AJO International 1 (2024) 100081

Contents lists available at ScienceDirect

AJO International

journal homepage: www.sciencedirect.com/journal/ajo-international

Evolving practice patterns of young retinal specialists: A five-year comparison of treatment and surgical preferences

Vincent Huang [a], Brian L VanderBeek [a], Sidney A Schechet [b], Hemang K Pandya [c], Mitul C Mehta [d], Jonathan C Tsui [a,e,*]

[a] Scheie Eye Institute, Department of Ophthalmology, Perelman School of Medicine at University of Pennsylvania, Philadelphia, PA, USA
[b] Department of Ophthalmology and Visual Science, The University of Chicago, Chicago, IL, USA
[c] Retina Specialists, Dallas, TX, USA
[d] Gavin Herbert Eye Institute, University of California, Irvine, Irvine, CA, USA
[e] Department of Ophthalmology and Visual Science, Rutgers New Jersey Medical School, Rutgers University, Newark, NJ, USA

ARTICLE INFO

Keywords:
Young retina specialists
Practice patterns and trends
Retina

ABSTRACT

Purpose: To describe trends in demographics and practice patterns of young retina specialists over a five-year follow-up period.
Design: A cross-sectional study of young retinal specialists conducted through an online social media platform to evaluate practice patterns for common conditions.
Methods: An anonymous survey was performed among U.S.-based young retinal specialists from a variety of practice environments in early stages of practice between August and September 2022. Results were compared to survey results from 2017.
Results: In 2022, the survey population included 358 members with 101 respondents compared to 44 respondents in 2017. Most respondents preferred bevacizumab as first-line treatment for foveal-involving diabetic macular edema (DME) (60%), vein occlusions (54%), and macular degeneration (56%). Aflibercept was more popular as first-line for DME patients with poor vision (51%) compared to those with good vision (18%). For proliferative diabetic retinopathy (PDR) without macular edema, respondents prefer panretinal photocoagulation alone (43%) or in combination with anti-VEGF (48%) over anti-VEGF alone (10%). Respondents repaired rhegmatogenous retinal detachments using combined vitrectomy-buckle (20%), primary scleral buckle (10%), and pneumatic retinopexy (PR) (10%). The percentage of respondents who have used PR at least once increased significantly from 2017 to 2022. From 2017 to 2022, more respondents use masks (29.5% to 82.8%) and post-injection antibiotics (2.3% to 16.0%) when performing injections while a smaller minority use topical gel anesthesia (34.1% to 15.5%).
Conclusions: Survey results suggest more providers are more likely to observe good visual acuity in diabetic edema and use laser alone in PDR without edema. In addition, longitudinal trends show increased use of PR, masks and post-injection antibiotics, and decreased use of topical gel anesthesia.

Introduction

Ophthalmology has experienced the arrival of new technology, major clinical trial results, and increasing pharmacologic therapies over the past several years. Accelerated by the global SARS-CoV-2 pandemic, the healthcare sector has seen an increase in telehealth utilization to deliver effective patient care.[1-5] Technology has also broadened the ability of physicians to widely collaborate, share opinions, and disseminate knowledge. In 2017, a survey of demographics and practice patterns was performed among young retinal specialists providing insight into the training backgrounds, types of practices joined, and volume of procedures of newly minted retinal specialists from a young retina specialist social media group.[6,7] This update provides insight into changing trends in the demographics, practice patterns, and opinions of young retina professionals over a recent five-year period.

* Corresponding author.
E-mail address: jonathan.tsui@va.gov (J.C. Tsui).

https://doi.org/10.1016/j.ajoint.2024.100081
Received 30 September 2024; Received in revised form 1 November 2024; Accepted 2 November 2024
Available online 6 November 2024

Methods

A cross-sectional study was conducted using a retina-based social media group on the Telegram mobile application to 358 members (at the time) in August-September 2022. This group, the American Retina Forum, was created for young retina specialists in their early years of practice to communicate regarding clinical questions. There is no age cutoff and specialists most commonly join the group in their five years of practice. A survey consisting of 48 questions regarding demographics, practice details, patient volume, clinical preferences, and miscellaneous was sent to all members with open invitation for response. All data was de-identified prior to collection. This was then compared to the results of a similar 2017 survey sent to the same group that included 43 questions, each of which was included in the 2022 survey. Additional question topics in 2022 included faricimab, port delivery, gene therapy, private equity, and advocacy. For impression of private equity, a scale of 1 to 5 was used where 1 was most negative and 5 was most positive. Unpaired *t*-test was used to assess differences between groups. Chi-square analysis was used for univariate associations.

