AAAS Science & Technology Policy Fellow,
Office of Research on Women's Health, NIH

Jennifer Reineke Pohlhaus, Ph.D.

AAAS Science & Technology Policy Fellow,
Office of Research on Women's Health, NIH

Louise Ramm, Ph.D.

Deputy Director, National Center for Research Resources, NIH

Joyce Rudick

Director of Programs and Management,
Office of Research on Women's Health, NIH

Joan Schwartz, Ph.D.

Assistant Director, Office of Intramural Research, NIH

Mona Trempe, Ph.D.

Office of Scientific Review,
National Institute of General Medical Sciences, NIH

Kathryn Zoon, Ph.D.

Scientific Director, National Institute of Allergy
and Infectious Diseases, NIH

APPENDIX C

Workshop Agenda

- 8:00 – 8:15 a.m. **WELCOME AND GOALS FOR THE WORKSHOP**
Barbara Alving, M.D., M.A.C.P., Director, National Center for Research Resources,
National Institutes of Health
- 8:15 – 9:15 a.m. **KEYNOTE ADDRESS**
Introduction of Speaker
Vivian Pinn, M.D., Director, Office of Research on Women’s Health; and Associate Director for Research
on Women’s Health, National Institutes of Health
- Progress and Promise: Women in Academic Medicine*
Nancy Andrews, M.D., Ph.D., Dean, Duke University School of Medicine
- 9:15 -10:00 a.m. **PANEL: FRAMING THE ISSUES**
Panel Chair:
Barbara Alving, M.D., M.A.C.P., Director, National Center for Research Resources,
National Institutes of Health
- Panelists:**
Demographics of Women in Biomedical Research: What is the current reality?
Timothy Ley, M.D., Associate Director of Basic Science, Alvin J. Siteman Cancer Center; and Alan A. and
Edith L. Wolff Professor of Medicine, Washington University Medical School
- The Reality of the Data: Employment of Women with PhDs in Biomedical Science*
Phoebe Leboy, Ph.D., President, Association for Women in Science; and Professor of Biochemistry,
University of Pennsylvania School of Dental Medicine
- 10:00-10:30 a.m. Break
- 10:30-11:30 a.m. **PANEL: MODELS FOR ADVANCEMENT IN INDUSTRY**
Discussion of why and how businesses are ensuring career success of women
- Panel Chair:**
Joan Lakoski, Ph.D., Associate Vice Chancellor for Academic Career Development,
University of Pittsburgh Schools of the Health Sciences
- Panelists:**
Deloitte’s Experience with the Women’s Initiative (WIN)
Asif Dhar, M.D., Deloitte Consulting, LLP
Creating a Flexible and Inclusive Culture
Jo Ellen Helmer, Partner, Health Sciences, Ernst & Young, LLP
- 11:30-12:00 a.m. **MILITARY MEDICAL SCIENTISTS: AN AIR FORCE PERSPECTIVE**
Col. Debra Niemeyer, Ph.D., Deputy Assistant Surgeon General, Modernization and Consultant
for Biomedical Research, Office of the Surgeon General, U.S. Air Force
- 12:00–1:00 p.m. Lunch
- 1:00–1:20 p.m. **THE NIH: PROMOTING SUSTAINED CAREER SUCCESS FOR WOMEN**
Elias Zerhouni, M.D., Director, National Institutes of Health

Appendix C: Workshop Agenda

- 1:20-2:20 p.m. **PANEL: DEVELOPING WOMEN LEADERS**
Panel Chair:
Creating Systems of Organizational Vitality – Actions for Leaders
 Diane Magrane, M.D., Associate Vice President, Faculty Development and Leadership, Association of American Medical Colleges
- Panelists:**
Enhancing Departmental Climate to Promote the Development of Women Leaders in Academia
 Jennifer Sheridan, Ph.D., Executive Director & Research Director, Women in Science and Engineering Leadership Institute (WISELI), University of Wisconsin at Madison
- Fostering Leadership – Learning from Two Institutions*
 W. Sue Shafer, Ph.D., Consultant, Women's Careers in Science
- 2:20-3:20 p.m. **PANEL: MODELS FOR ADVANCEMENT IN ACADEMIA**
Discussion of how academia is ensuring career success of women in biomedical research
- Panel Chair:**
 Judith Bond, Ph.D., Professor and Chair, Biochemistry and Molecular Biology, Pennsylvania State College of Medicine
- Panelists:**
*Progress in Recruiting and Retaining Women in Research at UC Davis:
 A Decade of Defining, Refining and Implementing Best Practices*
 Barry Klein, Ph.D., Vice Chancellor for Research and Professor of Physics,
 University of California – Davis
- Women in Biomedical Research*
 Andrew Schafer, M.D., Chair and E. Hugh Luckey Distinguished Professor of Medicine,
 Department of Medicine, Weill Cornell Medical College
- Women in Biomedical Research: Best Practices for Sustaining Career Success*
 Elizabeth Ofili, M.D., M.P.H., Associate Dean for Clinical Research and Director, Clinical Research Center; Chief of Cardiology and Professor, Morehouse School of Medicine
- 3:20-3:50 p.m. Break

Appendix C: Workshop Agenda

3:50-4:50 p.m.

PANEL: BEST PRACTICES INITIATIVES AT THE NIH

Discussion of NIH activities both intramural and extramural to ensure career success of women in biomedical research

Panel Chair:

Kathryn Zoon, Ph.D., Director, Division of Intramural Research, National Institute of Allergy and Infectious Diseases, National Institutes of Health

Panelists:

Building an Evidence Base to Address Challenges in the Careers of Women in Science

Raynard Kington, M.D., Ph.D., Deputy Director, National Institutes of Health

Career-Related Extramural Policies and Activities

Walter Schaffer, Ph.D., Senior Scientific Advisor for Extramural Research, National Institutes of Health

National Library of Medicine Pilot Activities to Enhance Biomedical Careers

Valerie Florance, Ph.D., Deputy Director for Extramural Programs, National Library of Medicine, National Institutes of Health

Intramural NIH Initiatives

Joan Schwartz, Ph.D., Assistant Director, Office of Intramural Research, National Institutes of Health

Responder: Jeremy Berg, Ph.D., Director, National Institute of General Medical Sciences, National Institutes of Health

Responder: Joan Goldberg, Executive Director of the American Society for Cell Biology

4:50-5:20 p.m.

WRAP UP AND NEXT STEPS

Barbara Alving, M.D., M.A.C.P., Director, National Center for Research Resources, National Institutes of Health

APPENDIX D

Speaker Biographies

Barbara M. Alving, M.D., M.A.C.P.

