

Nurturing Passion in a Time of Academic Climate Change: The Modern-Day Challenge of Junior Faculty Development

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Without passion man is a mere latent force and possibility, like the flint which awaits the shock of the iron before it can give forth its spark.

Henri-Frederic Amiel, 1821–1881

Where Has The Passion Gone?

For most physicians, medicine as a professional journey is driven by passion. Medical student essays speak passionately about healing the sick; comforting the bereaved; discovering new insights; and developing new paradigms for diagnosis, prognostic markers, and therapeutics. Academic health centers (AHCs) provide the home for this passion to be nurtured and honed among its trainees, and fueled among its faculty. However, in response to enormous pressures over the past 40 yr, AHCs have increasingly shifted the focus from faculty-relevant issues to strategic considerations about competitive market forces, reimbursement shortfalls, increasing regulatory oversight and compliance requirements, and extramural funding levels. As increasingly complex enterprises, AHCs have been slow to adjust with regard to revising promotion and tenure policies, establishing mentoring and faculty development programs, and creating bridge funding mechanisms, leaving relationships between academic leadership and faculty strained. Under the weight of all these forces, faculty passion and career satisfaction has steadily diminished, particularly among the most junior members. Recent reviews of academic medical faculty indicate that approximately 42% are seriously considering leaving academic medicine in the next 5 yr and that 40% reported that their career was not progressing satisfactorily (1). Career satisfaction is threatened by the lack of time for teaching, scholarship, and personal and professional self-renewal (2–6).

In addition to the rapidly changing economic and regulatory environments, AHCs are also affected by the evolving social environment, in which generational differences define distinct

approaches to career and family (7). By and large, department chairs and senior faculty are Baby Boomers. Born between 1945 and 1962, Boomers work hard out of loyalty, expect long-term employment, pay their “dues,” consider self-sacrifice a virtue, and respect authority. In comparison, junior faculty are primarily Generation X’ers. Born between 1963 and 1981, Generation X’ers tend to work hard if balance is allowed, expect that their careers will involve several job changes, do not value the concept of dues paying, are willing to endure self-sacrifice only occasionally, and tend to question authority. These generational issues pose an additional set of challenges for AHCs regarding appropriate mentoring, academic expectations, and promotion policies.

Yet, it must be acknowledged that, despite the challenges, the most important asset of an AHC is its faculty. Therefore, the future of the academic enterprise depends to a great extent on the degree to which AHCs are successful in nurturing the careers of their faculty, particularly junior faculty (8). The academic community has begun to hear the alarm. Recent editorials and essays speak to “momma, don’t let your babies grow up to be academics,” “time to heal,” “taking root in a forest clearing,” and “new bottles for vintage wines: the changing management of the medical school faculty” (9–12). But even so, passion is not acknowledged as a fundamental core value for next generation of physicians.

To nurture their passion for medicine and position junior faculty for academic success, AHCs should appoint faculty to career pathways aligned with scholarship interests, for example, clinician-educator (clinicians dedicated to clinical service and teaching), physician-scientist (clinicians dedicated to clinical service and research), or basic scientists, and to develop assessment tools appropriate for each pathway. Clearly, promotion criteria for both tenure and nontenure tracks differ, and expected funding levels differ between clinical and basic science research. In addition, distributions of effort between research, teaching, and clinical service are greatest for the physician-scientist. Academic policies must recognize current realities (e.g., the increasing importance of team science and work-life balance) rather than remain wedded to outdated frameworks for academic advancement. Expectations must be

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clearly communicated to faculty, and institutions must provide faculty with opportunities to meet these expectations.

In this review, we explore six factors—mentoring, career development, promotion and tenure, work-life balance, colleague networks, and research support models—that directly affect junior faculty career development and satisfaction.

Mentoring

Mentoring has never been so important to individual career development in academic medicine (13). With the rapidly changing clinical care environment and the intensifying competition for external funding, career development depends to a greater extent than in the past on expert guidance to help young faculty negotiate the new landscape. But the very structure of the mentoring relationship needs to change. The traditional one-on-one model was predicated on mentors and mentees sharing relatively delimited areas of scholarship, a pace of change that was incremental, and an academic hierarchy that was centered on departments. In the current world of interdisciplinary research, team science, and managed health care, one mentor is often insufficient. Robust career development necessitates that junior faculty engage with multiple senior faculty to glean more comprehensive scholarship guidance, acquire insights into the complexities of the organizational culture, and evaluate a range of styles that best facilitate their own development.

