Editorial

The Academic and Clinical Endocrinology Physician Workforce in the U.S.

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In this era of U.S. health care reform, it would be optimal for planning purposes to have a clear picture of the supply/demand balance of the U.S. physician workforce. This is particularly important in endocrinology because of the associated care for chronic and costly medical conditions, such as diabetes and osteoporosis. However, there is no central, reliable, complete, and up-to-date physician database in the United States. In the absence of such data, how can we intelligently plan for a cost-effective and prevention-focused health care system? How can those with a stake in the health care system optimize the future clinical, scientific, and academic workforce? These are questions that prompted the report by Desjardins *et al.* (1) in this issue of the *JCEM*. But first, a little background.

Can we reasonably estimate the size of the current and future deficit in the endocrinology workforce? We have reviewed this question in the past (2). On the "demand side," there are 26 million people with diabetes in the United States (3, 4), 10 million have osteoporosis (5), and about 12 million have a thyroid nodule requiring evaluation (6). Nearly 34% of adults have the metabolic syndrome, and one third of the U.S. population is obese (~100 million). Therefore, the total number of Americans with endocrine disorders comprises a substantial fraction of the population (nearly 150 million), and this figure does not even include other common disorders such as hyper- and hypothyroidism, polycystic ovarian syndrome, or less common diseases of the pituitary, parathyroid, and adrenal glands. In hospitals, the caseload is certainly high because approximately 30% of inpatients have diabetes. Obviously, the 2000–2500 practicing clinical endocrinologists in the United States (see below) cannot handle this burden, nor should they in an ideal world. Most patients can be managed by primary care providers and ancillary personnel. But even 10% of those patients (*i.e.* 15 million) could not be handled by the current pool of endocrinologists; this would yield a panel of approximately 6000 patients per endocrine physician. If a normal physician workload or panel would include 3000–4000 patients, this would predict approximately a 30–50% shortfall for the current demand. One could even argue that this is an underestimation because the population is aging and the diabetes epidemic progresses.

Why can't primary care providers manage patients with diabetes, osteoporosis, thyroid nodules, *etc.*? Is endocrine care really that complicated? The answer is yes; endocrine diagnosis and management are becoming increasingly complex. For example, there has been an explosion in the number of diabetes and osteoporosis drugs, often used in combination. There are now seven types of insulin and analogs, each with particular characteristics, and that figure does not even include the different premix preparations. It is difficult to maintain expertise on every one of these drugs. And then there are devices and technology: insulin pumps, glucometers, and continuous glucose monitoring systems. Who should get these devices, and more importantly, who will ensure that their use translates into meaningful clinical improvements? Who should be evaluated for islet or pancreas transplantation and how does one make that happen? In the controversial field of thyroid cancer and nodules, endocrinologists are needed to interpret results of aspiration cytology and make cost-effective decisions on utilization of imaging and treatment options. Contemporary treatment of osteoporosis now involves expensive biologicals (*e.g.*, recombinant human PTH and denosumab) that also demand special expertise. Furthermore, there are also multiple complex and sometimes conflicting practice guidelines, and economic incentives, malpractice concerns, and quality assessment measures are all driving outpatients to, not away from, endocrinologists. On the quality improvement side, primary care providers and hospitals are under financial pressure to

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demonstrate that their patients are meeting recommended glycemic goals. These are only a few examples of complexity requiring a specialist.

On the "supply side," there were 5811 board-certified endocrinologists in the United States in 2010 according the American Board of Internal Medicine. Their distribution has been discussed previously (2): approximately 1500 work in the 130 academic medical centers in the United States (an estimate based on self-described primary job descriptions from members of The Endocrine Society), largely performing research, and/or didactic and/or administrative tasks, leaving approximately 4300 available for other activities. Perhaps 10% or 500 are retired or no longer active, leaving approximately 3800 for other activities. An uncertain number (but perhaps 300–500) work in pharmaceuticals, biotechnology, the Food and Drug Administration, and the Department of Veterans Affairs, leaving approximately 3400 for other activities. There are no accurate data on the number of endocrinologists in full-time, non-hospital-affiliated private practice. For argument's sake, let's say there are approximately 2000 (plus or minus 300) endocrinologists in private practice, leaving approximately 1400 for other activities. Approximately 60–70% of endocrinology fellowship graduates are women today and many prefer to work part time. This leaves perhaps 1000 full-time endocrinologists for the approximately 6000 hospitals seeking part- or full-time coverage for endocrinology care and requisite quality improvement program supervision. Although these numbers are only educated estimates, they are nevertheless conservative and reveal how dismal the present supply is and will continue to be.

The obvious conclusions are that although we lack hard data on the U.S. endocrinology physician workforce, there is a severe supply-demand mismatch at present. The shortfall was predicted to be 8–25% in 2003, in a model that assumes that primary care physicians would be gatekeepers for access to endocrine care (7), an assumption that has not transpired. Our best guess is that the shortfall at present is in the 40–50% range. And the numbers presented above do not even account for the rapidly expanding obesity and diabetes epidemic. Yet, surprisingly, the number of fellowships in the United States actually has declined over the past two decades (American College of Graduate Medical Education; http://www.acgme.org/adspublic/). The mean age of endocrinologists in the United States, reported to be 49 yr in 2003 (7), is now likely higher; retirement of a substantial proportion of the current workforce is likely near at hand. Thus, the current inadequate supply will dwindle further. One only needs to survey advertisements and physician recruiter web sites or interview community hospital administrators to observe an immediate and acute need for just one endocrinologist, particularly in rural and underserved areas. Or one needs only to call an endocrinology office anywhere in the United States to learn that the average wait for an appointment is in the range of 3 months, with many offices not accepting new patients at all.

