



First-Year Ophthalmology Residency Call Structure and Its Association with Resident Anxiety and Confidence

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J Acad Ophthalmol 2019;11:e9–e15.

Abstract

Purpose The main purpose of this article is to characterize methods for preparing first-year ophthalmology residents for call and to evaluate the association between call structure and anxiety levels.

Methods Data on call structure and preparatory courses were collected by a national online survey of residency program directors and first-year residents in 2016 and 2017. Anxiety was assessed using the Endler Multidimensional Anxiety Scale, and confidence in evaluating and managing critical diagnoses on call was evaluated using a modified Likert-type scale.

Results In 2016, 132 first-year ophthalmology residents (28% of 465 total) responded to the survey, and in 2017, 103 first-year residents (22% of 469 total) responded, for a total of 235 residents participating. About 97.4% of residents reported that their residency program had a buddy call system, and 73.2% reported that their residency offered a preparatory course at the beginning of residency. In the resident cohort from 2017, there was a statistically significant association between length of buddy call duration and cognitive worry anxiety level ($p = 0.01$) with the lowest mean anxiety scores reported among those whose buddy call system lasted between 9 and 12 weeks. Higher confidence in making critical diagnoses on call was significantly associated with lower anxiety scores ($p < 0.05$ for all surveyed diagnoses). In the 2016 cohort, the mean cognitive worry score was significantly lower in those who had a preparatory course than those who did not (17.6 vs 22.2, $p = 0.02$), as was the mean overall anxiety score (33.8 vs 40.8, $p = 0.04$).

Conclusion Buddy call and preparatory courses are associated with less anxiety and improved confidence among residents on call.

Keywords

- ▶ residency
- ▶ primary call
- ▶ call structure
- ▶ anxiety
- ▶ confidence

The first year of ophthalmology residency is a demanding, often stressful time for trainees with a steep learning curve. The negative effects of stress on resident performance, mental health, and eventual burnout have been studied across many medical and surgical specialties.^{1–3} Within ophthalmology, a recent survey of residency program directors (PDs) identified a substantial burden of resident stress, burnout, and depression.⁴

Among the most stressful experiences in residency training is taking primary call.^{5,6} Given the wide variety, and often high-stakes nature, of cases seen while on call, taking call requires trainees to work semi-independently with maximal efficiency. This call experience, while demanding and stressful, is valuable in providing residents with the opportunity to practice and develop confidence and autonomy in their diagnostic and management skills.

received
October 8, 2018
accepted after revision
December 27, 2018

DOI <https://doi.org/10.1055/s-0039-1677845>.
ISSN 2475-4757.

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To equip trainees with the knowledge, skills, and confidence required for taking call, ophthalmology residency programs have developed a myriad of methods to prepare junior residents for taking primary call. Commonly, residency programs offer preparatory courses at the beginning of residency in foundational topics and skills pertaining to ophthalmology. These preparatory, or “orientation,” courses vary in length and content, but often consist of some combination of didactic lectures, case-based discussions, simulations, and dry- or wet-laboratory experiences over a matter of days to weeks. Additionally, many programs have adopted a “buddy call” system for easing the transition to independent call for first-year residents. Generally, in this model, first-year residents are paired with a senior resident to provide support and answer questions during the initial call experience. Again, however, there is considerable variability in how buddy call systems are structured among programs and how long these systems are left in place. Previous work within the radiology literature by Trout et al demonstrated that residents found a buddy call system helpful at reducing anxiety and building confidence while on-call.⁷ However, to date, there is no published literature describing how ophthalmology programs prepare residents for taking call, nor is there data regarding the efficacy of these efforts in reducing resident anxiety and improving confidence while on call.

In this cross-sectional survey study, we aimed to identify and describe how US ophthalmology residency programs prepare first-year residents to take call and how the call experience is structured across training programs. Additionally, we sought to determine whether different methods of preparing first-year ophthalmology residents for call were associated with differences in resident anxiety and confidence and whether buddy call systems decrease anxiety and increase confidence levels.

