Ophthalmology Residents' Internship Selection and Initial Trainee Confidence: An Observational Study

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Abstract

Purpose In this study, we set out to better understand the factors that influenced current ophthalmology residents' internship selection. We then tested the hypothesis that certain clinical or research experiences in medical school and internship may influence residents' confidence upon entering ophthalmology residency. Furthermore, we investigated whether completing internship at the same program as one's residency is correlated with confidence at the start of residency.

Design Observational, cross-sectional, multicenter survey.

Participants U.S. ophthalmology residents (Post Graduate Year 2/3) belonging to the class of 2018. Eighty surveys were submitted of which 63 were analyzed based on established inclusion criteria.

Methods Residents responded to a 22-question online survey addressing how residents chose their internship, internship curriculum, exposure to ophthalmology in medical school and during internship, confidence level entering ophthalmology residency, confidence in managing various ocular pathologies, and factors that built confidence prior to ophthalmology residency. A Likert scale format was used for the majority of survey questions. Kruskal–Wallis testing and Fisher's exact testing were used to compare outcome variables among three groups defined by sense of confidence entering ophthalmology training.

Main Outcome Measures Level of confidence at the start of ophthalmology residency.

Results Quality of life and geographic location were found to be the most important factors in choosing internship programs, while obtaining ophthalmology skills was least. Although 32.3% of residents either agreed or strongly agreed that they felt confident at the start of ophthalmology residency, 42.9% disagreed or strongly disagreed. Residents who felt most confident for ophthalmology training spent more time on ophthalmology rotations in medical school ($p = 0.05$) or internship ($p = 0.02$) and worked up patients independently during their internship ophthalmology rotation (s) (0.01). Completing one's internship at the same institution as one's ophthalmology residency did not correlate with confidence entering residency.

Keywords
- internship
- ophthalmology residency
- confidence level

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Conclusions Residents chose internships based on quality-of-life factors rather than enhancing ophthalmology training. Residents who felt confident at the start of ophthalmology residency had more hands on clinical ophthalmology experience than residents who did not feel confident. No statistically significant correlation was found between completion of internship at the same institution as one's ophthalmology residency and confidence entering residency.

Recently, a White Paper published by the AUPO/AAO (American Academy of Ophthalmology) in Ophthalmology titled "Integrating the Internship into Ophthalmology Residency Programs" summarized the current climate regarding ophthalmology residency training. Leaders in academic ophthalmology have highlighted the lack of residency training adaptation to the increasingly complex medical environment as serious cause for concern. The authors of the White Paper have identified current utilization of the ophthalmology's 4-year training period as being inefficient. Their primary recommendation was for ophthalmology residency training to move toward the development of 4-year programs that include an integrated internship to achieve better oversight over the first year of training and to ultimately add an additional 6 months of core ophthalmology curriculum.[1]

Currently, ophthalmology residents are required to complete internships prior to beginning ophthalmology residency. Internship options include internal medicine, general surgery, emergency medicine, family medicine, neurology, obstetrics and gynecology, pediatrics, and transitional year programs as defined by the Accreditation Council for Graduate Medical Education (ACGME).[2] There is no required medical school curriculum for students pursuing residency in ophthalmology. Of the more than 110 ophthalmology programs, as of the date of publication of the White Paper, only a handful offer and require a combined intern year as part of their training program (Rush, University of Mississippi, South Carolina, Utah, Iowa, and University of California at San Francisco),[1] with a few more departments offering the option since then. Unfortunately, there is paucity of literature evaluating the effectiveness of either internship format in preparing residents for training in ophthalmology. Moreover, there is no literature evaluating the effectiveness of medical school curricula in preparing residents for ophthalmology.[3] In this study, we set out to better understand the factors that influenced current ophthalmology residents' internship selection. We then tested the hypothesis that certain clinical or research experiences in medical school and internship may influence residents' confidence upon entering ophthalmology residency. Lastly, we investigated whether completing internship at the same program as one's residency is correlated to confidence at the start of residency.

