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Factors Influencing a Clinician-Scientist Career Path in Otolaryngology

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Objectives/Hypothesis: To better understand the obstacles facing residents and K-awardee faculty in choosing a clinician-scientist career in otolaryngology.

Study Design: Anonymous survey.

Methods: An anonymous, online Qualtrics survey was sent to residents participating in T32 training grants and K-awardee junior faculty. The survey was sent to the residents with the permission of their program chair. The results of this survey were compiled and analyzed. A separate survey was sent to current K-awardees in U.S. academic programs. Both surveys were then compared to a survey published in 2008 to determine if the concerns and obstacles faced by aspiring clinician-scientists are still present.

Results: Residents felt that combining a research and clinical career presented many obstacles, including a lower salary, competition with PhDs for grant funding, and the lack of departmental support. Prolonging their training to include a fellowship was not a deterrent. Family/spousal issues which ranked as the primary concern previously were no longer given the same level of importance. The major concerns of K-awardees were the economic disparity of clinician-scientists with their clinical counterparts, the lack of mentors, and department support. Forty percent received their K-award after first try, 100% after two revisions, and one has received an R grant funding.

Conclusions: The obstacles facing clinician-scientists in otolaryngology are highlighted by this survey and require attention by our academic programs, National Institutes of Health, and specialty societies.

Key Words: Career choice, otolaryngology, clinician-scientists, obstacles.

Level of Evidence: NA

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INTRODUCTION

Clinician-scientists, who combine an expertise in clinical care with the scientific training to undertake targeted research, are needed for investigating disease mechanisms and translating those discoveries into practical patient-care applications. Over the past several decades, however, there has been a decline in the number of clinician-scientists in the United States.[1,2] In 2014, just 1.5% of all practicing physicians reported research as their primary activity.[3] More recently, the National Institutes of Health (NIH) established a working group to assess this issue and identified obstacles facing MD or MD/PhD which included high educational debt, a decline in funding for biomedical research, and a steady increase in the average age of clinician-scientist with NIH funding.[4] This concern is mirrored in surgical disciplines, including otolaryngology-head and neck surgery (O-HNS), ophthalmology, obstetrics and gynecology, and general surgery, where clinician-scientists are declining.[5–9]

In our previous report, we surveyed two groups, K-awardees and residents, in T32 programs to identify the perceived obstacles of the clinician-scientist career path.[10]

These surveys found that residents were concerned about potential delays to starting their career and the family/spousal-related issues that could arise. Many commented that the amount of time needed to compete for research funding was too demanding when coupled with maintaining a sustainable clinical career.

For K-awardees, the main concerns were family/spousal-related issues, lack of departmental support, and the 75% time requirement. Despite these obstacles, the unique role of a clinician-scientist in biomedical research is widely recognized,[4] and recent data, for example, shows that areas such as head and neck cancer are being understudied and underfunded.[11] The aforementioned decline in the number of clinician-scientists and therefore research in the field of otolaryngology underscore the importance of identifying the reasons behind this decline and to work toward possible solutions.

MATERIALS AND METHODS

Two online anonymous surveys were reviewed and approved by University of California, San Diego institutional review board and sent to two groups of physicians through Qualtrics International Inc., Seattle, WA. Consent was acknowledged by their participation. The first survey was sent to all

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current (as of June 2021) otolaryngologist K-awardees of the NIH obtained by searching the NIH Research Portfolio Online Report Tools (RePORTER) using the key words "K-award and Otolaryngology" as well as through the Freedom of Information Act sent to NIH. Of the 20 surveys sent out, 100% were returned. The second survey was sent to a group of otolaryngology residents at Johns Hopkins University, Massachusetts Eye and Ear, University of California, San Diego, University of Colorado Anschutz Medical Campus, University of Miami, University of North Carolina, University of Washington, and Washington University in St. Louis. These institutions all hold a NIH-funded T32 training grants, which provides 1–2 years of dedicated research training to residents in otolaryngology. Of the 99 surveys sent out, 87 residents responded.

The survey was comprised of gathering demographic information: age, gender, education, academic rank, salary, choice of fellowship specialty, success in obtaining R funding, and questions regarding obstacles that they envisioned for pursuing a clinician-scientist career. A Likert scale (1 being most important to 5 or 6 being least important) was employed for each question with space provided for additional comments.

RESULTS

K-Awardee Survey Results

Demographics. Sixteen (76%) of the 20 junior faculty respondents were male; Seventeen (85%) were married. Fifteen of the awardees were not practicing in the same department in which they had completed their residencies; five did remain in the same department. Sixteen awardees left the department in which they did their fellowships; four began their careers in the department in which they received their fellowship training.