Director, National Center for Research Resources,
National Institutes of Health

Dr. Barbara M. Alving is the Director of the National Center for Research Resources (NCRR) at the National Institutes of Health. NCRR provides laboratory scientists and clinical researchers with the environments and tools they need to understand, detect, treat, and prevent a wide range of common and rare diseases. Dr. Alving earned her medical degree cum laude from Georgetown University School of Medicine, where she also completed an internship in internal medicine. She received her residency training in internal medicine at the Johns Hopkins University Hospital, followed by a fellowship in hematology. Dr. Alving then became a research investigator in the Division of Blood and Blood Products at the Food and Drug Administration (FDA). In 1980, she joined the Department of Hematology at the Walter Reed Army Institute of Research and became Chief of the Department in 1992. She left the Army at the rank of Colonel in 1996 to become the Director of the Medical Oncology/Hematology section at Washington Hospital Center in Washington, D.C. In 1999, she joined the National Heart, Lung, and Blood Institute (NHLBI), serving as the Director of the extramural Division of Blood Diseases and Resources until becoming the Deputy Director of the Institute in September 2001. From September 2003 until February 1, 2005, she served as the Acting Director of NHLBI. In March 2005, she became the Acting Director of NCRR and was named Director in April 2007. Dr. Alving is a Professor of Medicine at the Uniformed Services University of the Health Sciences in Bethesda, a Master in the American College of Physicians, a former member of the subcommittee on Hematology of the American Board of Internal Medicine, and a previous member of the FDA Blood Products Advisory Committee. She is a co-inventor on two patents, has edited three books, and has published more than 100 papers in the areas of thrombosis and hemostasis.

Nancy Andrews, M.D., Ph.D.

Vice Chancellor for Academic Affairs and Dean,
Duke University School of Medicine

Dr. Nancy Andrews was appointed vice chancellor for academic affairs and dean of the Duke University School of Medicine on October 1, 2007. She is also a professor in the departments of Pediatrics and Pharmacology & Cancer Biology. Andrews received her B.S. and M.S. degrees in molecular biophysics and biochemistry from Yale University, her Ph.D. in biology from the Massachusetts Institute of Technology, and her M.D. from Harvard Medical School. She completed her internship and residency in pediatrics at Children's Hospital Boston, and her pediatric hematology/oncology fellowship at Children's Hospital and the Dana-Farber Cancer Institute. After she completed her training, Dr. Andrews stayed on at Harvard and Children's Hospital, rising through the academic ranks to become the George Richards Minot Professor of Pedi-

atrics at Harvard, senior associate in medicine at the Children's Hospital Boston, and a distinguished physician of the Dana-Farber Cancer Institute. She served as an attending physician in hematology and oncology at Children's Hospital until 2003. She was director of the Harvard-M.I.T. M.D.-Ph.D. program from 1999 to 2003 and dean for basic sciences and graduate studies at Harvard Medical School from 2003 to 2007. Dr. Andrews has maintained an active NIH-funded research laboratory, studying mouse models of human diseases. She was an investigator of the Howard Hughes Medical Institute from 1993 to 2006. She has authored well over 100 peer-reviewed articles and 16 book chapters and has received many awards and honors for her research, including membership in the Institute of Medicine of the National Academies and in the American Academy of Arts and Sciences. She is president of the American Society for Clinical Investigation.

Jeremy M. Berg, Ph.D.

Director, National Institute of General Medical Sciences,
National Institutes of Health

Dr. Jeremy M. Berg became director of the National Institute of General Medical Sciences (NIGMS) in November 2003. He oversees a \$1.9 billion budget that funds basic research in the areas of cell biology, biophysics, genetics, developmental biology, pharmacology, physiology, biological chemistry, bioinformatics, and computational biology. The Institute supports more than 4,500 research grants—about 10 percent of the grants funded by NIH as a whole—as well as a substantial amount of research training and programs designed to increase the number of minority biomedical scientists. Prior to his appointment as NIGMS director, Dr. Berg directed the Institute for Basic Biomedical Sciences at The Johns Hopkins University School of Medicine in Baltimore, Maryland, where he also served as professor and director of the Department of Biophysics and Biophysical Chemistry. In addition, he directed the Markey Center for Macromolecular Structure and Function and co-directed the W.M. Keck Center for the Rational Design of Biologically Active Molecules at the university. Dr. Berg's research focuses on the structural and functional roles that metal ions, especially zinc, have in proteins. He has made major contributions to understanding how zinc-containing proteins bind to the genetic material DNA or RNA and regulate gene activity. His work, and that of others in the field, has led to the design of metal-containing proteins that control the activity of specific genes. These tailored proteins are valuable tools for basic research on gene function, and such proteins could one day have medical applications in regulating genes involved in diseases, as well. Dr. Berg has also made contributions to our understanding of systems that target proteins to specific compartments within cells and to the use of sequence databases for predicting aspects of protein structure and function. Dr. Berg served on the faculty at Johns Hopkins from 1986-2003. Immediately before his faculty appointment, he was a postdoctoral fellow in biophysics at the university. His honors include a Presidential Young Investigator Award

(1988-1993), the American Chemical Society Award in Pure Chemistry (1993), the Eli Lilly Award for Fundamental Research in Biological Chemistry (1995), and the Maryland Outstanding Young Scientist of the Year (1995). He also received teaching awards from both medical students and graduate students and has served as an advisor to the Johns Hopkins Postdoctoral Association since its founding. Dr. Berg received B.S. and M.S. degrees in chemistry from Stanford University in 1980 and a Ph.D. in chemistry from Harvard University in 1985. He is a coauthor of more than 130 research papers and three textbooks, *Principles of Bioinorganic Chemistry*, *Biochemistry* (5th Edition and 6th Edition), and *A Clinical Companion to Accompany Biochemistry*.

Judith S. Bond, Ph.D.

Professor and Chair, Department of Biochemistry and Molecular Biology, Pennsylvania State University College of Medicine

Dr. Judith S. Bond is Professor and Chair of Biochemistry and Molecular Biology at Pennsylvania State College of Medicine in Hershey, Pennsylvania. She is an Associate Editor of the *Journal of Biological Chemistry* and a Past President of the American Society for Biochemistry and Molecular Biology. Dr. Bond received a B.S. degree in science from Bennington College in Vermont in 1961, and M.S. and Ph.D. degrees in biochemistry and physiology from Rutgers University in 1962 and 1966. She did postdoctoral work at Vanderbilt University until 1968, and then joined the faculty of the Department of Biochemistry at the Medical College of Virginia, Virginia Commonwealth University. She moved to Virginia Polytechnic Institute as Professor and Head of the Department of Biochemistry and Nutrition in 1988, and then to Pennsylvania State University College of Medicine as Chair of Biochemistry and Molecular Biology in 1992. Dr. Bond's research on proteolysis, and particularly on unique and complex metalloproteases called meprins, has been funded continuously by the NIH for 32 years. She has authored over 150 refereed papers and given over 140 invited lectures throughout the world. Dr. Bond has a sustained interest in graduate education, having trained 16 Ph.D., 4 M.D./Ph.D., and 4 M.S. students. She currently has 2 Ph.D. students. She has also trained 18 postdoctoral fellows. She was director of the Medical Scientist Training Program at Pennsylvania State University Hershey campus, and obtained federal funding for this program. She served as Assistant Dean for Graduate Education from 1996-99, Co-Director of Graduate Education for the Life Sciences Consortium from 1995-2000, and Co-Director of the Chemical Biology Option of the Integrative Biosciences Graduate Program from 1996 to 2003. She served on several Association of American Medical Colleges Committees and is currently on the Scientific Foundation for Future Physicians Committee. Dr. Bond's service includes membership on the NIH Biochemistry Study Section 1987-91, which she chaired from 1989-91, and on the National Institute of Diabetes and Digestive and Kidney Diseases Advisory Council of the NIH from 1996-2000. Dr. Bond was elected president of the Association of Medical and Graduate

