# Training Clinical Pharmaceutical Scientists in Today's Highly Competitive Times: It's Time to Commit to Change

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We have reviewed the American College of Clinical Pharmacy (ACCP) Research Affairs Committee's commentary in this issue of *Pharmacotherapy*.[1] The report was prepared in response to a charge from the ACCP Board of Regents to provide recommendations "regarding the optimal pathway or pathways for preparing Pharm.D. graduates to be innovative clinical and translational scientists, able to successfully compete for funding at the national level." We also had the opportunity to review the editorial by Drs. Jerry L. Bauman and William E. Evans, also published in this issue.[2]

In the interest of full disclosure, we must declare that one of us (R.A.B.) chaired the American Association of Colleges of Pharmacy (AACP) task force to explore how academic pharmacy can increase its capacity for training clinical scientists, allowing pharmacy to respond optimally to the national emphasis on clinical and translational research. The committee's report[3] articulated conclusions similar to those of ACCP's Research Affairs Committee. In particular, the newfound emphasis on clinical and translational research provides the profession with a unique opportunity to make a significant contribution to the biomedical research enterprise and fulfill an important and challenging societal need. We applaud the Research Affairs Committee's attempt, on behalf of the profession, to bring closure to the issue of how we might best accomplish this goal. As a profession, we have been engaged in this conversation for more than 20 years. Despite this prolonged consideration, the issue has divided our profession and, to some extent, has distracted us from focusing on how to address this challenge.

The most serious issue on the table is straightforward: how do we (the profession of pharmacy) produce the manpower necessary to meet society's demands? Alternatively, do we simply relinquish this responsibility (and the associated opportunities) to others? As a starting point, we all agree that our profession should, and indeed must, play a significant role in clinical and translational research to optimally serve patients and the health care enterprise. Clinical and translational research is not a singular activity but rather a continuum of efforts; by virtue of its interdisciplinary nature, pharmacy aligns extraordinarily well with this continuum. At one end of this continuum is the need to have pharmacy-trained individuals who are well prepared to provide intellectual and scientific leadership. Often, this end of the spectrum is considered synonymous with individuals prepared to compete, and compete successfully, for National Institutes of Health (NIH) funding throughout their careers. This competition is, of course, conducted on a field of play that includes talented individuals from a wide array of disciplines who also are well prepared with strong pedigrees and experiences. As educators and senior colleagues within the profession, the most important question facing us—and perhaps the only question of any relevance with respect to this particular issue—is how best to prepare our students and junior colleagues for success in a competitive and ever-changing scientific environment.

One of us (R.A.B.) remembers joining the

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faculty at the University of Kentucky in 1978 and being informed how difficult it was to secure NIH funding. At that time, 30th–35th percentiles were required for funding, and it was understood that there was a bias against pharmacy and pharmaceutical science proposals (not necessarily doctor of pharmacy [Pharm.D.]– vs doctor of philosophy [Ph.D.]–trained scientists). Consequently, most schools of pharmacy had a research funding portfolio that was principally supported by the pharmaceutical industry, not by NIH. Findings by Dr. Kenneth Miller, Senior Vice President of the AACP, who tracked NIH and nongovernmental funding for the past 30 years, likely support this contention. We kidded back then that we were "born too late" and speculated that it would have been great to be a faculty member in an era during which a 50th percentile was sufficient to secure funding (pre-1975). Those were the good old days. Today, most of the NIH funds are going only to research projects in percentiles in the low teens or even single digits. The competition for, in essence, a shrinking federal pool of resources is intense, and we have a professional and moral responsibility to prepare scientists who have the best possible opportunity to compete in that marketplace. In the end, it will be the market that tells us whether or not we have been successful.

It always worries us when we find ourselves on the other side of an issue from our distinguished colleagues Drs. Bauman and Evans. We have tremendous respect for them as scientists and leaders within our profession. However, we agree with the recommendations of the Research Affairs Committee. The critical issue is not one of pedigree, but rather one of preparation. How does our profession, given the limited resources available to us, make a strategic best effort to respond to the manpower needs, in terms of both quantity and quality, that will have an impact on the biomedical research enterprise? Anything short of that reduces pharmacy to some level of irrelevance in the clinical and translational research arena. Our challenge is to channel our profession's limited resources in a way that will give us the very best opportunity to produce the most qualified manpower for the clinical and translational research enterprise. We have a moral and ethical responsibility to our students and junior colleagues to provide them with the tools and experiences to be competitive in a research environment that is only going to get tougher. We also have a moral and ethical obligation to society to provide the next generation, and continuing generations, with scientists who can have a profound and lasting impact on health care.

