



Leadership Development in Ophthalmology: Current Impact and Future Needs

Sean T. Berkowitz, BS¹ Janice C. Law, MD² Paul Sternberg Jr., MD² Shriji Patel, MD²

¹Vanderbilt University School of Medicine, Nashville, Tennessee

²Department of Ophthalmology, Vanderbilt University Medical Center, Nashville, Tennessee

Address for correspondence Shriji Patel, MD, 2311 Pierce Avenue, Nashville, TN 37232 (e-mail: Shriji.patel@vumc.org).

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Abstract

Importance There is a lack of peer-reviewed literature on leadership development programs (LDP) in ophthalmology. Research into LDP demographics, outcomes, and methodology is needed.

Objective The aim of the study is to evaluate the extent to which LDPs targeting ophthalmologists meet the needs of emerging leaders.

Design The design type of the study is cross-sectional analysis.

Setting This study involves international setting.

Participants The participants involved were ophthalmologists at any career level.

Methods Routine internet search was used to identify LDPs targeting ophthalmologists. LDPs identified were categorized by the outcome data available into four levels based on prior literature. Participants were assessed using previously validated software for gender (Gender-API, 2020) and race or ethnicity (NamSor, 2020)

Results Nine programs were identified which were classified into LDP generations. The first LDP in ophthalmology was the American Academy of Ophthalmology (AAO) LDP, which served as the nidus for the formation of four multinational LDPs, together forming the Global LDP. These LDPs were similar in size and scope; program size ranging from nine to 30 participants; a length of 1 to 2 years; with similar curricular offerings; with funding primarily derived from cost-sharing with a nominating society. The second generation of ophthalmology LDPs in the United States has targeted female scientists or faculty (Women's LDP by ARVO) and academic ophthalmology leaders (Academic LDP by Association of University Professors of Ophthalmology).

The AAO's LDP appears increasingly diverse with approximately 13% women at inception, gradually increasing from 40 to 65% women in the last 5 years ($n = 389$). There has also been a notable increase in ethnic diversity.

Conclusion and Relevance AAO LDP is the preeminent leadership training program for ophthalmologists, and it has influenced the creation of a new generation of LDP offerings. There remains a paucity of LDP evaluation metrics and reported outcomes. Newer iterations are successfully targeting academic leadership and attempting to address known disparities in gender and race or ethnicity. Further expansion of LDPs and related research can ensure equity and diversity in the pipeline.

Keywords

- leadership development program
- ophthalmology
- leadership

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Leadership development programs (LDPs) are important vehicles for the cultivation of leadership talent in the managerial realm.¹ These programs offer invaluable skills for aspiring leaders, allow opportunities to network with current leaders, and create a talented and prepared pipeline of future leaders. Physician LDPs are increasingly prevalent at academic health centers,² state medical societies, specialty societies, and national medical associations. However, LDPs specifically targeting physicians are difficult to evaluate given marked heterogeneity in structure and protocols across organizations.³ Despite the lack of clarity in LDP evaluation in the literature, there are books written on methods for measuring success of LDPs.⁴ LDPs are often evaluated based on some version of Kirkpatrick's four level tool for the evaluation of training programs,⁵ which looks at subjective or objective outcome measures of reaction, learning, behavior, and results. While meta-analyses of physician-targeted LDPs using these categories have demonstrated positive outcomes in all included studies, system-level results and long-term outcomes are studied⁶ infrequently. This corroborates with other systematic reviews of leadership training in medical education⁷ at academic medical centers.^{8,9}

Physician leadership can positively impact hospital quality.¹⁰ There are multifarious leadership roles beyond clinical practice management and departmental chairpersonship including organizational development, medical education, research, editorial scope, politics, advocacy, and quality improvement. Technical skills, emotional intelligence, communication, conflict resolution, negotiation, and advocacy are teachable skills required for successful physician-leaders.¹¹ As a result, there is a compelling need to define specific leadership competencies and expand and evaluate emerging LDPs.¹²

Moreover, there are important gender,¹³ race, ethnic,¹⁴ and other disparities in ophthalmology that may become more concentrated at the leadership level. These disparities need to

be addressed from pre-leadership and preophthalmology programming. For example, the Minority Ophthalmology Mentoring (MoM)¹⁵ program and Rabb-Venable program¹⁶ were developed to address pipeline issues into ophthalmology training. Recruiting talent is insufficient to address these disparities. Rather, investment in human capital with strategic talent management through formalized programs appears vital.