Departments of Biochemistry 1996-97, the Council of the International Proteolysis Society 1997-2001, and the Council of the American Society for Biochemistry and Molecular Biology 1996-99 and 2002-04. She was named YWCA Outstanding Woman in Science and Health in Virginia in 1989 and Virginia's Outstanding Scientist in 1988 and was an NIH MERIT Awardee 1989-96. In 2008, she was honored by the International Proteolysis Society and by Pennsylvania State University with the title of University Distinguished Professor.

Asif Dhar, M.D., M.B.A.

Federal Biomedical Informatics Practice Leader, Deloitte Consulting Senior Fellow, Deloitte Center for Health Solutions

Dr. Asif Dhar leads Deloitte's Federal Biomedical Informatics Practice. His teams develop innovative strategies to improve clinical outcomes and therapeutic discovery. Dr. Dhar is also a Senior Fellow with the Deloitte Center for Health Solutions. His translational informatics work is helping discover new approaches to optimize clinical R&D with breakthrough informatics tools. Dr. Dhar is also doing research to delineate the barriers and benefits for adopting personalized medicine. Dr. Dhar has deep functional and management experience that spans public and private sector clients. He has provided senior leadership for numerous Electronic Health Record (EHR) implementations in the US, Canada, and the UK. Dr. Dhar has also helped design enterprise data warehousing solutions, clinical discovery applications, and quality improvement programs at large integrated delivery networks and academic medical institutions. Dr. Dhar has a deep interest in advancing public sector clinical and research programs. He has provided biomedical informatics advisory services for the National Institutes of Health (NIH) National Cancer Institute (NCI) and testing advisory services for the Department of Defense (DoD). Dr. Dhar has served on study sections for the NIH National Human Genome Research Institute. Prior to joining Deloitte Consulting, Dr. Dhar served as a management consultant with Booz Allen Hamilton and as a physician executive with the Cerner Corporation. He holds a Medical Degree from the University of Illinois, a Masters in Business Administration degree from the University of Chicago Graduate School of Business, and a Bachelor of Arts degree from the University of Chicago. Deloitte has a deep commitment to advancing diversity and women in the workplace. After launching the Women's Initiative (WIN), Deloitte was recognized with nine national awards. WIN was also featured in more than 100 major news stories. In 2007, Deloitte was rated by *Business Week* as the "Best Place to Start a Career."

Appendix D: Speaker Biographies

Valerie Florance, Ph.D.

Deputy Director, Extramural Programs, National Library of Medicine, National Institutes of Health

Dr. Valerie Florance is Deputy Director of Extramural Programs at the National Library of Medicine (NLM), National Institutes of Health. She is responsible for a portfolio of advanced research topics in biomedical informatics and information sciences and for NLM's university-based informatics training program. Before coming to NLM in February 2001, she spent 3 years as Project Director for better_health @ here.now at the Association of American Medical Colleges (AAMC), leading two expert committees in the development of a roadmap for the use of information technologies in health care and biomedical research activities. Between 1986 and 1998, she held various faculty and administrative positions at the University of Rochester Medical Center, Johns Hopkins Medical Institutions, and the University of Utah, with responsibilities that included oversight of library and computing services, development of digital information resources, and teaching information skills and informatics concepts to faculty and students in the health sciences. Dr. Florance received graduate degrees in medical anthropology and library sciences. She completed her doctoral studies in information sciences at the University of Maryland, College Park. Her dissertation centered on knowledge representation for clinical problem solving. She twice won the Medical Library Association's Ida and George Eliot prize for her articles about knowledge management in biomedicine. She has been a member of NLM's Biomedical Library Review Committee, and was a member of the National Research Council/National Academy of Sciences study that published its report "Networking Health: Prescriptions for the Internet" in June 2000. In 2005, she was elected as a fellow to the American College of Medical Informatics.

Joan R. Goldberg

Executive Director, American Society for Cell Biology

Joan R. Goldberg is executive director of the American Society for Cell Biology (ASCB) in Bethesda, Maryland. She has also held leadership positions for the American Society for Bone and Mineral Research and the National Sleep Foundation. During the last 30 years her work has focused on advancing biomedical research. Ms. Goldberg has developed award-winning public and Congressional educational initiatives emphasizing research's impact on human health. At ASCB, Ms. Goldberg oversees an innovative portfolio of educational, career development, public policy, and publications programs. She works closely with the Society's Women in Cell Biology and Minorities Affairs Committees on columns and books, web-based materials, workshops, awards, and outreach efforts. Several of these programs have been, and continue to be, supported by the Office of Research on Women's Health and the National Institute of General Medical Sciences. She has also presented new approaches for program evaluation, strategic planning, and conflict

of interest management. In 2007 she presented at the first Aspen Health Forum and served on the Conflict of Interest Coalition for the Federation of American Societies for Experimental Biology. She is the author of three books, including *High-Tech Career Strategies for Women*, and hundreds of articles.

Jo Ellen Helmer, B.B.A.

Audit and Risk Advisory Partner

Jo Ellen Helmer has more than 19 years' experience, in Chicago, serving major health science clients (pharmaceutical/medical device companies and large academic medical centers), in both an external audit and business/risk advisory capacity. Organizations she has served include Baxter International, Zimmer Holdings, Inc., Promega Corporation, Optobionics, Mayo Clinic, University of Pittsburgh Medical Center (UPMC), National Surgical Hospitals and Northwestern Memorial Hospital. Ms. Helmer has deep experience with technical and financial reporting issues. She has experience with Section 404 of the Sarbanes Oxley Act, debt offerings, acquisitions and divestitures. She also serves as a liaison to the Global Pharma/Med Tech Centers of Excellence for risk advisory services. In this capacity she brings thought leadership and insights to local teams. Additionally, she has coordinated advisory engagements such as controls optimization related to Section 404 and AS5 (Auditing Standard #5), transaction advisory, compliance advisory (including FCPA), and valuations. Ms. Helmer has taken an active role to advance gender equity within the workplace. She has served on the firm's National Gender Equity Steering Committee and currently serves on the Midwest Area Gender Equity Steering Committee. She is also a member of the American Institute of Certified Public Accountants, iBIO (Illinois Biotechnology Industry Organization), Health Care Financial Management Association, and the Illinois, Indiana, Wisconsin, Pennsylvania and Minnesota CPA Societies.

