Taylor & Francis
Taylor & Francis Group

Neurological Research

A Journal of Progress in Neurosurgery, Neurology and Neuro Sciences

ISSN: 0161-6412 (Print) 1743-1328 (Online) Journal homepage: http://www.tandfonline.com/loi/yner20

Why neurology? Factors which influence career choice in neurology

Dara V. Albert, Chad Hoyle, Han Yin, Matthew McCoyd & Rimas V. Lukas

To cite this article: Dara V. Albert, Chad Hoyle, Han Yin, Matthew McCoyd & Rimas V. Lukas (2016) Why neurology? Factors which influence career choice in neurology, Neurological Research, 38:1, 10-14, DOI: 10.1080/01616412.2015.1120444

To link to this article: http://dx.doi.org/10.1080/01616412.2015.1120444

Published online: 26 Apr 2016.

Why neurology? Factors which influence career choice in neurology

Dara V. Albert[1], Chad Hoyle[2], Han Yin[3], Matthew McCoyd[4], Rimas V. Lukas[5]

[1]Division of Neurology, Nationwide Children's Hospital, Ohio State University, Columbus, OH, USA, [2]Division of Neurology, Ohio State University, Columbus, OH, USA, [3]Biostatistics Core of Nationwide Children's Hospital, Columbus, OH, USA, [4]Department of Neurology, Loyola University, Chicago, IL, USA, [5]Department of Neurology, University of Chicago, Chicago, IL, USA

Objective: To evaluate the factors which influence the decision to pursue a career in neurology.
Methods: An anonymous survey was developed using a Likert scale to rate responses. The survey was sent to adult and child neurology faculty, residents and fellows, as well as medical students applying for neurology. Descriptive statistics were used to analyse the factors of influence. Respondents were subsequently categorized into pre-neurology trainees, neurology trainees, child neurologists and adult neurologists, and differences between the groups were analysed using Pearson's chi-square test.
Results: One hundred and thirty-three anonymous responses were received. The respondents were neurologists across all levels of training and practice. Across all respondents, the most common factor of high importance was *intellectual content of specialty*, *challenging diagnostic problems*, *type of patient encountered* and *interest in helping people*. Responses were similar across the groups; however, the earliest trainees cited *interest in helping people* as most important, while those in neurology training and beyond cite *intellectual content of the specialty* as most important.
Discussion: As trainees transition from their earliest levels of clinical experience into working as residents and faculty, there is a shift in the cited important factors. Lifestyle and financial factors seem to be the least motivating across all groups. Encouragement from peers, mentors, faculty and practicing physicians is considered high influences in a smaller number of neurologists. This may present an opportunity for practicing neurologists to make connections with medical students early in their education in an effort to encourage and mentor candidates.

Keywords: Neurophobia, Neurology education, Career choice, Medical student education, Neurology residency

Introduction

Neurological diseases account for a high and escalating burden in the US and the world. In the next 20 years, the World Health Organization projects that 12% of deaths worldwide will be attributed to neurological disorders, and 14% of total years lost due to disability.[1] This presents a substantial need for neurological care. Despite this need, there is currently a shortfall in US neurologists. This shortfall is projected to increase from 11 to 19% by 2025.[2] Child neurology was identified in 2000 as having a 20% shortage in the field by the American Academy of Neurology (AAN) Workforce Task Force. It was projected this substantial shortfall would remain constant over the 20 years following that report.[3] A mere 2.6% of total US medical school graduates matched into Neuromedicine residencies.[4]

Little is known about the factors that influence medical students to pursue careers in Neuromedicine. Factors intrinsic to the specialty itself (patient population, intellectual content, physician lifestyle, etc.) as well as factors related to preclinical and clinical teaching are felt to influence career choices.[5–7] These factors are not mutually exclusive and many overlap much like a Venn diagram.

