

Improving the Transition to Ophthalmology Residency: A Survey of First-Year Ophthalmology Residents

Akshay S. Thomas, MD, MS¹ Travis Redd, MD, MPH¹ Thomas Hwang, MD¹

¹Casey Eye Institute, Oregon Health & Science University, Portland, Oregon

Address for correspondence Thomas Hwang, MD, Casey Eye Institute, Oregon Health & Science University, 3375 SW Terwilliger Blvd., Portland, OR 97239 (e-mail: hwangt@ohsu.edu).

J Clin Acad Ophthalmol 2016;8:e10–e18.

Abstract

Purpose The objective of this study is to quantify the impact of the transition from internship to ophthalmology residency and to identify practices that help ease this transition.

Methods An online questionnaire was developed with 21 questions focusing on areas felt to impact the transition to ophthalmology residency. This was sent to all program directors of accredited ophthalmology residency programs in the United States for distribution to their first-year trainees. Responses were tabulated and evaluated for associations using comparative statistics.

Results Ninety-one first-year residents responded. Fifty-five identified the transition to ophthalmologic training as more stressful than internship. Independent preparation ($p < 0.01$) and doing an ophthalmology rotation during internship ($p = 0.04$) significantly reduced stress, and those doing a transitional PGY-1 year were significantly more likely to do either ($p < 0.01$). Additionally, orientations dedicating more time to exam skills ($p < 0.01$) were associated with significantly lower stress, while residents who had relatively shorter buddy-call systems ($p = 0.02$) were significantly more stressed.

Conclusion This study identified the transition to ophthalmology residency as highly stressful for trainees. Time spent preparing for ophthalmology residency is crucial to easing this transition, and a transitional year affords more opportunity for such preparation. Orientations which provide more hands-on experience reduce stress among new residents, as do longer buddy-call systems.

Keywords

- ▶ residency
- ▶ stress
- ▶ orientation

Training to become a physician is a highly stressful and difficult undertaking. Particularly challenging are the transitions between sequential stages of the process. Nowhere is this more acute than in the transition from medical school to graduate medical training. New house officers encounter many new challenges, including an abrupt increase in responsibility, managing uncertainty, working as a team, and potential difficulty with socialization into a program.^{1,2} This stress subsequently confers an increased risk of depression and anxiety, which together may affect as many as 35% of

first-year residents across all specialties.³ These psychological sequelae can eventually contribute to early burnout.^{4,5}

In ophthalmology training, a significant transition occurs at the beginning of ophthalmology residency. Residents switch from internship, where they mostly function in general medical or surgical wards—toward which much of their prior clinical education is directed—to ophthalmology residency, where medical school and internship contribute relatively little toward the development of a pertinent knowledge base and practical skills.⁶ Unfortunately, the literature to

received
June 27, 2015
accepted after revision
February 10, 2016

DOI <http://dx.doi.org/10.1055/s-0036-1581109>.
ISSN 2379-0539.

Copyright © 2016 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.
Tel: +1(212) 584-4662.

License terms



date provides no assessment of the impact of this transition on new ophthalmology residents.

Several techniques have been described to reduce the emotional strain of initiating residency training in other medical specialties. On an individual level, seeking social support, being problem-focused, and avoiding self-blame have been identified as successful techniques in reducing the burden of this transition.⁷ Trainees have also cited several program-level interventions as particularly helpful in reducing stress, including close supervision during the first few weeks and on call, avoidance of sleep deprivation, facilitated personal discussions with colleagues and supervisors, and adequate personal time with friends and family.⁷ In addition, several preparatory courses have also been employed by residency programs for trainees beginning internship in surgery^{8,9} and medicine,^{10,11} resulting in increased preparedness and easier adaptation to postgraduate training. While these results apply specifically to the transition to internship in various nonophthalmologic medical fields, the results raise the possibility that similar personal- and system-level interventions might also be utilized to ease the transition to ophthalmology residency.

In this study, we surveyed current first-year ophthalmology residents in their initial months of training to assess the stress associated with the transition to the PGY-2 year. Additionally, we solicited examples of interventions they or their programs had employed to ease this transition, with the goal of informing both residents and residency programs how to better prepare for this transition.