Methods

Survey

The survey was composed of 22 questions. It was subdivided into sections titled: consent, demographics, choosing your intern year, intern year curriculum, preparedness, and match to ophthalmology residency. Question formats included multiple choice, Likert scales, and open ended. The survey was created, completed, and submitted on SurveyMonkey.com (San Mateo, CA). The majority of respondents took approximately 5 minutes to complete the survey.

Participants and Collection

With permission from the Association of University Professors of Ophthalmology (AUPO), the program director listserv was utilized to distribute the SurveyMonkey link to the program directors of all existing CGME-accredited ophthalmology residency programs. Approximately 10 to 15 of the listed email addresses were returned to sender marked as erroneous addresses, while the remaining 100 email addresses successfully arrived at the listed addresses. Program directors received an introductory email with a request to forward the link to the survey to their residents graduating in 2018. Survey submissions were collected from June 13, 2016, through August 8, 2016. Therefore, residents who responded were approximately 11 to 13 months into their ophthalmology residency. Eighty surveys were submitted of which 63 were analyzed. Surveys that did not meet inclusion criteria were left out. Inclusion criteria for analysis included full completion of survey, confirmed active enrollment in ophthalmology residency, and respondent's consent to being included. Participation in the survey was voluntary, responses were confidential, data were anonymous, and no incentives were provided for participating. The authors sent one follow-up email to program directors over the 2-month period the survey was open for submissions as a reminder to distribute to the appropriate residents. No submissions were permitted from the same internet protocol address more than once.

Statistical Analysis

Survey responses were individually transferred from SurveyMonkey.com into a Microsoft Excel file. Descriptive summary statistics were completed on the Excel software. Portions of these data were then further analyzed and compared using SAS 9.3 software (SAS Institute Inc. 2012; SAS OnlineDoc 9.3; Cary, NC). Responses were divided into three groups based on residents' response to their sense of confidence entering residency. Thirteen different responses from these three groups were then compared utilizing Kruskal–Wallis testing for continuous variables and Fisher's exact testing for categorical variables.

Results

Demographics

We analyzed 63 of the 80 surveys submitted. All 63 surveys reviewed included responses from ophthalmology residents of U.S. ophthalmology residency programs. There were 34 (54.0%) men and 29 (46.0%) women. Resident respondents had a mean age of 29.2 years with a range from 26 to 40 years. Other demographic data included 60 (97.8%) graduates from U.S. medical schools, 2 (3.2%) graduates from international medical schools, 3 (4.8%) residents took time off before intern year, 62 (98.1%) were allopathic physicians, and 1 (1.6%) was an osteopathic physician.

Internship Selection

Six (9.5%) residents strongly agreed and 34 (54.0%) agreed that internship is relevant. Twenty-three (36.5%) residents did not agree/strongly agree that internship is relevant to ophthalmology training. When choosing internships, location was rated to be most important and very important by 17 (27.4%) and 27 (43.6%) of respondents, respectively. Only two (3.2%) residents rated location as being either not very important or least important (►**Fig. 1**). Quality of life and number of electives were the next two factors found to be most important in choosing internship. Seventeen (27.0%), 23 (36.5%), and 20 (31.8%) residents ranked quality of life to be most important, very important, and important, respectively. Ten (15.9%), 28 (44.4%), and 15 (23.8%) residents found number of electives to be most important, very important, and important, respectively (►**Fig. 1**). Call schedule and rigor of medical training were found to be less important to residents when compared with location, quality of life, and number of electives. Four (6.3%) and six (9.5%) ranked call schedule and rigor of medical training to be most important, respectively. Obtaining and maintaining ophthalmology skills was found to be the least important factor of all. Only 4 (6.3%) and 12 (19.1%) ranked obtaining/maintaining ophthalmology skills as most and very important, respectively; 19 (30.2%) and 8 (12.7%) ranked obtaining/maintaining ophthalmology skills as not very important and least important, respectively (►**Fig. 1**).

