

# Training the Next Generation of Nephrologists

Donald E. Kohan

*Clin J Am Soc Nephrol* 6: 2564–2566, 2011. doi: 10.2215/CJN.08940811

Within the past few years there has been a tremendous upsurge of interest in issues related to nephrology fellowship training; there are close to 10-fold more published articles about this in the past 5 years than in the previous 50. There is good reason for such attention: we are, and have been for several years, approaching a critical juncture in the manner in which we recruit, teach, and fund nephrology trainees. A variety of forces are driving this “perfect storm” and include the following.

1. Increasing clinical workload. The U.S. chronic kidney disease (CKD) and dialysis population is growing, and taken together, exceeds the ability of the current nephrology workforce to provide comprehensive renal care (1,2). Added to this is the likelihood that formerly uninsured patients with CKD will be identified upon institution of the Patient Protection and Affordable Care Act. Improved efforts to recognize CKD, which is underdiagnosed and undertreated (3), will also likely increase the nephrologist’s workload. Notably, nephrology workforce concerns are not unique to the United States, having been reported in Spain (4), Italy (5), Sub-Saharan Africa (6), and elsewhere.

2. Diminished interest in nephrology as a career choice. The number of U.S. medical graduates going into nephrology has steadily declined for the past decade and, as a proportion of total trainees, is less than any other internal medicine subspecialty (1,2). The reported reasons for this include minimal nephrology exposure, unstimulating renal coursework, disheartening inpatient experiences, perception of a suboptimal work-life balance, generational learning differences, and lack of exposure to more attractive areas of nephrology such as outpatient general nephrology clinics, critical care nephrology, interventional nephrology, and transplantation. In addition, concerns exist over whether the international medical graduate pipeline, which is vitally important to the U.S. nephrology workforce, can be sustained.

3. The changing nature of nephrology care. Dialysis, and to some extent CKD, care is evolving to be more protocol-driven and dependent on nonphysician healthcare providers. Increased restrictions are being placed on tests ordered and therapy provided. Although such changes may be necessary and ultimately beneficial to the patient, they may also contribute to decreased interest in nephrology and job dissatisfaction (7).

4. Increased requirements for nephrology training programs. In an effort to improve the quality of graduates, the Accreditation Council for Graduate Medical Education has mandated that training programs increase focus on developing and assessing milestones and outcomes. This, along with other regulations such as more restrictive duty-hour requirements, has substantially increased the administrative workload of training program directors and program staff. Whether or not such regulations will improve health care is unknown because supporting evidence, based on carefully performed analysis published in the literature, is largely lacking.

5. Decreased funding for nephrology trainees and research. Given current and anticipated economic challenges, training programs are increasingly concerned about funding of fellow clinical and research training. No increase in federal funding for graduate medical education has occurred since the Balanced Budget Act of 1997, and pharmaceutical, society, and other nonfederal support for fellowship training has diminished.

It should be self-evident that nephrologists must take a lead role in addressing these issues; otherwise, we risk losing control of how nephrology care is provided and what research areas are prioritized. As part of this process, today’s nephrology training programs must adapt, being responsive to the multiple current and evolving challenges and then providing leadership in shaping future training strategies. To do so, nephrology educators must continually assess their constituency, determining the needs and desires of trainees, practicing nephrologists, researchers, regulatory agencies, nonphysician renal care providers, patients, and others. If the published literature is a metric of such efforts, then this need has been largely unmet. In light of this, the article by Lane and Brown in this issue of *CJASN* takes on particular importance. This study, conducted in Australia, attempted to obtain evidence to help align “nephrology training with workforce, patient and educational needs.” The investigators obtained completed questionnaires from 79% ( $n = 280$ ) of practicing Australian nephrologists listed with the Australian and New Zealand Society of Nephrology in 2007. Interviews, performed by the authors, were conducted with patients receiving care by a nephrologist ( $n = 11$ ), nephrology fellows ( $n = 24$ ), and practicing nephrologists ( $n = 27$ ). The survey revealed workloads and divisions of effort between

Division of Nephrology,  
University of Utah  
Health Sciences Center,  
Salt Lake City, Utah