Methods

Survey Questionnaire

An online survey was developed using a two-round modified Delphi survey involving a panel of four first-year ophthalmology residents. We chose not to use a validated instrument to measure stress, such as the Depression, Anxiety and Stress Scale (DASS), as the purpose of our survey was to measure the specific causes and interventions associated with stress among residents and not simply the prevalence of stress. After discussing the specific goals of the survey with the panel, the first round of the Delphi requested a list of events/responsibilities that panelists found most stressful at the start of ophthalmology residency as well as a list of interventions that could have been implemented to reduce this stress. We used these responses to develop an online questionnaire focusing on three broad areas felt to impact the transition to ophthalmology residency: (1) preparation during PGY-1 year; (2) orientation at the start of ophthalmology residency; and (3) the first 3 months of ophthalmology residency. All questions were in a multiple-choice format but also provided the option of free text entry. The second round of the Delphi had the panel rate individual questions on a scale of 0 to 5, with 5 being the “most likely to impact or measure stress among ophthalmology residents.” Questions with an average score less than 3 were deleted from the survey. We finally pilot tested the 21-question survey (→ **Table 1**) on the panel, and validated the survey based on adequate variance in

responses with very few “other” responses, high compliance rate to survey directions, and feedback that the survey adequately measured what it had been designed to measure.

Participants

We targeted current first-year ophthalmology residents at accredited U.S. ophthalmology programs. This study was conducted in accordance with the tenets of the Declaration of Helsinki. After approval of the Institutional Review Board at Oregon Health & Science University, we sent a link to the online questionnaire via email to all domestic residency program directors with a request that it be forwarded to current first-year residents. This email was sent in early October 2013, and the survey link was closed 2 weeks later. We collected no demographic characteristics from participants to preserve anonymity and encourage honest responses.

Statistical Analysis

We generated frequency tables for responses to each question, and performed the Fisher exact test to identify associations between categorical questions of interest. This test was chosen over the χ^2 test because the expected values for many cells were <5 .

The primary outcome was resident stress level during the first 2 months of residency, which subjects ranked on a scale from 1 to 10 (10 being high) on the questionnaire. We considered this an ordinal rather than numerical scale, due to the absence of units and potential for variation in opinion of the magnitude of intervals between adjacent numbers on the scale. Therefore, we used nonparametric tests to evaluate potential associations between selected variables identified on the survey and stress level during early residency. For questions with ordinal answer choices, we used the Jonckheere–Terpstra test for ordered alternatives (Jonckheere trend test). We analyzed questions which allowed respondents to select more than one answer choice using Wilcoxon rank sum tests comparing all those who selected a given answer choice to all those who did not (and applied a Bonferroni correction for multiple comparisons to *p*-values). Finally, for simple categorical answer choices where only one answer could be selected per respondent and questions with ordinal answer choices of varying intervals, we used the Kruskal–Wallis equality-of-populations rank test.

We anticipated a response rate of at least 15% to ensure generalizability to the broader population of ophthalmology residents. We utilized Excel 2011 (Microsoft, Redmond, WA) for data management and Stata/SE 12 (StataCorp, College Station, TX) for all statistical analysis.

Results

Ninety-one first-year ophthalmology residents responded to the survey. It is unknown how many program directors forwarded the survey to all of their first-year residents, but assuming all 458 potential respondents¹² received the survey, a highly conservative estimate of the response rate would be 20%. The actual response rate is likely much higher, but cannot be precisely quantified.

Table 1 Survey responses of 91 first-year ophthalmology residents across the United States in 2013