Resident Confidence

The primary outcome measure of this study was residents' confidence upon entering ophthalmology residency. ►**Fig. 2** demonstrates residents' response to the statement, "I felt confident for the start of my ophthalmology residency." Five (7.9%), 16 (24.4%), 15 (23.8%), 17 (27.0%), and 10 (15.9%) residents strongly agreed, agreed, felt neutral, disagreed, and strongly disagreed, respectively. Thus, 21 (32.3%) residents agreed or strongly agreed that they were confident; leaving 42 (67.7%) residents strongly disagreeing, disagreeing, or feeling neutral that they were confident entering ophthalmology training.

To better understand the meaning of the results that correlated residents' confidence level to different experiences, we grouped all residents who did not feel confident at the beginning of residency ($n = 27$) into one category, all those who felt neutral ($n = 15$) into another category, and all those who felt confident ($n = 21$) into a third category displayed in the results (►**Fig. 3**). The new categories were labeled not confident, neutral, and confident.

Our interest in internship experiences and their correlation with confidence upon entering residency extended to medical school experiences as well. Results were marginally significant indicating that more time on clinical

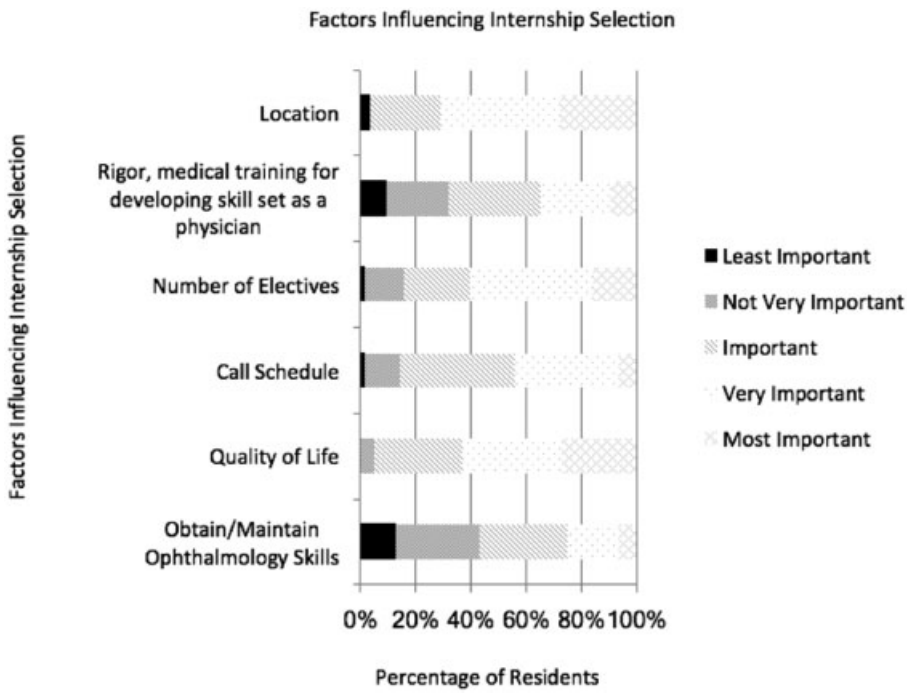

Fig. 1 A stacked bar chart illustrating the relative influences of various factors (*y*-axis) on internship selection.

