

Nephrology Education: Time for a Change



We are experiencing a revolution in nephrology education. In all phases of a learner's career—undergraduate medical education (UME), graduate medical education, and postgraduate education—shifts in priorities, funding, and patient care have dramatically altered how we teach.^{1,2} Developing novel ways to teach nephrology, at all learner levels, will be critical to meet the needs of restructured UME curricula, the increased prevalence and treatment modalities for kidney disease, and the changing nature of renal fellowship. In this edition of the *Advances in Chronic Kidney Disease (ACKD)*, we highlight innovative nephrology curricula, developed by leading educators, and share how to implement these tools more widely at other institutions.

As of 2018, approximately half of medical schools had shifted from a 2-year preclerkship phase to an 18-month or shorter preclerkship phase, and data from the American Association of Medical Colleges (AAMC) show 85% of medical schools are planning or have implemented a new curriculum within the past 3 years, suggesting more schools are moving toward this timing.^{3,4} This shortening of the preclerkship years requires an emphasis on essential and clinically oriented topics, with a resultant reduction of content deemed less relevant to clinical practice.⁵ Additionally, schools are placing a greater emphasis on small-group, active learning and shifting away from a lecture-heavy teaching strategy.⁵ This, combined with the recognition of the vast impact of social determinants of health and racism on patient care, has dramatically altered the UME educational landscape.⁵⁻⁷ These changes can present a challenge to nephrology educators who have developed rich curricula with a heavy emphasis on glomerular and kidney physiology. Dr Stern and colleagues describe the challenges and opportunities for nephrology educators to adapt to a shorter preclerkship phase by focusing on more clinically relevant topics and replacing lectures with faculty-led small-group sessions. They propose innovative additions to the curriculum, including dialysis policy, and using the lessons of apolipoprotein L1 (APO L1) to demonstrate the pitfalls of conflating race and biology. To help implement inquiry-based, active learning of complex renal physiology topics, Dr Hoenig and colleagues present their "hands-on" kidney physiology lab, where students review and interpret original data from seminal experiments to better understand kidney physiology. These laboratories exploit students' natural curiosity in order to teach fundamental kidney physiologic concepts while providing an opportunity for self-directed learning and enhancement of problem-solving skills. Finally, Paloma Orozco-Scott, MPH, Jerrel Cattlett, and others propose a framework for antiracist teaching, which provides educators with an actionable and stepwise plan for grappling with the social construct of race, which is often presented as a biologic fact. Taken together, these 3 articles provide UME educators with the necessary tools to create and teach a modern, anti-oppressive, exciting, hands-on, and clinically focused preclerkship nephrology course.

For almost a decade, trends in graduate training of medical residents demonstrated a declining interest in nephrology, leading to a decrease in the number of nephrology applicants and eventually a relative reduction in the nephrology workforce.⁸ By changing the current paradigms of how we educate, we have the opportunity to reverse this disheartening trend and enhance recruitment of trainees into our discipline. This challenge can be tackled by those in academic institutions as well as by community-based nephrologists who may be an untapped resource to encourage trainees in pursuing nephrology as a career choice. There have been several initiatives by training programs to attract residents into nephrology, ranging from alterations to work schedules to subspecialization into focused career pathways. Additionally, compared to historical methods, there has been a new focus on how the nephrology community teaches and evaluates trainees.

Our challenge is not only to kindle a love of nephrology in students but also to continue that excitement during the continuum of their training as internal medicine residents. Dr Hilburg and colleagues assert that our goal as nephrology educators in teaching residents should predominantly be centered on resident education rather than on recruitment. They describe their ambulatory nephrology curriculum for all internal medicine trainees at the University of Pennsylvania. This curriculum focuses on common renal disorders encountered in general medicine and prepares internists to deliver superb care to a growing population of CKD patients; it does so in non-hospital-based settings, a domain of kidney care delivery often overlooked when planning traditional nephrology electives during their internal medicine training. Dr Kwon describes how nephrologists in private practice—who comprise the majority of practicing nephrologists—can be a valuable yet an untapped resource in complementing nephrology education and recruitment, especially for residents in community programs.⁹ While there are many limitations compared to academic settings, including time, personnel, and resources, she presents a compelling argument for the many rewards inherent to resident teaching. She describes how to delicately balance teaching and patient care duties and provides substantial resources and ideas for other private practitioners interested in teaching medical residents. Other ideas to enhance interest in nephrology include broadening the curricular offerings in fellowship programs and preparing fellows for the future in addition to the present. Dr Greenberg and colleagues describe the modern nephrology fellowship, which includes formal curricula in home dialysis, palliative care, and point-of-care ultrasound. They provide actionable ideas

on how such curricula can be designed, and how fellowship programs that do not have access to these resources can partner with other groups to create meaningful learning opportunities for their fellows. Other important areas, such as the necessity to develop stellar clinician educators, are explored by Dr Jain and colleagues who describe a novel fellow educator pathway concomitant with the nephrology fellowship. The need for robust kidney pathology education to complement clinical training cannot be overstated. Dr Kuperman and Dr Caza and colleagues provide a perspective on educating nephrology fellows and practicing nephrologists in nephropathology. This form of teaching expands beyond formal classroom didactics and ranges from online resources, educational courses/symposia, and mentorship opportunities.

Education in nephrology expands beyond the fellowship training phase that includes more than nephrologists. An expansion of advanced practice providers (APPs) in nephrology has led to increased multidisciplinary approaches of care and, hence, different approaches to dissemination of knowledge. However, since the training of APPs is apprentice-based, most APPs will begin their nephrology career without prior exposure to nephrology. Amy Sears, DNP, Kim Zuber PA-C, and Jane Davis DNP present a much-needed discussion on the necessity, benefits, and limitations in training for APP in nephrology. They propose the ideal training platform that would be beneficial for a successful partnership between APPs and physicians and outline current and past initiatives.

Finally, nephrologists are more than clinicians—they are medical directors of dialysis units and serve in executive as well as operational roles and as entrepreneurs.¹⁰ Leadership skills are necessary to function as a nephrologist but are typically not a part of nephrology training. Dr Yau and Dr Auguste discuss how to incorporate such training into a fellow curriculum and in continuing medical education.

We are excited to present this ensemble of work for this unique issue of *ACKD*. We thank all our authors and reviewers for their contributions and Dr Charuhas V. Thakar for inviting us to be guest editors.

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