Results

Demographics

Of 358 retina specialist group members, 101 members responded yielding a 28.2% response rate. Respondent demographics compared to results from 2017 are summarized in Table 1. An increasing share of respondents identified as female in 2022 (24.8%, 25/101) compared to 2017 (11.4%, 5/44) ($p = 0.07$). The mean age was 38.7 years, compared to mean age in 2017 (35.3 years) ($p = 0.0004$).

74.3% of respondents were in private practice while 17.3% were based in a private equity (PE)-owned group. The average impression of PE by physicians working in PE-owned groups was 3.4 on a scale of 5, compared to 1.5 for physicians not working in PE-owned groups ($p < 0.0001$). On a scale of 0 (no pain) to 10 (most pain), 67.3% (68/101) experienced some degree of work-related pain with the average severity of 3.9 out of 10.

Clinical volume

Respondents most commonly saw 100–149 patients per week, which was the most frequent response in 2017 as well. The majority (76/101) of respondents worked 30–49 h per week. In terms of procedures, physicians performed a median of 20–39 injections, 5–9 lasers, and 4–6 surgeries per week. Clinical volume is summarized in Table 2.

76.0% of respondents had call responsibilities in 2022 compared to 93.2% in 2017, and on average had 13 weeks of call (range 2–52). Few (16/101) also performed ROP screening and primary cataract surgeries without vitrectomy (24/101).

Clinical preferences

In 2017, 70.5% of respondents did not wear a mask when performing injections compared to only 17.2% in 2022 ($p < 0.00001$) (Table 3). Also, 34.1% of respondents used topical anesthetic gel when performing injections in 2017 compared to only 15.5% in 2022 ($p = 0.01$). Additionally, 2.3% of respondents used post-injection antibiotic drops when performing injections compared to 16.0% in 2022 ($p = 0.02$).

Most respondents prefer intravitreal bevacizumab for patients with visual acuity (VA) not worse than 20/40 and a new diagnosis of diabetic macular edema (DME) (60.4%) or retinal vein occlusions (53.5%) (Table 3) (Fig. 1). However, while few (17.8%) prefer aflibercept for DME in patients with good vision, a majority (50.5%) now prefer it for patients with worse than 20/40 vision compared to 43.2% in 2017. Respondents prefer treat and extend protocols (93/100) over pro re nata and most often inject 3 doses of a given anti-VEGF medication before switching if there is an incomplete initial response.

Observation (58.4%) is the most preferred management of non-center-involving diabetic macular edema, followed by laser treatment. In cases of proliferative diabetic retinopathy without macular edema, most respondents prefer panretinal photocoagulation (PRP) in combination with anti-VEGF injections (47.5%) or PRP alone (42.6%) over anti-VEGF alone (9.9%). While many respondents (60.0%, 60/100) do not plan on quickly integrating more recently approved agents such as ranibizumab biosimilars into their clinical practice, the majority (77.0%, 77/100) have already used or would use faricimab. In the absence of limitations, such as high deductible plans, the majority (69.4%, 68/98) would choose aflibercept as first-line anti-VEGF drug of choice, followed by faricimab (17.3%, 17/98). While the vast majority (99.0%, 98/99) do not foresee ranibizumab implants affecting greater than 20% of their exudative age-related macular degeneration (AMD) patients, the majority (52.5%, 52/98) respondents think gene therapy will be the most common method to treat wet AMD within the next ten years or sooner.

Table 1
Comparison of respondent demographics in 2017 and 2022.

