



Current Landscape of Uveitis Specialists in the United States

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Abstract

Purpose This study characterizes the current landscape of uveitis specialists and their practice settings in the United States.

Methods An anonymous Internet-based survey with questions pertaining to training history and practice characteristics was distributed via REDCap to the American Uveitis Society and Young Uveitis Specialists listservs.

Results Forty-eight uveitis specialists in the United States responded to the survey out of 174 uveitis specialists that identify as practicing in the United States. Twenty-five of 48 respondents (52%) completed an additional fellowship. These additional fellowships ranged from surgical retina (12/25, 48%), cornea (8/25, 32%), and medical retina (4/25, 16%). Two-thirds of uveitis specialists managed their own immunosuppression, while one-third comanaged immunosuppression with rheumatologists. Thirty-three of 48 (69%) maintained a surgical practice.

Conclusion This is the first survey of uveitis specialists across the United States to provide understanding into training and practice characteristics. These data will provide insight into career planning, practice building, and assist in resource allocation.

Keywords

- ▶ uveitis
- ▶ fellowship
- ▶ immunosuppression
- ▶ retina

Uveitis is an important cause of vision loss and ocular comorbidities and accounts for approximately 10% of blindness in the United States.^{1,2} Despite this, there are a limited number of

uveitis specialists in the United States, with less than 180 members of the American Uveitis Society (AUS) indicating the United States as their practice location.³ Over the past

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decade, there has been increasing interest in fellowship training in uveitis⁴ with 11 to 15 uveitis training programs available each year in the United States.⁵ One study found that the number of available uveitis fellowship positions increased 21.4% from 14 to 17 between 2012 and 2017.⁶ As of 2021, there were 20 uveitis fellowship positions offered.⁵ Another study showed that the number of matched applicants in uveitis fellowships increased by 19% between 2010 and 2017 as the number of fellowships increased by 0.3 programs/year.⁴

As the number of uveitis fellowship positions and fellows increases, data concerning the practice of uveitis may be useful to applicants. However, no prior studies have evaluated the practice settings of uveitis specialists in the United States. To address this gap in knowledge, we performed a Web-based survey of uveitis specialists in the United States. Uveitis specialists diagnose and treat a spectrum of ocular inflammatory diseases which often require systemic immunosuppression to control the disease.⁷ Ocular inflammatory diseases may be managed by the uveitis specialist alone or comanaged with a rheumatologist with a combination of local and systemic medications.⁷ As a clinical subspecialty recognized by the American Board of Ophthalmology, and a field that offers fellowships reviewed for compliance by the Association of University Professors of Ophthalmology (AUPO) Fellowship Compliance Committee (FCC), it is important to understand the landscape of uveitis specialists so that career and practice development guidance can be provided and institutional resources can be appropriately allocated. To the best of our knowledge, this is the first study to report the landscape of uveitis specialists and their practice settings across the United States.

Methods

An anonymous Internet survey (**Supplementary Material S1**, available online only) was administered via REDCap during March 2021 to the AUS and the Young Uveitis Specialists (YUS) listservs. The survey was created in consultation with board-certified, uveitis fellowship-trained uveitis specialists in both academic and private practice settings. Survey questions pertained to the fellowship training and current and historical practice characteristics, such as location of practice (based on United States geographic census regions, Northeast: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania; South: Maryland, Delaware, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Kentucky, Mississippi, Louisiana, Texas, Arkansas, Oklahoma; Midwest: Michigan, Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas; West: Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Arizona, Nevada, Hawaii, Alaska, California, Oregon, Washington), clinical focus, days spent seeing uveitis patients, management of immunosuppression, and barriers to clinical practice. Free-text responses were also permitted when responding to questions about barriers to uveitis practice. Data from uveitis specialists that were in practice 10 or fewer years after fellowship training and those more than 10 years

after fellowship training were compared. Analysis was performed using R with descriptive statistics, Fisher's exact test, chi-squared test, and Welch's *t*-test to compare categories and statistical significance was set at $p < 0.05$. The study was approved by the University of California, Los Angeles Institutional Review Board.

Results

Forty-eight uveitis specialists in the United States responded to the survey, out of 174 self-identified uveitis specialists that practice in the United States in the AUS directory³ (at the time of the survey). There is overlap with the YUS listserv where the majority are AUS members and participants were permitted to submit a single survey response. **Table 1** demonstrates the demographics of uveitis specialists, of which 25/48 (52%) were male. Thirty-one out of 48 (65%) of respondents were in practice 10 or fewer years from fellowship training and 17/48 (35%) were in practice more than 10 years after fellowship training. Of the respondents, 6/48 (13%) were located in the Northeast, 17/48 (35%) located in the South, 9/48 (19%) located in the Midwest, and 16/48 (33%) in the West. The majority (42/48, 88%) of uveitis specialists completed a 1-year dedicated uveitis fellowship. With regard to additional training, 52% (25/48) respondents completed an additional fellowship. These additional fellowships ranged from surgical retina (12/25, 48%), cornea (8/25, 32%), and medical retina (4/25, 16%). The majority (16/25, 64%) of these specialists completed their additional fellowship training before their uveitis fellowship.