Survey question ^a	n (%)
Intern year	
2. Which best describes your PGY-1 year?	
Preliminary medicine	48 (53%)
Transitional	37 (41%)
Preliminary surgery	5 (5%)
Other	1 (1%)
3. What type of independent preparation did you do for ophthalmology residency? ^b	
None	29 (32%)
Textbook	35 (39%)
Videos	8 (9%)
Rotation	49 (54%)
4. On average, how many hours per week did you spend preparing for ophthalmology residency during your PGY-1 year?	
< 1	66 (73%)
1 to 5	22 (24%)
5 to 10	1 (1%)
> 10	2 (2%)
Orientation experience	
5. How long was orientation at the start of ophthalmology residency?	
< 1 wk	22 (24%)
1 to 2 wk	54 (60%)
> 2 wk	14 (16%)
6. What percentage of orientation was spent on didactic information?	
< 25%	20 (22%)
25 to 50%	38 (43%)
> 50%	31 (35%)
7. What percentage of that time was spent practicing hands-on skills?	
< 25%	45 (50%)
25 to 50%	38 (42%)
> 50%	7 (8%)
8. Was there a time slot dedicated to relationship-building during orientation?	
Yes	63 (70%)
No	27 (30%)
9. Did you feel adequately oriented to facilities and logistics upon completion of orientation?	
Yes	43 (48%)
Somewhat	42 (47%)
No	5 (6%)
10. What was the most beneficial part of orientation? ^b	
Practicing exam skills	64 (71%)
Introductory lectures	35 (39%)
Team-building sessions	8 (9%)
Practicing basic surgical skills	6 (7%)
Administrative-related topics	2 (2%)
Other	2 (2%)

Table 1 (Continued)

Survey question ^a	n (%)
11. What was the least beneficial part of orientation?^b	
Practicing exam skills	4 (5%)
Introductory lectures	25 (28%)
Team-building sessions	23 (26%)
Practicing basic surgical skills	15 (17%)
Administrative-related topics	14 (16%)
EHR-related topics	2 (2%)
Nothing	2 (2%)
Other	4 (5%)
12. Which didactic topic do you wish had been discussed in more detail?^b	
Basic eye exam	38 (42%)
Ocular trauma	23 (26%)
Common consult diagnoses	56 (62%)
Surgical topics	2 (2%)
Other	2 (2%)
13. Which exam skill do you wish had been addressed in more detail?^b	
Autorefracton	12 (13%)
Lensometry	12 (13%)
Manifest refraction	29 (32%)
Applanation tonometry	22 (24%)
Pupillary exam	9 (10%)
Confrontational visual fields	6 (7%)
Anterior segment exam (slit lamp)	24 (27%)
Posterior segment exam (slit lamp)	36 (40%)
Posterior segment exam (indirect ophthalmoscopy)	44 (49%)
Gonioscopy	66 (73%)
Early residency experience	
14. Which exam skills did you feel adequately prepared for when you started seeing patients?^b	
Autorefracton	31 (35%)
Lensometry	29 (33%)
Manifest refraction	29 (33%)
Applanation tonometry	41 (46%)
Pupillary exam	65 (73%)
Confrontational visual fields	70 (79%)
Anterior segment exam (slit lamp)	61 (69%)
Posterior segment exam (slit lamp)	30 (34%)
Posterior segment exam (indirect ophthalmoscopy)	24 (27%)
Gonioscopy	6 (7%)
None	1 (1%)
16. What was the most stressful aspect of your first few weeks as a new resident?^b	
Call	68 (78%)
Clinic responsibilities	30 (35%)
Reading	29 (33%)

(Continued)

Table 1 (Continued)

Survey question ^a	n (%)
City/new people	5 (6%)
17. Did you have a buddy-call system? If so, for how long?	
No	1 (1%)
< 1 mo	24 (27%)
1 to 3 mo	49 (56%)
3 to 6 mo	9 (10%)
> 6 mo	5 (6%)
18. What would be the most challenging rotation with which to begin? ^b	
VA/county hospital	22 (26%)
Comprehensive ophthalmology	4 (5%)
Consult	3 (4%)
Cornea	4 (5%)
Glaucoma	2 (2%)
Retina	28 (33%)
Pediatric ophthalmology	37 (44%)
Neuro-ophthalmology	21 (25%)
Ocular pathology	1 (1%)
Oculoplastics	8 (9%)
Research	1 (1%)
Other	1 (1%)
19. What would be the best rotation with which to begin? ^b	
VA/county hospital	23 (26%)
Comprehensive ophthalmology	75 (85%)
Oculoplastics	6 (7%)
Cornea	6 (7%)
Glaucoma	6 (7%)
Retina	4 (5%)
Pediatric ophthalmology	1 (1%)
Neuro-ophthalmology	5 (6%)
Ocular pathology	5 (6%)
20. What would you have done differently prior to starting ophthalmology residency? ^b	
Nothing	34 (39%)
More preparation	45 (52%)
Rotation	12 (14%)
Other	1 (1%)
21. How does the transition to ophthalmology residency compare with the transition to internship?	
Much less stressful	6 (7%)
Somewhat less stressful	15 (17%)
Equally stressful	12 (14%)
Somewhat more stressful	32 (36%)
Much more stressful	23 (26%)

Abbreviations: EHR, electronic health record; VA, Veterans' Affairs.