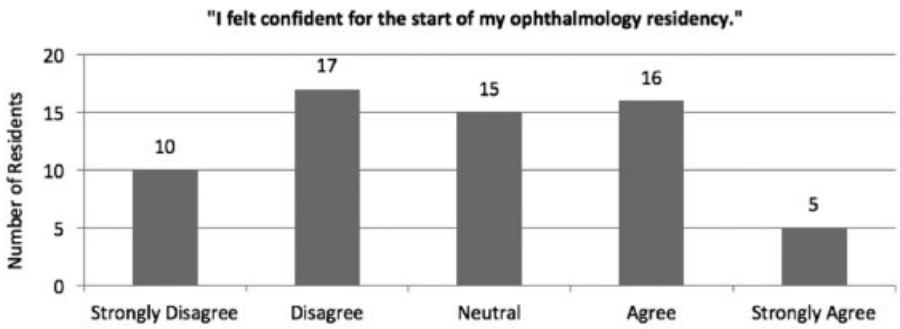

Fig. 2 A column chart illustrating the main outcome: residents' confidence level at the start of ophthalmology residency.

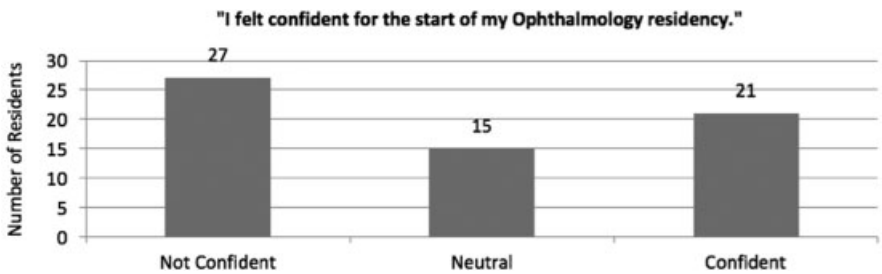

Fig. 3 A column chart illustrating the main outcome: residents' confidence level at the start of ophthalmology residency. The five groups in ►**Fig. 2** have been adapted into three new groups within this figure to better represent possible correlations between confidence level and varying experiences. Residents with low confidence have been labeled Not Confident while those with perceived confidence have been labeled Confident.

ophthalmology rotations in medical school had a direct association with increased confidence entering residency ($p = 0.05$). The Confident group cited just over 10 weeks of clinical ophthalmology rotations in medical school, while the Not Confident group cited 8 weeks. Results did not demonstrate a significant association between completion of ophthalmology research rotations in medical school and matching at one's home ophthalmology program with increased confidence.

In addition to investigating whether or not residents completed ophthalmology rotations during internships, we also looked into the length of these rotations and attempted to characterize the experiences qualitatively. Over 75% of the Neutral and Confident groups had completed an ophthalmology rotation during internship, while only half of the Not Confident group did. There was a marginally significant correlation between the number of weeks of ophthalmology rotation completed during internship and confidence level upon entering residency ($p = 0.02$). The Confident group had completed the most (7.14 weeks) amount of time on ophthalmology rotations during internship, while the Not Confident group had completed the least (2.44 weeks). We asked the residents who had completed ophthalmology rotations during internship to further characterize their experiences. They were asked to comment on how valuable they felt their rotations were, their extent of involvement in the operating room (OR), and whether they had worked up patients independently. In response to the statement "my ophthalmology rotation was valuable," no residents responded disagree or strongly disagree, but these data were not statistically significant ($p = 0.13$). No significant correlation was found between assisting in the OR and level of confidence.

We asked residents whether they worked up patients independently on their clinical ophthalmology rotations during internship. Sixteen of 17 residents who felt confident entering residency strongly agreed or agreed that they worked up patients independently ($p = 0.01$). In contrast, only 4 of 14 residents who did not feel confident entering residency agreed or strongly agreed that they worked up patients independently.

