



# Views on Careers in Clinical Neurosciences Among Neurosurgeons and Neurologists in China

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**■ BACKGROUND:** China has a large and aging population. The need for physicians with training in clinical neurosciences will grow. There is little known regarding the factors that lead physicians in China to pursue careers in clinical neurosciences. The objective of this study was to garner a clearer understanding of factors that influence physicians to pursue careers in neurosurgery and neurology in China.

**■ METHODS:** We surveyed attendees at a national neuroscience conference on the factors that influence their pursuit of careers in clinical neurosciences. Responses were quantified on a Likert scale. One-way analysis of variance was used to compare different groups of respondents.

**■ RESULTS:** Factors associated with the intellectual elements of the specialties were rated most highly. Differences were noted between respondents, with trainees rating lifestyle-related factors more highly compared with attending physicians.

**■ CONCLUSIONS:** The intellectual challenges are important factors for physicians in China influencing the pursuit of careers in the clinical neurosciences. This finding echoes results found elsewhere in the world. However, differences with trainees elsewhere in the world emerge when evaluating additional factors influencing trainees pursuing careers in the clinical neurosciences. Trainees in China rate educational experiences and mentorship more highly, whereas U.S.

trainees rate altruistic goals more highly. This study provides a clearer understanding of factors influencing career choice among clinical neuroscientists in China.

## INTRODUCTION

With an aging population and a higher incidence of neurologic diseases, the need for physicians within the clinical neurosciences will grow. In China, with its large population, the need for clinical neuroscientists may be of greater significance than other countries. This increased need will occur on a background of recent and future reforms in the fields of neurology and neurosurgery.<sup>1,2</sup> As China is the largest producer of medical school graduates per year (144,000) with large class sizes (mean 548 graduates per school), influences on specialty and subspecialty career choices will be important to understand. The perceived imbalance between physician supply and need further underlines this concept.<sup>3</sup>

A lack of comfort with the clinical neurosciences among medical students and other trainees has been well described.<sup>4,5</sup> Factors such as self-perceived knowledge of neurology and self-perceived skill in managing neurologic problems have been shown to influence the likelihood that medical students in China pursue careers in clinical neuroscience.<sup>6</sup> The factors that lead physicians in China who have already completed their training to pursue careers in clinical neurosciences have yet to be identified. In the United States, a shift from altruistic goals ("helping others") to

## Key words

- Career choice
- China
- Neurology
- Neurophobia
- Neurosurgery
- Survey

## Abbreviations and Acronyms

CI: Confidence interval

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intellectual goals has been described as trainees progress to become attending faculty in clinical neurosciences.<sup>7</sup> It is unclear if similar factors and trends can be found in decisions regarding career choice among Chinese physicians and trainees.

Among attending faculty in China, there are distinct ranks based substantially on experience. Recent graduates of medical school who enter a specialty in an apprentice-like role are considered to be junior attending physicians and function in a role similar to fellows in the United States. Physicians who have completed their training and practice independently are classified as attending physicians. A distinct class of physicians with greater experience are classified as associate chief physicians or chief physicians. The organization of specialties and subspecialties is under intense discussion in China, and the recent requirement by the National Health and Family Planning Commission for all physicians to complete a standardized 3-year residency training program by 2020 is a strong indication of the likely movement toward standardized subspecialty training and examinations in the future. In light of these developments and the uncertain status of neuroscience training among physicians in China, we conducted a survey of medical students, residents, and attending physicians at a national conference hosted in a provincial capital in China.

## MATERIALS AND METHODS

This project was approved by the Institutional Review Board of the University of Chicago Biological Sciences Division. A previously described survey<sup>7</sup> was translated, modified for culturally relevant phrasing of questions, and reviewed by some of the authors (I.J., H.D., C.M., J.C., J.L., Z.W.) (Figure S1). Numerous factors were listed, and respondents were asked to rate on a 5-point Likert scale the influence of these factors on pursuing a career in the clinical neurosciences. This survey was administered at a scientific conference attended by a national Chinese audience of clinical neuroscientists. Most of the attendees were neurosurgeons from academic institutions. However, many attendees came from clinical neurology and basic neuroscience backgrounds. Surveys were administered on a single day and collected later that day. Statistical analyses were performed using IBM SPSS Statistics for Windows version 22 (IBM Corporation, Armonk, New York, USA). Demographic data were analyzed to arrive at the respondents' composition. Descriptive statistics were obtained for each variable, including mean, SD, confidence interval (CI), and percentage of respondents who chose "major influence" or "strong influence." One-way analysis of variance was used to compare different groups of respondents. The significance level was 0.05.

## RESULTS

Of 200 surveys administered, there were 103 respondents (52% response rate) (Table 1). Answers on specialty/level of training were not provided by 20 respondents (19%). Most (77%) respondents had already completed training. Approximately half of these physicians were at the attending level, and the other half were at the higher associate chief or chief physician level. A smaller percentage (13.2%) were residents, and the remainder (9.6%) were postgraduate students or medical students. Most respondents came from a neurosurgical background (85.4%) with a smaller percentage (13.2%) from neurology backgrounds.

In response to a question to rate the level of influence of factors on their decision to pursue a career in neuroscience, "challenging diagnostic problems," "intellectual content of the specialty," and "possessed required skills and ability" received the highest mean scores from respondents. "Lack of stress in that field," "not too demanding," and "opportunity to lead" received the lowest mean scores from respondents (Table 2). When the group was divided into trainees (medical students and residents) and nontrainees (attending and associate chief/chief physicians), "challenging diagnostic problems" remained the response with the highest mean score. "Intellectual content of the specialty" remained the second highest scoring category. Among trainees, answers related to mentorship and education ("example of a physician of the specialty" and "clerkship experience in medical school") scored highly. Among nontrainee physicians, "diversity in diagnosis and therapy" had the third highest mean score. Significant differences were noted between the 2 groups on responses "time for family obligations" (trainee mean score = 2.79, CI [2.12, 3.46]; nontrainee mean score = 2.05, CI [1.77, 2.32];  $F = 5.948$ ,  $P = 0.017$ ), "ease of getting residency" (trainee mean score = 2.79, CI [2.35, 3.23]; nontrainee mean score = 2.03, CI [1.75, 2.32];  $F = 7.232$ ,  $P = 0.009$ ), and "physical exam unique to specialty" (trainee mean score = 3.0, CI [2.52, 3.48]; nontrainee mean score = 2.23, CI [1.97, 2.50];  $F = 7.951$ ,  $P = 0.006$ ) with trainees rating these factors higher compared with nontrainees.

**Table 1. Level of Clinical Practice and Specialty**

	Number (%)	Respondent Type
Answered		
Medical student applying for graduate school	1 (1.2%)	Medical students
Neurosurgery postgraduate student	7 (8.4%)	
Neurology postgraduate student	0 (0%)	
Neurosurgery resident	6 (7.2%)	Residents
Neurology resident	5 (6.0%)	
Neurosurgery attending	27 (32.5%)	Attending
Neurology attending	4 (4.8%)	
Neurosurgery associate chief physician or chief physician	31 (37.3%)	Associate chief or chief physicians
Neurology associate chief physician or chief physician	2 (2.4%)	
Total response	83 (100.0%)	
No answer	20	
Total	103	

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