Education. Four (20%) of 20 respondents had an advanced degree in research (PhD or equivalent). Seven (35%) awardees either did extended postdoctoral study or worked in the biotechnology field for an extended period before residency. Seventeen (85%) pursued a formal post-residency subspecialty otolaryngology fellowship; of these, neurotology was the fellowship most represented followed by laryngology and microvascular surgery.

K-award. On average, those surveyed were 3.2 years into their K-award. Of the 20 respondents, eight (40%) were funded on their first submission; 10 (50%) were funded after one revision; and two (10%) were funded after two revisions. Seven (35%) of 20 participated in a NIH-sponsored T32 training during their residency. Four (57%) had a 1-year T32 appointment; three (43%) had a 2-year T32 research experience. All of the K-awardees surveyed believe that the K-award will benefit their academic career. One (5%) of the 20 had obtained R01 funding; 10 (50%) have applied but have not been funded (some are working on resubmission); nine (45%) have not yet applied for an R01 grant. The total number of peer-reviewed publications that resulted from these 13 K-awards was 201 (range: 0–30; mean: 10; median: 9.5).

Salary. To determine the Association of American Medical Colleges (AAMC) salary scale benchmark for those surveyed, the respondents were asked their current academic rank and total salary. The assistant professor range was \$186,000 to \$280,000 (mean, \$235,600, <5th% AAMC; median, \$250,000, <10th% AAMC). The associate professor range was \$215,000 to \$525,000 (mean, \$358,000, ~25th% AAMC; median, \$350,000, ~20th% AAMC).

Four (20%) respondents believe that their salary is on par with the primarily clinically focused faculty (those involved in clinical practice >75% of the time) of the same rank in their department; 13 (65%) did not think so; three (15%) did not know. Thirteen (65%) awardees reported that their guaranteed salary does not require their department to subsidize them; seven (35%) responded that they do create a deficit for the department.

Allocated clinical time. Fourteen (70%) of the 20 awardees responded that they feel pressure from peers or other faculty members to work more than the 25% allotted time in clinical medicine; six (30%) reported that they do not feel this pressure.

Perceived obstacles. On a scale from 1 (most important) to 5 (least important), the major concern (current and/or previous) in taking the clinician-scientist career path was in order of ranked importance as follows (Fig. 1):

- Potential loss of income: 60% ranked this as 1 or 2; 20% ranked it as most important (1); 25% of those surveyed ranked this as least important (4 or 5).
- Lack of departmental support: 40% ranked this as 1 or 2; 30% ranked this as least important (4 or 5).
- Family (spousal)-related issues: 37% ranked this as 1 or 2; 21% ranked it as 1; 53% ranked this as least important (4 or 5).
- Losing clinical skills over time with a 75% research commitment: 37% ranked this as 1 or 2; 47% ranked this issue as least important (4 or 5).
- Length of time to establish a career: 25% ranked this as their primary concern (1 or 2); 45% of the awardees rated this as least important (4 or 5).

Resident Survey Results

Demographics. Fifty-five (63%) of the 87 residents who responded to this question were male; thirty-two (37%) were female.

Research education background. Of the 87 respondents, 86 (99%) had done research as medical students. Their reasoning for having done so, ranked in order of importance from 1 (most important) to 5 (least important) were the following (Fig. 2):

- Research is an important aspect of medicine for me and I wanted to contribute and learn: 42% ranked this as most important (1); 51% ranked this as 1 or 2.
- Research is a "requirement" to obtain a residency in O-HNS, so I had to do it: 14% ranked most important reason (1); 31% ranked 1 or 2.
- Residents I met in O-HNS told me to do it, so I followed their advice: 32% ranked most important (1 or 2); 35% ranked least important (4 or 5).
- Research enabled me to get to know a faculty member well so that I could get a good letter of recommendation: one resident ranked most important (1), but 39%