Effective mentoring models are also challenged by the relative homogeneity of senior faculty as compared with the increasing diversity of young faculty. Studies from both academia and the corporate world report that although mentoring is effective, women and racial/ethnic minorities gain less benefit from current models than do Caucasian men (14–16,13,8,17,18).

Perhaps the greatest mentoring challenge involves the different views through generational lenses. Senior faculty often express frustration with the approach of junior faculty that is less given to self-sacrifice, less oriented to institutional needs, and more focused on creating a multifaceted life early in their careers (4). An question often asked among senior faculty regarding their junior colleagues is “Where is their passion; their commitment to medicine?” Trainees and young faculty counter that they cannot succeed at the expense of their personal health and the health of their families. A leader of a national residency group notes that “the notion that you give your life away to become a physician has changed with each generation a fuller life outside of medicine makes us better doctors” (19).

The current multifaceted realities of work-life balance for junior faculty stand in sharp contrast to the previous linear model of career advancement. Therefore, perhaps the crux of problem is not a lack of passion or commitment among junior faculty, but rather the lack of an appropriate model for today’s career building. At the core of any new model there needs to be a more informed approach to mentoring that takes into account current pressures in health care delivery, recent funding constraints, and the increasing emphasis on team science, as well as faculty diversity, and generational perspectives. Effective mentor programs must consider structures other than mentor–protégé pairings, such as “mentoring committees” and peer-based

mentoring. Moreover, this model must value the mentor. Faculty who are passionate about their own work and who are invested in nurturing their colleagues from the next generation must be recognized for the “added value” that they provide to the AHC (20).

Numerous innovative approaches to effective mentoring are now being developed across medical specialties (6,13,17,21–23). While the effectiveness of these various programs remains to be qualitatively assessed, the diversity of these models, which encompasses formalized traditional mentoring, peer mentoring (6), functional mentoring (23), and mentoring committees, provides encouraging evidence that AHCs are beginning to recognize mentoring as a core academic responsibility. To be optimally effective, this responsibility requires serious-minded commitments by leadership, senior faculty, and junior faculty alike.

Career Development

Despite the increasingly complex academic environment, current trainees and junior faculty have precious little opportunity to learn about effective strategies for career development and management. Rather than planned in a deliberate and proactive fashion, critically important aspects of career building, such as developing a robust curriculum vitae, building effective networks of colleagues and collaborators, setting and achieving professional goals, deciphering the unwritten rules of advancement, managing time and productivity, and obtaining effective mentoring, are all too often left to happenstance (4). This is an expensive oversight. Faculty satisfaction is intimately tied to faculty retention. The costs associated with recruiting and training new faculty are estimated to be more than 1.5 times a first-year salary (24), with greater costs of replacement associated with the physician–scientist.

Over the last 10 yr, federal agencies such as the National Institutes of Health and the Office of Women’s Health of the US Department of Health and Human Services, professional organizations such as the American Association of Medical Colleges, and private foundations such as the Burroughs Wellcome Foundation and the Doris Duke Foundation have begun to provide funding to support the design and implementation of career development programs. In addition, leading institutions have initiated their own programs. In the aggregate, these varied programs are more aligned with the increasing complexities of academic medicine and the changing roles and responsibilities of medical school faculty.

Among the many successful initiatives, the University of California, San Diego National Center for Leadership in Academic Medicine (NCLAM) is a notable example. Funded by the Office of Women’s Health, NCLAM is a 7-mo. program that includes a curriculum-based series of professional development workshops, academic strategic career planning, individualized academic performance counseling sessions, a formal junior/senior mentoring relationship built around a professional development contract, and community network building for both junior and senior faculty (25,26). The program has defined benchmarks for success that are pertinent to both the institution and the individual faculty participants. For the

School of Medicine, the goals are (1) to provide a formal mentoring system for junior faculty, (2) to provide feedback to junior faculty about their academic progress, (3) to enhance the “connectivity” of junior faculty to the School of Medicine, and (4) to increase the sense of community for both junior and senior faculty. Complementary expectations for junior faculty include: (1) developing skills appropriate for their career path, (2) developing a personal academic strategy aligned to the requirements for success at the University of California, and (3) expanding their network of colleagues within the university. The NCLAM program requires that each junior faculty participant commit to full engagement in the program. This includes attendance at weekly half-day workshops, completion of an individual professional development contract, and regular meetings with a senior mentor focused on completion of the contract. Recognizing the significant time commitment of the participants, the program compensates the respective departments for 5% of the faculty member’s base salary for the duration of their participation.