Raynard S. Kington, M.D., Ph.D.

Acting Director, National Institutes of Health

Dr. Raynard S. Kington was appointed Acting Director of the National Institutes of Health on November 1, 2008. Previously, he had served as Deputy Director of the NIH since February 9, 2003. The Deputy Director of NIH functions as the Principal Deputy Director to the Director, NIH, and shares in the overall leadership, policy direction, and coordination of NIH biomedical research and the research training programs of NIH's 27 Institutes and Centers with a budget of almost \$29 billion and 18,000 employees. Prior to this appointment, Dr. Kington had been Associate Director of NIH for Behavioral and Social Sciences Research since September, 2000. In addition to this role, from January, 2002 to November, 2002, he served as Acting Director of the National Institute on Alcohol Abuse and Alcoholism. Prior to coming to NIH, Dr. Kington was Director of the Division of Health Examination Statistics

Appendix D: Speaker Biographies

at the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC). As Division Director, he also served as Director of the National Health and Nutrition Examination Survey (NHANES), one of the nation's largest studies to assess the health of the American people. Prior to coming to NCHS, he was a Senior Scientist in the Health Program at the RAND Corporation. While at RAND, Dr. Kington was a Co-Director of the Drew/RAND Center on Health and Aging, a National Institute on Aging Exploratory Minority Aging Center. Dr. Kington attended the University of Michigan, where he received his B.S. degree with distinction and his M.D. degree. He subsequently completed his residency in Internal Medicine at Michael Reese Medical Center in Chicago. He was appointed a Robert Wood Johnson Clinical Scholar at the University of Pennsylvania, where he completed his M.B.A. with distinction and his Ph.D. with a concentration in Health Policy and Economics at the Wharton School. He was also awarded a Fontaine Fellowship. He is board-certified in Internal Medicine and Public Health and Preventive Medicine. In 2006, Dr. Kington was elected to membership in the Institute of Medicine of the National Academies. Dr. Kington's research has focused on the role of social factors, especially socioeconomic status, as determinants of health. His current research includes studies of the health and socioeconomic status of black immigrants, differences in populations in willingness to participate in genetic research, and racial and ethnic differences in infectious disease rates. His research has included studies of the relationship between wealth and health status; the health status of U.S. Hispanic populations; the determinants of health care services utilization; the economic impact of health care expenditures among the elderly; and racial and ethnic differences in the use of long-term care.

Barry M. Klein, Ph.D.

Vice Chancellor for Research, University of California, Davis

Dr. Barry M. Klein received his Ph.D. degree in condensed matter theory from New York University in 1969 following an undergraduate degree in engineering physics from NYU. From 1969-71 he held a postdoctoral appointment at the Naval Research Laboratory (NRL). In 1971 he became a member of the NRL staff working in condensed matter theory and in plasma physics on the theory of x-ray emission from laser-produced plasmas. In 1978, he became head of the NRL Electronic Structure of Solids Section, leading a theoretical effort in electronic structure studies of a wide range of solid systems, with particular emphasis on fundamental investigations of superconducting properties and point defects. From 1984-85, he was Program Manager for Condensed Matter Theory and Acting Section Head for Condensed Matter Sciences at the National Science Foundation. Returning to NRL in 1985, Dr. Klein became Branch Head for Condensed Matter Physics, supervising efforts in experimental x-ray physics, plasma spectroscopy and synchrotron radiation, in addition to theoretical condensed matter research. In 1989, Dr. Klein became Branch Head for the Complex

Systems Theory Branch, leading a theoretical effort involving over 20 scientists engaged in studies of a wide range of condensed matter properties from electronic structure theory, to many body theory, to atomic physics. In 1992, Dr. Klein became Professor of Physics and Chair of the Department of Physics at the University of California, Davis. In 1998, he was appointed to the position of Vice Provost for Academic Personnel at UC Davis, a position he held for three years. On July 1, 2001, Dr. Klein was appointed Vice Chancellor for Research at UC Davis, his current position. Dr. Klein is a Fellow of the American Physical Society, a Fellow and Chartered Physicist of the Institute of Physics, and he is a Foreign Member of the Russian Academy of Sciences. He has also been Chair of the American Physical Society Division of Computational Physics. He was the recipient of a New York City Mayor's Committee on Scholastic Achievement undergraduate scholarship, a NASA graduate Fellowship and a National Research Council Postdoctoral Associateship. He has received several government awards, including a Navy Meritorious Civilian Service Award in 1992. He has been a member of numerous NSF, DoD, and DoE and DoE Laboratory committees including: the NSF Supercomputing Center Peer Review Committee; the High Performance Computing Advisory Board for Los Alamos and Oak Ridge National Laboratories; the Advisory Committee for Physical Sciences and Space Technology and the Director's Advisory Committee at the Lawrence Livermore National Laboratory; and the Materials Science and Technology Advisory Committee at the Los Alamos National Laboratory. Dr. Klein's condensed matter research efforts have been in electronic structure theory and applications, studying the fundamental properties of condensed matter systems using theoretical and computational approaches. He has over 140 research publications.

Joan M. Lakoski, Ph.D.

Associate Vice Chancellor for Academic Career Development and Executive Director of the Office of Academic Career Development, University of Pittsburgh Schools of the Health Sciences

Dr. Joan M. Lakoski is the Associate Vice Chancellor for Academic Career Development and the Founding and Executive Director of the Office of Academic Career Development at the University of Pittsburgh Schools of the Health Sciences, and the Associate Dean for Postdoctoral Education and Professor of Pharmacology at the University of Pittsburgh School of Medicine. Dr. Lakoski received her doctoral degree in pharmacology from the University of Iowa, completed postdoctoral training in the Department of Psychiatry at the Yale University School of Medicine, and has held faculty positions at the University of Texas Medical Branch in Galveston and the Pennsylvania State University College of Medicine, including appointment as Interim Chair of the Department of Pharmacology at Pennsylvania State University. Her administrative responsibilities encompass oversight of comprehensive career development services, including development of mentoring programs for professional students, postdoctoral fellows, residents, clinical fellows and

Appendix D: Speaker Biographies

faculty, to “empower the health science professional” at the University of Pittsburgh. Dr. Lakoski is a member of the graduate faculty at the University of Pittsburgh and conducts research on the neuropharmacology of aging, the impact of mentoring and responsible conduct in research and serves on National Institutes of Health Center for Scientific Research review panels, including membership in the Neuroendocrinology, Neuroimmunology, and Behavior Study Section (2006-2010). Dr. Lakoski also serves as Director of Faculty Development and Director of Mentorship for the Clinical and Translational Research Institute funded by a Clinical and Translational Science Award to the University of Pittsburgh, as Co-Director of the Multidisciplinary Clinical Research Scholars (KL2) Program, and as Director of the RiMED Fellows Program – an innovative international postdoctoral training program at the University of Pittsburgh. For her numerous activities in support of postdoctoral fellows, Dr. Lakoski was the recipient of the 2007 Postdoctoral Advocate Award from the University of Pittsburgh Postdoctoral Association. Dr. Lakoski serves in numerous leadership roles in a variety of professional organizations and is President-Elect of the Society for Executive Leadership in Academic Medicine (SELAM), International. She is a member of the Committee to Study the National Needs for Biomedical, Behavioral, and Clinical Research Personnel of the Policy and Global Affairs Division of the National Academy of Sciences and the National Research Council.

