Author’s response to reviews

Title: Perceptions of nephrology among medical students and internal medicine residents: a national survey among institutions with nephrology exposure

Authors:
Devika Nair (Devika.nair@vanderbilt.edu)
Kurtis Pivert (kpivert@asn-online.org)
Adrian Baudy (abaudy@tulane.edu)
Charuhas Thakar (thakarcv@UCMAIL.UC.EDU)

Version: 2 Date: 16 Oct 2018

Author’s response to reviews:

Dear Members of Editorial Board,

We thank the reviewers for their careful review and comments. Our manuscript has been revised accordingly, as detailed below, and we believe has been strengthened by their input. We have responded to the reviewer individual comments below.

Reviewer 1 comments and revisions:

As with all Survey Based Research" on line 33/34 on pg 14 should be a new paragraph

We thank the reviewer for their comments and have revised this as a new paragraph.

Re Figure 6. the titles of each sub-figure "Would Consider Nephrology Contribution to Sentiment" I understand this is how the text finding program reports results, but please re-write or re-arrange the wording for each sub-figure
Figure 6 and the figure title have been revised as follows:

Figure 6: Most frequent terms identified in the free-text analysis for respondents who would (upper) and who would not (lower) consider a career in nephrology.

Reviewer 2 comments and revisions:

Why did the authors choose to include only "medical schools associated with academic internal medicine training programs"? This excluded a large number of medical students and likely residents who might have been interested in nephrology. What criteria was used to make these selections?

We thank the reviewer for their comments. Medical schools and internal medicine training programs were identified using definitive publicly available data sources—AAMC’s database and FREIDA, respectively. All medical schools were included, but residencies without affiliated nephrology fellowships were censored because trainee perceptions of nephrology could be strongly influenced by interactions with local fellows and nephrology attendings. We have clarified these inclusion criteria, acknowledge this as a limitation, and have revised our manuscript as follows:

The survey audience was identified using publicly available data sources per the following inclusion criteria: 1) allopathic medical schools listed in the American Association of Medical College (AAMC) database; and 2) internal medicine residencies listed in the American Medical Association’s Fellowship and Residency Electronic Interactive Database (FREIDA) located at institutions with an associated nephrology fellowship. The latter criterion was critical because trainee perceptions of nephrology could be strongly influenced by interactions with local fellows and nephrology attendings.

Only residencies with affiliated nephrology fellowships were selected for inclusion, which potentially excluded many trainees interested in nephrology and limits the generalizability of our results.
Is there any information on the respondents that could favor this being a relatively representative sample, e.g., number of institutions or states represented among the responses (if not directly surveyed, could this be determined by location of IP addresses?).

Yes. This information is included in the full list of participating institutions in the acknowledgements section of the paper. We obtained a wide variety of responses in terms of geographic location and NIH funding, which we believe strengthens the generalizability of our results. We have revised the Discussion to underscore this point as follows:

The external validity of our survey is strengthened by the wide variety of geographic locations and levels of National Institutes of Health funding of our 30 participating institutions.

In several sections the medical student and resident results are combined. These are such very different groups. The data should be presented as sub-group defined in all instances (e.g., in abstract), and where useful, comparisons and contrasts highlighted.

We agree that these are very different groups and have highlighted differences in medical student and resident responses in our “choosing to pursue nephrology” and “choosing to pursue a subspecialty” categories of our manuscript. Figure 3 and Figure 5 focus on differences between these physicians in training.

How were the questions developed? This is such an important detail in understanding the methodology - the How many individuals were involved in the focus groups? How was the generalizability of the focus groups favored? Were any other investigators involved in using this primary data to design questions? Were the questions piloted before the survey launched?
This is very valuable information that we neglected to include. We thank the reviewer for highlighting this gap and have included this information in our revised version. Specific question items were developed by the primary author after an iterative process involving interviews of two focus groups consisting of six medical students and fifteen internal medicine residents, respectively. A purposive sampling technique was employed to ensure the ethnic, gender, and age-related diversity of focus group participants. Survey items were pilot-tested twice within each focus group before questionnaire finalization. We have revised the manuscript as follows:

Our survey tool was informed by prior existing analyses of fellow perceptions of nephrology and of other subspecialty fields. Specific question items were developed by the primary author after interviews of two focus groups of six medical students and fifteen internal medicine residents, respectively. A purposive sampling technique was employed to ensure the ethnic, gender, and age-related diversity of focus group participants. Survey items were pilot-tested twice within each focus group before questionnaire finalization. Apart from institution and trainee year, no identifying demographic characteristics, including VISA status, were included in the survey to ensure anonymity and encourage survey participation.

Why was gender and visa status not surveyed/reported? These items may very well have influenced the responses.