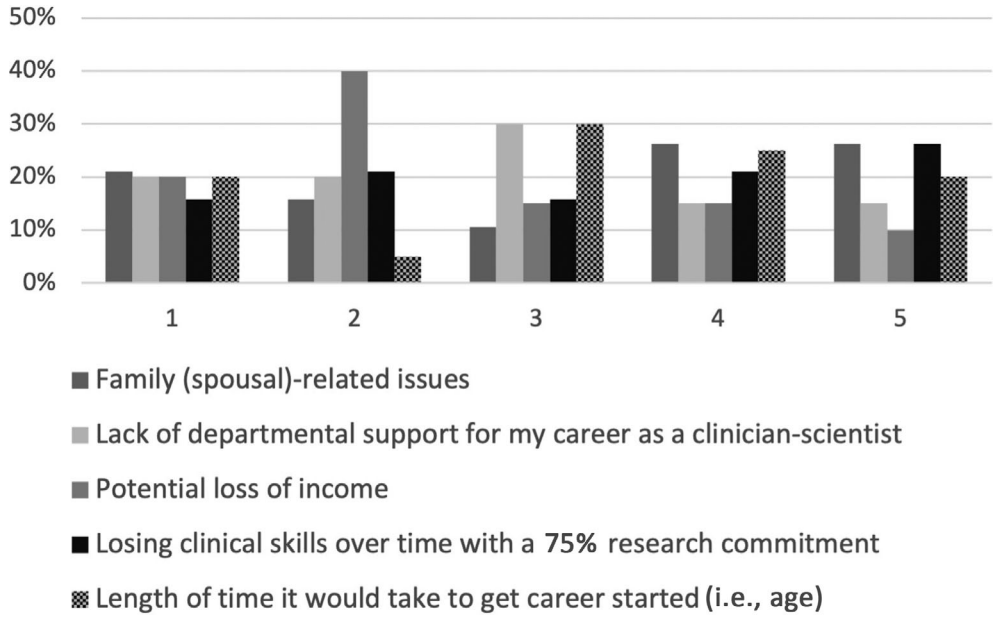

Fig. 1. K-awardees graph results: perceived obstacles.

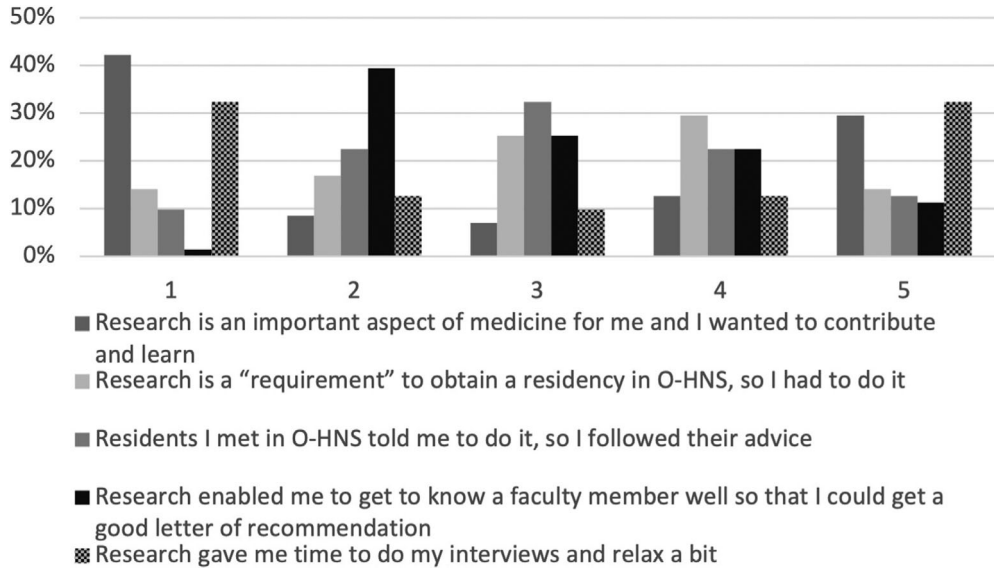

Fig. 2. Residents T32 survey graph results: research educational background.

ranked 2; 25% ranked 3; and 34% ranked least important (4 or 5).

- Research gave me time to do my interviews and relax a bit: 45% ranked 1 or 2; 45% ranked 4 or 5.

Education and career plan. Four (6%) of the respondents had a PhD or PhD equivalent degree; 85% participated in a T32 program during residency while it is planned in 15%; 58 (83%) planned a clinical fellowship; four (6%) are uncertain. The subspecialty selected most often for fellowship training was head and neck surgical oncology, followed by neurotology, facial plastics and reconstructive surgery, rhinology, and pediatric otolaryngology. Seventeen (24%) anticipated an academic career with a basic science laboratory; 16 (23%) a clinical and teaching academic career; two (3%) a private practice career; three (4%) a private practice career with a university teaching appointment. Four (6%) anticipate a multispecialty medical group career. Eighteen (26%) selected an academic career but were undecided between a basic science laboratory and clinical practice. Ten (14%) were unsure or planned to take a path different than the options provided. Thus, 23% of the respondents did not intend to be in an academic center in the future.