	2017 Respondents ($N = 44$)	2022 Respondents ($N = 101$)
Gender		
Male	39 (88.6%)	75 (74.3%)
Female	5 (11.4%)	25 (24.8%)
Prefer not to say	–	1 (1.0%)
Age (years)		
Mean [SD]	35.3 [2.8]	38.7 [5.9]
Years in Practice		
Mean [SD]	2.9 [1.8]	5.9 [5.9]
Salary ($)		
<200k	2 (4.6%)	8 (7.9%)
200,000–299,999	10 (22.7%)	11 (10.9%)
300,000–399,999	11 (25.0%)	20 (19.8%)
400,000–499,999	8 (18.2%)	19 (18.8%)
500,000–599,999	4 (9.1%)	8 (7.9%)
600,000–699,999	2 (4.5%)	8 (7.9%)
700,000–799,999	1 (2.3%)	5 (4.9%)
800,000+	2 (4.5%)	14 (13.9%)
Prefer not to disclose	4 (9.1%)	7 (6.9%)
Practice Location		
Urban	18 (40.9%)	55 (54.5%)
Suburban	25 (56.8%)	59 (58.4%)
Rural	7 (15.9%)	7 (6.9%)
Operating Room Setting		
Hospital	29 (67.4%)	60 (59.4%)
Ambulatory Surgery	33 (76.7%)	73 (72.3%)
Center		
Number of Offices		
One	6 (14.0%)	24 (23.8%)
Two	14 (32.6%)	23 (22.8%)
Three	12 (27.9%)	28 (27.7%)
Four	6 (14.0%)	11 (10.9%)
Five or more	5 (12.6%)	15 (14.8%)
Practice Type		
Private Practice Only	28 (93.3%)	75 (74.3%)
Private Equity	–	17 (16.8%)
Academic Practice Only	12 (27.3%)	17 (16.8%)
Research Track*	1 (6.7%)	4 (23.5%)
Clinical Track*	14 (93.3%)	13 (76.5%)
Research		
Yes	26 (59.1%)	58 (58.0%)
Clinical Trials	24 (96.0%)	50 (86.2%)
Bench Research	2 (8.0%)	5 (8.6%)
Epidemiology	4 (16.0%)	16 (27.6%)
Translational	2 (8.0%)	12 (20.7%)
Other	1 (4.0%)	9 (15.5%)
No	18 (40.9%)	42 (42.0%)

* Includes hybrid academic practices as well.

Table 2
Comparison of clinical volume between responses from 2017 to 2022.

	2017 Respondents (*N* = 44)	2022 Respondents (*N* = 101)
Practice Size (patients/ week)		
<50	4 (9.1%)	7 (6.9%)
50–99	9 (20.5%)	20 (19.8%)
100–149	17 (38.6%)	35 (34.7%)
150–199	9 (20.5%)	23 (22.8%)
200–249	2 (4.5%)	10 (9.9%)
250+	2 (4.5%)	6 (5.9%)
Scribe		
Yes	21 (47.7%)	59 (58.4%)
No	23 (52.3%)	42 (41.6%)
Patient Care Hours (per week)		
<20	0 (0%)	3 (3.0%)
20–29	1 (2.3%)	6 (5.9%)
30–39	15 (34.1%)	37 (36.6%)
40–49	20 (45.5%)	39 (38.6%)
50–59	7 (15.9%)	9 (8.9%)
60+	1 (2.3%)	7 (6.9%)
Surgeries (per week)		
0–3	23 (52.3%)	41 (40.6%)
4–6	18 (40.9%)	48 (47.5%)
7–9	2 (4.5%)	3 (3.0%)
10–12	1 (2.3%)	6 (5.9%)
13+	0 (0%)	3 (3.0%)
Injections (per week)		
<20	9 (20.5%)	25 (24.8%)
20–39	14 (31.8%)	28 (27.7%)
40–59	12 (27.3%)	19 (18.8%)
60–79	0 (0%)	14 (13.9%)
80–99	4 (9.1%)	7 (6.9%)
100+	4 (9.1%)	8 (7.9%)
Lasers (per week)		
<5	20 (45.5%)	48 (47.5%)
5–9	13 (29.5%)	39 (38.6%)
10–14	10 (22.7%)	11 (10.9%)
15+	0 (0%)	3 (3.0%)

Table 3
Comparison of clinical preferences between responses from 2017 to 2022.