Correspondence to: Dara V. Albert, Nationwide Children's Hospital, Ohio State University, Division of Neurology, 700 Children's Drive, Columbus, OH 43205, USA. Email: dara.albert@nationwidechildrens.org

Methods

A 36 question anonymous survey (Supplementary Fig. 1) was developed by modifying questions asked in the 1993 AAMC Graduate Questionnaire (GQ), and the more recent AAMC GQs with further additional questions added by the authors.[8,9] A single question at the top of the survey read: "Please rate the following factors' level of influence on your decision to pursue a career in neurology". Thirty-six different factors of influence were listed and respondents had 5 answer choices (no influence, minor influence, moderate influence, strong influence and major influence) numbered 1–5 on a Likert scale. The survey was constructed using a free online web source (esurv.org), and a link was generated.[10] The survey was open for

DOI 10.1080/01616412.2015.1120444

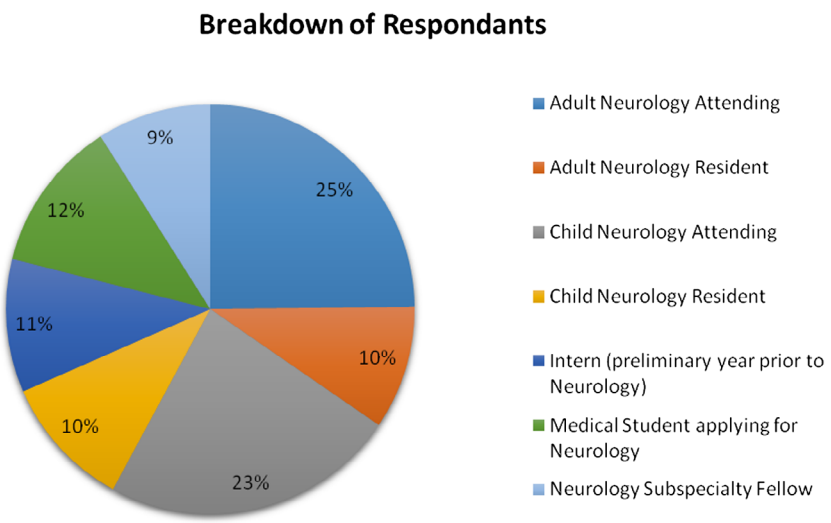

Figure 1 Breakdown of respondents.

responses for a total of 8 months, from October 2014 to May 2015. This link was emailed to a convenience sample of adult and child neurology attendings, residents, fellows and medical students applying for neurology that were known to the authors. Additionally, publically available contacts for neurology clerkship directors and from Student Interest Group in Neurology (SIGN) chapters at many US and Canadian Medical schools were contacted to reach medical students applying for neurology. SIGN chapters were reached via email as well as social media web pages when available. The authors requested that respondents forward the link to other possible respondents using a snowball sampling technique, a well described method for increasing survey responses. Snowball sampling has been used in a variety of research studies when there is concern that the sample size might otherwise not be large or diverse enough to represent a whole population.[11,12] This method employs identifying an initial number of subjects who serve as "seeds" and they are asked to help identify other members of the population of interest to be included in the study. Those subjects are then asked to recruit more members in a "snowball effect".[11] Given this method of disseminating the survey, we were unable to track the response rate. This survey did not assess the training background (US vs. foreign medical school; additional advanced degrees obtained by respondents) or age and gender of the respondents.

Respondents were asked their level of training or practice, and if they were in child or adult neurology. Factors were considered high importance if the respondent chose "strong influence" or "major influence", and less important if "moderate influence," "minor influence" or "no influence" was chosen. Descriptive statistics were used to analyse the factors of influence. Respondents were then grouped into one of four categories: adult neurology, which included adult neurology residents and attendings; child neurology, which included child neurology residents and attendings; pre-neurology trainees, which included medical students applying for neurology as well as those in their preliminary year internship; and finally, neurology trainees, which included adult and child residents and subspecialty fellows. Response differences between groups were analysed using Pearson's chi-square test, to test the overall distribution of each category of response between different groups with significance established at $p < 0.05$.

Results

One hundred and thirty-three anonymous responses were received through the website link. The respondents were adult and child neurologists across all levels of training and practice. The breakdown of respondents was as follows: adult neurology attendings (25%), adult neurology residents (10%), child neurology attendings (24%), child neurology residents (11%), preliminary year of internship prior to neurology (11%), medical students applying for neurology (12%) and neurology subspecialty fellows (9%) (Fig. 1).

Across all respondents, the most common influences chosen to be of high importance were *intellectual content of specialty*, *challenging diagnostic problems*, *type of patient encountered* and *interest in helping people*. The most common influences noted to be of low importance were *malpractice insurance costs*, *minimum of uncertainties in diagnosis and therapy*, *level of educational debt* and *desire for authority* (Fig. 2).

