

A Qualitative Evaluation of Advanced Training Programs in Glomerular Diseases: Results From a Program Directors' Survey



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A career primarily focused on the management of glomerular diseases (GDs) is an important niche within the specialty of nephrology. This is due to the rarity and complexity of the various GDs, and their management. Several centers around the world offer either an additional year of training in GD-management or focus on specialized GD training during nephrology fellowship.¹ Advanced training in GD allows healthcare professionals to gain in-depth knowledge and expertise in this area, thereby enhancing their

ability to diagnose and manage various GDs effectively. This skill set can enable them to provide better care for patients with GD, offering more accurate diagnoses, tailored treatment plans, and improved outcomes. An advanced year in GD training may involve research activities such as conducting clinical studies or participating in ongoing research projects. This provides healthcare professionals with an opportunity to contribute to the scientific understanding of GD, explore innovative treatments or diagnostic techniques, and potentially make novel and scientifically valuable contributions to the field. In addition, pursuing a GD fellowship leads to collaborations with experts in the field of GDs, including other researchers and specialists. It can

improve professional networking, allow for the exchange of ideas and sharing of experiences, and can foster potential collaborations in research or clinical practice even beyond the duration of the advanced training year. This can enhance career prospects for healthcare professionals. GD training can open up opportunities for academic positions, leadership roles, or specialized clinical practice in institutions focusing on GD. Data on the successes and limitations of advanced fellowship programs or focused training in GD is scant.²

Using a qualitative descriptive study design, we conducted an 8-question online survey of directors of programs that offer advanced training in GD. A total of 16 programs were identified worldwide via various websites. The first set of open-ended questions was designed to assess the programs' location, duration, and training experience. The second set of questions was designed to evaluate measures of success and challenges of each program (Supplementary Table S1). Surveys were conducted between April and May 2023. Survey responses were entered into NVivo version 12 1.6.1 (QSR International) and analyzed using thematic content analysis.

Fourteen programs responded to the survey (>90% response rate). All participants responded to each question. Of the programs, 6 of 14 have had GD specific training for over 15 years (Supplementary Figure S1); and the remaining ranged from 5 to 15 years. Most of the programs were in the United States (10/14) and 4 of 14 programs were located in Europe. Of the 14 programs, 11 reported that their graduates primarily entered academia. All programs had local or institutional renal pathologists

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Table 1. Themes and subthemes with descriptive quotes

Factors contributing to GD program success	
Multidisciplinary	"[We have a] close collaboration with rheumatology and immunology." "We have an interdisciplinary (Nephrology, Rheumatology, Dermatology and OB/GYN) lupus clinic." "We do offer a combined pediatric adult GN clinic [and] training in kidney biopsy." "[We have] nephropathology [as part of the program]." "Integration of our clinics with rheumatology and pulmonary as there is significant overlap in the systemic diseases that result in GD."
Institutional support for research	"Protected time for Clinician Scientists to study GNs and more." "Clinical research opportunities for interested fellows."
Local expertise	"Program directors completed GN fellowships at other institutions." "Multiple faculty members devoted to GN." "Our success is due to massive expertise locally in GN."
Educational curricula	"Dedicated GN clinics that GN fellow attends with 2 attendings allowing for different perspectives on management." "A 2-year fellowship for more longitudinal exposure, and it is tied to doing a Master's degree in clinical epidemiology with a large focus on research." "There is lots of flexibility for fellows to be able to attend on service or join the nephropathology department."
Patient-related factors	"Clinically we have a lot of patients coming to our institution and that provides a wealth of knowledge and experience for our GN fellows." "Wide variety of referral cases." "Large and diverse patient population"
Challenges for GD programs	
Financial resources/funding	"Finding money to pay fellow salaries." "[Get] funding for an additional year of training in glomerular disease." "Funding - we don't have specific funding for fellowships; hence our "fellows" have to do a lot of ordinary renal residency work. [There's] great demand for properly funded GN fellowships."
Political factors/ US immigration	"Inability to recruit fellows with visas." "Inability to hire J-visa candidates." "Interested people are often from overseas and as there is clinical work, state board licensure becomes an issue."
Declining interest in nephrology and nephrology research	"The number of young doctors interested in nephrology is gradually decreasing." "Appointment of young physicians due to the burden of this specialty [is difficult]." "Finding fellows who want to do basic, translational, and clinical research..." "Identifying nephrology fellows interested and dedicated to doing 2 years of extra training."
Healthcare and patient-related factors	"Many of our patients are non-English speaking with limited health literacy, which complicates understanding of diagnosis and potential treatment options." "Reimbursement of biologicals [is an issue]."