Methods

Study Design

Data on first-year ophthalmology call structure and preparation were collected using a nationwide online survey of residency PDs and first-year residents. Surveys were sent out to first-year residents between February 2016 and April 2016 (late in the academic year) and then again between October 2017 and December 2017 (early in the next academic year, to a new class of first-year residents). Residents were recruited through email invitation by their PDs and by direct email invitation to ~200 first-year residents whose email addresses were known. The link to the survey was posted on Facebook in the Ophthalmology Class of 2020 group page.

PDs were surveyed only in the 2016 survey period and completed a nine-item survey, providing descriptive information on their program’s first year call structure and preparatory course, including whether or not their program utilized a buddy call system. Buddy call was described as both as having the option of calling an upper-year resident for assistance and requiring all patients seen by a first year to also be seen by a senior resident. Residents completed a 14-

item survey, which included items describing the call structure and preparatory courses of their program and quantifying their call-related anxiety and confidence. Survey responses were anonymous and untraceable to the resident’s or PD’s identity or program.

Anxiety while on ophthalmology call was evaluated using the Endler Multidimensional Anxiety Scales–State (EMAS-S) inventory (Western Psychological Services, Los Angeles, CA).⁸ The EMAS-S has been used previously in studies of resident anxiety,⁷ and has been shown in extensive research to have construct validity, content validity, and criterion validity.⁸ This 20-item questionnaire is divided into 10 items evaluating autonomic emotional (AE), or physiologic, anxiety, and 10 items evaluating cognitive worry (CW) using a five-point, Likert-type scale (ranging from “not at all” to “very much”) to quantify how each item applies to their experience while on call. Items assessing AE anxiety ask about physical symptoms, such as unsteady hands, rapid heartbeat, sweaty palms, muscle tension, and dry mouth. CW items ask about self-evaluation and thoughts of failure or doubt. A score out of 50 points is generated for the AE, CW, and total anxiety scores. Lower scores are reflective of lower anxiety for AE, CW, and total anxiety.

Confidence in evaluating and managing critical diagnoses on call was evaluated using a five-point, Likert-type scale ranging from “very unsure” to “very confident.” The critical diagnoses included identifying a retinal detachment, endophthalmitis, orbital fractures, retrobulbar hemorrhage, and ruptured globe.

The institutional review board at the University of Pennsylvania School Medicine approved this study.

Statistical Analysis

Data was analyzed for the individual and combined cohorts from 2016 to 2017, because two cohorts were surveyed in different time period of their first-year ophthalmology residency. We used descriptive statistics (mean, standard error [SE], percentage) to summarize survey responses. The associations of level of preparation for buddy call with buddy call anxiety score and confidence score were evaluated using analysis of variance. All the statistical analyses were performed in SAS v9.4 (SAS Institute Inc., Cary, NC), and two-sided $p < 0.05$ was considered statistically significant.

Results

Program Director Description of First-Year Call Structure and Preparation

Thirty-six PDs of a total of 116 (31%) responded to the survey. One hundred percent of PDs reported their program uses a buddy call system. Thirty-two PDs (89%) reported that their program offers some form of preparatory course at the beginning of residency. During this preparatory time, 53% of PDs reported no clinical responsibilities for residents, 19% reported 1 to 2 days of clinical responsibilities per week, and 22% reported 3 to 5 days of clinical responsibilities. One-third of PDs reported they were either unsure or neutral on the benefit of preparatory courses in training first years for primary call, while 36% of PDs were somewhat confident,

and 22% of PDs were very confident that preparatory classes trained first years to take primary call. Seventy-five percent of PDs were very confident that buddy call trained first-year residents to take primary call, and the remaining 25% responded that they were somewhat confident.