^aQuestions 1 and 15 not included. Question 1 pertained to contact information, and question 15 asked respondents to rank stress level on a scale from 1 to 10.

^bQuestion was of the type "select all that apply," thus answer frequencies may sum to >100% where indicated.

► **Table 1** provides the wording of all survey questions and the proportion of respondents who selected each answer choice. Of note, 55 (63%) respondents identified the transition to ophthalmologic training as “somewhat more” or “much more” stressful than the transition to internship. Sixty-six (73%) spent less than 1 hour per week preparing for ophthalmology residency during internship, and 45 (52%) wished they had done more. During orientation to ophthalmology residency, 64 (71%) identified sessions dedicated to exam techniques as most helpful, and 25 (28%) considered introductory lectures as least helpful. Residents wished that greater attention had been paid to common consult diagnoses ($n = 56$, 62%), basic eye exam ($n = 38$, 42%), and ocular trauma ($n = 23$, 26%) during orientation. With respect to exam techniques, there was a desire for greater detail in discussing gonioscopy ($n = 66$, 73%) and the posterior segment examination, using both slit lamp ($n = 36$, 40%) and indirect ($n = 44$, 49%) ophthalmoscopy. However, most respondents felt comfortable with pupillary examination ($n = 65$, 73%), confrontational visual fields ($n = 70$, 79%), and examination of the anterior segment ($n = 61$, 69%) following orientation. Finally, 68 (78%) identified call as the most stressful aspect of early residency, and 75 (85%) considered comprehensive ophthalmology the best rotation with which to begin.

Two-way tabulation showed a significant association between type of PGY-1 year and the amount of time spent preparing independently for ophthalmology residency (Fisher exact test, two-sided p -value = 0.01). Specifically, respondents doing a transitional year tended to spend more time preparing than those doing a preliminary medicine or any other type of PGY-1 year.

The overall median stress level during the first 2 months of residency was 7 (scale from 1 to 10, 10 being highly stressful). ► **Table 2** displays relationships between various questions of interest and the level of stress experienced during early residency. Factors associated with significantly lower stress during this period included spending more time during PGY-1 year preparing for ophthalmology residency (Kruskal–Wallis test, two-sided p -value = 0.02). Specifically, independent preparation (Jonckheere test, two-sided p -value = 0.002) and doing an ophthalmology rotation during internship (Jonckheere test, two-sided p -value = 0.04) significantly reduced stress, and those doing a transitional PGY-1 year were significantly more likely to do either (Kruskal–Wallis test, $p = 0.008$). Residency orientations which spent relatively more time practicing hands-on skills (Jonckheere test, two-sided p -value < 0.01), relationship-building sessions during orientation (Wilcoxon rank sum test, two-sided p -value = 0.05), feeling adequately oriented to facilities and logistics following orientation (Jonckheere test, two-sided p -value < 0.01), and having a longer buddy-call system (Kruskal–Wallis test, two-sided p -value = 0.04) were also associated with significantly lower stress levels. There was no significant association between type of PGY-1 year (Kruskal–Wallis test, two-sided p -value = 0.79), type of independent preparation for ophthalmology residency (Wilcoxon rank sum tests, two-sided Bonferroni-adjusted p -values ranged from 0.20 to <0.99), length of orientation (Jonckheere test, two-sided p -value = 0.14), or time spent on didactic topics during orientation (Jonckheere test, two-sided

p -value = 0.83) and stress experienced during the first 3 months of ophthalmology residency. Among residents that did a transitional year, there was a nonsignificant trend toward lower stress among the group that did independent preparation (mean 6.3 vs. 8 on the 10-point stress scale; $p = 0.08$).