We investigated how confident residents felt in regard to common ophthalmologic problems they were likely to see on call at the beginning of residency. ►**Fig. 4** demonstrates the percentage of residents who felt they could or could not have identified relevant clinical findings and initiated proper management for 12 common presentations. Fifty-three (84.1%) and 10 (15.9%) residents responded yes and no, respectively, to being able to manage conjunctivitis. Conjunctivitis had the highest percentage of residents who believed they could handle management when compared with the other 11 pathologies. The least number of residents felt they could identify and initiate management of keratitis; 12 (19.0%) responded yes; 68.3 and 62.9% of residents felt they could manage corneal abrasion/ulcer and corneal foreign body, respectively. Conjunctivitis, corneal abrasion/ulcer, and corneal foreign body were the only diagnoses more than 50% of residents felt confident in managing as a

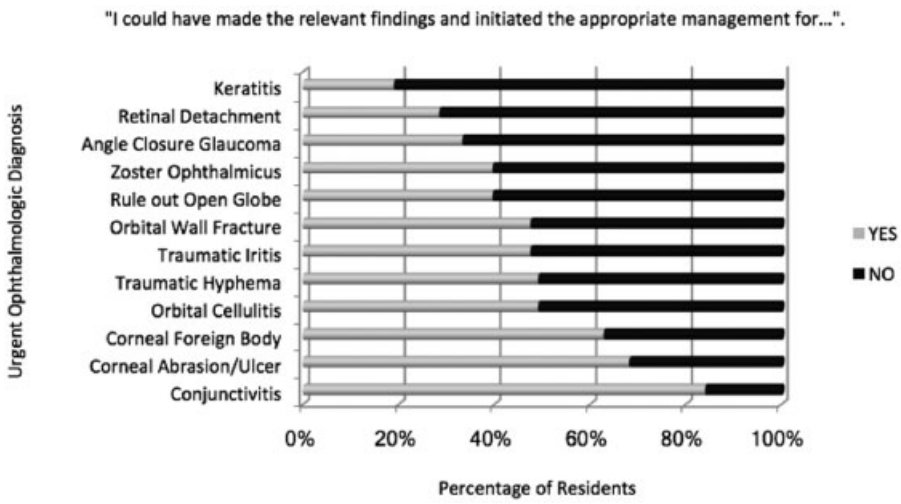

Fig. 4 A stacked bar chart illustrating the residents' perceived ability to recognize and manage common urgent ophthalmologic problems at the start of their residency.

result of their pre-residency training. The remaining nine presentations (keratitis, retinal detachment, acute angle closure, globe rupture, zoster ophthalmicus, traumatic iritis, traumatic hyphema, orbital cellulitis, orbital wall fracture) had less than 50% of residents respond that they could confidently identify and manage the disease.

We investigated whether completing internship at the same location as one's ophthalmology program correlated with confidence level upon entering residency. No significant correlation was found between confidence and internship location ($p = 0.72$), but less than 33% of residents in each confidence group completed their internship at the same location as their ophthalmology program.

Internship Clinical Curriculum

Residents were asked to document the approximate number of weeks they spent on various nonophthalmology rotations during their internship in an effort to identify whether there were any associations between feeling confident starting ophthalmology residency and nonophthalmology rotations completed during internship. Residents identified the number of weeks they spent on different rotation blocks including: internal medicine, intensive care unit, medicine specialties, ambulatory, surgery/surgical subspecialties, emergency medicine, and other. Data analysis did not find any significant associations between internship nonophthalmology rotation make-up and feeling confident at the start of ophthalmology residency.

Relevant Experiences Prior to Ophthalmology

We had a particular interest in learning from residents which experiences they felt were useful in preparing for ophthalmology residency. ►**Fig. 5** demonstrates residents' opinions regarding 10 different experiences an intern is likely to encounter. Seven experiences had more than 50% of residents either strongly agree or agree they were helpful in preparation for residency. Those included familiarity with an ophthalmology program's residents, faculty, and electronic medical record; attending wet laboratories; accompanying residents on call; and interacting with one's ophthalmology program. Independent practice in a resident-run clinic was rated as the most useful experience by residents. Fifty-seven percent and 27% of residents strongly agreed and agreed, respectively, that independent practice in a resident-run clinic was useful in preparing for residency. Nonophthalmology OR time and participating in ophthalmology research were felt to be the least helpful. 69.9 and 73.0% of residents felt neutral, disagreed, or strongly disagreed that nonophthalmology OR time and participating in ophthalmology research, respectively, were helpful in preparing for residency. 44.4% of residents strongly agreed or agreed that shadowing attending ophthalmologists in clinic was helpful.