Resident Description of First-Year Call Structure and Preparation

In 2016, 132 first-year ophthalmology residents (28% of 465 total) responded to the survey, and in 2017, 103 first-year residents (22% of 469 total) responded, for a total of 235 residents participating. Among the total survey cohort of first-year residents, 172 residents (73.2%) reported that their program offered an ophthalmology preparatory course at the beginning of residency. Lectures and skills sessions were the most common format of teaching in these courses, followed by wet laboratory and simulation center sessions. Two-hundred twenty-nine residents (97.4%) reported that their program had a buddy call system. About 60.8% of residents reported having buddy call for between 3 and 8 weeks, with 6.4% of residents reporting buddy call lasting less than 3 weeks and 23.0% lasting longer than 8 weeks. Timing of when first-year residents began taking independent primary call varied across respondents, with 19.6% of resident reporting taking call within the first month of residency, 38.7% in the second month, 33.2% in the third month, and 7.3% in the fourth month or later. When first-year residents have a question on call, 35.5% responded that they contact a second-year resident on back up call, and 63.7% contact a third-year resident. One reported initially contacting a fellow or attending. Responses were similar between the 2016 cohort and the 2017 cohorts individually, as detailed in ►Table 1.

Overall Confidence and Anxiety Level

There was a trend toward increased confidence in diagnosing critical diagnoses in the 2016 cohort compared with the 2017 cohort. There were also lower CW, AE, and overall anxiety scores as measured by the EMAS-S in the 2016 cohort compared with the 2017 cohort (►Table 2).

Effect of Call Structure and Preparation on Anxiety

In the cohort of respondents from only 2017, there was a statistically significant association between length of buddy call duration and CW anxiety level measured by the EMAS-S ($p = 0.01$), with overall anxiety score also approaching significance ($p = 0.08$). The lowest mean scores in CW, AE, and overall anxiety were reported among those whose buddy call system lasted between 9 and 12 weeks. Compared with buddy call systems lasting 9 to 12 weeks, those respondents whose buddy call systems lasted fewer than 9 weeks or greater than 12 weeks had higher CW, AE, and overall anxiety scores (►Table 3).

The presence of an ophthalmology preparatory course was not statistically significantly associated with decreased anxiety scores in the 2017 cohort, and there were no significant differences in anxiety scores between different content types in preparatory courses (i.e., lectures, skills

sessions, wet laboratory, simulation) (►Table 4). However, in the 2016 cohort, the mean CW score was significantly lower in those who had a preparatory course than those who did not (17.6 vs 22.2, $p = 0.02$). In this cohort, overall anxiety score was also lower in those who had a preparatory course compared with those who did not (33.8 vs 40.8, $p = 0.04$). In the 2016 cohort, lectures, wet laboratories, and skills sessions were all significantly associated with lower CW score, while simulation was not (►Table 5).

Confidence in Critical Diagnoses and Anxiety

In the 2017 cohort, higher confidence in making critical diagnoses on call was significantly associated with lower CW, AE, and overall anxiety scores. This was true for diagnosing a retinal detachment (CW $p < 0.001$, AE $p = 0.004$, overall anxiety $p < 0.001$), diagnosing endophthalmitis (CW $p = 0.003$, AE $p = 0.07$, overall anxiety $p = 0.01$), diagnosing entrapped extraocular muscles in the setting of an orbital wall fracture (CW $p < 0.001$, AE $p = 0.03$, overall anxiety $p = 0.003$), diagnosing a globe rupture (CW $p < 0.001$, AE $p < 0.001$, overall anxiety $p < 0.001$), and managing a sight-threatening retrobulbar hematoma (CW $p = 0.001$, AE $p = 0.02$, overall anxiety $p = 0.001$). The same strong association between increased confidence and lower anxiety scores was seen in the 2016 cohort.

Length of Buddy Call and Confidence

There was no statistically significant association between the length of buddy call and respondents' reported level of confidence in making critical diagnoses on call in the 2017 cohort (retinal tear/detachment, $p = 0.20$; endophthalmitis, $p = 0.29$; entrapped extraocular muscle, $p = 0.73$; globe rupture, $p = 0.52$; retrobulbar hematoma, $p = 0.66$).