Phoebe Leboy, Ph.D.

President, Association for Women in Science
Professor of Biochemistry, University of Pennsylvania
School of Dental Medicine

Dr. Phoebe Leboy received her B.S. degree from Swarthmore College, her Ph.D. from Bryn Mawr College, and held postdoctoral positions at the University of Pennsylvania and the Weizmann Institute of Science in Israel. She joined the faculty of the University of Pennsylvania in 1966 and retired from the faculty in 2005. While at the University of Pennsylvania, she was a faculty member in the Cell and Molecular Biology and Bioengineering Graduate Groups, served as Chair of the University Faculty Senate, Chair of the Graduate Group in Molecular Biology, and chair of her department. Dr. Leboy has been a member of several NIH grant review panels and recently completed a term as chair of the NIH Skeletal Biology Development and Disease Study Section. She has served as a liaison from the University of Pennsylvania to the MIT/9 University consortium on gender equity in science and co-chaired the University of Pennsylvania's 1999-2001 Task Force on Gender Equity. She has been the recipient of a NATO Postdoctoral Fellowship, an NIH Research Career Development Award, a Fogarty Senior International Fellowship, and a Lindback Award for Distinguished Teaching.

Timothy Ley, M.D.

Professor, Washington University in St. Louis

Dr. Timothy Ley received his degree from Washington University in St. Louis Medical School in 1978 and performed his internal medicine residency at Massachusetts General Hospital. He completed fellowships in Hematology and Oncology at the NIH and at Washington University and joined the faculty at Washington University in St. Louis in 1986. He is now the Alan and Edith Wolff Professor of Medicine and Professor of Genetics at Washington University and serves as the Associate Director of the Genome Center at Washington University (Cancer Genomics). Dr. Ley is a past president of the American Society for Clinical Investigation, a member of the AAP Council, a fellow of AAAS, and a member of the Institute of Medicine. He has developed approaches to reactivate fetal hemoglobin synthesis for patients with hemoglobinopathies, defined the role of the perforin/granzyme system for the function of cytotoxic and regulatory T cells, and has performed pioneering genomic studies of acute myeloid leukemia. He has written extensively about the physician-scientist career path and was a key advocate for establishing the extramural Loan Repayment Programs at the NIH. He has mentored more than 40 pre- and postdoctoral fellows in his laboratory; nearly all hold research positions in academic medicine and pharmaceutical companies.

Diane M. Magrane, M.D.

Vice President for Faculty Development and Leadership Programs,
Association of American Medical Colleges

Dr. Diane M. Magrane holds the position of Director for Faculty Development and Leadership Programs at the Association of American Medical Colleges. She is responsible for a variety of faculty development programs, including Women in Medicine, the Executive Development Seminars for Chairs and Associate Deans, and TeamWorks. In addition, she supports the Group on Faculty Affairs and is senior editor of Faculty Vitae, an on-line professional development publication for medical faculty. Before joining the AAMC in 2004, she was Associate Dean for Medical Education and Professor in Obstetrics and Gynecology at the University of Vermont College of Medicine. She received her M.D. degree from the University of Iowa in 1978 and completed residency training in Ob/Gyn at St. Louis University Hospitals in St. Louis, Missouri, in 1982. She has been actively involved in improving instruction, evaluation, and faculty development in medical education at UVM and in national educational organizations. Dr. Magrane's educational scholarship lies in interdisciplinary activities in women's health education and in applying systems of educational psychology, complexity theories, and classic curriculum design to enhancing the environment and educational processes of academic medicine. She is a founding member of the Alliance for Clinical Education, past chair of the Association of Pro-

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fessors of Gynecology and Obstetrics undergraduate medical education committee and of the examination committee of the Council for Resident Education in Obstetrics and Gynecology, and past president of the Association for Professors in Gynecology and Obstetrics. In recognition of her national leadership in medical education, she was honored as a distinguished alumnus of the University of Iowa College Of Medicine in 2002 and with an APMO-Wyeth Career Achievement Award in 2006. She has benefited from leadership training in a variety of venues, including the AAMC Women in Medicine Programs, Harvard Macy Programs for educational leaders, and Executive Leaders in Academic Medicine (ELAM 2003). Her position at the AAMC has brought her full circle to support professional development and leadership skills training for all medical school faculty in North America. In March 2009, Dr. Magrane continues her leadership journey in a new position as Director of the Center for Executive Leadership in Academics at Drexel University College of Medicine, which includes the ELAM program for women and a variety of cross-institutional leadership development programs.

Colonel Debra M. Neimeyer, Ph.D., Colonel, USAF, BSC (retired)
Chief Scientist, 59th Medical Wing, Wilford Hall Medical Center

Colonel (Dr.) Debra Marie Niemeyer retired from the Air Force June, 2008. Dr. Niemeyer is the 59th Medical Wing (MDW) Chief Scientist, Lackland Air Force Base, San Antonio, Texas, and serves as technical authoritative liaison to Headquarters Air Force and Department of Defense. The wing is the Air Force's largest medical facility, staffed with 5,650 military, civilian, contract employees, residents and students. The wing's varied mission includes deployed and in-garrison health care delivery, graduate medical education, enlisted specialty training, and clinical research to enhance Air Force readiness. Dr. Niemeyer is responsible for high-level collaboration between the Air Force, DoD, local, national and international government, academic and industry, development, test, evaluation and acquisition organizations. She works directly for the 59 MDW Commander at senior executive levels as portfolio authority to advance modernization efforts for health maintenance and threat mitigation, human system integration and performance sustainment. She is the Wing's representative to federal governance/policy bodies. She develops and maintains the wing's research program and modernization road-map, directs research integration into the San Antonio Military Medical Center, Major Command, Air Force Surgeon General, Joint medical research and development (R&D), National strategic plans and investment strategies, oversees Defense Base Closure and Realignment Commission (BRAC) activities to position local assets in support of multi-agency research, and provides the Air Force Surgeon General consultative R&D support for 12,000 officers. Her last active duty assignment was as the Deputy Assistant Surgeon General, Modernization Directorate, and Consultant to the Surgeon General for Biomedical Research, Office of the Surgeon General, Falls Church, Virginia. She oversaw the operations of 600 personnel at eleven different locations,