**Correspondence:**  
Donald E. Kohan,  
Division of Nephrology,  
University of Utah  
Health Sciences Center,  
1900 East 30 North,  
Salt Lake City, UT  
84132. Phone: 801-  
581-2726; Fax: 801-  
581-4343; E-mail:  
Donald.kohan@hsc.  
utah.edu

general nephrology, CKD, ESRD, administration, teaching, and research that were not very dissimilar to those reported in the United Kingdom, Canada, and the United States. Heavy clinical demands were identified as a problem, and the authors inferred that they adversely affected the ability of nephrologists to train fellows. The direct interviews, albeit involving small numbers of individuals, revealed that patients primarily valued good communication skills. Nephrologists and trainees primarily valued clinical skills and an evidence-based approach to patient care. They also recognized the importance of humanistic attributes, but noted that patients often used these as a proxy for medical knowledge. The authors suggested that their data support the need for training in advanced communication and a holistic approach to patient care.

The findings by Lane and Brown (7) are fairly predictable; however, the strength of their study lies in the fact that it is one of the few studies that attempts to align training curricula with current clinical practices and patient needs. Other studies (reviewed in Parker [9]) have surveyed nephrology fellows and/or nephrology practitioners about ESRD curricula and identified concerns over insufficient training in end-of-life issues, ethics, and peritoneal dialysis. In a landmark study by Berns (10), U.S. nephrologists who had completed their training within the past 2 to 6 years were surveyed (133 respondents). Key areas that were identified as needing better training included all home dialysis modalities, business practice, administrative skills, understanding regulatory issues, stones, genetic renal disorders, nutrition, children with kidney disease, adults with childhood kidney disease, renal complications of pregnancy, poisoning, plasmapheresis, end-of-life care, clinical pharmacology, performing ultrasounds, vascular access assessment and interventions, and interpreting radiologic studies. This study also noted that a survey of fellows conducted as part of the nephrology in-training examination found that >25% of fellows felt that they needed better training in cystic kidney diseases, palliative care, plasmapheresis, renal ultrasound, peritoneal dialysis, home hemodialysis, arteriovenous access management, stones, and geriatrics.

Given that we have identified key issues related to future nephrology training, have now obtained important information about what training programs should teach, and are committed to continued assessment of the effectiveness and relevance of training, how do we best move forward to meet these challenges? In my opinion and that of other nephrology educators, the solution is complex and involves a variety of approaches:

1. New curricula need to be developed that address difficult-to-teach areas. These could be through e-learning, involve increased use of simulation, and include increased regional training opportunities for areas with insufficient numbers of patients (*e.g.*, peritoneal dialysis) (9,10).

2. New curricula need to be developed that address evolving critical issues in nephrology. This includes using a multidisciplinary approach to health care, working in the setting of patient-centered medical homes and accountable care organizations, awareness and understanding of public policy, being a proponent of quality and safe care, enhanced development of communication and administra-

tive skills, and others. Ultimately, the goal is to give nephrologists the tools to be effective clinicians and leaders in healthcare reform.

3. Teaching methodologies must be adapted to today's learner. Trainees are less likely today to respond to authority and traditional apprenticeship training. In particular, the use of Web-based learning must be facilitated, including blogs, podcasts, and social media (11). Notably, the nephrology societies, and particularly the American Society of Nephrology, are undertaking major efforts to promote better fellowship training through e-learning modalities (12).

4. Aspects of nephrology that attract trainees' interest in nephrology as a career choice must be emphasized, including outpatient nephrology clinics, critical care nephrology, interventional nephrology, home dialysis, and transplantation (8). In addition, it is critically important that nephrologists emphasize recent advances in the field to attract both clinicians and researchers. Examples might include identification of the association between ApoL1 gene variants and kidney disease in African Americans (13), the circulating urokinase receptor as a cause of focal segmental glomerulosclerosis (14), the potential use of stem cells in promoting renal repair, identification of renal ion transporters and regulatory proteins, new drugs that may be effective for the treatment of CKD (*e.g.*, bardoxolone [15]), and others.