Discussion

Call is an essential part of residency training in ophthalmology. It is fundamental to the acquisition of the knowledge, skills, and confidence necessary to become an independent practitioner. However, call can be a stressful experience, particularly for new residents. Stress can lead to anxiety, and anxiety can lead to decreased performance.^{9,10} Ophthalmology programs implement a myriad of tactics to foster skills and confidence in first-year ophthalmology residents. Included in these tactics is buddy call, whereby an upper-year resident is involved in every case that a new first year is called about for a designated amount of time before the first year is released into independent call.

In our study, we have demonstrated that increased confidence in accurately diagnosing critical ophthalmic pathology is associated with decreased overall anxiety. The length of buddy call does not appear to be associated with the confidence in these diagnoses. Preparatory courses were found to be significantly associated with decreased anxiety, and therefore preparatory courses that emphasize accurate diagnosis of critical pathology potentially seen on call may further strengthen the confidence, and therefore decrease the anxiety, of first-year residents who are beginning to take call.

Table 1 Description of first-year residency call structure and preparation

Questions/Responses	2016 Cohort (n = 132)	2017 Cohort (n = 103)
Does your residency program have a buddy call system?		
Yes	127 (96.2%)	102 (99.0%)
No	5 (3.8%)	1 (1.0%)
What does buddy call entail? (may select >1)		
Upper-year resident must be called for every patient	48 (36.4%)	41 (39.8%)
Upper-year resident must physically examine every patient	75 (56.8%)	74 (71.8%)
Upper-year resident can be called if you have a question	61 (46.2%)	34 (33.0%)
Upper-year resident can physically examine patient if you are unsure	60 (45.5%)	36 (35.0%)
How long is your buddy call system?		
1–2 wk	12 (9.1%)	3 (2.9%)
3–4 wk	27 (20.5%)	32 (31.1%)
5–8 wk	43 (32.6%)	41 (39.8%)
9–12 wk	15 (11.4%)	8 (7.8%)
> 12 wk	31 (23.5%)	18 (17.5%)
Missing	4 (3.0%)	1 (1.0%)
Does your residency program offer an ophthalmology preparatory course at the beginning of residency?		
Yes	97 (73.5%)	75 (72.8%)
No	34 (25.8%)	28 (27.2%)
Missing	1 (0.8%)	0 (0.0%)
What does your preparatory course entail? (may select >1)		
Lectures	100 (75.8%)	77 (74.8%)
Skills sessions	77 (58.3%)	54 (52.4%)
Simulation center	17 (12.9%)	11 (10.7%)
Wet laboratory	27 (20.5%)	21 (20.4%)
Other	6 (4.5%)	7 (6.8%)
In what month of your first year of residency did you begin taking primary call by yourself?		
1st	36 (27.3%)	10 (9.7%)
2nd	44 (33.3%)	47 (45.6%)
3rd	38 (28.8%)	40 (38.8%)
4th–6th	6 (4.5%)	4 (3.9%)
> 6th	7 (5.3%)	0 (0.0%)
I have not yet taken independent primary call	1 (0.8%)	2 (1.9%)
When you have a question on call, whom do you contact first?		
2nd-year resident on backup call	42 (31.8%)	41 (40.2%)
3rd-year resident on backup call	88 (66.7%)	61 (59.8%)
Fellow on call	1 (0.8%)	0 (0.0%)
Attending on call	1 (0.8%)	0 (0.0%)

Our study also demonstrates that buddy call duration of 9 to 12 weeks is associated with the lowest amount of overall anxiety. Buddy call that was shorter than 9 weeks may have been too brief for a resident to experience the full spectrum of pathology that may present on call. Prolonging buddy call for greater than 12 weeks may hinder the confidence of residents as they embark on independent call by stifling their independent critical-thinking skills.