GD, glomerular disease; GN, glomerulonephritis; OB/GYN, obstetrics/gynecology.

who participated in training the fellows. The majority (9/14) of programs did not have a formal fellowship curriculum. In [Table 1](#), we discuss successes and challenges that programs with GD fellowships faced. Key factors of success included having departmental resources, multidisciplinary teams and local expertise in GD, and protected time for research. Challenges for GD training programs included lack of funding, declining interest in nephrology, visa issues for international fellows, and lack of resources for patient education in GD.

Several centers around the world offer either an extra year of training in GD or focus on specialized GD training during nephrology fellowship. Specialization in GD provides nephrologists with the expertise and confidence

to treat these increasingly complex patients.² Although trainees may gain exposure to GD during general nephrology fellowship via tracks developed by certain centers, some centers may lack referrals of complex GD cases leading to less clinical expertise and confidence in caring for these patients.^{3,4} In addition, there is a wide variation in glomerular training across general nephrology fellowship programs, resulting in lower self-reported clinical competency by trainees.⁵ This lack of adequate training in general nephrology fellowship is potentially a reason for increasing patient referrals to glomerular specialists, especially because research and clinical trials in GD are often conducted in larger referral centers.⁵ Therefore, an additional year of training specifically in GD is essential for training fellows interested in GD treatment

and management. Our survey had nearly 100% response rate of well-established programs that offer GD fellowships. It appears that most of the fellowships are located in North America and Europe. Although 50% of the programs have been established for several decades, there are newer programs that have been built over the past 10 years.

Although many rare glomerular kidney diseases originate in infancy or childhood, there are no specific pediatric training courses. High quality training courses exist that cover the entire spectrum of pediatric nephrology and address the topic of glomerulopathies thoroughly, such as the Junior Masterclass of the IPNA/ESPN with over 1000 participants in the last 10 years⁶; however, a GD-only focused course or training opportunity for pediatric nephrologists has yet to be developed.

Table 2. Potential solutions for the challenges in glomerular disease fellowship programs

Financial resources/funding	<ul style="list-style-type: none"> • Philanthropic funding • Grants from societies • National/international society collaborations with pharmaceutical companies with dedicated funding for GD programs
Political factors/US immigration	<ul style="list-style-type: none"> • Immigration policy reform • Institutional support towards certain visa categories, such as H1b, J1 and J1 waivers.
Declining interest in nephrology and nephrology research	<ul style="list-style-type: none"> • Grass-roots efforts at undergraduate and graduate levels to increase interest in nephrology • Encouraging trainees to consider GD as a training pathway and support their applications to other programs even if not available locally • Creating multidisciplinary clinics with rheumatology, dermatology, pulmonology, etc. • Increase nephropathology exposure • Cross-talk between institutions with regards to research to improve opportunities
Healthcare and patient-related factors	<ul style="list-style-type: none"> • Advocating for reimbursements and coverage of medications by insurance • Creating partnerships with pharmaceutical companies to aid coverage of uninsured patients • Improving translation services at institutions

GD, glomerular disease.

The care of patients with GD requires an in-depth knowledge of disease pathogenesis; varied clinical presentations; comorbid conditions; and experience with immunosuppression administration, including dealing with complications. Furthermore, response to treatment can vary widely among patients with the same GD. Therefore, comfort and knowledge in treating GD often develops with clinical experience. Gaining clinical experience by completing specialized GD training may thus enhance the prospects of fellowship graduates pursuing careers in academia instead of private practice, potentially mitigating the waning interest in academic nephrology. It is also valuable for GD trainees to interpret and contribute to the literature. This can be done by encouraging participation in ongoing institutional research and leading GD-based journal clubs.

Another important skill is interpreting renal pathology and balancing the risks and benefits of immunosuppression. All responding GD fellowships had in-house nephropathologists who contributed to the training program. Inhouse nephropathologists have more impact than virtual nephropathologists⁷ and can hold regular nephropathology sessions. Performing kidney biopsies is an

additional skill that can be acquired.

The curriculum for GD fellowships is important, particularly considering rapid advances in the field. One major finding was that many of the centers did not have a formal fellowship curriculum. This highlights the absence of structured education in some GD fellowship programs.