	2017 Respondents (*N* = 44)	2022 Respondents (*N* = 101)
DME with good VA		
Bevacizumab	32 (72.7%)	61 (60.4%)
Aflibercept	8 (18.2%)	18 (17.8%)
Ranibizumab	0	4 (4.0%)
Steroids	0	2 (12.0%)
Laser	0	1 (1.0%)
Observation	3 (6.8%)	15 (14.9%)
DME with poor VA		
Bevacizumab	24 (54.5%)	48 (47.5%)
Aflibercept	19 (43.2%)	51 (50.5%)
Ranibizumab	0	2 (2.0%)
Steroids	0	0
Laser	1 (2.3%)	0
Observation	0	0
Non-CI-DME with any VA		
Bevacizumab	5 (11.4%)	13 (12.9%)
Aflibercept	1 (2.3%)	3 (3.0%)
Ranibizumab	0	0
Steroids	0	1 (1.0%)
Laser	15 (34.1%)	25 (24.8%)
Observation	23 (52.3%)	59 (58.4%)
PDR without ME or VH		
Anti-VEGF	3 (6.8%)	10 (9.9%)
PRP	14 (31.8%)	43 (42.6%)
Combination	27 (61.4%)	48 (47.5%)
RVO with good VA		
Bevacizumab	31 (70.5%)	53 (53.5%)
Aflibercept	5 (11.4%)	26 (26.3%)
Ranibizumab	3 (6.8%)	5 (5.1%)
Steroids	0	1 (1.0%)
Laser	0	1 (1.0%)
Observation	5 (11.4%)	13 (13.1%)
RVO with poor VA		
Bevacizumab	29 (65.9%)	54 (54.0%)
Aflibercept	11 (25.0%)	37 (37.0%)
Ranibizumab	3 (6.8%)	4 (5.0%)
Steroids	0	3 (3.0%)
Laser	0	1 (1.0%)
Observation	1 (2.3%)	0
nAMD with active subfoveal CNV		
Bevacizumab	29 (65.9%)	57 (56.4%)
Aflibercept	12 (27.3%)	31 (30.7%)
Ranibizumab	3 (6.8%)	7 (6.9%)
Faricimab	–	6 (5.9%)
Treatment Protocol		
Treat and Extend	40 (93.0%)	93 (93.0%)
PRN	3 (7.0%)	7 (7.0%)
Provider Mask Use		
Yes	13 (29.5%)	82 (82.8%)
Post-Procedure Antibiotic		
Yes	1 (2.3%)	16 (16.0%)
Injection Anesthesia		
Topical drops	10 (22.7%)	38 (39.2%)
Topical gel	15 (34.1%)	15 (15.5%)
Subconjunctival	19 (43.2%)	44 (45.4%)
Vitrectomy Gauge		
23 g	13 (34.2%)	23 (14.0%)
25 g	24 (63.2%)	79 (84.9%)
27 g	1 (2.6%)	1 (1.1%)

DME=Diabetic Macular Edema, CI=Center-involving, Good VA=20/40 or better, Poor VA=worse than 20/40, nAMD=neovascular or "wet" AMD, CNV=choroidal neovascularization.

Surgical preferences

Pars plana vitrectomy (PPV) alone was the most common method to repair rhegmatogenous retinal detachment (RRD) overall. This was followed by pneumatic retinopexy (PR) and scleral buckle (SB), and less frequently by combined SB/PPV. Interestingly, the percentage of respondents who never use pneumatic retinopexy decreased from 41.5% in 2017 to 23.5% in 2022. In addition, the majority (85.7%, 84/98) prefer PPV for pseudophakic patients with RRD and SB (86.7%, 85/98) for young patients with RRD. PR alone was the preferred treatment (55.2%, 53/96) for superior macula-on RRD in a phakic patient, followed by SB then PPV. SB alone (47.9%, 46/96) was the preferred treatment for a 4 o'clock partial macula-off RRD approaching the fovea in a phakic patient, followed by PPV and then PR. Each respondent was given the choice of RRD repair in their own eye at their current age, and most elected PR (60.0%, 57/95) followed by SB (25.3%, 24/95).

When placing secondary intraocular lenses, the majority (71.9%, 69/96) prefer scleral fixation over anterior chamber or iris-sutured, with equal preference for scleral sutured and non-sutured scleral tunneled lens. Few respondents (8.4%, 8/95) utilize intraoperative optical coherence tomography visualization.

The most frequent choice of stain was triamcinolone for epiretinal membranes (17.0%, 16/44) and indocyanine green for internal limiting membrane (81.25%, 26/32). The vast majority of respondents utilize the same forceps for both ERM and ILM peels, with the most popular forceps being Alcon Finesse® Sharkskin ILM forceps followed by Alcon Grieshaber ILM forceps. Almost all respondents (98.0%, 94/96) would perform an ILM peel during a macular hole repair, but a smaller majority (79.2%, 76/96) would do so during an ERM peel. The large majority use the Alcon constellation vitrectomy machine (89.6%, 86/96), 25-gauge (84.9%, 79/93) and a non-contact viewing system (95.7%, 90/94).