Given the importance of intentional leadership programs within the field, the American Academy of Ophthalmology (AAO) founded its LDP in 1998. Additional ophthalmology-specific LDPs have emerged in the last two decades; however, the specific outcomes and degree to which these LDPs contribute to the field of ophthalmology have been minimally described in the literature. As a result, the authors sought to survey the current state of LDPs in the field of ophthalmology and evaluate the evolution of these LDPs and their changing demographics.

Methods

Identification of LDPs targeting ophthalmologists was found by routine search engine querying for "LDP" and "ophthalmology" (► **Table 1**). We assessed programs as per their target outcomes following a modified version of Kirkpatrick's four-level evaluation⁵ with the following categories: reaction (Level 1), knowledge or learning (subjective; Level 2A), knowledge or learning (objective; Level 2B), behavior/expertise (subjective; Level 3A), behavior/expertise (objective; Level 3B), system results/performance (subjective; Level 4A), and system results/performance (objective; Level 4B), which was sourced directly from prior evaluation of LDPs for physicians.⁶ Categorical levels and representative outcomes are described in ► **Table 2**.

Table 1 Leadership development programs (LDPs) targeting ophthalmologists

Program	Society/Institution	Size of program	Length	Year founded
AAO leadership development program	The American Academy of Ophthalmology (AAO)	18–20 participants	1 y	1998
PAAO Curso de Liderazgo	Pan-American Academy of Ophthalmology (PAAO)	16–18 participants	1 y	2004
European Society of Ophthalmology leadership development program (EuLDP)	European Society of Ophthalmology (SOE)	30 participants	2 y	2005
AIOS leadership development program	All India Ophthalmological Society (AIOS)	10–22 participants	1 y	2008
APAO leadership development program	Asia-Pacific Academy of Ophthalmology (APAO)	19 participants	1 y	2009
RANZCO leadership development program	The Royal Australian and New Zealand College of Ophthalmologists (RANZCO)	Unlisted	1.5 y	2014
AOC leadership development program	African Ophthalmology Council (AOC)	17–20 participants	2 y	2015
ARVO Women's leadership development program	The Association for Research in Vision and Ophthalmology (ARVO)	9–12 participants and their mentors	1 y	2016
AUPO Academic leadership development program	The Association of University Professors of Ophthalmology (AUPO)	10–14 participants	1 y	2020

Table 2 Outcome measures for leadership development programs (LDPs) targeting ophthalmologists

Program	Capstone project categories	Alumni leadership roles	Awards to LDP	Evaluation categories ^a
The American Academy of Ophthalmology (AAO) leadership development program	Advocacy Projects (26.39%), Leadership Development Projects (2.89%), Membership Projects (14.23%), Ophthalmic Education Projects (8.25%), Ophthalmic Training Program Projects (6.60%), Organizational Development Projects (7.84%), Practice Management Projects (5.57%), Public Information/Public Service Projects (13.81%), Quality of Care Projects (6.60%), Website Projects (7.84%)	"277 served as Academy committee members, Councilors or Academy representatives to outside organizations. 25 served on the Academy's Board of Trustees or Committee of Secretaries including 2 Academy Presidents, 242 have served as president of a state, subspecialty, or specialized interest ophthalmology society."	"2013 Academy's Special Recognition Award 2001 trophy in the American Society of Association of Executives' Gold Circle Awards"	Level 1, Level 2A, Level 3A, Level 3B, Level 4A, Level 4B
Pan-American Academy of Ophthalmology (PAAO) Curso de Liderazgo	Capstone projects	N/A	N/A	Level 4A, Level 4B
European Society of Ophthalmology leadership development program (EuLDP)	Capstone projects	N/A	N/A	Level 4A, Level 4B
All India Ophthalmological Society (AIOS) leadership development program	Capstone projects	N/A	N/A	Level 4A
Asia-Pacific Academy of Ophthalmology (APAO) leadership development program	"Patient care enhancement, Training and education, Research and development, Community work, Leadership development, Advocacy"	N/A	N/A	Level 4A
The Royal Australian and New Zealand College of Ophthalmologists (RANZCO) leadership development program (LDP)	Self-directed project	N/A	N/A	Level 4A
African Ophthalmology Council (AOC) leadership development program (LDP)	Projects to benefit participants' nominating society	N/A	N/A	Level 4A
The Association for Research in Vision and Ophthalmology (ARVO) Women's leadership development program	N/A	"62% are currently serving on an ARVO committee, 73% of the 2018–2019 class plans to pursue a leadership role at their institution within the next 2 y."	N/A	Level 1, Level 2A, Level 3A, Level 3B
The Association of University Professors of Ophthalmology (AUPO) Academic leadership development program	N/A	N/A	N/A	N/A

^aEvaluation categories:

Reaction (Level 1).