Our qualitative analysis showed that the success of these programs was largely dependent on having good institutional and departmental support. In addition, having renal pathologists, rheumatologists, geneticists, and other physicians on site who are invested in the success of the GD fellowship is important. Finally, having at least a few GD experts as faculty with protected time for teaching and research was a key determinant of a successful program. Dedicated weekly clinics for the GD fellow with at least 2 GD experts can enhance their training. A major challenge was funding, which may have led to fellows not being recruited at certain centers for several years. Financial support for such fellowships can come from government funding, philanthropic funding, or institutional funding. Applying for larger society-based grants may be a potential solution; however, the number of awards allocated to rare diseases such as GD is often limited. Professional

societies such as the International Society of Glomerular Disease⁸ may be able to align with patient advocacy organizations and industry sponsors to allow for support and development of these fellowship programs. Given the rapid growth of novel agents to treat GDs, it is important to have continuous development of such fellowships to train future GD experts.

A broader challenge is the general lack of interest in nephrology fellowships. Although we may be interested in training more GD experts, there is a lack of general interest in training in nephrology.³ This trickles down to not pursuing advanced training and spending more years in debt for some of our graduates.⁹ Interestingly, one of the other challenges reported by US programs was the ongoing visa-related concerns that our graduates face. Given that most programs may not be under a graduate medical education umbrella, the institution is unable to sponsor several visa types that would allow for future application for permanent residency in the United States. Immigration policy reform could help to attract promising candidates for GD fellowship programs with the prospect of building a successful long-term career in the United States. Another major challenge has been the lack of resources for patient education and

access to subspecialty care, which would enable patients to be seen by a GD expert earlier in their disease course. Lack of referrals and patient volume may also impact the perceived need for GD fellowships.

The main difficulty in establishing a career in GD is rooted in the rarity of disease. Although time spent with a challenging and complex patient with GD may not always translate into a reimbursement benefit, a GD specialist can be an invaluable resource for nephrology divisions and practices. An extra GD training year as a clinical instructor will improve reimbursement of institutions allowing for trainee salary support and potential hiring as future faculty. Furthermore, given the low incidence and prevalence of GD, establishing an infrastructure to concentrate a significant number of patients in a specialized clinic can be challenging. Networking with specialties such as rheumatology and nephropathology can assist with patient referrals. Participation in international observational cohort studies such as CureGN, RADAR, ERKnet, and NEPTUNE allows for contribution to important trials, networking with GD experts around the globe, and accessing the data for research questions that may arise. In Table 2, we summarize some of the ideas or proposals we have to improve training in GD. We feel that this data can help to inform the development of new guidelines and educational curricula for trainees and highlight the need to foster international collaborations that can provide peer support, aid with funding, and promote GD research.

DISCLOSURE

KDJ is a founder and copresident of the American Society of Onco-

Nephrology; is a founding member of the International Society of Glomerular Disease; reports consultancy agreements with Secretome, George Clinicals, PMV Pharmaceuticals, and Calliditas; reports honoraria from the American Society of Nephrology, Micromedex, and UpToDate.com; reports serving on the editorial boards of the American Journal of Kidney Diseases, CJASN, Clinical Kidney Journal, Journal of Onconephrology, Kidney International, and Nephrology Dialysis Transplantation; and reports serving as Editor-in-Chief of ASN Kidney News and section editor for onconephrology for Nephrology Dialysis Transplantation. IMS is supported by the American Society of Nephrology Carl W. Gottschalk Research Scholar Award, the Boston University Department of Medicine Research Accelerator Program Award, and the Else Kroener-Fresenius Stiftung iPRIME-CS Scholarship (2021_EKFK.15), UKE, Hamburg. JO reports honoraria from Chiesi, Alnylam, Alexion; and is on the editorial board of Pediatric Nephrology. LJD is the Executive Director of the International Society of Glomerular Disease. The International Society of Glomerular Disease has received financial support from Traverso, Boehringer Ingelheim, Chinook, Calliditas, and Otsuka. LJD serves on the Board of Directors of NephCure. KJ is a founding member of the International Society of Glomerular Disease; and serves as principal site investigator for the FSGSALLAGE (NCT04065438) and FSGS Pediatric (NCT02235857) clinical trials.

SUPPLEMENTARY MATERIAL

Supplementary File (PDF)

Supplementary Table S1. Survey Questions.

Supplementary Figure S1. Breakdown of years of existence of

the advanced glomerular disease fellowships.

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