An interval analysis demonstrates that junior faculty participation in NCLAM has been empowering and cost effective (26). Of the 67 participants over a 4-yr interval, 87% remained at UCSD and 93% continued in academic medicine. The participants reported that their confidence in skills needed for academic success, for example, research, teaching, personal leadership, and administration, improved significantly. Retention rates improved, resulting in recruitment cost savings that exceeded the cost of the program. The institutional leadership has been similarly pleased with the program’s positive impact. As the Dean for Faculty and Student Matters writes: “The junior faculty are enriched and nurtured by the NCLAM experience, and their enthusiasm is such that they go out and infect other junior faculty as well as senior faculty ... it is a magnification effect. As a result of NCLAM, I have seen a sea of change in views and attitudes of the importance of faculty development at UCSD. It has engendered an atmosphere of mentoring and nurturing not seen in my 25 years at UCSD. NCLAM is one of the most important programs in the entire UCSD Health Sciences.”

Promotion and Tenure

Appointing and promoting excellent faculty are core missions of AHCs. However, an increasing body of evidence indicates that the “one-size fits all model” is not robust in the face of today’s current pressures on AHCs and the diversity of faculty scholarship. To nurture their passion for medicine and position junior faculty for academic success, AHCs must revise policies so that faculty appointment and promotion are aligned with academic interests (e.g., clinician-educator, clinician-investigator, physician-scientist) and develop assessment tools appropriate for each pathway. The process of re-evaluating these policies must be informed by precise, globally applicable definitions of scholarship. If the definition of excellence is unclear, and the expectations for accomplishment too low, too high, or inequitable, and/or the evaluation process too opaque or too subjective, the processes of appointment and promotion can lose credibility and fail to achieve their intended goals (27).

In addition, the development of new processes for appointment and must take into account longstanding disparities in career development for women and persons of color.

Gender Discrimination

There is a striking disconnect in the representation of women in medicine. Over the past decade, women have become the majority matriculants to medical schools. Yet, over this same interval, the pace of women being promoted to professor has increased marginally at best. In 1985, 9.9% of women and 31.5% of men were full professors. In 2001, 10.9% of women and 30.09% of men were full professors. On the basis of survey responses by the majority of academic medical institutions in the United States, there are 21 female professors per medical school (approximately one per department), including both nontenured and basic sciences faculty, compared with 161 male professors. Moreover, between 1995 and 2001, the percentage of tenured women decreased from 14% to 12%, and that for men decreased from 32% to 28% (28).

It is possible that the hierarchical system of medical schools works against women moving to the top. Certainly gender discrimination is a difficult, pervasive, and powerful problem. Importantly, in a contemporary study, 40% of respondents ranked gender discrimination first out of 11 possible hindrances to a career in academic medicine (29,30). Gender discrimination remained important among the remaining respondents, 35% of whom ranked it second in importance, after “limited time for professional work” or “lack of mentoring.” Importantly, perception regarding this issue is that there is little that can be done about it. Proactive and recurrent evaluation of the gender climate, in addition to transparent and fair scrutiny of promotion and salary decisions, would be reasonable steps to improve this barrier.

Lack of Diversity as a Barrier

Visible characteristics are well recognized as provoking bias and cumulative advantage or disadvantage in the workplace. Disparities exist based on racial/ethnic minority status-, country origin, and gender. These defining characteristics are perceptible in recruitment and may manifest subtly as bias in the promotion process. In comparison, invisible dimensions of cultural diversity such as religion and sexual orientation play a less significant role. In recent focus group evaluations utilizing anonymous phone questionnaires, potential explanations for gender or other visible trait bias such as race or country of origin included: (1) lack of available mentors, (2) the assignment of excessive additional duties, and (3) lack of leadership support for promotion. Disparities in leadership behavior toward faculty, promotion criteria that addresses the faculty members’ context and environment, and differential scrutinizing of professional competence or credentials were identified as manifestations of bias. Climate improvement through training in self-awareness, increased diversity in leadership, and the embracing of diversity as a leadership priority have been suggested as means to erase diversity disparities (31).