Discussion and Conclusions

Fourth year medical students applying to ophthalmology face the additional task of deciding where to complete their internship. The internship has a dual purpose. Importantly, it is a critical developmental step on the road from student to independent physician. It is also an important part of the training of a future ophthalmologist and represents 25% of the post-graduate training. Advice on selecting internships likely comes from a variety of sources including peers, family, friends, mentors, and practicing ophthalmologists themselves. The task is made increasingly difficult by the varying opinions among the ophthalmology community about how to fulfill the year. Currently, the decision comes down to each student's personal goals and circumstances. Our professional organizations make no specific recommendations for internship content nor provide any specific milestones for the ophthalmology-bound intern. Approximately two-thirds (40 of 63) of residents surveyed agreed or strongly agreed that intern year experience is relevant to their training in ophthalmology, meaning that 23 of 60 residents did not find value in internship. Our results indicate that maintaining and starting to obtain skills necessary to becoming a better

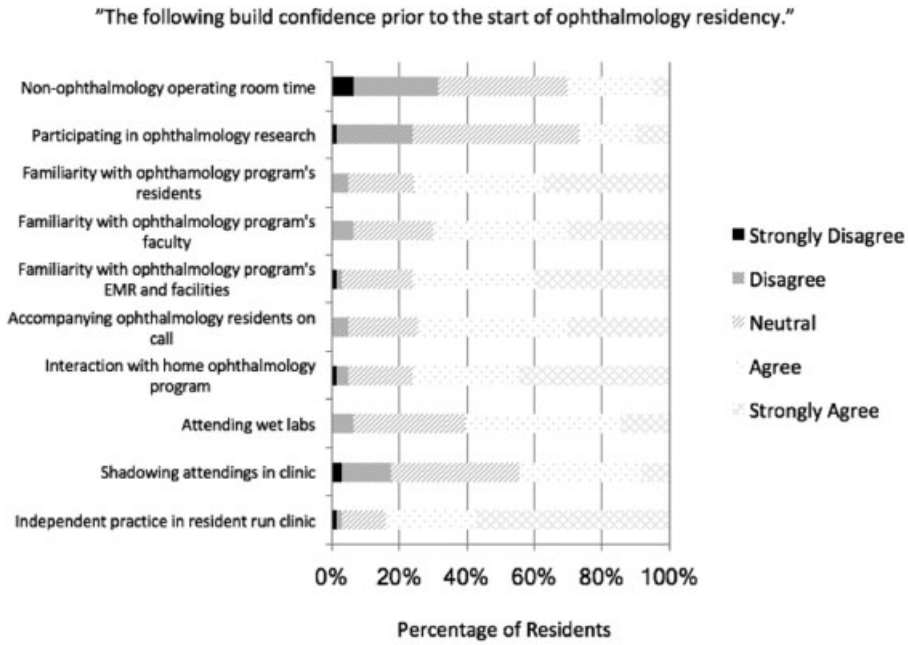

Fig. 5 A stacked bar chart illustrating how valuable residents' perceive different factors in preparing for ophthalmology residency.

ophthalmic physician and surgeon during internship was the least important factor cited when choosing internship. These data may be concerning considering the short 4-year period ophthalmology residents have to obtain the necessary skills to practice independently, safely, and with confidence. Furthermore, factors such as location, number of electives, and quality of life were found to be the top three most influential factors in selecting internships. These data suggest that many residents are selecting how to spend 25% of their 4-year training period based on lifestyle factors rather than quality of training and enduring skills.