Knowledge or learning (subjective; Level 2A).

Knowledge or learning (objective; Level 2B).

Behavior/expertise (subjective; Level 3A).

Behavior/expertise (objective; Level 3B).

System results/performance (subjective; Level 4A).

System results/performance (objective; Level 4B).

Additionally, looking specifically at the AAO LDP, participant demographic changes over time were assessed using previously validated software for gender (Gender-API, 2020) and race or ethnicity (NamSor, 2020).

Systematic Review of Existing Literature

For context on current analyses of LDPs, a systematic review of publications related to leadership development and ophthalmology

was performed through a modified PRISMA protocol with qualitative analysis¹⁷ using the electronic databases of PubMed—Legacy, Web of Science, and ERIC (Education Resources Information Center). The search was limited to English publications. Inclusion criteria were initially intended to capture any discussion of LDPs in ophthalmology. Studies exploring leadership across specialties, with specific stratification for ophthalmologists, were included. Exclusion criteria

included (1) individually written interviews, personal reflections, or lectureships; (2) articles that were published in languages other than English; (3) reference to leadership personnel without discussion of the concept of leadership; (4) articles with no specific reference to ophthalmology. As no protected health information was required to conduct this study, IRB approval was not required.

The initial query focused on LDPs in ophthalmology (**Appendix A**), which yielded no results in any database. The query was expanded to include the more inclusive phrases of “leadership” AND “ophthalmology” (**Appendix B**). Institutional Review Board approval was not required for this literature search study.

Results

LDPs are offered by: AAO¹⁸; Asia-Pacific Academy of Ophthalmology (APAO)¹⁹; The Association for Research in Vision and Ophthalmology (ARVO)²⁰; The African Ophthalmology Council (AOC)^{21,22}; The Royal Australian and New Zealand College of Ophthalmologists (RANZCO)²³; European Society of Ophthalmology (SOE)²⁴; All India Ophthalmological Society (AIOS)²⁵; Association of University Professors of Ophthalmology (AUPO)²⁶; and Pan-American Association of Ophthalmology (PAAO).

The earliest LDP identified was the AAO LDP founded in 1998. Since then, four additional multinational LDPs and two national LDPs have emerged, predominantly with large national or international scope. When reported, program size ranged from 9 to 30 participants. Programs typically spanned 1 to 2 years, and were composed of meetings, forums, networking events, and/or capstone projects. LDPs were primarily funded by cost-sharing mechanisms with a

nominating society or the individual participant, with support from industry partners.

Statements from organizational webpages as well as several AAO LDP capstone projects suggest these large multinational LDPs are in fact part of a larger “Global LDP” network (→ **Fig. 1**). For example, the following multinational and national LDPs were founded either directly from AAO or based on the AAO LDP: AIOS LDP was founded by S. Natarajan, MD (AAO LDP VIII, Class of 2006)²⁵; the APAO LDP was founded by Philip Lam, MD and Catherine Green, MBChB FRANZCO MMedSc in 2009²⁷; the PAAO LDP was founded by Zelia Correa, MD (AAO LDP V, Class of 2003)²⁸; Stefan Seregard, MD cultivated the European-SOE LDP (LDP VI, Class of 2004) after the 2004 AAO-SOE joint meeting; the RANZCO LDP was founded in collaboration with the AAO and APAO^{29,30}; the AOC LDP is based on the AAO LDP²⁹ with leadership from Michael Brennan, MD and Sidney Gicheru, MD for Anglophone, Francophone, and Lusophone Africa.²² The Global LDP network of multinational organizations was defined as the first generation of ophthalmology-specific LDPs, whereas the national LDPs and societal LDPs comprise the second generation.

In addition to these international programs, two programs in the United States were identified, which targeted specific demographics of female scientists or faculty (ARVO Women's LDP) and academic ophthalmology leaders (AUPO Academic LDP). These two programs comprise the second generation of targeted ophthalmology-specific LDPs within the United States (→ **Fig. 2**).