Discussion

This study aimed to assess the stress associated with beginning ophthalmology residency and identify potential interventions to help ease this transition. Key findings include the following: (1) time spent preparing for ophthalmology residency during PGY-1 year is crucial to easing this transition; (2) a transitional PGY-1 year affords more opportunity to prepare for ophthalmology residency than preliminary medicine or surgery; (3) orientations which provide more hands-on experience, relationship-building, and familiarity with logistics reduce stress among new residents, whereas longer orientations and didactic teaching do not; (4) longer buddy-call systems produce significantly lower stress; and (5) the majority of respondents would prefer starting residency with a comprehensive ophthalmology rotation.

Our data suggest that the majority of new first-year ophthalmology residents found the transition to ophthalmology residency more stressful than the transition to their PGY-1 year. However, devoting time during PGY-1 year to prepare for ophthalmology residency, even if for only 1 hour per week, significantly eased this transition. In retrospect, 45 (52%) respondents wished they had done more such preparation. The demands of a PGY-1 year may leave little room in the schedule for significant independent study for the future ophthalmology resident. However, it is also possible that this low level of preparation is due to a lack of guidance. A preparatory curriculum, whether a web-based learning module or a reading syllabus during the PGY-1 year, could facilitate improved preparation for ophthalmology residency without adding undue burden.

Residents can also ease the transition to residency themselves via their selection of type of PGY-1 year. Those doing a transitional year were more likely to do independent preparation, such as reading and ophthalmology rotations, which were associated with less stress during the PGY-2 year. Doing a transitional year itself, however, was not associated with less stress. One possible reason for this disparity is that only a portion of residents doing a transitional year did independent preparation. Among those doing a transitional year, there was indeed a trend toward less stress in the group that did independent preparation. This approach may be especially helpful given the paucity of ophthalmology-specific training in medical school and internship.^{13–16} A few ophthalmology residency programs in the country^{17,18} offer an integrated PGY-1 position for ophthalmology residents wherein residents have greater exposure to ophthalmology during their PGY-1 year. While this may reduce stress during their PGY-2 experience, it is also possible that this design may simply shift the stressful transition to the PGY-1 year. It may be important to consider a PGY-1 experience that allows for learning ophthalmology-specific clinical skills without the expectation of independent patient care, often demanded of a PGY-2 resident.

Table 2 Factors affecting stress level during the first 2 months of ophthalmology residency among 91 respondents across the United States in 2013

Survey question	N	Stress level, ^a median (IQR)	Statistical test performed	Two-sided p-value
2. Which best describes your PGY-1 year?				
Preliminary medicine	48	8 (4–8)	Kruskal–Wallis test	0.789
Transitional	37	7 (5–8)		
Preliminary surgery	5	7 (5–7)		
Other	1	6 (6–6)		
3. What type of independent preparation did you do for ophthalmology residency? ^b				
None	28	8 (7–8)	Rank sum test	0.339 ^c
Textbook	34	7 (6–8)	Rank sum test	1.000 ^c
Videos	7	8 (7–9)	Rank sum test	0.235 ^c
Rotation	48	6 (4–8)	Rank sum test	0.196 ^c
4. On average, how many hours per week did you spend preparing for ophthalmology residency during your PGY-1 year?				
< 1	66	8 (6–8)	Kruskal–Wallis test	0.016 ^d
1 to 5	22	5.5 (4–8)		
5–10	1	1 (1–1)		
>10	2	5 (3–7)		
5. How long was orientation at the start of ophthalmology residency?				
< 1 wk	22	8 (4–9)	Jonckheere trend test	0.138
1 to 2 wk	54	7 (5–8)		
> 2 wk	14	7 (4–8)		
6. What percentage of orientation was spent on didactic information?				
< 25%	20	7.5 (4.5–8.5)	Jonckheere trend test	0.826
25 to 50%	38	7 (5–8)		
> 50%	31	7 (6–8)		
7. What percentage of orientation was spent practicing hands-on skills?				
< 25%	45	8 (6–9)	Jonckheere trend test	0.001 ^d
25 to 50%	38	6 (5–8)		
> 50%	7	4 (3–8)		
8. Was there a time slot dedicated to relationship-building during orientation?				
Yes	63	7 (4–8)	Rank sum test	0.046 ^d
No	27	8 (6–9)		
9. Did you feel adequately oriented to facilities and logistics upon completion of orientation?				
Yes	43	5 (4–8)	Jonckheere trend test	<0.001 ^d
Somewhat	42	8 (7–9)		
No	5	9 (8–10)		
17. Did you have a buddy-call system? If so, for how long?				
No	1	6 (6–6)	Kruskal–Wallis test	0.036 ^d
< 1 mo	24	8 (6.5–9)		
1 to 3 mo	49	7 (5–8)		
3 to 6 mo	9	7 (4–8)		
> 6 mo	5	4 (4–6)		

Abbreviation: IQR, interquartile range.