Work–Life Balance

During one of my early annual reviews, my first mentor, a woman and professor of medicine (a rarity at the time) who was helping me focus my long-term goals and objectives opened her curriculum vitae and said, “There, what do you see?” She was pointing to her accomplishments, specifically during an 8-year interval. Strangely, there was a gap between 1980 and 1988 during which not a paper, a committee membership, or a national meeting presentation was listed. She said, “During those 8 years, both of my children were under 10 years of age.” This direct approach made a clear point: Family matters.

In recent faculty surveys, infringement on family well-being was the strongest predictor of faculty discontent of any variable studied (2,6,32). Junior faculty will work hard to meet the demands of their career, but increasingly they also seek a fuller life outside of medicine. Academic institutions have attempted to address these issues by increasing flexibility of the promotional clock to more accurately reflect time worked, including part-time status and family and maternity leave. Although such policies are now in place at the majority of academic institutions, some faculty, particularly women, still do not ask for these benefits due to the perceived risk of collegial and supervisory backlash. Institutions such as Stanford University have made these time adjustments for review for promotion available to all faculty so a “don’t ask, it is automatically granted” policy is universally applied (7).

Colleague Networks

The greatest danger for junior faculty in academic medicine is isolation (4). Recent surveys of the social networking site Facebook and other web-based surveys have demonstrated the importance of social networking with regard to individual satisfaction. Recent studies indicate that roughly half of faculty surveyed feel that they have a network of supportive colleagues in their own department, but less than half report having one weekly substantive teaching or research conversation in their own department, the medical school, or anywhere in the university system. Having a network of productive colleagues is one of the strongest predictors of research productivity, publications, and advancement through the promotion system. Not surprisingly, those in interdepartmental centers, as opposed to clinical departments, at academic medical institutions report a higher degree of satisfaction and are less likely to leave academic medicine (6).

Research Support

“For a successful academic medical research career, you need three things: a strong and reliable mentor, a short and long term research plan that can succeed, and a very supportive home environment.”

Anonymous, 1982

The complexities of junior faculty development have moved beyond the paradigm set out in the above quotation. In response to the doubling of the National Institutes of Health (NIH) budget, there has been a sustained increase in the num-

ber of applications received by the Center of Scientific Review over the past decade. Between 1998 and 2004, the number of applications increased from 30,000 to 50,000, and the number of applications per investigator increased from 1.1 to 1.4. This flurry of activity has resulted in the NIH Council reviewing more than 14,200 applications each year. The increased volume has begat increased competition that has had a disproportionately negative impact on junior investigators, such that the age at which American biomedical researchers with doctoral degrees succeed in obtaining their first R01 award from the National Institutes of Health (NIH) has increased from 34.2 to 41.7 yr (33). The number of R01 grants awarded to those younger than age 35 has declined to 4% from 25% in 1980.

Compounding this competitive pressure on R01 funding, models for supporting biomedical research are also in transition. Many NIH institutes are investing in “big science,” such as the Human Genome Project, proteomics, and nanotechnology, and there is an increased emphasis on team science and interdisciplinary centers as key vehicles for scientific discovery. Given these realities, a junior investigator needs more than a mentor to facilitate a successful transition to sustained independence and scholarly productivity.

In recognition of these issues, the National Academy of Sciences convened the Committee on Bridges to Independence: Fostering the Independence of New Investigators in Biomedical Research. In a report released in March 2005, the committee made a number of recommendations to address the changing climate for conduct of biomedical research and to ensure successful maintenance of a cadre of junior faculty. Specifically, the Committee called for the following: (1) imposing a 5-yr limit on postdoctoral research; (2) considering reallocation of funding away from R01 grants and toward new career transition awards; (3) clarifying the mentorship role of principal investigators, with increased variety and new sources of career advising; (4) developing opportunities for learning grant writing and other research survival skills; (5) instituting university-backed safety net funding to help young researchers who have trouble securing NIH funding; and (6) reducing the requirements for preliminary data in R01 grant applications. Paramount in all of this was the need for a uniform approach to research training that included particular consideration of the needs of minority faculty. These and other recommendations are summarized in Table 1.