Current practice characteristics are displayed in **Table 2**. Uveitis specialists also concurrently practiced other aspects of ophthalmology, including comprehensive ophthalmology (11/48, 23%), surgical retina (12/48, 25%), medical retina (11/48, 23%), cornea (5/48, 10%), and 9/48 (19%) that solely practice uveitis. The majority of uveitis specialists evaluated an even split of both posterior and anterior uveitis (67%), compared to those who primarily managed anterior uveitis (6%) and posterior segment uveitis (27%).

With regard to management of immunomodulatory therapy (IMT), 32/48 (67%) responded that they managed their own medications, with the most commonly managed medications being antimetabolites (100%), calcineurin inhibitors (72%), adalimumab (91%), and infusions including infliximab, rituximab (47%), and alkylating agents (22%). The majority (35/48, 73%) of uveitis specialists did not have dedicated support staff (such as registered nurses, medical assistants, physician assistants, or nurse practitioners).

Comparisons regarding training backgrounds and practice characteristics between uveitis specialists that were in practice 10 years or less after fellowship and those that were in practice greater than 10 years after fellowship are also displayed in **Tables 1** and **2**. There were no differences in the number of uveitis specialists that pursued additional fellowship training between the two groups, but there were significantly more that pursued additional cornea training in the group that was greater than 10 years out from training (6/12, 50% vs. 2/23, 15%, **Table 1**). Conversely, in the group

Table 1 Training backgrounds of uveitis specialists in the United States

	Years after fellowship		p-Value
	0–10 years	10+ years	
Gender, (N) %			0.017 ^a
Male	(12) 39	(13) 76	
Female	(19) 61	(4) 24	
Completed dedicated 1-year uveitis fellowship, (N) %			0.65 ^a
Yes	(28) 90	(14) 82	
No	(3) 10	(3) 18	
AUPO FCC compliant fellowship, (N) %			< 0.001 ^a
Yes	(27) 96	(5) 36	
No	(1) 4	(9) 64	
If No: Completed a combined uveitis fellowship, (N) %			0.99 ^a
Yes	(2) 67	(3) 100	
No	(1) 33	(0) 0	
Another fellowship in addition to uveitis, (N) %			0.08 ^a
Yes	(13) 42	(12) 71	
No	(18) 58	(5) 29	
If Yes, completed before or after uveitis fellowship, (N) %			0.69 ^a
Before	(9) 69	(7) 58	
After	(4) 31	(5) 42	
Type of additional fellowship, (N) %			0.041 ^a
Surgical retina	(7) 54	(5) 42	
Medical retina	(4) 31	(0) 0	
Cornea	(2) 15	(6) 50	
Pathology/Oncology	(0) 0	(1) 8	
Practice in another specialty, (N) %			0.06 ^a
Comprehensive	(8) 26	(3) 18	
Surgical retina	(8) 26	(4) 23	
Medical retina	(10) 32	(1) 6	
Cornea	(2) 6	(3) 18	
No other specialties	(3) 10	(6) 35	

Abbreviation: AUPO, Association of University Professors of Ophthalmology; FCC, Fellowship Compliance Committee.

^ap-Value for Fisher's exact test.

less than 10 years out from training, there were more that pursued medical retina training (4/12, 31% vs. 0%, ► **Table 1**).

When evaluating the types of IMT that were solely managed by the uveitis specialist between the two groups, there were no differences between the two groups with respect to management of antimetabolites, calcineurin inhibitors, adalimumab, and infusions. Uveitis specialists who were in practice greater than 10 years after fellowship were significantly more likely to be managing their own alkylating agents (1/6, 67% vs. 1/23, 4%, $p = 0.010$, ► **Table 2**).

When queried about barriers that uveitis specialists have encountered in their practice (► **Table 3**), lack of/limited support staff was the most often cited barrier (29/48, 60.4%), followed by reimbursement for time/effort involved (27/48, 56.3%) and logistics of self-managing IMT (19/48, 39.6%). No

differences in types of barriers encountered in practice were seen between the two groups (► **Table 3**). Free-text comments regarding barriers centered around themes which included barriers due to insurance authorizations/denial of medication as well as the amount of time required both inside/outside of clinic for coordination of care with uveitis patients.