And what about the academic and scientific side of the endocrinology workforce? This is the aspect that is of the most interest to Desjardins *et al.* (1). The bottom line here is that in 2011 we do not know the cause of extremely common endocrine disorders such as type 2 diabetes, type 1 diabetes, osteoporosis, or polycystic ovarian disease. Clearly, there is a lot to learn about the basic aspects of diabetes, osteoporosis, and other areas of endocrinology. We need to understand what causes them if we are ever going to develop effective therapeutics and preventive measures. With this background, the article by Desjardins *et al.* (1) asks the following question: in the absence of current, reliable national data, can meaningful data be generated using a simple web-based questionnaire? The answer is "yes," but with caveats. On the "strengths" side, the goal is clearly noble; the authors are trying to reverse the data vacuum. Furthermore, the study makes the point that it is reasonably easy to generate data using simple web-based questionnaires. It also underscores the important point that "early investigators" in academia are defined as being "younger than 49 yr old." This inclusion criterion is appropriate, but should not go unnoticed; age 49 is mid-career or late-career in the business and banking worlds, yet it is still "entry level" in academic endocrinology. Additionally, the authors find that only 6% of research in endocrinology is focused on disease prevention (diabetes, osteoporosis, obesity, metabolic syndrome). Although this will not be surprising to the *cognoscenti*, it is important to highlight. The authors also underscore the salary disparities for female endocrinologists, as well as the financial disincentives associated with a research career compared with clinical practice. Finally, the complex range of responses generates very fertile grounds for further hypothesis generation and web-based questionnaires.

Several limitations in their study must be acknowledged, however. First, the study did not examine the broad U.S. endocrine physician workforce because the sample was derived from The Endocrine Society, a premier academic society and not a society composed exclusively of clinical endocrinologists. Not surprisingly, therefore, there was an overrepresentation of academic endocrinologists and an underrepresentation of private practice endocrinologists. Second, the 29.6% response rate is accepted as statistically valid, but our suspicion is that there is substantial selection bias here; physicians who left academia and The Endocrine Society might be disproportionately disincentivized to

respond to a survey from that Society, compared with active, engaged academic members. Third, the salary data were presented as natural logs and thus are difficult to interpret; it would have been preferable to see hard dollar figure salaries. Fourth, the study excluded pipeline issues like large debts that most U.S.-trained graduates must repay (often more than $200,000), and the marked salary disparities between procedure *vs.* "cognitive" non-procedure-based subspecialties that drive away medical students and residents from entering non-procedure specialties. Finally, the study was retrospective in character, sampling physicians who made life decisions between 1991 and 2005, when National Institutes of Health (NIH) funding was robust. The current trickle of NIH research dollars is unquestionably driving the best and brightest (and most debt-ridden) future researchers away from discovery and into practice, or out of medicine entirely.

With these strengths and limitations, what can be taken away from this paper? In an era when the U.S. government, hospitals, health insurance companies, and healthcare providers attempt to plan for the future, any data pertaining to the endocrine physician workforce is welcome and essential. In addition, now that we know that simple web-based questionnaires can be effective, additional groups can be targeted, *e.g.* real-world private practice endocrinologists and ancillary providers. More focused questions can now be asked, *e.g.* how do marked salary disparities between procedure-based and non-procedure-based specialties affect decisions to enter a given subspecialty or private practice *vs.* research/academia?

On the other hand, we already know the answers to many of these questions. Why would any rational "young" physician with thousands of dollars in college/medical school debt, frequently married to a spouse with equivalent additional debt, enter a non-procedure specialty? And if they did, why would they want to pursue additional fellowship training that pays a fraction of what they could earn immediately by entering practice? And if they did decide to enter a research fellowship, would they ever be able to afford to accept an academic salary? And if they did, would they have any chance of obtaining NIH grant support in a world where they see their seasoned role models failing in the face of NIH percentile cutoffs of 5–15%? Perhaps we do not need more questionnaires—we need to act.

On the clinical care side, we need to increase the number of fellowship programs and training slots. Perhaps more urgently, we must correct the perverse financial incentives that favor costly procedures and acute hospital care, and that discourage the pursuit of training in subspecialties predominantly devoted to preventive care such as endocrinology. In some cases, alternative health care models will need to be explored to best deploy the existing workforce. We are learning that endocrinologists can help fill the demand gap problem of rural populations where much of the healthcare disparity falls. In this regard, our institution has developed telemedicine diabetes services to remote rural areas. We are learning that with adequate state-of-the-art videoconferencing, a remote-site diabetes nurse, and compatible electronic medical record systems, endocrinologists in academic centers can deliver the much needed specialized consultant care in diabetes to medically underserved communities.

On the academic side, we need to aggressively reinvest in the NIH—the main incubator for scientists considered necessary for academia, biotechnology, and pharmaceutical industries. Here, the main target for change should be clear: the salary disparities between private practice and scientific careers must be reduced, or the problem will only keep worsening. The work by Desjardins *et al.* (1) provides new metrics supporting this notion. Finally, whereas emerging economy countries and other U.S. competitors are increasing support for basic and clinical research, the United States has been reducing it. This is a poor decision on many levels, and it should be reversed urgently and aggressively.

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