Perceived obstacles. The residents were asked to rank, in order of importance from 1 (most important) to 6 (least important), their primary concerns when considering the clinician-scientist career (Fig. 3).

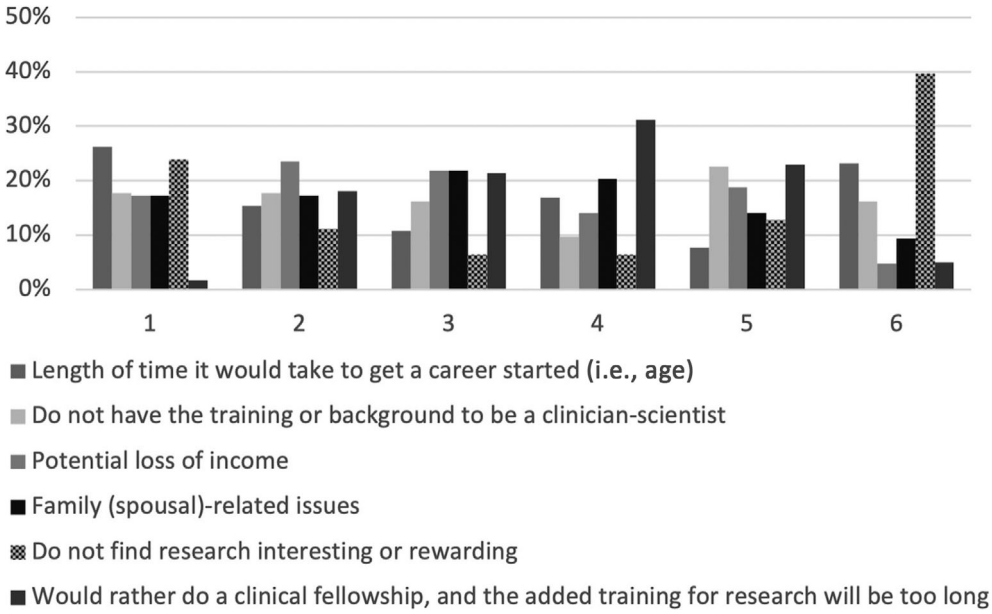

Fig. 3. Residents T32 survey graph results: educational and career plan.

- Length of time it would take to get a career started: 42% ranked this as 1 or 2; 48% ranked this as least important (4–6).
- Potential loss of income: 41% rated as most important (1 or 2); 38% rated as least important (4–6).
- Do not have the training or background to be a clinician-scientist: 35% ranked as most important (1 or 2); 48% ranked as least important (4–6).
- Family (spousal)-related issues: 34% ranked as most important (1 or 2); 44% ranked as least important (4–6).
- Do not find research interesting or rewarding: 35% ranked as primary concern (1 or 2), 59% ranked as least important (4–6).
- Would rather do a clinical fellowship, and the added training for research will be too long: 20% ranked as 1 or 2; 48% ranked as 4, 5, or 6.

DISCUSSION

The value of having physicians/surgeons engaged in basic and translational research cannot be over emphasized. In the course of their practice and training, they witness the unanswered questions and needs of their patients of which even the most engaged PhD may not be cognizant. So, it is important to understand the factors that influence the career of clinician-scientists. All residency programs with a currently funded T 32 research opportunity were included as they represent a likely pipeline to a clinician-scientist career. While in the original 2008 survey only one (5%) of the 22 residents commented that "I do not find research interesting or rewarding" as their primary obstacle in a clinician-scientist career, this number increased to 15 (24%) in this survey. Why residents are embarking on a T 32 training path if they are not invested in the research may simply be that they matched into programs with this as a requirement despite it not being their intended career path.

The data collected from the T 32 residents showed that no single obstacle was consistently an issue. They did feel that the added training for research would not take too long, nor would it deter them from pursuing a clinical fellowship. Another barrier mentioned abundantly in the comments was the challenging funding climate. The idea of competing for scarce funding while also embarking on longer training, receiving lower pay, and feeling increased stress was an "uphill battle." One recurring theme was the perceived lack of support from mentors and their institutions. This is different from the original survey in which family/spousal issues ranked as a primary concern while now it possibly shows a change of attitude in this regard. We also acknowledge that this survey does not account for the attitudes of academic otolaryngologists that emerge from programs with no T32 funding mechanism, but it was our sense that those residents who are willing to invest 1–2 years of additional training would be most committed to a clinician-scientist career and their attitudes would be an important representative sample.