The Pharm.D. degree is a great precursor for pursuing a career in clinical and translational research. There are many examples (but unfortunately not enough) of individuals with Pharm.D. degrees, residencies, or fellowship training who have had truly outstanding clinical or translational research careers and have managed to be successful with NIH funding in these highly competitive times. However, the question before the academy today is how to systematically and effectively respond to the pressing demands and opportunities of these times. Unlike the ACCP Research Affairs Committee report, the AACP report did not suggest that we abandon fellowship training. Instead, the AACP report suggested that the only way our profession would be able to build a sufficient critical mass of high-end talent to compete today and tomorrow was to challenge every major school of pharmacy at a research-intensive university to "accept as a necessary component of their research/graduate training mission a significant interdisciplinary education/training program for clinical scientists in experimental pharmacotherapeutics at the PhD level."[3]

It is our opinion that the academy has been too slow to anticipate and respond to the opportunities that are now before us. Instead of being poised to aggressively pursue this opportunity, most schools of pharmacy are scrambling to recruit qualified and competitive talent in the clinical and translational research domain. This talent simply does not exist—regardless of training paradigm—in numbers sufficient to make a real difference. Are enough Pharm.D. fellows being produced in this country of the caliber, and with the portfolio of experiences and accomplishments, that would lead an academic organization to commit to a start-up package investment of $500,000 or higher? Is the supply of such individuals (regardless of the discussion of qualifications) scalable and sustainable? Are those individuals prepared to be competitive in academic research, or have their experiences been tailored more toward the industrial sector? Who will train them and serve as role models for a lifetime of success?

This might be the time for us to suggest that the Ph.D. route is the most appropriate mechanism for preparing Pharm.D. graduates for a research career in the academy. However, clinical and translational research represents a big tent, and

our profession's contributions within that tent are broad based and varied. Of course, there is room for individuals prepared through the more traditional Pharm.D.-fellowship route. Also, of course, we are fortunate to work with many extremely talented and motivated students who will be well served by this pathway. However, the simple reality is that this pathway is not sufficiently robust to meet the needs of today, much less the demands of tomorrow. As with all other challenges that have faced our profession and that we certainly will face in the future, we must recognize the situation as it exists and formulate a strategic and effective response. In our opinion, that response must include a robust and concerted effort to prepare young clinical and translational scientists through the Pharm.D.-Ph.D. route.

## References

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## Authors' Reply

### The Pedigree Is Important

We thank ACCP for giving us the opportunity to respond to Drs. Blouin and Pollack's comments about our editorial on how best to prepare the next generation of clinical pharmaceutical scientists.

We do not argue that preparing some of our future clinical pharmaceutical scientists through the Pharm.D.-Ph.D. route is a good thing, and we understand why leaders of institutions who have invested heavily in this approach need to be strong advocates of their past decisions. Our point is to have both pathways—but on equal footing and not a "preferred" or "most appropriate" way. Having two types of scientists trained by two different pathways in the same department or laboratory but with one being preferred strikes us as repugnant—certainly not a good recipe for collaboration. As Drs. Blouin and Pollack point out, even the AACP position statement (unlike ACCP's) did not suggest we abandon the fellowship route. We do agree that, at this time, there are probably not enough sophisticated fellowship programs to create an adequate mass of clinical pharmaceutical scientists—but, as we pointed out in the editorial, we are likewise suspect that the graduate school route will be able to provide the needed quantity for the future. Therefore, let's have both, and to this end, we call for a renewed effort to reinvigorate high-level fellowship training in this nation.

We do argue with Drs. Blouin and Pollack's statement that "the critical issue is not one of pedigree, but rather one of preparation." If it were not an issue of both pedigree and preparation, then why are we having this debate? We would merely prepare all future biomedical researchers in exactly the same way, with the same pedigree. There would be no physician-scientists, no pharmaceutical scientists, no information scientists, and so forth; all biomedical scientists would be cut from the same cloth in an identical fashion across all health professions and fields of biomedical research. That would be unwise. What we need are scientists whose pedigree is from the pharmacy profession, with others from the medical profession and others from the entire breadth of basic sciences. Therefore, the pedigree is a critical issue and one that cannot be ignored by focusing on preparation. That would be putting process over substance.

The question then becomes whether it is wiser to produce all future clinical pharmaceutical scientists by means of the Pharm.D.-Ph.D. process or to use broader approaches that include (and in some situations emphasize) the Pharm.D. (-only) plus fellowship track, for reasons we have summarized in our editorial. We think the clear answer is a resounding "yes" to the latter approach.

What we think is perhaps the much more worrisome issue is the nature of students who are being attracted to enter the pharmacy profession and our fear that few have any interest in a scientific career when they apply to pharmacy schools. The ambition of many students is to become the pharmacists they see in their community drug stores; these are their role models. Indeed, the "drug store on every corner" business model has fueled the staggering growth in pharmacy schools and pharmacy admissions in this country. Although not all bad, this model perhaps has translated into a decrease in the percentage of students who come to the profession with an interest in science. Thus, if we are looking for our next generation of pharmaceutical scientists in the pharmacy school

classrooms, we are looking for a diminishing number of needles in a proliferating haystack. Instead of arguing about what we do when we find one of these needles, we must, as a profession, find better ways to convey the scientific opportunities that exist within the pharmacy profession to undergraduate science students who are considering the next step in their higher education. If we do not change the substrate that is entering the pipeline, then it will not really matter what process we use to produce the next generation of pharmaceutical scientists. We might as well have our academic debates about how to get oil out of a pipeline that has lemonade coming into it.

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