to include three test beds and one technology center, and managed career planning for 2,000 medical scientists. She provided direction and made investment decisions for nearly 100 acquisition programs and research projects valued at 220 million dollars, Dr. Niemeyer was commissioned a second lieutenant in 1981 through Air Force ROTC. She graduated from Marywood University with a baccalaureate degree in biology, the University of Minnesota with a master's degree in medical microbiology, and completed a doctorate of philosophy in microbiology and immunology at the Medical College of Virginia, Virginia Commonwealth University. She directed clinical and applied research laboratories around the world and served in special duty and Headquarters assignments. Following retirement in June 2008, she accepted her current civil service position. Dr. Niemeyer established the first Air Force biological agent testing capability in Southwest Asia and the Pacific Rim. Following the terrorist attack on the Pentagon, she set up an alternate command section and directed emergency airlift operations for delivery of blood products. Additionally, she assembled and led a microbiology response team to assist the Centers for Disease Control and Prevention and the New York City Department of Health following the release of anthrax spores into the U.S. Postal System. She formed rapid bio-agent testing teams in support of the U.S. Secret Service at Presidential events and to augment Winter Olympics security. She established the Applied Technology Center to conduct "controlled environment" assessments of off-the-shelf and nascent technologies and the Directorate's Medical Innovations Office to address "disruptive technology" impacts on the Air Force "fly and fight" mission. She has substantial experience in clinical laboratory medicine, blood program operations and transfusion medicine, expeditionary operations, force protection and counter-proliferation, technology test and evaluation, medical planning, program management, and product acquisition. Dr. Niemeyer holds appointments at several academic institutions.

Elizabeth Ofili, M.D., M.P.H., F.A.C.C.

Associate Dean, Clinical Research
Professor of Medicine and Director, Clinical Research Center
Chief, Section of Cardiology, Morehouse School of Medicine

Dr. Elizabeth Ofili completed medical school with distinction at Ahmadu Bello University in Nigeria and received the Master of Public Health degree from The Johns Hopkins University, Baltimore, Maryland. Dr. Ofili completed an Internal Medicine Residency at Oral Roberts University in Tulsa, Oklahoma; Cardiology Fellowship at Washington University in St. Louis, Missouri; and an Advanced Cardiovascular Research Fellowship at St. Louis University Health Sciences Center, St. Louis, Missouri. Dr. Ofili has an active interest in the mechanism of myocardial dysfunction with particular emphasis on the role of ultrasound imaging modalities. She received the Young Investigator Research Award from the American Society of Echocardiography for work on the physiologic basis of pharmacologic stress agents in a canine model of coronary artery

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disease. In collaboration with Dr. Morton Kern, Dr. Ofili developed and validated the method of analysis of the intracoronary Doppler spectral wave form that remains in use in cardiac catheterization laboratories for physiologic studies of coronary flow reserve in patients with coronary artery disease. She has received national and international recognition for her expertise in the field of echocardiography and for advancing scientific knowledge on the role of ultrasound imaging modality in clinical practice and population-based research. As a recipient of the National Institute of Health Preventive Cardiology Academic Award, Dr. Ofili established a large clinical patient database at Grady Memorial Hospital in congestive heart failure, chest pain, and hyperlipidemia. Additionally, Dr. Ofili received the Center of Excellence Award from the Consortium of Southeastern Hypertension States for work on a community-based network implementation of lipid and hypertension treatment algorithms to improve patient outcomes. Dr. Ofili has received over 50 million dollars in extramural funds for investigator-initiated work as a principal investigator, co-investigator and from multicenter clinical trial contracts. Other national awards include the Dr. Daniel Savage Scientific Award from the Association of Black Cardiologists; the Nannette K. Wenger Award for Health Policy from the Advocacy Group WomenHeart and the National Library of Medicine Exhibit, Changing the Face of Medicine, the Rise of America's Women Physicians. Dr. Ofili was recognized as one of America's leading physicians by Black Enterprise Magazine; Physician of the Year, by the U.S. Congressional Health Advisory Board; the nation's top twenty-five female physicians by Heart and Soul Magazine, and Who's Who in Black Atlanta. She serves on the Board of Trustees of the Educational Commission for Foreign Medical Graduates (ECFMG); board of directors of the Georgia Medical Care Foundation and the Foundation for the Advancement of International Medical Education and Research. Dr. Ofili is the founding Director and Principal Investigator of the National Institutes of Health Center of Clinical Research Excellence at Morehouse School of Medicine. A Past-President of the Association of Black Cardiologists, a member of the International Society of Hypertension in Blacks, the American Heart Association Scientific Councils on Clinical Cardiology, Epidemiology and Prevention, and High Blood Pressure Research, Dr. Ofili has served on the American Heart Association Science Advisory Committee, the National Institutes of Health Clinical Research Advisory group, the National Heart, Lung, and Blood Institute Women's Heart Health and the National Academy of Sciences, Institute of Medicine Committee on Global Research and Development in Cardiovascular Diseases. Dr. Ofili has mentored over 45 junior faculty or postdoctoral fellows and over 25 undergraduate students. She has published over 100 peer-reviewed scientific papers and book chapters, over 60 abstracts of original work, and made over 400 scientific presentations on cardiovascular disease, healthcare disparities, and women's health, including over 50 keynote addresses, medical grand rounds, and visiting professorships at national and international academic medical centers. Her work has appeared in publications and journals including The Journal of the American Medical Association, the

New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, American Journal of Cardiology, American Heart Journal, and Journal of the National Medical Association, Ethnicity & Disease and Urban Cardiology.

Vivian W. Pinn, M.D.

Associate Director for Research on Women's Health,
National Institutes of Health
Director, Office of Research on Women's Health,
National Institutes of Health

Dr. Vivian W. Pinn is the first full-time Director of ORWH, an appointment she has held since November 1991. In 1994, she was also named Associate Director for Research on Women's Health, NIH. Dr. Pinn came to NIH from the Howard University College of Medicine in Washington, DC, where she had been Professor and Chair of the Department of Pathology since 1982. Dr. Pinn has been invited to present the ORWH's mandate, programs, and initiatives to many national and international organizations with an interest in improving women's health and the health of minorities. Her recent focus has been to raise the awareness of the scientific community about the importance of sex and gender factors in basic science, clinical research, and health care. Dr. Pinn earned her B.A. degree from Wellesley College and received her M.D. degree from the University of Virginia (UVA) School of Medicine. She completed her postgraduate training in pathology at Massachusetts General Hospital, during which time she also served as Teaching Fellow at Harvard Medical School. Dr. Pinn then joined the faculty of the Tufts University School of Medicine and Tufts-New England Medical Center Hospital until leaving for her position at Howard University. She is a member of many professional and scientific organizations, in which she has held many positions of leadership. Dr. Pinn has received numerous honors and awards and has been granted nine honorary degrees since 1992. She is a fellow of the American Academy of Arts and Sciences and was elected to the Institute of Medicine in 1995. She received an Alumni Achievement Award from Wellesley College in 1993 and the second annual Distinguished Alumna Award from UVA in September 1992. She has been recognized for her contributions to women's health and medicine by many professional organizations, including the President's Achievement Award from the American Medical Writers Association, the James D. Bruce Memorial Award from the American College of Physicians for distinguished contributions in preventive medicine; the 2000 Women in Medicine Leadership Development Award from the AAMC; the Commonwealth Fund's Margaret E. Mahoney Award for Outstanding Service for work in advancing the quality of health care for women; and the Lifetime Achievement Award from the Jacobs Institute of Women's Health. In 2007, Dr. Pinn received the University of Virginia Walter Reed Distinguished Alumni Achievement Award.