Discussion

This is the first study to report on the training backgrounds and practice characteristics of uveitis specialists in the United States. These data provide insight which may help residents considering uveitis fellowship training, uveitis specialists with practice management, and fellowship directors with mentorship. Furthermore, an understanding of the

Table 2 Practice characteristics of uveitis specialists in the United States

	Years after fellowship		p-Value
	0–10 years	10+ years	
Number of days/week treating patients with uveitis, mean ± SD	2.1 ± 1.2	2.2 ± 1.4	0.85 ^c
Type of uveitis managed, (N) %			0.49 ^a
Primarily anterior uveitis	(1) 3	(2) 12	
Primarily posterior segment uveitis	(8) 26	(5) 29	
An even split of both	(22) 71	(10) 59	
Number of additional uveitis specialists in the practice, (N) %			0.80 ^a
0	(10) 32	(5) 29	
1	(9) 29	(6) 35	
2	(7) 23	(2) 12	
3+	(5) 16	(4) 24	
Currently maintain a surgical practice, (N) %			0.99 ^a
Yes	(21) 68	(12) 71	
No	(10) 32	(5) 29	
Type of practice, (N) %			0.87 ^a
University/academic	(15) 49	(10) 59	
Private practice	(6) 19	(5) 29	
Both private and academic	(6) 19	(2) 12	
Large multispecialty group	(2) 7	(0) 0	
Government	(1) 3	(0) 0	
Other	(1) 3	(0) 0	
Dedicated support staff, (N) %			0.75 ^a
Yes	(9) 29	(4) 24	
No	(22) 71	(13) 76	
Manage your own immunosuppression, (N) %			0.20 ^a
Yes	(23) 74	(9) 53	
No	(8) 26	(8) 47	
If yes, which type?, (N) %			
Antimetabolites	(23) 100	(9) 100	0.24 ^b
Calcineurin Inhibitors	(14) 61	(9) 100	0.83 ^b
Adalimumab	(20) 87	(9) 100	0.63 ^b
Infusions (infliximab, rituximab, etc.)	(10) 43	(5) 56	0.99 ^b
Alkylating agents	(1) 4	(6) 67	0.01 ^b

Abbreviation: SD, standard deviation.

^ap-Value for Fisher's exact test.

^bp-Value for Pearson's chi-squared test.

^cp-Value for Welch's t-test.

barriers that uveitis specialists encounter can help ophthalmology practices increase efficiency in delivering care and assist in understanding the multidisciplinary nature of uveitis practices. This information can enhance the recruitment and retention of uveitis specialists.

In 2007, there were only 97 members of the AUS that self-identified as uveitis specialists in the United States.⁸ At time of the writing of this article, the AUS had 174 members that self-identified as practicing in the United States, represent-

ing a sizable increase.³ As an ophthalmic subspecialty whose numbers of practicing specialists in the United States have almost doubled over the past 15 years, attention must be paid to supporting the career development of uveitis specialists and retaining uveitis specialists. Uveitis is one of the ophthalmic subspecialty fellowships that have fewer training opportunities offered annually, with approximately 12 fellowship positions filled each year.⁵ Given the relatively low numbers of graduating uveitis specialists compared to other

Table 3 Barriers encountered in uveitis practice

	Years after fellowship		p-Value
	0–10 years	10+ years	
Barriers encountered in uveitis practice, (N) %			
Lack of/limited support staff	(20) 65	(9) 53	0.63 ^a
Availability of adequate quality/type of multimodal imaging	(7) 23	(4) 24	0.99 ^a
Ability to obtain laboratory testing or systemic imaging in a timely manner	(6) 19	(3) 18	0.99 ^a
Co-management with other services (rheumatology, infectious diseases)	(12) 39	(5) 29	0.74 ^a
Reimbursement for time/effort involved	(17) 55	(10) 59	0.99 ^a
Availability of special therapeutics (i.e., intravitreal antivirals, antibiotics, anti-inflammatory medications)	(8) 26	(1) 6	0.19 ^a
Logistics of self-managing immune suppression	(14) 45	(5) 29	0.45 ^a
Other	(4) 13	(5) 29	0.31 ^a

^ap-Value for Pearson's chi-squared test.

ophthalmic subspecialties, additional guidance is critical in helping develop careers.