We agree this may have influenced the responses, but chose to exclude these details to ensure maximum anonymity of participants and to encourage the widest survey participation. Further, because the IRB exemption required participants be allowed to skip any questions they were uncomfortable answering, questions about immigration status may have gone unanswered yielding no possibility for meaningful aggregation and analysis. The challenges associated with visa status were reflected in the free-text responses, for example: “Finding jobs that waive visa issues is difficult. You may end up choosing a hospitalist position despite feeling over-qualified.” We included the challenges associated with visa status in our discussion regarding the potential for combined fellowships to attract a wider breadth of trainees, and recognize this data gap for certain participant characteristics as a limitation to our study overall.

Why was the presence of a nephrology fellowship program at the students' and residents training site not surveyed/reported?
We only chose to survey those programs with an affiliated nephrology fellowship and have included this information in our revised version. We believe trainee perceptions of nephrology are highly influenced by housestaff perceptions of local fellows and attending nephrologists/nephrology consult service and that only including those programs with an affiliated nephrology fellowship would allow for a more accurate response regarding perceptions of nephrology.

How were the themes identified? The bag of words model is indicated but is not explained for the reader or an appropriate reference is not indicated. This should be better detailed. How many investigators were involved in this important process?

Because the corpus of responses to a single open-ended question was circumscribed, a formal qualitative analysis using an inductive approach was not considered. Instead analysis of the free-text responses was conducted in two phases by the first and second authors (DN, KP). In the first phase manual sentiment analysis (DN and KP) stratified respondents by whether they would or would not consider a career in nephrology. Representative quotes from each group were identified during this phase. Next, a bag-of-words model was used to identify recurrent terms used by respondents in each group. Briefly, responses from both groups were tokenized, stop words removed using a modified stop words corpus (censoring “nephrology”), and counts aggregated and sorted. We have revised the manuscript as follows:

Open-ended responses were reviewed individually for sentiment and analyzed using the tidytext R package (https://cran.r-project.org/web/packages/tidytext/index.html) to identify frequent terms among groups.

Open-ended responses were reviewed and stratified using a manual sentiment analysis and subsequently analyzed using a bag-of-words model (Figure 6).

There seems to be opportunities for richer data analysis. The question of the relatively insufficient financial compensation for the perceived workload and work difficulty is frequently posited as a negative incentive for nephrology as a career choice. The authors could look at those residents who state financial compensation is very important in both the group who choose and the group that foregoes nephrology to determine if there are differences in impact of other factors (to define if the 'phenotypes' are similar or different in regards this question).
We have conducted this analysis and revised the manuscript as follows:

Resident Subgroup Analysis

A subgroup analysis of resident respondents, who are further along the educational continuum and closer to subspecialty differentiation, was conducted. Residents indicating compensation was a very important factor when choosing a specialty (91 residents) were included and stratified by whether they would (26 residents) or would not (65 participants) consider a nephrology career.

Those who would consider a nephrology career indicated procedures (46% for those considering nephrology vs. 35% who would not), patient severity (53.8% vs. 35.4%), patient census (62% vs. 35%), access to mentors (69% vs. 59%), and autonomy post-fellowship (50% vs. 43%) were all very important factors when considering a subspecialty. This is of interest given the misperception among trainees of nephrology as being a procedure-poor subspecialty. When examining influencing factors when considering nephrology specifically, those who considered nephrology were more likely to indicate compensation (85% for those would consider nephrology vs. 72% who would not), exposure to nephrology (27% vs. 14%), patient severity (23% vs. 12%), and competitive of admission (35% vs. 5%) as important factors.

In interest in the subject matter - why is the recommendation for interactive web-based games and TBLs only stated as ‘may need to be utilized’ rather than stated more positively?

We agree and have edited the manuscript to reflect this.

In mentorship - what does concept 'streamline their mentoring skills' mean?

We have edited to state that this means ‘strengthen’ mentorship skills.
In job opportunities - are the 2016 data being compared to 2017 data? Need to make this clear.

We have revised the manuscript to reflect 2018 data as follows:

While this continues to be a valid concern, ASN’s recent workforce survey points to a decline in the percentage of fellows who had trouble securing a satisfactory position—38% in 2018 as compared to 53.1% in 2016.

Reviewer 3 comments and revisions:

Much of the discussion is based on speculations on how to overcome the reduced interest in the career of nephrology. This description should be reduced. Finally, too many tables are included in the manuscript.

We thank the reviewer for their comments and agree the discussion is speculative and have edited our manuscript to underscore this is hypothetical. However, we believe our results provide data to support constructive suggestions, and thus adds to the overall value of our manuscript to the larger nephrology educator community. In addition to acknowledging this limitation the discussion has also been streamlined to improve readability and the following sentence added acknowledging this limitation:

And while this work is hypothesis-generating, it does provide a basis for informing potential approaches that could change the current trend of declining interest in the specialty.

We acknowledge the data presented in tables and figures may be excessive for the topic, yet believe they greatly contribute to the educational and translational value of the manuscript. If preferred, we can translate Figures 5 and 7 into the text.