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Andrew I. Schafer, M.D.

Chairman, Department of Medicine, Weill Cornell Medical College

Dr. Andrew I. Schafer completed his medical education at the University of Pennsylvania, his internal medicine residency at the University of Chicago, and his fellowship in hematology at the Peter Bent Brigham (now Brigham and Women's) Hospital and Harvard Medical School. After rising through the ranks at Harvard to Associate Professor of Medicine, he moved to Houston in 1989 to become Chief of Medicine of the Houston VA Medical Center and then Chairman of the Department of Medicine at the Baylor College of Medicine. In 2002, he became the Frank Wister Thomas Professor and Chairman of the Department of Medicine at the University of Pennsylvania. He assumed his current position in May 2007 as the E. Hugh Luckey Distinguished Professor and Chairman of the Department of Medicine at Weill Cornell Medical College and Physician-in-Chief of the New York-Presbyterian Hospital/Weill Cornell Medical Center. Dr. Schafer is the author of more than 200 original articles and the editor of five textbooks in the field of hemostasis, thrombosis, and hematology. His clinical expertise is in the area of hematology, coagulation, and thrombosis. Dr. Schafer has made many important research contributions to the field of hemostasis and vascular cell biology. He has been the principal investigator of NIH grants for almost 30 consecutive years and has served on the Board of Extramural Advisors of the National Heart, Lung, and Blood Institute of the NIH. Dr. Schafer has been elected to membership in the American Society for Clinical Investigation (for which he served as Secretary-Treasurer), the Association of American Physicians, and fellowship in the American Association for the Advancement of Science. Dr. Schafer was the 2007 President of the American Society of Hematology and is President-elect of the Association of Professors for Medicine for 2010–2011.

Walter T. Schaffer, Ph.D.

Senior Scientific Advisor, Extramural Research,
National Institutes of Health

Dr. Walter Schaffer currently serves as the Senior Scientific Advisor for Extramural Research, National Institutes of Health. Prior to his move to the immediate office of the Deputy Director for Extramural Research, Dr. Schaffer served as Acting Director of the Office of Extramural Programs. He has also served as the NIH Research Training Officer for the NIH and Deputy Director of the Division of Program Analysis in the Alcohol, Drug Abuse, and Mental Health Administration. He has been a Scientific Review Administrator and a Senior Staff Fellow for the National Institute on Alcohol Abuse and Alcoholism. He joined the NIH in 1978 after earning a Ph.D. in biochemistry at the University of Texas Health Science Center at San Antonio and a B.S. degree in chemistry (1974) from the University of Washington. His research interests include hormonal influence on age-related changes and the regulation of oxidative metabolism in brain.

Joan Schwartz, Ph.D.

Assistant Director, Office of Intramural Research,
National Institutes of Health

Dr. Joan Schwartz received her undergraduate degree in chemistry from Cornell University and her Ph.D. from Harvard University, with training in biological chemistry. After postdoctoral training at Rutgers Medical School, Dr. Schwartz moved to the National Institutes of Health (NIH), where she has spent her entire professional career. Dr. Schwartz was a senior investigator, first in the National Institute of Mental Health, and then in the National Institute of Neurological Disorders and Stroke, studying neurotrophic factors. She is Assistant Director, Office of Intramural Research, Office of the Director, and served as Acting Deputy Director, Office of Intramural Training and Education for 3 years. She chairs the NIH Committee on Scientific Conduct and Ethics, which developed the NIH course for tenure-track investigators, "How to Succeed as a PI at the NIH." She chaired the Second Task Force on the Status of Intramural Women Scientists and is a member of Dr. Zerhouni's NIH Working Group on Women in Biomedical Careers, which is working to implement some of the recommendations of the Task Force.

W. Sue Shafer, Ph.D.

Consultant, Women's Careers in Science

Dr. W. Sue Shafer is a consultant to individuals about their careers as well as to institutions concerning women's careers in science and medicine. She has over 30 years of experience leading and managing broad-based scientific research programs in both government and academia. She is adept at developing consensus about future research directions; and skilled at developing resources, overseeing expenditures, and educating others in the responsible conduct of research. Her particular interests are in scientific careers for women and minorities, developmental biology, biomedical ethics, and biomedical research policy. She is a seasoned team builder and mentor for both scientists and nonscientists. Trained as a developmental biologist, Dr. Shafer received her undergraduate degree from the University of Wisconsin, and her Ph.D. degree from the University of Florida, Gainesville. She held positions of increasing responsibility at the National Institutes of Health, where she ultimately served as the Deputy Director of the National Institute of General Medical Sciences. She then moved to the University of California, San Francisco, where she was the Assistant Vice Chancellor for Research Administration and then the Deputy Director of the Institute for Quantitative Biomedical Research. Throughout her career, Dr. Shafer has mentored women and men (formally and informally) scientists, and non-scientists. She was a member of the Women in Cell Biology, Committee of the American Society for Cell Biology (ASCB) from 1990 through 2003 (chair from 1994 to 1998). She initiated the Women in Cell Biology column in the ASCB Newsletter (widely read by women and men for advice and insights to career development);

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and the ASCB's annual career lunch, a time for discussing career development issues among women (and men) scientists. She conceived and developed the idea for AXXS (Achieving XXcellence in Science) to facilitate and increase the contributions of women to science, working through their scientific societies. AXXS Committee activities (she was committee chair from 1998 to 2005) were supported by the Office of Research on Women's Health, NIH. As co-chair of the UCSF Chancellor's Advisory Committee on the Status of Women, 2000 to 2002, she was co-principal investigator on a major study, commissioned by the Chancellor, of the climate for faculty at UCSF. The study paid particular attention to issues that impact women and men differently. Dr. Shafer is sought after for her perspectives and knowledge regarding women's careers. She was an invited participant and breakout group leader in a July 2000 conference, "Women in the Chemical Workforce," sponsored by the Chemical Sciences Roundtable of the National Research Council. As an invited speaker and leader of the panel on the Middle East at the Colloquium on Career Paths for Women in the Health Sciences: A Global Perspective, she helped develop a report on career paths for women internationally for the Fogarty International Center and the Office of Research on Women's Health of the National Institutes of Health. She was also an invited panelist at a 2008 AAMC Workshop on Women in the Physician Workforce on the topic of Maximizing Contributions and Improving the Success of Women in Academic Medicine.