Uveitis specialists often work closely with rheumatologists given the high proportion of patients with ocular inflammatory diseases that have associated systemic autoimmune diseases.⁹ Therefore, IMT may be prescribed by the uveitis specialist or comanaged with a rheumatologist.¹⁰ Our study found that the majority of uveitis specialists prescribe and manage their own IMT. Interestingly, uveitis specialists that were greater than 10 years from fellowship were more likely to manage their own alkylating agents. The reasons behind this may be multifaceted, first, because of the significant side effects and concerns of risk of malignancy with alkylating agents¹¹ and second, because of the increasing use of Food and Drug Administration-approved biologics for uveitis, such as adalimumab, resulting in decreased use of alkylating agents in recent years.¹⁰

In our survey, additional fellowships were frequently pursued by uveitis specialists, most commonly surgical retina, medical retina, and cornea. Of those who had additional fellowship training, the majority pursued additional fellowships before their uveitis training. More uveitis specialists that were less than 10 years from training had pursued additional medical retina training, which may be due to medical retina fellowships being newer to the AUPO FCC compliance process. The greater number of uveitis specialists within the past 10 years completing AUPO FCC compliant fellowship reflects the fact that uveitis fellowships are increasingly seeking compliance with the AUPO FCC. Over half of uveitis specialists practiced in a university/academic setting likely due to the collaborative nature of uveitis practice, which often requires consultation with rheumatology, infectious disease, and other specialties; and frequently requires access to advanced laboratory testing, diagnostics,¹² and treatments.¹⁰ The majority of total respondents maintained a surgical practice—either retina or comprehensive/anterior segment surgeons.

Uveitis specialists play an important role in many practice settings with regard to improving patient outcomes and referrals. In academic or tertiary referral settings, there is

a higher proportion of patients referred for management of posterior uveitis, panuveitis, or chronic uveitis, due to the nature of these diseases having a higher likelihood of permanent vision loss and requiring IMT.^{13,14,15} The need for expertise in academic and tertiary referral settings is supported by our survey demonstrating that over half of respondents practiced in an academic or university setting. A retrospective study using data from the Systemic Immunosuppressive Therapy for Eye Diseases cohort study and the Multicenter Uveitis Steroid Treatment trial found that visual acuity in patients with uveitis have improved visual acuity after initiating care with a uveitis specialist.¹⁶ National surveys of ophthalmologists have demonstrated that the evaluation and management of patients with uveitis can be challenging and that the majority of ophthalmologists prefer to refer to a uveitis specialist. Taken together, this suggests that having a uveitis specialist in a group practice may lead to improved patient outcomes and satisfaction.¹⁷ Additionally, having a uveitis specialist on staff may lead to an increased number of referrals, both from within the organization and also external referrals from the community. Due to the complexity of patients with uveitis, these referrals to uveitis specialists may be made by other subspecialty-trained ophthalmologists or comprehensive ophthalmologists for second opinions, diagnosis and work-up, and long-term management.¹⁸

The practice environment of a uveitis specialist is complex, including many barriers that are encountered on a day-to-day basis. In our study, the most common barrier encountered was lack of support staff with less than 30% of uveitis specialists having any sort of support staff. Second, was the lack of reimbursement for time spent and effort. For example, during a visit, a uveitis specialist may need to obtain prior authorization¹⁹ for diagnostics and medication, labs for monitoring IMT, and multiple ancillary ophthalmic imaging tests may be needed. Following the visit, lab results need to be reviewed and care coordination with multiple other members of the care team may be needed. These tasks require dedicated support staff and require considerable

time and investment. This is particularly important in the field of uveitis where laboratory monitoring for IMT may be required monthly upon initiation or on a weekly basis such as when initiating alkylating agents.⁷ Without these resources, growth of the uveitis practice will be limited and could ultimately impact patient outcomes and patient satisfaction, and lead to delays in referrals. Of note, in our survey, there were no differences in the types of barriers encountered between uveitis specialists less than 10 years in practice and those greater than 10 years of practice suggesting that these barriers are encountered in any stage of one's career, despite additional clinical experience.

This study has several limitations, which include a limited response, representing approximately 30% of currently practicing uveitis specialists in the United States. The study was limited to uveitis specialists in the United States, due to the different training pathways outside of the United States and differing models of practice and reimbursement. Future studies may repeat this survey to ascertain a trend over time and to also understand the practice of uveitis worldwide.

In conclusion, this survey of uveitis specialists across the United States provides insight into the training pathways and practice characteristics. These data will provide guidance for career planning, practice building, and assist in resource allocation. As previously reported by Smith et al, increased recognition of uveitis training and the field of uveitis are important as it can influence decisions in research funding and clinical care needs.²⁰ Lastly, addressing the barriers encountered in uveitis practice may increase interest in uveitis training and increase the number and retention of uveitis specialists.

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Conflict of Interest

None declared.

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