Similar results regarding buddy call structure were obtained for both the 2016 and 2017 cohort of first-year ophthalmology residents; however, there were different results with regard to anxiety and CW scores. In 2016, the survey was completed by first-year residents between February and April, whereas in 2017 the survey was completed by first-year residents between October and December. As such, the 2016 cohort represented junior residents who had

Table 2 Overall resident anxiety scores and confidence in diagnosis

Questions/Responses	2016 Cohort (n = 132)	2017 Cohort (n = 103)
How confident do you feel right now in your ability to correctly diagnose a retinal tear or detachment?		
Very unsure	2 (1.5%)	8 (7.8%)
Somewhat unsure	17 (12.9%)	32 (31.1%)
Neutral	18 (13.6%)	22 (21.4%)
Somewhat confident	74 (56.1%)	35 (34.0%)
Very confident	21 (15.9%)	6 (5.8%)
How confident do you feel right now in your ability to correctly diagnose endophthalmitis?		
Very unsure	2 (1.5%)	4 (3.9%)
Somewhat unsure	8 (6.1%)	21 (20.4%)
Neutral	15 (11.4%)	27 (26.2%)
Somewhat confident	68 (51.5%)	44 (42.7%)
Very confident	39 (29.5%)	7 (6.8%)
How confident do you feel right now in your ability to correctly diagnose an entrapped extraocular muscle in the setting of an orbital wall fracture?		
Very unsure	2 (1.5%)	2 (1.9%)
Somewhat unsure	7 (5.3%)	14 (13.6%)
Neutral	7 (5.3%)	13 (12.6%)
Somewhat confident	71 (53.8%)	54 (52.4%)
Very confident	45 (34.1%)	20 (19.4%)
How confident do you feel right now in your ability to correctly diagnose a globe rupture?		
Very unsure	7 (5.3%)	1 (1.0%)
Somewhat unsure	6 (4.5%)	13 (12.6%)
Neutral	60 (45.5%)	23 (22.3%)
Somewhat confident	59 (44.7%)	54 (52.4%)
Very confident		12 (11.7%)
How confident do you feel right now in your ability to correctly manage a sight threatening retrobulbar hematoma?		
Very unsure	9 (6.8%)	12 (11.7%)
Somewhat unsure	19 (14.4%)	31 (30.1%)
Neutral	19 (14.4%)	25 (24.3%)
Somewhat confident	55 (41.7%)	27 (26.2%)
Very confident	30 (22.7%)	8 (7.8%)
EMAS anxiety score	2016 Cohort: Mean (SE)	2017 Cohort: Mean (SE)
CW score	18.8 (0.7)	23.6 (1.0)
AE score	16.8 (0.6)	18.8 (0.9)
Overall score	35.6 (1.3)	42.4 (1.8)

Abbreviations: AE, autonomic emotional; CW, cognitive worry; EMAS, Endler Multidimensional Anxiety Scale; SE, standard error.

more experience in their first year. This likely explains why the entire 2016 cohort had higher confidence in recognition of critical diagnoses, as well as lower overall anxiety.

Limitations of this study must be recognized to place the results in context. There are over 100 ophthalmology residency programs in the United States, and less than 50% of PDs and residents responded to the survey. As such, our results only apply to the cohort that responded to the survey. Additionally, because the two cohorts were surveyed at different time periods in their first year, the results may reflect the effect of cumulative experience rather than of buddy call. Finally, our

study did not evaluate the frequency with which residents are taking call or the type of hospital setting call is taken in. These are also possible contributors to anxiety, confidence, and burnout associated with the call experience, and may warrant additional study in future surveys.

Future studies may explore the structure of preparatory courses in more detail to determine if they may aid in promoting confidence in critical diagnoses and, consequently, decreased overall anxiety. It may also be useful to investigate other strategies not touched on in this study that ophthalmology residencies use to improve resident anxiety

Table 3 Buddy call duration and EMAS anxiety scores in the 2017 cohort

	Overall anxiety score		CW score		AE score	
	Mean (SE)	p-Value	Mean (SE)	p-Value	Mean (SE)	p-Value
Duration of buddy call (wk)						
1–2	38.0 (11.9)	0.08	21.0 (7.0)	0.01	17.0 (5.0)	0.41
3–4	37.6 (2.8)		20.2 (1.5)		17.4 (1.5)	
5–8	45.7 (3.0)		25.6 (1.6)		20.1 (1.6)	
9–12	31.6 (3.0)		17.5 (1.7)		14.1 (1.7)	
> 12	48.5 (4.8)		27.9 (2.6)		20.6 (2.3)	

Abbreviations: AE, autonomic emotional; CW, cognitive worry; EMAS, Endler Multidimensional Anxiety Scale; SE, standard error.