For the pre-neurology trainee group, *interest in helping people* was chosen as the most important factor of influence, followed by *opportunity to make a difference* and *type of patient encountered*. The factors chosen to be of least importance were *malpractice insurance costs* and *desire for authority*, echoing results for the entire group.

For the group of residents and fellows currently in neurology training, *intellectual content of the specialty* was

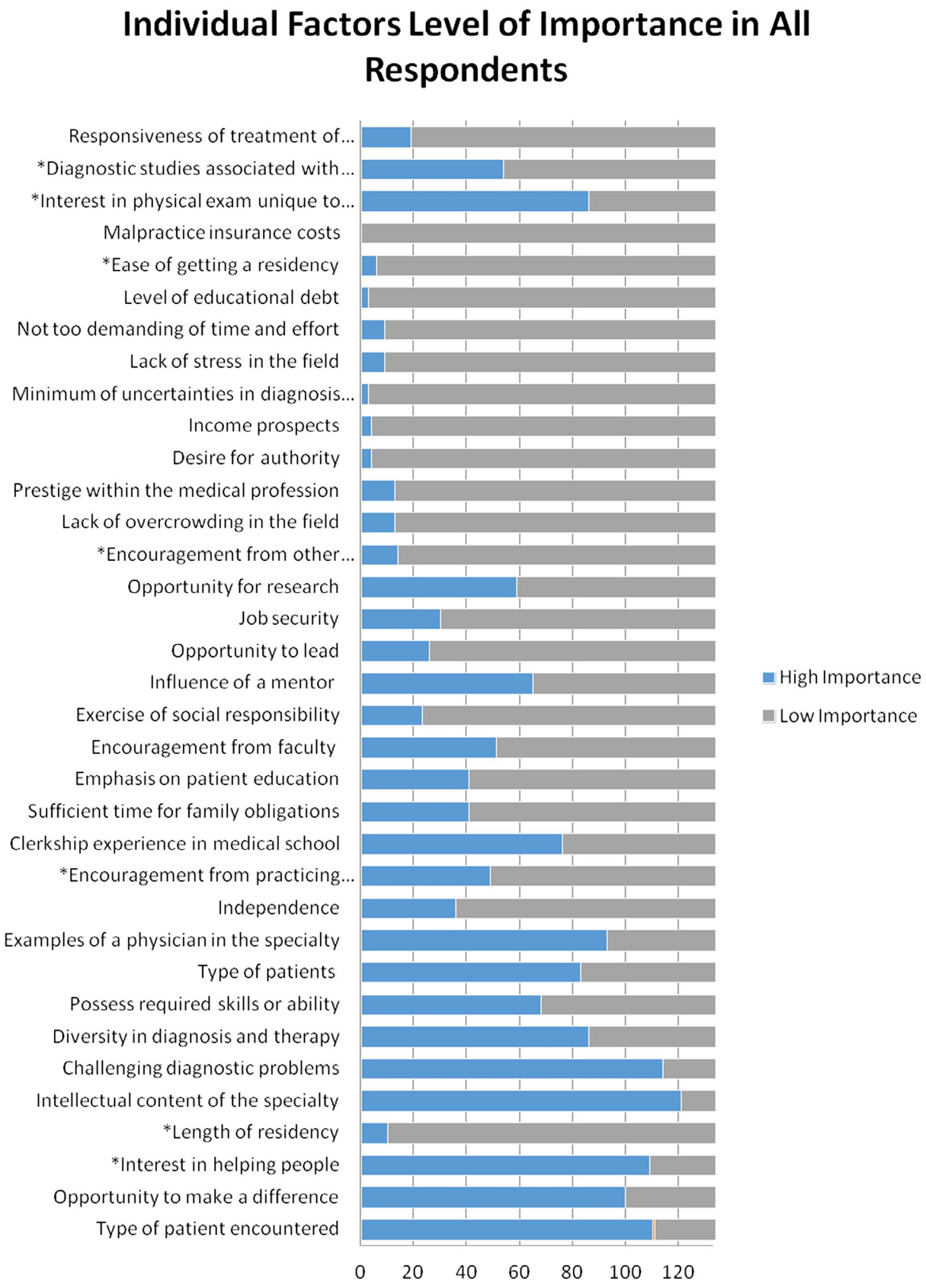

Figure 2 Factors of influence rated by level of importance by all of the respondents. Responses were considered high importance if the respondent chose "strong influence" or "major influence", and less important if "moderate influence," "minor influence" or "no influence" was chosen. Comparisons were done using Pearson's chi-square test. *p-value <0.05 was considered significant.