Given the changing funding climate and the advanced technological capabilities to support biomedical science, single-institution support of junior faculty may not be sufficient to ensure the success or retention of junior faculty (34). In this regard, greater coordination and collaboration among diverse academic schools (*e.g.*, biomedical engineering and medical institutions) should be pursued to diminish technological redundancies and optimize resource and data sharing. Shared regional and national core facilities could also enhance access to the resources necessary to conduct research. Streamlining administrative support and oversight functions through the formation of purchasing cooperatives for research equipment and supplies should be implemented. And, finally, the development of a national, standardized curriculum through multi-

Table 1. Components of support for junior faculty developing research careers

Support Programs	Financial Resources	Education and Training	External Funding Resources
Junior grant-writing programs, NIH-sponsored workshops	Faculty research development programs	Masters in clinical research for MDs and PhD candidates	CTSA/RCMI programs that provide pilot, protocol and educational support
Mentoring programs: Senior investigators/junior investigator teams	Matching or seed funds from internal university programs	KL2 programs for junior faculty	Limitation of post-doctoral support
Faculty development programs	Bridge-funding programs	Research certificate programs	Pathway to Independence Awards
	Multi-institutional funding programs (Coulter Foundation)	Implementation of training in research at the undergraduate level	Reduction of preliminary data, length of NIH applications, and modification of the review process.

From: Bridges to Independence: Fostering the Independence of New Investigators in Biomedical Research (<http://www.nap.edu/catalog/11249.html>)

institutional cosponsorship of graduate and postdoctoral research training programs should be structured to address the current complexities in biomedical research and equip junior faculty with the requisite skill sets for success in their academic careers.

Conclusion

The future success of AHCs depends to a great extent on the degree to which they are successful in recruiting, nurturing, and promoting talented faculty, particularly the most junior members. Those who are recruited to their first faculty position typically have strong training and demonstrated excellence in research or clinical practice. However, when faced with the complexities of the current academic environment, these enthusiastic individuals are relatively lacking in the knowledge, skills, and guidance that are critical for managing their own careers (22). Moreover, expectations of this younger generation of faculty often differ from those of their more senior colleagues. Yet, as a leading program director notes, "Generational changes do not necessarily mean reduced commitment. We can attract or repel [trainees and junior faculty]. We must choose which we wish to do." If AHCs are to grow and flourish, junior faculty must be nurtured, mentored, and retained. These efforts must balance the core values of both the AHC and the junior faculty. Passion can only flourish if it is properly nurtured.

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References

1. Lowenstein S, Fernandez G, Crane L: Medical school faculty discontent: Prevalence and predictors of intent to leave academic careers. *BMC Med Educ* 7: 37, 2007
2. Feder ME, Madara JL: Evidence-based appointment and promotion of academic faculty at the University of Chicago. *Acad Med* 83: 85–95, 2008
3. Paller MS, Cerra FB: Investing in research: The impact of one academic health center's research grant program. *Acad Med* 81: 520–526, 2006
4. Bickel J, Brown AJ: Generation X: Implications for faculty recruitment and development in academic health centers. *Acad Med* 80: 205–210, 2005
5. Bland CJ, Seaquist E, Pacala JT, Center B, Finstad D: One school's strategy to assess and improve the vitality of its faculty. *Acad Med*, 77: 368–376, 2002
6. Bussey-Jones J, Bernstein L, Higgins S, Malebranche D, Paranjape A, Genao I, Lee B, Branch W: Repaving the Road to Academic Success: The IMERGE Approach to Peer Mentoring. *Acad Med*, 81: 674–679, 2006
7. Buckley LM, Sanders K, Shih M, Kallar S, Hampton CM: Obstacles to promotion? Values of women faculty about career success and recognition. Committee on the Status of Women and Minorities, Virginia Commonwealth University, Medical College of Virginia Campus. *Acad Med*, 75: 283–288, 2000
8. Koopman RJ, Thiedke CC: Views of family medicine department chairs about mentoring junior faculty. *Med Teacher*, 27: 734–737, 2005