Importantly, the gaps in gender and academia have been addressed by both the ARVO Women's LDP and the newly emerging AUPO Academic LDP. Additionally, AAO LDP capstone projects have focused on diversity, including exploring barriers to a successful match for minorities and surveys to



Fig. 1 Elaboration of the Global LDP from the AAO LDP. AAO, American Academy of Ophthalmology; LDP, leadership development program.

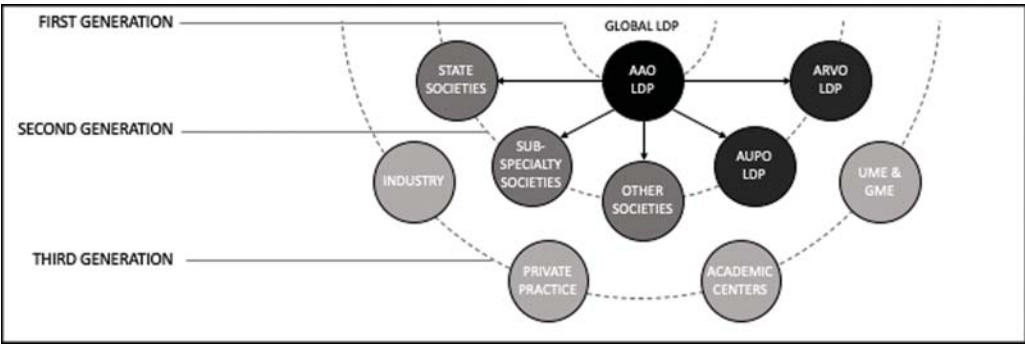


Fig. 2 Schematic of LDPs within the United States. LDP, leadership development program.

characterize interest and increase underrepresented minorities in ophthalmology. These efforts have led to encouraging trends when examining the demographics of AAO LDP participants. There has been a significant increase in the proportion of female LDP participants, which began with roughly 13% women, and has increased to 40 to 65% women from 2015 to

2020 ($n = 389$). There has also been an increasingly diverse membership since inception of the program with representation from all around the world (►Fig. 3). All LDPs alluded to discussion of self-improvement, learning, and behavior changes in their mission and goals; however, specific outcome measures were rarely delineated. The AAO