the most frequently cited factor of high importance. This holds as the most commonly cited factor as trainees move into the role of faculty. The second and third frequently cited factors were *challenging diagnostic problems* and *interest in helping people,* respectively. The factors most frequently cited as least important by this group were

	Mostimportant Factor	Second most important factor	Third most important factor
Pre-Neurology Trainees	interest in helping people	intellectual content of the specialty	opportunity to make a difference
Neurology Trainees	intellectual content of the specialty	challenging diagnostic problems	interest in helping people
Child Neurologists	intellectual content of the specialty	interest in helping people	challenging diagnostic problems
Adult Neurologists	intellectual content of the specialty	challenging diagnostic problems	type of patient encountered

Figure 3 Top three most important factors rated by each of the four groups.

malpractice insurance costs and *minimum of uncertainties in diagnosis and therapy*.

For child neurology residents and faculty, the most frequently cited factor of high importance was also *intellectual content of the specialty*, followed by *interest in helping people* and *challenging diagnostic problems*. The factors which were most frequently cited as being of low importance were *malpractice insurance costs, ease of getting a residency, minimum of uncertainties in diagnosis, and therapy* and *income prospects*.

For adult and child neurology residents and faculty, *intellectual content of the specialty* was the most frequently cited factor of high importance in pursuing a career in clinical neuroscience. This was followed by *challenging diagnostic problems*. The factors of least importance were *malpractice insurance costs, minimum of uncertainties in diagnosis* and *level of educational debt*.

When comparing the responses between the four groups, there are significant differences in factor rating for the following factors of influence: *Diagnostic studies associated with specialty* (*p*-value 0.022), *Interest in physical exam unique to specialty* (*p*-value 0.007), *Ease of getting a residency* (*p*-value 0.0103), *Encouragement from other students/residents* (*p*-value 0.002), *Encouragement from practicing physicians* (*p*-value 0.008), *Length of residency* (*p*-value 0.029) and *interest in helping people* (*p*-value 0.017) (Fig. 3), with these factors being statistically most important to the pre-neurology trainees. All of these factors, except for *interest in helping people*, were not the most frequently cited for high importance or low importance for any of the groups, potentially limiting the importance of the differences between groups.

Conclusions

As trainees transition from their earliest levels of clinical experience (medical students, internship) into working as residents and attendings, there is a shift in the cited important factors. There is a transition from most frequently citing *interest in helping people* as the factor most influencing a choice of pursuing a career in clinical neuroscience to citing the intellectual content inherent in neurosciences. The frequently cited *opportunity to make a difference* follows a similar pattern. Of note, *interest in helping people* remains a frequently cited factor by child neurologists even at the attending level. While *interest in helping people* is still ranked highly by adult neurologists, it does shift down the list sometime. Our study does not answer what drives the shift from altruism to intellectualism (two non-mutually exclusive concepts) as clinicians gain experience. Nor does our study give value to one ranking of the importance of specific factors over another.

Other factors which are inherent to the field such as c*hallenging diagnostic problems* (86%), *types of patients encountered* (83%), *interest in physical exam unique to specialty* (65%), *opportunity for research* (44%) and *diagnostic studies associated with specialty* (41%) were also deemed important by a high number of responders from all groups.

Financial motivators (*malpractice insurance costs, level of educational debt, income prospects*) seemed to be lower in importance for all groups. Lifestyle factors (*length of residency, sufficient time for family obligations, job security* and *lack of stress in the field*) were all felt to be of less importance overall, while more philosophical factors about the content of neurology seem to be more influential. The idea that neurology is the "ultimate cerebral specialty" seems to be supported by 91% of respondents noting *intellectual content of the specialty* of high importance.