Discussion

Demographics

Although the percentage of women in ophthalmology, and

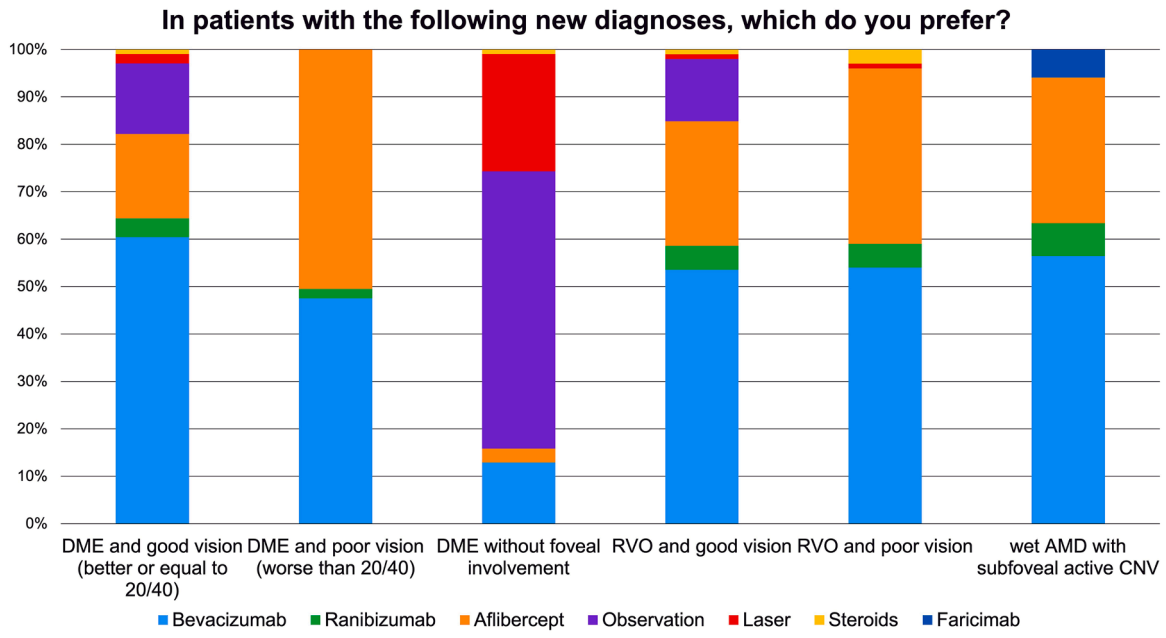

Fig. 1. Practice Preferences for Treatment of Common Retinal Conditions.

specifically retina, has historically been lower than the percentage of women in other fields of medicine, it has steadily increased over the past decades.[8] United States data from 2019 revealed 27% of ophthalmologists identified as female.[8] We observed a similar trend as 11.4% identified as female in 2017 which increased to 24.8% in 2022.

This survey also found increases in mean age by 3.4 years and mean years in practice by 3 years between 2017 and 2022. This trend likely reflects a combination of aging of repeat respondents over five years and new, younger respondents. Furthermore, 8/101 respondents were older than 45 in the 2022 compared to 0/44 in 2017. After excluding these potential outliers, the average age was 37.5 with an average of 4.6 years of practice, both higher than in 2017. This may reflect a disproportionate increase in membership in the group among practicing retinal specialists who tend to be older after finishing fellowship, compared to the addition of a limited number of graduating fellows each year. This highlights another widely recognized trend in medicine of the aging physician workforce.[9] Nevertheless, due to deidentification of data, it is not possible to directly assess possible cohort bias from re-sampling the same population in both surveys.

Private equity organizations continue to spotlight the benefit of centralizing operations and financial expertise while allowing ophthalmologists to deliver quality care.[10] Zhu et al. report that PE acquisitions across all specialties increased from 2013 to 2016 with a more recent focus on ophthalmology from 2017 and onwards.[11] Although we did not collect responses related to private equity in 2017, by 2022 nearly 1 in 5 respondents working in private practice considered themselves within a PE group. The difference in perception of PE between those employed and those not employed by PE indicates that PE is a polarizing topic among retinal specialists. While some respondents working under a PE model indicated they would not do so if given the choice again, the average impression of PE-employed retinal specialists was slightly more positive than neutral. In addition, although the growth of PE has been notable, most physicians responded that they were not involved in PE.

Clinical volume and preferences post- COVID-19

The COVID-19 pandemic impacted both patients and physicians by decreasing access to care and limiting in-person encounters. Nonetheless, the average response in our surveys reflected a full return to pre-pandemic clinical and surgical volume. Respondents were most commonly seeing 100–149 patients, working 40–49 h, performing 20–39 injections, and conducting <5 lasers per week in both surveys. Respondents did more commonly perform 4–6 surgeries per week (52.2%, 48/92) in 2022 compared to 0–3 surgeries per week (52.3%, 23/44) in 2017, whic may be due to more established practices by respondents with more years of practice or increased elective surgery after pandemic-related restrictions were lifted. We did observe some changes around injection protocols, including an overwhelming increased mask usage directly related to national protocols for safety during the pandemic. As mask usage has been found to have no difference in rates of endophthalmitis, it is likely that practice patterns will continue to reflect the contemporary state of national policies in the future.[12]