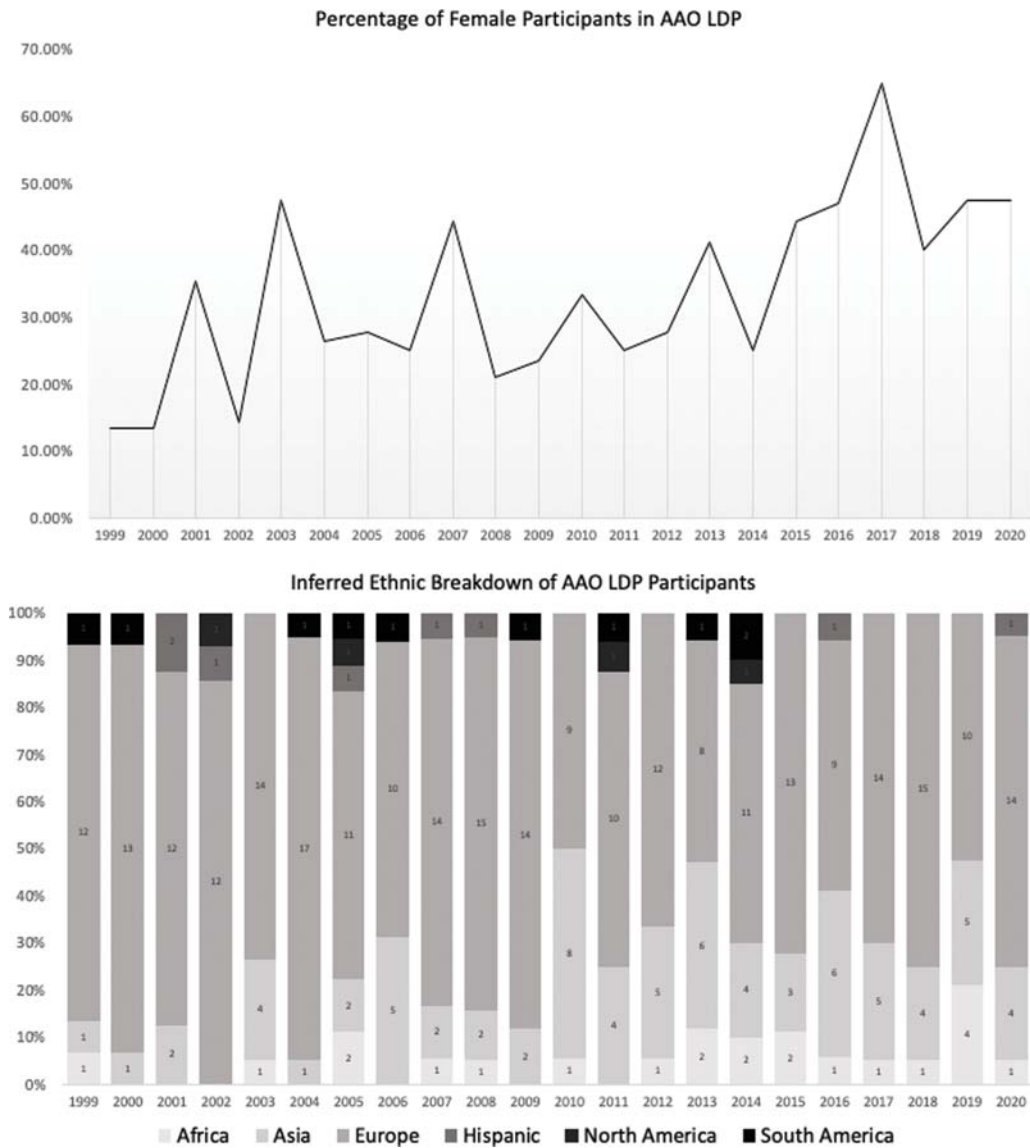


Fig. 3 Demographic distribution of AAO LDP participants over time. AAO, American Academy of Ophthalmology; LDP, leadership development program.

LDP provided the most comprehensive evaluation category information with subjective evidence from select participants as well as capstone abstracts with organization-level outcomes. The AAO LDP information included all four levels of evaluation; however, objective information regarding learning, which would be acquired from testing of participants, was not present. The ARVO Women's LDP highlighted key outcomes for participants, and provided subjective information on personal growth, but no organization-level outcomes were included. In contrast, the LDPs from the APAO, SOE, AIOS, PAAO, and AOC primarily included a reference to capstone projects without any indication of personal development outcomes. Importantly, project abstracts are available for the AAO LDP, EuLDP, and PAAO programs. These abstracts can be considered Level 4B outcomes (objective organizational-level metrics).

Supplemental Literature Review

Twenty publications were consistent with inclusion and exclusion criteria. In terms of primary categorical leadership content, academic leadership (journal editorial, academic, or departmental, research funding) was discussed in 55% of articles, with the remaining literature focused on global or international leadership (10%), professional society leadership (5%), post-graduate or surgical leadership training (10%), and private practice, industry, MBA-ophthalmologist, or general health care leadership (20%). Most publications addressed gaps in leadership in ophthalmology, with discussion of gender disparity, which was the primary focus of 60% of articles. With the exception of one study using a curricular intervention,³¹ 95% of studies were either cross sectional, review or descriptive report, or observational and retrospective in design. Outcome measures, when available, included gender proportion as well as demographic, professional, and academic profile statistics of specific leadership categories. Publications that were included in the final qualitative analysis are described in Supplementary Table S1.^{31–50}

Discussion

Ophthalmology-specific LDPs are similar to current LDPs at academic health centers² in size, structure, and lack of robust performance metric reporting. The first generation, Global LDP, represented a critical expansion of the AAO's leadership development training internationally. As evidenced by the leadership ophthalmology literature, as well as needs-based capstone projects, cultivation of leadership in specific demographics is needed. Attempts at addressing these gaps are being made by both the ARVO Women's LDP and the newly emerging AUPO Academic LDP, creating more opportunities for women and underrepresented minorities in these programs.

Given the national and international scope of the LDPs identified, we sought to characterize the availability of leadership programs within ophthalmology subspecialty and state societies. While several societies offered honors or awards for leadership, there were no specific LDPs identified, from a nonmember routine internet search, for subspecialty or state ophthalmology societies. Instead these societies utilize the

AAO LDP to train and cultivate leaders for their organizations. With estimates of 17,000 ophthalmologists registered for centers for medicare and medicaid services (CMS),⁵¹ the AAO LDP program can serve 0.12% of ophthalmologists in the United States, annually. Adding the ARVO and AUPO LDP offerings would increase this offering to 0.27%. Although leadership training is intended to have far reaching impact beyond the individuals trained, there is a clear dearth of LDPs catered specifically to ophthalmologists. Fortunately, the AAO LDP develops a tremendous leadership capacity for ophthalmology, and AAO LDP graduates have and can continue to create second and third generation programs.