^aMedian stress level during the first 2 months of ophthalmology residency, assessed by survey. Scale of 1 (not stressful) to 10 (extremely stressful).

^bAnswer choices were not distinct groups; respondents could check more than one answer. Each pairwise comparison is between those who selected the indicated answer and those who did not.

^cBonferroni-corrected.

^dStatistically significant at $\alpha = 0.05$ level.

Orientation to ophthalmology residency is another period where interventions have the potential to reduce the stress of this transition. The duration and focus of orientation at the start of ophthalmology residency was found to vary widely among respondents in this study. We found that residents undergoing orientations which provided more hands-on experience, relationship-building, and familiarity with logistics experienced significantly less stress than their counterparts, whereas longer orientations and didactic teaching had no effect on stress. Given these findings, residents would likely benefit from an orientation schedule with a greater emphasis on examination techniques, common pathology seen on consults, and logistical issues that they are likely to encounter.

Respondents identified call as the most stressful aspect of the first few months of ophthalmology residency. The majority of respondents had some duration of buddy-call system in place, wherein a senior resident assisted their new colleagues with after-hours patient care. We found that residents at programs with a longer duration of buddy call were significantly less stressed. While this places a greater burden on senior residents, a longer duration of supervised call appears to ease the transition to ophthalmology residency.

Lastly, 75 (85%) respondents identified comprehensive ophthalmology as the “best” rotation with which to begin, while pediatric ophthalmology, retina, Veterans’ Affairs/county hospital, and neuro-ophthalmology were selected as the “most challenging” in the initial stages of residency. It is not feasible for most programs to start all residents with the same rotation. Some programs, however, offer a staggered schedule for residency start time,¹⁹ allowing each resident to start with the same rotation and have the same sequence of rotations throughout their training. While such a model could incorporate the results of this study to improve residents’ experience during the first year, it may complicate the logistics of transitioning from internship or to fellowship. It is also possible that the difference in the stress experienced by the residents in different types of rotations could be related to other confounding factors, such as the level of independence and workload in different settings rather than the type of rotation. Future research may aim to address whether such confounders exist or why residents found some rotations more stressful than other.

This study did not assess whether a reduction in stress during early residency translates to better training or better patient care. In fact, it is possible that a certain degree of stress can facilitate the development of residents into capable ophthalmologists. However, the literature suggests that an impaired sense of physician wellbeing can lead to lower levels of empathy toward patients.^{20,21} As we conceive resident training to be not only the transfer of knowledge, but also the development of multidimensional competence, resident wellbeing and stress remain important issues even though knowledge acquisition and the sense of wellbeing have not been correlated.²² Furthermore, an improved sense of wellbeing early in residency may be important, as some authors have observed persistence of burnout for residents who experience this phenomenon early in their training.²³

The main limitations of this study were the low response rate, possible nonresponse bias, and uncontrolled confounding factors due to the absence of demographic and program characteristics. While a response rate of 20% limits the generalizability of our results, it does fall within the range of prior published physician surveys.²⁴ Further investigation on this topic with input from a larger proportion of residents is warranted. While commencing ophthalmology residency will likely always be somewhat stressful, this study indicates that there may be interventions that residents and residency programs can implement to reduce this burden during the PGY-2 year.

Financial Support

This work was funded by an unrestricted institutional grant from Research to Prevent Blindness (New York, NY). This research was also funded by the following grant: P30 EY010572 from the National Institute of Health (NIH, Bethesda, Maryland).

Acknowledgment

The authors would like to thank Dr. Dongseok Choi for his help with the statistical analysis.