Clinical preferences

Our survey found a decrease in the use of topical anesthetic gel between 2017 and 2022 which may be due to supply shortage or related to findings by Stem et al. in 2019 suggesting a correlation with endophthalmitis.[13] Furthermore, a higher percentage of respondents noted use of post-injection antibiotics despite studies published both pre-pandemic and during the pandemic, that there was no difference in endophthalmitis with prophylactic topical antibiotics.[13,14] This may be due to risk adversity and an abundance of caution during the pandemic secondary to limited resources in the event of endophthalmitis. This mirrors the finding by Finn et al. that retinal surgeons with <5 years of practice were more likely to perform subconjunctival antibiotic injections in retinal detachment repair compared to more experienced surgeons.[15]

There are many factors considered in the selection of anti-VEGF medications for various retinal indications. Since 2017, bevacizumab still remains the most popular anti-VEGF agent for treatment of diabetic macular edema with good vision, and retinal vein occlusions and wet AMD regardless of vision. However, practice patterns have shifted to aflibercept from bevacizumab as the preferred treatment for diabetic macular edema with poor vision. This parallels DRCR Protocol T which found aflibercept had superior visual acuity outcomes compared to bevacizumab these patients.[16] Although Protocol T results were initially published prior to the 2017 survey, these findings suggest practice alignment with clinical trial evidence lags with a longitudinal trend toward alignment, but not fully actualized due to clinician preferences,

insurance constraints, and more. Among retina specialists who worked for PE-owned groups, there was a higher tendency to observe DME with good vision (41% vs 15%, $p = 0.01$), but there was no difference in selection of anti-VEGF agent.

In addition, the proportion of respondents who prefer bevacizumab for retinal vein occlusions has significantly decreased from 68% to 53% ($p = 0.02$) while the proportion of respondents who prefer aflibercept has significantly increased from 18% to 32% ($p = 0.02$). Interestingly, the SCORE2 trial demonstrated bevacizumab was non-inferior to aflibercept in improving visual acuity in patients with central retinal vein occlusion, but bevacizumab had significantly lower odds of macular edema resolution.[17] Nonetheless, although there has not yet been a retinal vein occlusion study demonstrating aflibercept superiority, another study did demonstrate aflibercept non-inferiority to ranibizumab.[18]

Similarly, the proportion of respondents who prefer bevacizumab for wet AMD has decreased from 66% to 56% ($p = 0.15$) while the proportion of respondents who prefer aflibercept and faricimab has increased from 27% to 31% and 0% to 6%, respectively. Since the CATT trial, many studies have demonstrated non-inferior efficacy and safety profiles between bevacizumab and ranibizumab, ranibizumab and aflibercept, and most recently, aflibercept and faricimab for wet AMD.[19-22] A trade-off analysis revealed a relatively small superiority of aflibercept 2 mg and ranibizumab 0.5 mg in efficacy and side effects against other anti-VEGF formulations, including bevacizumab 1.25 mg, but acknowledged the difference would not likely translate to cost-effectiveness.[23]

Medical treatment for retinal diseases has rapidly advanced with the development bispecific monoclonal antibody faricimab, and retinal specialists are eager to incorporate such research innovations into their practice evidenced by 87% of respondents who would choose aflibercept or faricimab as first-line anti-VEGF agent in the absence of cost limitations and a majority who believe gene therapy will be a mainstay of wet AMD treatment within the next 10 years. While bevacizumab has historically been preferred for its non-inferiority and cost, current studies demonstrating the efficacy of aflibercept in patients with bevacizumab or ranibizumab-resistant disease[24-28] and future head-to-head studies with faricimab may contribute to a shift in practice patterns.

Limitations

Compared to a similar survey conducted in 2017 with low response rate, this study received over twice as many responses. Although the survey was distributed to the same social media group, membership in the group also approximately doubled over the same period. Due to the anonymity of the survey, it is not possible to perform paired statistical tests, but it is likely that many respondents in 2017 also contributed to the 2022 results, which may also contribute to selection bias. Unfortunately, some demographic information was not collected to preserve anonymity, such as current geographic location and area of training, although this would be useful data for future studies to identify regional preferences.

Ophthalmology is a rapidly changing field with shifting treatment paradigms fueled both by research developments as well as policy changes. The strengths of this study include a large sample of anonymous respondents representing a national organization. However, those that may be more likely to respond may share other characteristics that may skew survey results, such as bias towards digitally-engaged respondents. While the chat is open for all members to read, those that read the chat regularly may be more aware of the survey and respond. In addition, other factors affecting preferences were not analyzed specifically such as constraints placed by PE organizations; the type of practice throughout the study period was not noted either. Not all respondents answered every question. Lastly, medical and surgical retinal specialists were not separated in the analysis although 53.2% identified as medical retina specialists.