Codifying LDP outcomes will undeniably facilitate the expansion and optimization of second and third generation programs, and provide quantifiable return-on-investment information for organizations that may be hesitant to invest in less empirically validated strategic talent management programs. Empiric evidence for system-level improvement should track clinical, financial, and other organization-specific goals to evaluate the efficacy of LDPs.

There is evidence for significant gender disparities in ophthalmology leadership positions, which is well represented in the literature. For example, department chairs remain predominantly held by men,^{40,46} which may be due to gender disparities in National Institutes of Health funding in ophthalmology,⁴¹ or a historical lack of women in leadership positions at ophthalmic publications⁴² that remains an important topic of discussion in 2020.^{32,33,52} In fact, there has been a compelling call for gender diversity in ophthalmology leadership due to the disparity between the number of practicing women ophthalmologists and the proportion of women in leadership roles.⁵² This trend is improving but is representative of the gender disparities in national medical societies across specialties.³⁵ Despite apparent gender parity in residency, academic leadership is disproportionately male, regardless of chairperson and residency program director gender.⁴⁴ The increasing presence of women in LDPs demonstrated here is an encouraging initial step in creating gender equality in academic leadership. Further targeted LDPs such as the Women's LDP from ARVO can help foster retention of gender diversity in academia through dedicated mentorship.

Similarly, minority groups underrepresented in medicine comprise 30.7% of the U.S. population, but the proportions of practicing ophthalmologists, ophthalmology faculty, and ophthalmology residents are only 6, 5.7, and 7.7%, respectively.¹⁴ Therefore, the issue of equity will require early and active intervention. Landmark efforts from the AAO and AUPO, with sponsorship from major ophthalmology societies, to create the MOM program¹⁵ as well as the National Medical Association's Rabb-Venable¹⁶ represent an important step in targeted mentoring. These programs may contribute to the third-generation efforts for undergraduate and graduate medical education. Expansion of these efforts must focus on gaps in the pipeline with subsequent and continuous leadership training for later-career ophthalmologists.

U.S. academic ophthalmology department chairs are reportedly 90% male and predominantly fellowship-trained in Cornea, Vitreoretinal Surgery, and Glaucoma.³⁷ The "triple threat" of roles as a clinician, researcher, and educator remains

relevant, and previous leadership roles are described as invaluable for department ophthalmology chairpersons.⁴⁰ However, the duties of the academic chairperson are dynamic, reflecting an ever-changing health care landscape; therefore, LDPs are vital to provide the newer generation of leaders with necessary skill development. Navigating the political and hierarchical complexity of these organizations may require significant mentorship for aspiring ophthalmologist-leaders. There is a promising opportunity to augment the reach and influence of current leaders through formalized mentorship and expansion of LDPs. Meta-analyses of LDPs at academic health centers suggest most programs are targeted toward early-career physicians, with no programs targeting physicians in top-level leadership roles,⁶ though the AAMC and other organizations provide mid- and early-career leadership training.^{53,54} Leadership development capacity will need to be personalized both to specific demographics and level of career development. Because executive-level ophthalmology mentors are inherently in short supply, top-down LDP and mentorship networks will need to be designed to optimize access and impact.

Conclusion

There is a paucity of outcome measures for LDPs catered specifically to ophthalmologists, which parallels the lack of peer-reviewed literature describing leadership and ophthalmology. The first generation Global LDP in ophthalmology was spearheaded by the AAO and followed by targeted offerings from ARVO and AUPO. These new programs help address important gaps in ophthalmology leadership described in the literature such as disparities in gender, race, and ethnicity, with a predominant focus on academic ophthalmology leadership roles. Further expansion of formalized leadership training programs is needed to serve a growing population of ophthalmologists facing an exceedingly complex health care landscape. As these programs emerge, detailed research on outcomes from existing LDPs can ensure equity and diversity and allow for successful replication and growth for second and third generation LDP offerings.

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Conflict of Interest

None declared.

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