9. Carr P, Bickel J, Inui, TS: *Taking root in a forest clearing: A resource guide for medical faculty*, Boston, MA, Boston University School of Medicine, 2004
10. Griner PF, Blumenthal D: New bottles for vintage wines: The changing management of the medical school faculty. *Acad Med*, 73: 720–724, 1998
11. Lundemerer, KM: *Time to heal. American medical education from the turn of the century to the era of managed care*, New York, Oxford University Press, 1999
12. Strasburger VC: Momma, don't let your babies grow up to be academics! *Clin Ped*, 39: 167–168, 2000
13. Jotkowitz AB, Clarfield AM: Mentoring in internal medicine. *Eur J Intern Med*, 17: 399–401, 2006
14. Chew LD, Watanabe JM, Buchwald D, Lessler DS: Junior faculty's perspectives on mentoring. *Acad Med*, 78: 652, 2003
15. Daley S, Wingard DL, Reznik V: Improving the retention of underrepresented minority faculty in academic medicine. *J Natl Med Assoc*, 98: 1435–1440, 2006
16. Jagsi R, Butterson JR, Starr R, Tarbell NJ: A targeted intervention for the career development of women in academic medicine. *Arch Intern Med*, 167: 343–345, 2007
17. Yager J, Waitzkin H, Parker T, Duran B: Educating, training, and mentoring minority faculty and other trainees in mental health services research. *Acad Psychiatry*, 31: 146–151, 2007
18. DeLong TJ, Gabarro JJ, Lees RJ: Why mentoring matters in a hypercompetitive world. *Harvard Bus Rev*, 86: 115–121, 2008
19. MacKay B: Residents strive to raise public awareness of their role. *CMAJ*, 168: 1030, 2003
20. Lee JM, Anzai Y, Langlotz CP: Mentoring the mentors: Aligning mentor and mentee expectations. *Acad Radiol*, 13: 556–561, 2006
21. Tracy EE, Jagsi R, Starr R, Tarbell NJ: Outcomes of a pilot faculty mentoring program. *Am J Obst Gynecol*, 191: 1846–1850, 2004
22. Thorndyke LE, Gusic ME, George JH, Quillen DA, Milner RJ: Empowering junior faculty: Penn State's faculty development and mentoring program. *Acad Med*, 81: 668–673, 2006
23. Thorndyke LE, Gusic ME, Milner RJ: Functional mentoring: A practical approach with multilevel outcomes. *J Contin Educ Health Prof*, 28: 157–164, 2008
24. Wenger D: Conducting a cost-benefit analysis of faculty development programs. *Acad Physician Sci*, 1: 6–7, 2003
25. Garman KA, Wingard DL, Reznik V: Development of junior faculty's self-efficacy: Outcomes of a National Center of Leadership in Academic Medicine. *Acad Med*, 76: S74–S76, 2001
26. Wingard DL, Garman KA, Reznik V: Facilitating faculty success: Outcomes and cost benefit of the UCSD National Center of Leadership in Academic Medicine. *Acad Med*, 2004, 79: S9–S11, 2004
27. Fleming VM, Schindler N, Martin GJ, DaRosa DA: Separate and equitable promotion tracks for clinician-educators. *JAMA*, 294: 1101–1104, 2005
28. Bunton SA, Mallon WT: The continued evolution of faculty appointment and tenure policies at U.S. medical schools. *Acad Med*, 82: 281–289, 2007
29. Carr PL, Ash AS: Faculty perceptions of gender discrimination and sexual harassment in academic medicine. *Ann Intern Med*, 132: 889, 2000
30. Carr PL, Szalacha L, Barnett R, Caswel C, Inui T: A "Ton of feathers": Gender discrimination in academic medical careers and how to manage it. *J Women's Heal*, 12: 1009–1018, 2003
31. Price EG, Gozu A, Kern DE, Powe NR, Wand GS, Golden S, Cooper LA: The role of cultural diversity climate in recruitment, promotion, and retention of faculty in academic medicine. *J Gen Intern Med*, 20: 565–571, 2005
32. Fairchild DG, Benjamin EM, Gifford DR, Huot SJ: Physician leadership: Enhancing the career development of academic physician administrators and leaders. *Acad Med*, 79: 214–218, 2004
33. Weinberg RA: A lost generation. *Cell*, 126: 9–10, 2006
34. Heinig SJ, Krakower JY, Dickler HB, Korn D: Sustaining the engine of U.S. biomedical discovery. *N Engl J Med*, 357: 1042–1047, 2007