Encouragement from peers (11%), mentors (49%), faculty (38%) and practicing physicians (37%) was considered high influences in a smaller number of neurologists. Interestingly, *encouragement from practicing physicians* (*p*-value 0.003) and *encouragement from other students/residents* (*p*-value 0.003) were most important to the pre-neurology group. The influence of having role models on medical student career choice has been well documented in other specialties.[13–15] This may present an opportunity for practicing neurologists, as well as neurology residents and fellows, to make connections with medical students early in their education in an effort to encourage and mentor candidates. Another factor that lends itself to potential change is the presence and quality of the neurology clerkship. About half (58%) of all the respondents cited their clerkship experience in medical school to be a high influence, and this was similar for

recent graduates (55%). It has been recently demonstrated that having a required neurology clerkship as well as neurology elective opportunities correlates with the number of medical students matching in Neuromedicine training programs.[5] Increasing the number of medical schools which include neurology in their core curriculum, might in turn, increase the number of medical students would be interested in pursuing careers in neurology.

Career choices in medicine are complicated and likely many intangible factors are at play. These include factors that are individual-specific (interactions between mentor–mentee, direct clinical experiences) as well as more global (changes in the healthcare system). This study does provide an early step in the understanding of what leads medical trainees and professionals to pursue careers in clinical Neuromedicine. This information can help guide our thinking on the optimal methods for promoting careers in neurology, a field with an inadequate volume of clinicians. Further study is needed to fully understand what drives physicians to pursue careers in neurology.

This study is limited by its relatively small sample size and the inability to track response rate.

References

1 World Health Organization. Neurological disorders: public health challenges [Internet]. [cited 2014 Sep 17]. Available from: http://www.who.int/mental_health/neurology/neurodiso/en/.

2 Dall TM, Storm MV, Chakrabarti R, Drogan O, Keran CM, Donofrio PD, *et al*. Supply and demand analysis of the current and future US neurology workforce. Neurology. 2013 Jul 30;81:470–8.

3 Bradley WG. Neurology in the next two decades: report of the workforce task force of the American academy of neurology. Neurology. 2000 Feb 22;54:787–9.

4 Main match results and data 2014 [Internet]. [cited 2014 Jul 22]. Available from: http://www.nrmp.org/wp-content/uploads/2014/04/Main-Match-Results-and-Data-2014.pdf.

5 Albert DV, Yin H, Amidei C, Dixit KS, Brorson JR, Lukas RV. Structure of neuroscience clerkships in medical schools and matching in neuromedicine. Neurology. 2015 Jul 14;85:172–6.

6 Humbert KA, Chang BS. In the beginning: How medical students choose (or do not choose) neurology. Ann Neurol. 2014 Apr;75:487–9.

7 Werner RM, Polsky D. Strategies to attract medical students to the specialty of child neurology. Pediatr Neurol. 2004 Jan;30:35–8.

8 Kassebaum DG, Szenas PL. Factors influencing the specialty choices of 1993 medical school graduates. Acad Med J Assoc Am Med Coll. 1994 Feb;69:163–70.

9 AAMC graduate questionnaires [Internet]. Association of American Medical Colleges website. [cited 2015 Jan 19]. Available from: https://www.aamc.org/data/gq.

10 esurv.org [Internet]. [cited 2014 Sep 12]. Available from: esurv.org.

11 Magnani R, Sabin K, Saidel T, Heckathorn D. Review of sampling hard-to-reach abd hidden populations for HIV surveillance. AIDS. 2005 May;19:S67–S72.

12 Sadler GR, Lee H-C, Lim RS-H, Fullerton J. Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. Nurs Health Sci. 2010 Sep 1;12:369–74.

13 Campos-Outcalt D, Senf J, Watkins AJ, Bastacky S. The effects of medical school curricula, faculty role models, and biomedical research support on choice of generalist physician careers: a review and quality assessment of the literature. Acad Med J Assoc Am Med Coll. 1995 Jul;70:611–9.

14 Sutton PA, Mason J, Vimalachandran D, McNally S. Attitudes, motivators, and barriers to a career in surgery: a national study of U.K. undergraduate medical students. J Surg Educ. 2014 Oct;71:662–7.

15 Lucas C, Edmonds L, Leroy J, Reith D. Career decisions: factors that influence the Māori doctor. Intern Med J. 2014 Jun;44:562–7.