5. Training program directors must take ownership of the future of how their programs are accredited. Although outcomes-based education has intuitive merits, we must work to make our training practices as evidence-based as possible.

This represents only a partial list, but it is obvious that much needs to be done. As we move forward, training program directors must continuously assess how effectively they are meeting their constituencies' needs. Regularly performed surveys and analysis, such as that reported by Lane and Brown (7) in this issue of CJASN, will help ensure that we continue to move in the right direction.

#### Disclosures

None.

#### References

1. Kohan DE, Rosenberg ME: The chronic kidney disease epidemic: A challenge for nephrology training programs. *Semin Nephrol* 29: 539–547, 2009
2. Parker MG, Ibrahim T, Shaffer R, Rosner MH, Molitoris BA: The future nephrology workforce: Will there be one? *Clin J Am Soc Nephrol* 6: 1501–1506, 2011
3. Macdougall-Rivers M, Phillips, L: Recognition of chronic kidney disease in a general medicine outpatient clinic. *Ren Fail* 2011, in press
4. Berns Carro C: [Trends in resident positions offered in nephrology (1985–2008)]. *Nefrologia* 31: 155–161, 2011
5. De Pietro C: [The demographic profile of Italian nephrologists]. *G Ital Nefrol* 27: 166–177, 2011
6. Naicker S, Eastwood JB, Plange-Rhule J, Tutt RC: Shortage of healthcare workers in sub-Saharan Africa: A nephrological perspective. *Clin Nephrol* 74[Suppl 1]: S129–S133, 2010
7. Lane, Brown: *Clin J Am Soc Nephrol* 6: 2681–2687, 2011
8. Mehrotra R, Shaffer RN, Molitoris BA: Implications of a nephrology workforce shortage for dialysis patient care. *Semin Dial* 24: 275–277, 2011
9. Parker MG: Nephrology training in the 21st century: Toward

- outcomes-based education. *Am J Kidney Dis* 56: 132–142, 2010
10. Berns JS: A survey-based evaluation of self-perceived competency after nephrology fellowship training. *Clin J Am Soc Nephrol* 5: 490–496, 2010
  11. Sparks MA, O’Seaghdha C, Sethi SK, Jhaveri, KD: Embracing the Internet as a means of enhancing medical education in nephrology. *Am J Kidney Dis* 2011, in press
  12. Perazella MA: Nephrology fellowship training in the 21st century: Where do we stand? *Clin J Am Soc Nephrol* 5: 387–389, 2011
  13. Genovese G, Friedman DJ, Ross MD, Lecordier L, Uzureau P, Freedman BI, Bowden DW, Langefeld CD, Oleksyk TK, Uscinski Knob AL, Bernhardt AJ, Hicks PJ, Nelson GW, Vanhollebeke B, Winkler CA, Kopp JB, Pays E, Pollak MR: Association of trypanolytic ApoL1 variants with kidney disease in African Americans. *Science* 329: 841–845, 2010
  14. Wei C, El Hindi S, Li J, Fornoni A, Goes N, Sageshima J, Maiguel D, Karumanchi SA, Yap HK, Saleem M, Zhang Q, Nikolic B, Chaudhuri A, Daftarian P, Salido E, Torres A, Salifu M, Sarwal MM, Schaefer F, Morath C, Schwenger V, Zeier M, Gupta V, Roth D, Rastaldi MP, Burke G, Ruiz P, Reiser J: Circulating urokinase receptor as a cause of focal segmental glomerulosclerosis. *Nat Med* 17: 952–960, 2011
  15. Pergola PE, Raskin P, Toto RD, Meyer CJ, Huff JW, Grossman EB, Krauth M, Ruiz S, Audhya P, Christ-Schmidt H, Wittes J, Warnock DG: Bardoxolone methyl and kidney function in CKD with type 2 diabetes. *N Engl J Med* 365: 327–336, 2011

Published online ahead of print. Publication date available at [www.cjasn.org](http://www.cjasn.org).

See related article, “Alignment of Nephrology Training with Workforce, Patient, and Educational Needs: An Evidence Based Proposal,” on pages 2681–2687.