Conclusion

As the medical field responded to the COVID-19 pandemic, this survey suggests that ophthalmologists continued to deliver care in a similar fashion. Nonetheless, certain practice patterns showed variation, such as use of pneumatic retinopexy, which may be reflective of fellowship training trends or a response to pandemic restrictions. Furthermore, with approvals of suprachoroidal and port delivery mechanisms to deliver treatment as well as biosimilar and anti-complement therapies, the clinician's armamentarium continues to grow. Future studies should continue to evaluate longitudinal differences between young retina specialists compared to the retina community as a whole, in addition to the global retina community.

Ethical approval

This research was conducted in accordance with the Declaration of Helsinki. There was no collection nor evaluation of any protected patient health information.

Statement of informed consent

Informed consent was not obtained for this anonymous survey.

Precis

This analysis of longitudinal practice pattern changes among young retinal specialists is performed using survey data collected in 2022 compared to a similar survey conducted in 2017. The study highlights trends in practice volume, treatment preferences, surgical techniques, and evolving clinical approaches among early-career retina specialists. The study also provides insightful data into the role of new treatments, latest publications, and clinical preferences are shaping the practices and patterns of young retina specialists in the United States.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgements

The authors would like to thank all participants of the survey for their time and consideration.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Sommer AC, Blumenthal EZ. Telemedicine in ophthalmology in view of the emerging COVID-19 outbreak. *Graefes Arch Clin Exp Ophthalmol.* 2020;258(11): 2341–2352. https://doi.org/10.1007/s00417-020-04879-2.
2. Hincapie MA, Gallego JC, Gempeler A, Pineros JA, Nasner D, Escobar MF. Implementation and usefulness of telemedicine during the COVID-19 pandemic: A scoping review. *J Prim Care Community Health.* 2020;11, 2150132720980612. https://doi.org/10.1177/2150132720980612.
3. Colbert GB, Venegas-Vera AV, Lerma EV. Utility of telemedicine in the COVID-19 era. *Rev Cardiovasc Med.* 2020;21(4):583–587. https://doi.org/10.31083/j.rcm.2020.04.188.
4. Moorhead SA, Hazlett DE, Harrison L, Carroll JK, Irwin A, Hoving C. A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication. *J Med Internet Res.* 2013;15(4):e85. https://doi.org/10.2196/jmir.1933.
5. Grajales 3rd FJ, Sheps S, Ho K, Novak-Lauscher H, Eysenbach G. Social media: a review and tutorial of applications in medicine and health care. *J Med Internet Res.* 2014;16(2):e13. https://doi.org/10.2196/jmir.2912.