References

- Brennan N, Corrigan O, Allard J, et al. The transition from medical student to junior doctor: today's experiences of Tomorrow's Doctors. *Med Educ* 2010;44(5):449–458
- Flynn SP, Hekelman FP. Reality shock: a case study in the socialization of new residents. *Fam Med* 1993;25(10):633–636
- Schneider SE, Phillips WM. Depression and anxiety in medical, surgical, and pediatric interns. *Psychol Rep* 1993;72(3, Pt 2):1145–1146
- Hurst C, Kahan D, Ruetalo M, Edwards S. A year in transition: a qualitative study examining the trajectory of first year residents' well-being. *BMC Med Educ* 2013;13:96
- Teunissen PW, Westerman M. Opportunity or threat: the ambiguity of the consequences of transitions in medical education. *Med Educ* 2011;45(1):51–59
- Shah M, Knoch D, Waxman E. The state of ophthalmology medical student education in the United States and Canada, 2012 through 2013. *Ophthalmology* 2014;121(6):1160–1163
- Paice E, Rutter H, Wetherell M, Winder B, McManus IC. Stressful incidents, stress and coping strategies in the pre-registration house officer year. *Med Educ* 2002;36(1):56–65
- Antonoff MB, Swanson JA, Green CA, Mann BD, Maddaus MA, D'Cunha J. The significant impact of a competency-based preparatory course for senior medical students entering surgical residency. *Acad Med* 2012;87(3):308–319
- Meier AH, Henry J, Marine R, Murray WB. Implementation of a Web- and simulation-based curriculum to ease the transition from medical school to surgical internship. *Am J Surg* 2005;190(1):137–140
- Laack TA, Newman JS, Goyal DG, Torsher LC. A 1-week simulated internship course helps prepare medical students for transition to residency. *Simul Healthc* 2010;5(3):127–132

- 11 Mushin IC, Matteson MT, Lynch EC. Developing a resident assistance program. Beyond the support group model. *Arch Intern Med* 1993;153(6):729-733
- 12 SF Match Residency and Fellowship Matching Services. Ophthalmology residency match report. Available at: <https://www.sfmach.org/SpecialtyInsideAll.aspx?id=6&typ=2&name=Ophthalmology>. Accessed March 19, 2014
- 13 Spivey BE. Ophthalmology for medical students: content and comment. *Arch Ophthalmol* 1970;84(3):368-375
- 14 Stern GA; The Association of University Professors of Ophthalmology Education Committee. Teaching ophthalmology to primary care physicians. *Arch Ophthalmol* 1995;113(6):722-724
- 15 Jacobs DS. Teaching doctors about the eye: trends in the education of medical students and primary care residents. *Surv Ophthalmol* 1998;42(4):383-389
- 16 Quillen DA, Harper RA, Haik BG. Medical student education in ophthalmology: crisis and opportunity. *Ophthalmology* 2005;112(11):1867-1868
- 17 Department of Ophthalmology & Visual Sciences, University of Utah. Residency program. Available at: <http://medicine.utah.edu/ophthalmology/education/residency/index.php>. Accessed March 19, 2014
- 18 University of Iowa Health Care - Ophthalmology Residency. Integrated internship. Available at: <http://www.uihealthcare.org/GME/InsidePages.aspx?id=241830&taxid=225135>. Accessed March 19, 2014
- 19 The Department of Ophthalmology at California Pacific Medical Center Residency Program. The staggered start. Available at: <http://www.cpmc.org/professionals/education/residencies/ophthalmology/apply.html>. Accessed March 19, 2014
- 20 Passalacqua SA, Segrin C. The effect of resident physician stress, burnout, and empathy on patient-centered communication during the long-call shift. *Health Commun* 2012;27(5):449-456
- 21 Beckman TJ, Reed DA, Shanafelt TD, West CP. Resident physician well-being and assessments of their knowledge and clinical performance. *J Gen Intern Med* 2012;27(3):325-330
- 22 West CP, Shanafelt TD, Cook DA. Lack of association between resident doctors' well-being and medical knowledge. *Med Educ* 2010;44(12):1224-1231
- 23 Campbell J, Prochazka AV, Yamashita T, Gopal R. Predictors of persistent burnout in internal medicine residents: a prospective cohort study. *Acad Med* 2010;85(10):1630-1634
- 24 Cummings SM, Savitz LA, Konrad TR. Reported response rates to mailed physician questionnaires. *Health Serv Res* 2001;35(6):1347-1355