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Editorial

On Becoming a Nephrologist: Medical Students' Ideas to Enhance Interest in a Career in Nephrology

The summary by Parker et al[1] of US medical graduates' perceptions toward nephrology paints a troubling picture of declining interest in this specialty as a career. As 2 medical students—1 American, 1 European—heading toward careers in nephrology, we provide our perspectives regarding this trend among medical students and propose potential solutions.

We believe that the decline of US medical students' interest in nephrology stems in part from misinformation. Jhaveri et al[2] recently hypothesized that incorporating outpatient nephrology rotations and improved research experiences into internal medicine (IM) residency could fuel greater interest in a career in nephrology among residents by providing more comprehensive exposure to the field. We are confident that this holds equally true for medical students because a lack of exposure to representative nephrology experiences leads to generalized misconceptions about the field.

To better understand medical students' disinclination toward nephrology, we must first appreciate the factors that students use to rate subspecialties. Emotional impressions based on short exposures to different specialties play a key role in influencing future career paths. In a publication by Hauer et al[3] assessing the factors associated with medical students' career choices in IM, students reported favorable feelings about caring for their patients as the most influential factor in choosing IM. With an odds ratio (OR) of 8.72, this factor was even more important to medical students than being impressed with their educational experience (OR, 4.57) or any other perceptions they had of internists' lifestyles (OR, 2.00), which ranked second and third, respectively.[3] While longitudinal patient care is a particular feature of nephrology, there is no evidence that medical students are aware of this.

Moreover, during the preclinical years, students tend to be drawn to fields that contain exciting research topics. Based on our observations of our student contemporaries, work in stem cell and regenerative medicine, cancer genomics, and immunity regulation have become recent favorites. Often, the intersection of these fields with nephrology is lost. In the early to mid-1900s, renal physiology became popular as tools to elucidate the function of the nephron were implemented, thus drawing the best and brightest minds to nephrology. Educators must highlight the potential of kidney stem cells, the importance of the genetic underpinnings of glomerular diseases and hypertension, and the critical role of immune regulation in kidney transplantation in order to return the best and brightest to the field. Although this may be a focus in preclinical curricula at certain institutions, in our experiences, these exciting topics in kidney research are not adequately highlighted.

Financial compensation plays an increasing role in choosing postgraduate specialty training as increasing costs of medical education provide a greater impetus for debt-averse students to choose higher paying specialties. A 2008 article shows that nephrology ranks fifth of 9 IM subspecialties in terms of average salary,[4] contrary to the popular belief among medical students that nephrology is a poorly paying subspecialty. With recent legislation in the United States leading to the bundling of end-stage renal disease payments and quality assurance measurements affecting reimbursement, there is concern that US nephrologists' salaries will be decreasing in coming years. This is of concern not only to currently practicing nephrologists, but also to students considering careers in nephrology.

Comparing our respective experiences in American and German medical education systems may provide some insights into the challenges facing nephrology in the United States. Notably, at the University of Erlangen-Nuremberg (Germany), students were given substantive training in clinical nephrology. At Weill Cornell (United States), there is no required training in or exposure to clinical nephrology. Nephrology initially captured the interest of the German medical student (M.S.B.) during the first preclinical year of medical school while he was analyzing his own kidneys' powerful ability to concentrate urine during a physiology experiment on thirst. His interest was confirmed after a series of acid-base lectures given by a nephrologist during IM training in the first clinical year. The complexity of the problem and the rigor with which the nephrologist approached it provided a challenge that M.S.B. realized could sustain his interest throughout his career. The American medical student (A.B.P.) had a different experience. He had developed an interest in nephrology after conducting epithelial transport research as an undergraduate. However, during the preclinical years of medical school, he found that students had to grapple with the complexity of nephrology without the context of its clinical utility; in A.B.P.'s peer group, this experience fostered

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nephrology's reputation for being unnecessarily complicated. During his clinical years, A.B.P. discovered that he was looking to develop confidence and acuity in his clinical skills. Topics, concepts, and skills that were difficult to comprehend or master sometimes led to discouragement, decreasing his interest in the related field. Without A.B.P.'s undergraduate exposure to the intricacies of electrolyte and acid-base disturbances, which seemed akin to a challenging puzzle, he never would have perceived nephrology as a field that could sustain his interest throughout his career.

Nephrologists traditionally have been regarded to be among the best IM teachers, in part because of their physiology-based approach. Increasing their educational responsibilities in the IM curriculum of medical students could fuel a broader interest in the mechanism of disease and ultimately in nephrology. This notion is supported by data published in another survey by Hauer et al[5] that found that, according to IM clerkship directors, exposure to internists is among the 3 main factors involved in students' choices in choosing a career in IM. A medical student at Weill Cornell recalls initially being apprehensive when placed on the nephrology floor during her IM rotation. She recalled her confusion when learning how the kidneys handle electrolytes and was worried that she would not get a broad exposure to general medicine. She says she overcame this apprehension due to the exceptional teachers in nephrology who gave her a clinical context for how to deal with electrolyte and acid-base abnormalities. She also received a comprehensive view of medicine as her team was consulted on patients from a wide array of departments due to the universality of fluid and electrolyte abnormalities. This suggests that the nephrology floor is a suitable site for general medicine block of an IM clerkship and could serve as a way of increasing nephrology exposure during the clinical curricula in medical school.

Along with developing a better understanding of the role of nephrologists, students also must be provided with information about the exciting new developments in the discipline from both the clinical and basic science fields. Recently, Sparks et al[6] published a review of the benefits and limitations of the internet and social media as a means of medical education in the nephrology community. In our experience, many current medical trainees prefer online educational material for learning. By presenting teaching materials and new research findings through social media, such as blogs, wikis, podcasts, YouTube videos, or mobile applications, nephrologists could be role models for introducing new and engaging formats of medical education and in turn attract medical students to the field.

In sum, we believe that US medical students' limited exposure to representative nephrology puts the field in a disadvantaged position to develop its future workforce. The current educational framework in the United States encourages students to perceive nephrology as lacking emotionally stimulating experiences and as being particularly complex. Additional challenges we have observed include concerns about financial compensation, extended work hours, and the stress associated with caring for extremely sick chronically ill patients. Therefore, we are convinced that focusing on the following avenues will help develop a more positive experience in nephrology for medical students:

- Redesigning educational styles to emphasize case-based application of theoretical and physiologic principles within the IM curriculum
- Raising awareness about the rewarding aspects of longitudinal patient care in nephrology
- Increasing educational responsibilities of nephrologists, especially during medical student clerkships
- Establishing and encouraging nephrology mentorship for medical students
- Embracing social media as a means to engage students

The famous physiologist Claude Bernard once described the role of the kidneys in whole-body homeostasis by saying, "The constancy of the internal milieu is the condition for free and independent life."[7(p236)] It is of utmost importance for us to develop and encourage a new generation of nephrologists charged with protecting our free and independent lives.

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