The levels of confidence upon entering ophthalmology residency were found to be variable among residents. Twenty-one residents endorsed some degree of confidence upon entering residency, while 27 endorsed a lack of confidence. Fifteen identified their confidence level as neutral. Specifically, more than 50% of residents did not feel prepared to diagnose and initiate management for several emergent and vision treating presentations they are likely to encounter during the first few months of residency, as shown in ►**Fig. 4**. The lack of confidence felt by the majority of residents indicates that there is room for significant improvement in preparing them for their second post graduate year. The results of our study shed some light on how to restructure the internship to increase confidence level at the start of ophthalmology residency from the perspective of trainees and can be used by those medical students who are interested in maximizing the yield of their internship experience. As shown in ►**Fig. 5**, independent practice in a resident-run clinic was endorsed as the most helpful experience in preparing for residency. The following experiences were all cited as useful by more than 50% of residents: familiarity with one's ophthalmology program's faculty, electronic medical record, facilities, and residents; attending wet laboratories; accompanying residents on call; and interaction with one's home ophthalmology program as useful. Residents cited nonophthalmology OR time and ophthalmology research as not particularly helpful in preparing for ophthalmology residency.

We hypothesized that completing certain clinical and research experiences during internship and medical school may influence residents' confidence upon entering residency. Our results confirmed that completing clinical ophthalmology rotations during internship and medical school was directly correlated with confidence entering residency, although only to a marginal statistical significance. Many educators, residents, and students have long endorsed the concept that direct patient care experiences increase trainees' confidence.[4] We were also able to show with marginal significance that residents who worked up patients independently during internship ophthalmology rotations were more likely to feel confident entering residency. Our results in regard to whether completing internship at the same location as one's ophthalmology program were mixed. While more than 50% of residents believed that familiarity with one's ophthalmology program's faculty, electronic medical record, facilities, and residents is useful in preparing for ophthalmology residency, our results did not show that completing internship at the same location as one's ophthalmology program correlated with increased confidence entering residency.

The results presented in this article are the first to our knowledge to show that completing ophthalmology rotations in medical school or internship and working up patients independently are directly correlated with confidence entering residency.

The primary limitations of our study were its low power and inability to identify which respondents belonged to

present-day 4-year ophthalmology programs (Rush, University of Mississippi, South Carolina, Utah, Iowa, and University of California at San Francisco). Differentiating which residents belonged to 4-year programs may have demonstrated differences in confidence levels compared with traditional standalone internships. Further studies comparing ophthalmology resident performance within programs that include residents who completed an independent internship versus those who completed the joint 4-year program may provide tangible data that one format more strongly correlates with trainees' confidence.

Our study is an initial attempt to characterize the impact of preophthalmology residency training on the product of ophthalmology residency by means of examining trainees' confidence upon entering residency. It goes without saying that a successful training program deals with many more facets of residents' experience than confidence alone: medical knowledge; surgical, procedural, and patient care skills; scientific output; as well as trainees' wellness. Aside from the metrics of time spent in ophthalmology rotations and working up patients independently, the presence and quality of didactic and clinical curricula, extent of immersion into quality and patient care safety initiatives, and other factors may have a significant impact on the graduating resident. While our study did reveal that lifestyle factors appear to be the most important reason for current internship selection, time spent in clinical ophthalmology rotations and, specifically, independently working up patients during internship directly correlated with confidence level upon entry into ophthalmology residency. It also showed that completing internship at the same location as one's ophthalmology program did not correlate with increased trainees' confidence. While a combined internship/residency training model may increase efficiency of ophthalmology training and allow for deeper immersion into research or subspecialty training, as suggested by the White Paper,[1] and while the authors of this study support the notion of a combined internship/residency model, we recommend further study of the various facets of the current training models to better understand which training program aspects ultimately lead to a successful ophthalmology residency graduate. Systematic study of current medical school and internship experiences may help create a better training model, be it a combined internship–residency program, continuation of the status quo, or another altogether different training concept.

Meeting Presentation
This study was presented at the AUPO Annual Meeting, January 25, 2017, San Diego, CA.

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Conflict of Interest
None declared.

Ethical Approval
Exemption was obtained from the Northwestern University Institutional Review Board.

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