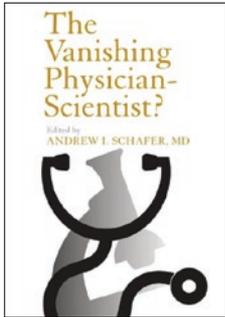




## Regenerating physician-scientists



### The Vanishing Physician-Scientist?

Edited by Andrew I. Schafer

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The academic niche for physician-scientists has been degenerating for over three decades. In 1979, the director of the US National Institutes of Health (NIH), James Wyngaarden, initially highlighted an alarming drop-off in the number of physician-scientists and their success rates in NIH funding. Since then, the combined burdens of an increasingly stringent overall NIH budget, educational loans on young physicians (often in the six figures), the procedure-driven nature of modern clinical medicine, and the financial vise of managed care and its follow-on effects on the academic environment have created an increasingly ablative force on the necessary environment to maintain a proper balance in the numbers of physician-scientists. In *The Vanishing Physician-Scientist?*, edited by Andrew I. Schafer, currently chairman of the Department of Medicine at Weill Cornell Medical College, the fate of the physician-scientist is revisited from multiple angles: renewal versus extinction, the evolution of diverse lineages (MD-PhD, late bloomers with MD degrees alone, PhDs in clinical departments), implications for biotechnology and drug discovery, gender imbalance, pipeline versus attrition effects, role models, financial and modern lifestyle concerns and the fragile microenvironmental niche of academic medicine in general. The result is a fascinating must-read for those of us with a deep interest in the subject that goes beyond conjecture and anecdotal personal experience to recent academic survey data, population analyses, current NIH funding trends, outcome analyses of MD-PhD trainees and, most importantly, onward toward a series of cogent, specific and implementable suggestions for regeneration. As the last page is turned, a more sanguine view of the problem emerges, along with a few surprises.

The book is comprised of 15 chapters written by over twenty leading physician-scientists who offer a number of penetrating insights into the crux of the problem of regenerating a new cadre of leaders in academic medicine. For example, as noted in the book by Tim Ley, a former president of the American Society of Clinical Investigation, the demographics of physician-scientists have been relatively stable since 1990. The bulk of these researchers hold an MD degree alone, and their success rates for NIH funding are similar to others with PhD or MD-PhD joint degrees.

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A surprising trend of combined MD-PhD trainees moving away from scientific careers is also evident in survey analyses. Interestingly, a case can be made to enhance our focus on designing strategies for renewing the population of physician-scientists. Also, as noted by Ley, the pool of physician-scientists is still overwhelmingly male, despite the near equal number of females in medical school today, indicating a need to address gender-specific issues.

‘Translational medicine’ has become the mantra for every medical school dean in the US and elsewhere, and, as presented by Barry Collier, the physician-in-chief of Rockefeller University, in his chapter, regenerating the pool of physician-scientists is clearly central to this goal. Increasingly, scientific centers of excellence are forging close networks with leading medical institutions, creating an interactive, nurturing microenvironment for physician-scientists. In this new era, in which humans themselves are models for human disease, technological barriers are rapidly breaking down, as higher-throughput human genotyping, whole exome or genome sequencing and high-content chemical screening on human stem cell model systems are becoming customary. The major discoveries in genomics research coming out of the Broad Institute at the Massachusetts Institute of Technology, in close collaboration with physicians at Massachusetts General Hospital and elsewhere, come to mind. Finding the extreme and rare clinical phenotypes of major interest, and having the capability of calling back the patient for additional information, will be increasingly important going forward. However, as Collier clearly documents, academia must recalibrate how young physicians are recognized, protected and promoted as essential components of these large interdisciplinary teams.

The crucial role of the environmental academic niche for physician-scientists, and the need for its substantial modification, is a major point of discussion in many chapters. In terms of mentoring, the needs for earlier exposure to research in the core medical curriculum, as well as in post-graduate MD training, the inclusion of off-site mentors and exposure to successful physician-scientists that have managed to balance the scientific and medical demands of their profession with personal family goals are mentioned throughout the book. The need for the institution itself to create a more nurturing infrastructure is also highlighted.

Finally, as noted by the preeminent physician-scientist David Nathan, the former president of the Dana-Farber Cancer Institute and also the physician-in-chief of Children’s Hospital in Boston, there has never been a more exciting time to be a physician-scientist. ‘They must not and will not vanish,’ he writes. ‘Indeed, their future can be as bright as ever if we proactively fashion it with creativity, foresight, and vision.’ This future is clearly being empowered by annotated digital medical records, expanding databases on genotype-phenotype disease correlations from global collaborations, and research centers and networks funded by major philanthropic organizations and individuals. Likewise, the ability to study human disease in a dish, offered by recent advances in human stem cell biology, are extraordinary, offering the possibility of studying extremely rare and highly differentiated human cells from people with specific, rare and/or common diseases. Clearly, a resurgence in human physiology is on the horizon, and this need alone is likely to lead to a new breed of physician-scientists. The future of biology might be summed up in three words: human, human and human. Stethoscope, anyone?