Jennifer Sheridan, Ph.D.

Executive and Research Director, Women in Science and Engineering Leadership Institute (WISELI), University of Wisconsin-Madison

Dr. Jennifer Sheridan is the executive and research director of the Women in Science & Engineering Leadership Institute (WISELI) at the University of Wisconsin-Madison. She was co-PI of the UW-Madison's NSF ADVANCE grant, and is PI of an NSF PAID grant. Dr. Sheridan received her Ph.D. degree from the Department of Sociology at UW-Madison in August 2001, specializing in social stratification and quantitative research methods. Her graduate work focused on the social origins and implications of occupational sex segregation. She has authored or co-authored fourteen peer-reviewed papers, covering topics such as measurement of occupational standing, long-term effects of childhood abuse, and her current line of inquiry, the status of women in science and engineering. As WISELI's executive and research director, Dr. Sheridan develops and oversees the workshops and grant programs administered by WISELI, as well as the research and evaluation produced by WISELI, including two all-faculty climate surveys administered in 2003 and 2006.

Elias A. Zerhouni, M.D.

Former Director, National Institutes of Health

Former NIH Director, Elias A. Zerhouni, M.D., led the nation's medical research agency and oversaw the NIH's 27 Institutes and Centers with more than 18,000 employees and a fiscal year 2007 budget of \$29.2 billion from May 2002 to October 2008.

Dr. Zerhouni, a world renowned leader in the field of radiology and medicine, has spent his career providing clinical, scientific, and administrative leadership. He is credited with developing imaging methods used for diagnosing cancer and cardiovascular disease. As one of the world's premier experts in magnetic resonance imaging (MRI), he has extended the role of MRI from taking snapshots of gross anatomy to visualizing how the body works at the molecular level. He pioneered magnetic tagging, a non-invasive method of using MRI to track the motions of a heart in three dimensions. He is also renowned for refining an imaging technique called computed tomographic (CT) densitometry that helps discriminate between non-cancerous and cancerous nodules in the lung.

Since being named by President George W. Bush to serve as the 15th Director of the National Institutes of Health in May 2002, Dr. Zerhouni has overseen a number of milestones. Prior to joining the NIH, Dr. Zerhouni served as executive vice-dean of The Johns Hopkins University School of Medicine, chair of the Russell H. Morgan department of radiology and radiological science, Martin Donner professor of radiology, and professor of biomedical engineering. Before that, he was vice dean for research at Johns Hopkins. Dr. Zerhouni was born in Nedroma, Algeria, and came to the United States at age 24, having earned his medical degree at the University of Algiers School of Medicine in 1975. After completing his residency in diagnostic radiology at the Johns Hopkins University School of Medicine as chief resident (1978), he remained at Johns Hopkins, serving as instructor (1978–1979) and then as assistant professor (1979–1981). Between 1981 and 1985 he was in the department of radiology at Eastern Virginia Medical School and its affiliated DePaul Hospital. He returned to Johns Hopkins as an associate professor in 1985. In 1988, Dr. Zerhouni was appointed director of the MRI division. He was promoted to full professor of radiology in 1992 and of biomedical engineering in 1995. In 1996, he was named chairman of the radiology department.

Since 2000, he has been a member of the Institute of Medicine. He served on the National Cancer Institute's Board of Scientific Advisors from 1998–2002. He was a consultant to both the World Health Organization (1988), and to the White House under President Ronald Reagan (1985). He has won several awards for his research, including a Gold Medal from the American Roentgen Ray Society for CT research and two Paul Lauterbur Awards for MRI research. His research in imaging

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led to advances in Computerized Axial Tomography (CAT scanning) and Magnetic Resonance Imaging (MRI). He is the author of 212 publications in peer-reviewed journals and holds 8 patents.

Kathryn C. Zoon, Ph.D.

Director, Division of Intramural Research, National Institute of Allergy and Infectious Diseases, National Institutes of Health

Dr. Kathryn C. Zoon has been Director of the Division of Intramural Research and Scientific Director, National Institute of Allergy and Infectious Diseases, since January 2006. Previously, she was the Deputy Director for Planning and Development of the Division of Intramural Research since June 2004. Dr. Zoon was the Principal Deputy Director of the Center for Cancer Research at the National Cancer Institute (NIH) from 2003–2004. She served as the Director of the Center for Biologics Evaluation and Research (CBER), U.S. Food and Drug Administration, and was a member of the NIH Scientific Directors from 1992–2003. Dr. Zoon was the Director of the Division of Cytokine Biology in CBER from 1988–1992, where she directed the research and review of cytokines, growth factors, and cellular products. She was at NIH from 1975 to 1980 with Nobel Laureate Christian B. Anfinsen, studying the production and purification of human interferon. She has continued her research on the structure and function of human interferon alphas. She received her B.S. cum laude in chemistry from Rensselaer Polytechnic Institute in 1970 and was granted a Ph.D. degree in biochemistry from Johns Hopkins University in 1976. Dr. Zoon is an associate editor of the *Journal of Interferon Research* and the author of more than 100 scientific papers. She was president of the International Society for Interferon and Cytokine Research (ISICR) from 2000–2001. She served on the Foundation for Advanced Education in the Sciences (FAES) Board of Directors and was the first vice president from 1999–2003 and is currently the Federal Liaison to the Board of the International Association of Biologists. She has received numerous awards, including BioPharm Person of the Year Award 1992, the NIH Lectureship 1994, Sydney Riegelman Lectureship 1994, Genetic Engineering News (GEN) Award 1994 for streamlining and improving the regulatory process for biologics and biotechnology products, the Meritorious Executive Rank Award 1994 for sustained superior performance in revitalizing and reorganizing the Center for Biologics Evaluation and Research to meet the challenges of new responsibilities and new technologies, National Cancer Patients “Grateful Patients Award” 1996, Rensselaer Polytechnic Institute Alumni Association Fellows Award 1997, the Department of Health and Human Services Secretary’s Award for Distinguished Service 1998 as a member of the FDA Reform Legislation Working Group, the 1999 Johns Hopkins University Delta Omega Alpha Chapter’s 75th Anniversary Outstanding Member Award, the 2001 DHHS Secretary’s Award for Distinguished Service for outstanding leadership in positioning FDA as an important contributor to the nation’s capability to respond to bioterrorism. Dr. Zoon was elected to the Institute of Medicine in October 2002. In

June of 2003, she received the Johns Hopkins University Distinguished Alumna Award and two Department of Health and Human Service awards for counterbioterrorism and gene therapy. In May of 2005, Dr. Zoon received the DHHS Secretary’s Award for Distinguished Service for the Tissue Action Plan Team.

APPENDIX E

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1. Journal Publications and Books

2. Reports

3. Press

4. Websites

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This bibliography is a sample of the many references relevant to Best Practices for Sustaining Career Success. Inclusion on this list does not imply endorsement by the National Institutes of Health.