The major concern voiced by several of the K-awardees was the potential lack of income garnered by a clinician-scientist career. This was borne out by the fact that the mean salary levels for K-awardees was in the <5th% AAMC scale for assistant professors and 25th% for associate professors. Comments from the K-awardees mentioned the lack of incentives available to supplement income. One awardee commented that the Triological Society—ACS Clinical Scientist Development Award, which provides a salary supplement for K23-awardees, was a major factor in their sustained commitment, because their salary was near their clinical-focused peers.

Ways to provide clinician-scientists with comparable salaries to their clinically focused faculty would surely ease the economic sacrifice they make especially with the burden of repayment of educational debt looming for many of these individuals.

Otolaryngology is a field with highly competitive and successful individuals which can lead to professional burnout.[12] To prevent burnout and protect the number of clinician-scientists in the field, incentives need to be developed for individuals on this career path and provide greater departmental support. Several comments lamented that there was a scarcity of departments in the United States that train clinician-scientists so opportunities are limited. Additionally, awardees expressed concerns that otolaryngologists in the early stages of their clinician-scientist careers were being dissuaded from applying for the K-award because of the financial drain it put on the department. Fortunately, since the past survey was conducted, there has been a major shift by funding institutions to recognize that a required 75% time commitment is onerous and a barrier for applicants and departments particularly in surgical disciplines. We are encouraged that several NIH institutes have now reduced the research effort to 50% for surgical specialists.

The residents strongly voiced in their comments that the demands of their departments along with the challenging competition for federal research grants were strong barriers in their pursuit of an clinician-scientist career. Trainees felt that the time and energy needed to compete with full-time research faculty for funding while maintaining a financially viable clinical career was very demanding. This competition comes from the high expectations of NIH study section reviewers, many of whom are PhD-trained scientists. Establishing a laboratory as a principal investigator is the crucial next step in developing a clinician-scientist career, one that many K-awardees may never reach. One statistic gleaned from the 2014 NIH Workforce report showed that individuals who were either enrolled in a NIH loan repayment program or had a K-award showed a significantly higher likelihood of obtaining a subsequent grant than those without.[4] Examining the data for one NIH institute heavily involved in otolaryngology, the National Institute on Deafness and Other Communication Disorders statistics in 2020, showed there were only two K08 applications received, with one funded, and seven K23 applications with five funded (NIH RePORT).[13] Reflecting these statistics, the current survey found that only one of the K-awardees went on to obtain R funding despite the overall NIH experience that both K08 and K23-awardees had significantly higher rates of receiving subsequent NIH research awards. In Ophthalmology, the average length of time that a K-awardee takes to obtain their first R-award was 3 years after completion of their K-award.[7] In general surgery, the conversion rate for clinician-scientists with K-awards to R funding was 46% in the period from 2007 to 2012.[8] Improving the chance for an initial R grant after a K-award requires perseverance and most probably bridge funding from the department.[14] This is a critical period when investigators phase out of research which may entirely jeopardize the costly investment in their career development. One strategy can be ongoing collaborations with senior scientists and research mentors who can provide encouragement, laboratory space, and personnel during the funding gap years.[15,16] The benefit of collaborations or "team science" cannot be over emphasized especially for early career clinician-scientists in a surgical discipline such as otolaryngology where clinical demands are substantial.[16]

Clinician-scientists have a special role in otolaryngology. It is incumbent upon our academic departments to preserve and nurture these individuals who are a hybrid of clinician and researcher and who can act as translators of science to the clinic.[17] This survey provides a snapshot of the attitudes and obstacles of residents in the pipeline and junior faculty with K-awards who have begun their path toward a clinician-scientist career.

CONCLUSION

Clinician-scientists are necessary for the advancement of our specialty and without them, essential scientific research may not be as fruitful. Many participants surveyed expressed the importance of and need for role models when selecting this career, therefore departments must continue training clinician-scientists to be mentors in the future. Furthermore, mentors are necessary to support future scientists in the competition for research dollars. It is vital in the field of otolaryngology for departments to focus on this mentorship, so the shortage of clinician-scientists does not persist or even worsen. In a time when family and spousal issues seem to be less of a deterrent to potential clinician-scientists, the main approach to training more clinician-scientists should come from aforementioned departmental changes as well as supporting residents in research who constitute an important pipeline into a research career. There is a rich and diverse selection of candidates for otolaryngology research programs and this field needs to support and foster these individuals so they can become successful clinician-scientists.

AUTHOR CONTRIBUTIONS

J.P.H.—Designed study, analyzed data, manuscript preparation. O.E.E.—Analyzed data, manuscript preparation.

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