6. Schechet SA, Pandya HK, Mehta MC. Social media collaboration of retinal physicians: A 'Young Retina Forum' survey. *Eur J Ophthalmol*. 2020;30(4):770–773. https://doi.org/10.1177/1120672119832186.
7. Wang AL, Tsui J, Pandya HK, Mehta MC. Preferred practice patterns among young retina specialists. *Investigative Ophthalmology & Visual Science;*. 2018:873.
8. Gill HK, Niederer RL, Shriver EM, Gordon LK, Coleman AL, HV Danesh-Meyer. An eye on gender equality: A review of the evolving role and representation of women in ophthalmology. *Am J Ophthalmol*. 2022;236:232–240. https://doi.org/10.1016/j.ajo.2021.07.006.
9. Dellinger EP, Pellegrini CA, Gallagher TH. The aging physician and the medical profession: a review. *JAMA Surg*. 2017;152(10):967–971. https://doi.org/10.1001/jamasurg.2017.2342.
10. Ruby AJ, Williams GA. Private equity in ophthalmology: differences between present versus past. *Curr Opin Ophthalmol*. 2022;33(5):342–346. https://doi.org/10.1097/ICU.0000000000000875.
11. Zhu JM, Hua LM, Polsky D. Private Equity Acquisitions of physician medical groups across specialties, 2013-2016. *JAMA*. 2020;323(7):663–665. https://doi.org/10.1001/jama.2019.21844.
12. Fortes BH, Astafurov KV, Hodge DO, et al. Effect of physician face mask use on postinjection endophthalmitis. *Retina*. 2022;42(11):2120–2127. https://doi.org/10.1097/IAE.0000000000003592.
13. Stem MS, Rao P, Lee IJ, et al. Predictors of Endophthalmitis after Intravitreal Injection: A multivariable analysis based on injection protocol and povidone iodine strength. *Ophthalmol Retina*. 2019;3(1):3–7. https://doi.org/10.1016/j.oret.2018.09.013.
14. Morioka M, Takamura Y, Nagai K, et al. Incidence of endophthalmitis after intravitreal injection of an anti-VEGF agent with or without topical antibiotics. *Sci Rep*. 2020;10(1):22122. https://doi.org/10.1038/s41598-020-79377-w.
15. Finn AP, Talcott KE, Han J, Ali FS, Rao P. Variation in perioperative care practices among vitreoretinal surgeons in the United States. *Ophthalmic Surg Lasers Imaging Retina*. 2022;53(12):681–690. https://doi.org/10.3928/23258160-20221117-01.
16. Wells JA, Glassman AR, Ayala AR, et al. Aflibercept, Bevacizumab, or Ranibizumab for Diabetic Macular Edema: two-year results from a comparative effectiveness randomized clinical trial. *Ophthalmology*. 2016;123(6):1351–1359. https://doi.org/10.1016/j.ophtha.2016.02.022.
17. Scott IU, VanVeldhuisen PC, Ip MS, et al. Effect of Bevacizumab vs Aflibercept on visual acuity among patients with macular edema due to central retinal vein occlusion: the score2 randomized clinical trial. *JAMA*. 2017;317(20):2072–2087. https://doi.org/10.1001/jama.2017.4568.
18. Hykin P, Prevost AT, Sivaprasad S, et al. Intravitreal ranibizumab versus aflibercept versus bevacizumab for macular oedema due to central retinal vein occlusion: the LEAVO non-inferiority three-arm RCT. *Health Technol Assess*. 2021;25(38):1–196. https://doi.org/10.3310/hta25380.
19. Comparison of Age-related Macular Degeneration Treatments Trials, Research G, Martin DF, Maguire MG, et al. Ranibizumab and bevacizumab for treatment of neovascular age-related macular degeneration: two-year results. *Ophthalmology*. 2012;119(7):1388–1398. https://doi.org/10.1016/j.ophtha.2012.03.053.
20. Schmidt-Erfurth U, Kaiser PK, Korobelnik JF, et al. Intravitreal aflibercept injection for neovascular age-related macular degeneration: ninety-six-week results of the VIEW studies. *Ophthalmology*. 2014;121(1):193–201. https://doi.org/10.1016/j.ophtha.2013.08.011.
21. Chakravarthy U, Harding SP, Rogers CA, et al. Alternative treatments to inhibit VEGF in age-related choroidal neovascularisation: 2-year findings of the IVAN randomised controlled trial. *Lancet*. 2013;382(9900):1258–1267. https://doi.org/10.1016/S0140-6736(13)61501-9.
22. Heier JS, Khanani AM, Quezada Ruiz C, et al. Efficacy, durability, and safety of intravitreal faricimab up to every 16 weeks for neovascular age-related macular degeneration (TENAYA and LUCERNE): two randomised, double-masked, phase 3, non-inferiority trials. *Lancet*. 2022;399(10326):729–740. https://doi.org/10.1016/S0140-6736(22)00010-1.
23. Schmid MK, Bachmann LM, Fas L, Kessels AG, Job OM, Thiel MA. Efficacy and adverse events of aflibercept, ranibizumab and bevacizumab in age-related macular degeneration: a trade-off analysis. *Br J Ophthalmol*. 2015;99(2):141–146. https://doi.org/10.1136/bjophthalmol-2014-305149.
24. Papakostas TD, Lim L, van Zyl T, et al. Intravitreal aflibercept for macular oedema secondary to central retinal vein occlusion in patients with prior treatment with bevacizumab or ranibizumab. *Eye (Lond)*. 2016;30(1):79–84. https://doi.org/10.1038/eye.2015.175.
25. Cohen MN, Houston SK, Juhn A, et al. Effect of aflibercept on refractory macular edema associated with central retinal vein occlusion. *Can J Ophthalmol*. 2016;51(5):342–347. https://doi.org/10.1016/j.jcjo.2016.02.001.
26. Chang AA, Broadhead GK, Hong T, et al. Intravitreal Aflibercept for treatment-resistant neovascular age-related macular degeneration: 12-month safety and efficacy outcomes. *Ophthalmic Res*. 2015;55(2):84–90. https://doi.org/10.1159/000440886.
27. Bakall B, Folk JC, Boldt HC, et al. Aflibercept therapy for exudative age-related macular degeneration resistant to bevacizumab and ranibizumab. *Am J Ophthalmol*. 2013;156(1):15–22. https://doi.org/10.1016/j.ajo.2013.02.017. e1.
28. Hamid MA, Abdelfattah NS, Salamzadeh J, et al. Aflibercept therapy for exudative age-related macular degeneration resistant to bevacizumab and ranibizumab. *Int J Retina Vitreous*. 2021;7(1):26. https://doi.org/10.1186/s40942-021-00299-4.