Table 4 Ophthalmology preparatory course and EMAS anxiety scores in the 2017 cohort

	Overall anxiety score		CW score		AE score	
	Mean (SE)	p-Value	Mean (SE)	p-Value	Mean (SE)	p-Value
Preparatory course at the beginning of residency?						
Yes	41.5 (2.0)	0.43	23.0 (1.1)	0.32	18.5 (1.0)	0.62
No	44.7 (3.7)		25.1 (2.1)		19.5 (1.9)	

Abbreviations: AE, autonomic emotional; CW, cognitive worry; EMAS, Endler Multidimensional Anxiety Scale; SE, standard error.

Table 5 Ophthalmology preparatory course and EMAS anxiety scores in the 2016 cohort

	Overall anxiety score		CW score		AE score	
	Mean (SE)	p-Value	Mean (SE)	p-Value	Mean (SE)	p-Value
Preparatory course at the beginning of residency?						
Yes	33.8 (1.4)	0.04	17.6 (0.8)	0.02	16.2 (0.7)	0.18
No	40.8 (2.7)		22.2 (1.5)		18.6 (1.4)	
Lectures						
Yes	34.3 (1.4)	0.07	18.0 (0.8)	0.04	16.3 (0.7)	0.19
No	39.6 (2.8)		21.3 (1.6)		18.3 (1.4)	
Skills sessions						
Yes	33.6 (1.6)	0.07	17.5 (0.9)	0.03	16.1 (0.8)	0.22
No	38.3 (2.1)		20.6 (1.2)		17.7 (1.0)	
Simulation						
Yes	34.1 (2.5)	0.66	17.7 (1.2)	0.55	16.4 (1.4)	0.83
No	35.8 (1.4)		19.0 (0.8)		16.8 (0.7)	
Wet laboratory						
Yes	31.4 (1.9)	0.10	16.0 (1.0)	0.048	15.4 (1.1)	0.29
No	36.6 (1.5)		19.5 (0.8)		17.1 (0.8)	
Other						
Yes	40.8 (6.6)	0.37	21.7 (2.9)	0.38	19.2 (3.8)	0.41
No	35.3 (1.3)		18.7 (0.7)		16.7 (0.6)	

Abbreviations: AE, autonomic emotional; CW, cognitive worry; EMAS, Endler Multidimensional Anxiety Scale; SE, standard error.

and confidence on call throughout their 3 years of training, such as daytime emergency room experience and consult rotations. Additionally, the intern year prior to beginning ophthalmology residency is a variable experience, with some programs offering ophthalmology rotations during the first

post-graduate year or even an integrated internship tied to the ophthalmology program. Future investigation in this area would also be valuable, as it is possible that the internship experience may also impact anxiety and confidence associated with ophthalmology call.

Conclusion

Call is a challenging, anxiety-inducing time period at the beginning of ophthalmology residency. The current structure of buddy call is highly variable among ophthalmology residency programs. Preparatory courses are associated with decreased CW scores, and confidence in making critical diagnoses is associated with lower overall anxiety. Length of buddy call is not associated with confidence in making critical diagnoses. Nine to twelve weeks of buddy call are associated with the lowest overall anxiety scores of first-year residents.

Note

This study was presented at the Association of University Professors in Ophthalmology Annual Meeting in January 2017 and at the Association for Research in Vision and Ophthalmology Meeting in May 2017 by Dr. Akosua Nti as a poster presentation but has not been submitted for consideration with another journal.

Conflict of Interest

None.

Acknowledgments

The authors would like to thank Andrew Trout, MD, for sharing the Endler Multidimensional Anxiety Scale instrument materials.

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