

Training the Next Generation of Anesthesiologists: A Cross-sectional Mixed-methods Study on Mentorship in Anesthesiology

To the Editor:

Mentorship is a “two-way relationship” in which the mentor invests personal knowledge, energy, and time to help others grow, develop, and improve to become the best and most successful they can be.¹ For mentees, mentorship can improve career satisfaction, reduce burnout, and enhance psychosocial well-being.^{1–3} For mentors, benefits include increased personal satisfaction and gaining new perspectives from interactions. In addition, mentorship can potentially mitigate gender and racial disparities by fostering career advancement and equity.²

Surveys of Canadian anesthesiology residents⁴ and European anesthesiologists³ indicate strong support for mentorship but also highlight barriers, especially among women mentees.³ In the United States, a survey queried anesthesia residency program directors about mentorship and found that nearly all believed mentorship was an important part of resident development.⁵ These studies started to uncover the role of mentorship in trainee’s development; however, the importance of mentorship in anesthesiology, and the role gender plays in it, remains unexplored.

To address this gap, in collaboration with the American Society of Anesthesiologists (ASA), we conducted a web-based survey distributed to the ASA members (March to April 2024) to evaluate the dynamics of mentorship focusing on gender (Supplemental Digital Content methods, <https://links.lww.com/ALN/E346>). Our goal was to identify factors influencing mentor–mentee pairings, the availability of mentorship, and the perceived barriers and facilitators of the mentorship experience. We used a cross-sectional, mixed-methods design that included a survey and focus groups. The study was approved by the University of California–San Francisco (San Francisco, California) institutional review board (IRB

23–39546). The survey included structured and open-ended questions on mentorship roles, selection preferences, barriers, and demographics. Members had the option of participating in one of the three focus groups conducted by Zoom in November 2024. The study followed the Checklist for Reporting Results of Internet E-Surveys and the Standards for Reporting Qualitative Research guidelines (see Supplemental Digital Content, <https://links.lww.com/ALN/E345>).

Sessions were recorded, transcribed, and analyzed thematically using qualitative description in MAXQDA Analytics Pro 24 (Verbi Software, Germany).^{6–8} Statistical analysis was done using SAS software (version 9.4), and data were presented as numbers (percentages). Gender association with survey responses was assessed by the odds ratio with 95% CI adjusted for multiple comparison (Benjamini–Hochberg method). Integrating quantitative and qualitative data strengthened the interpretation by capturing the breadth and depth of mentorship experiences and highlighting the structural and interpersonal factors, including identity-based convergence, that influence access to and equity in anesthesia mentorship.

A total of 1,183 ASA members participated in the study; 58.9% were mentors and 62.5% were mentees (Supplemental Digital Content fig. S1, <https://links.lww.com/ALN/E338>). Of the 808 respondents who reported their gender, 57% identified as male and 41.7% as female. Additional demographics are included in Supplemental Digital Content table S1 (<https://links.lww.com/ALN/E339>). Women mentees were significantly more likely than men to cite gender, race/ethnicity, and psychological support as key factors in mentor selection. They also reported greater difficulty accessing mentorship. Men were more likely to report no barriers. Among mentors, women emphasized gender and race when selecting mentees and experienced more barriers, including time constraints. Men tended to prioritize the mentee’s experience and reputation. Participants who were both mentors and mentees exhibited similar gender-based patterns. Both groups perceived benefits from mentorship, but men more often reported improved clinical skills. Results are presented in table 1.

Focus groups (Supplemental Digital Content table S2, <https://links.lww.com/ALN/E340>; table S3, <https://links.lww.com/ALN/E341>; table S4, <https://links.lww.com/ALN/E342>; table S5, <https://links.lww.com/ALN/E343>; and table S6, <https://links.lww.com/ALN/E344>) revealed that identity-based convergence shapes relationship dynamics and may reinforce exclusion. Most participants supported structured mentorship programs, especially those that promote representation. Themes around society-led mentorship initiatives emerged prominently among women participants. Participants described mentorship as a bidirectional relationship that

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are available in both the HTML and PDF versions of this article. Links to the digital files are provided in the HTML text of this article on the Journal’s Web site (www.anesthesiology.org). M.G. and L. Soriano contributed equally as first authors.

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Table 1. Mentee and Mentor Responses by Gender Identity

Mentee Responses	Women N = 237	Men N = 314	OR (95% CI)
Was your most important mentor formally assigned by a program or institution?	73 (30.8)	110 (35.0)	0.8 (0.5–1.3)
Have you had multiple mentors throughout your career? Including outside of anesthesia?	197 (83.1)	265 (84.4)	0.9 (0.5–1.6)
When did you get your first mentor?			
During medical school	101 (42.6)	120 (38.2)	1.5 (0.7–3.1)
During residency/training	112 (47.3)	152 (48.4)	1.3 (0.6–2.7)
After residency/training (reference)	24 (10.1)	42 (13.4)	1.0
How important are the following factors in choosing a mentor?			
Gender	137 (57.8)	72 (22.9)	4.6 (2.9–7.4)
Race/ethnicity	58 (24.5)	47 (15.0)	1.8 (1.1–3.2)
Age	104 (43.9)	131 (41.7)	1.1 (0.7–1.7)
Your personal compatibility	234 (98.7)	305 (97.1)	2.3 (0.4–12.7)
Their previous experience	230 (97.1)	308 (98.1)	0.6 (0.2–2.7)
Geographic location	182 (76.8)	247 (78.7)	0.9 (0.5–1.5)
Their standing in the anesthesia community	186 (78.5)	237 (75.5)	1.2 (0.7–2.0)
Have you faced the following barriers when choosing a mentor?			
Lack of individuals the same gender as me	67 (28.3)	7 (2.2)	17.3 (6.1–49)
Lack of individuals the same race/ethnicity as me	46 (19.4)	34 (10.8)	2.0 (1.1–3.7)
Lack of individuals the same age as me	46 (19.4)	30 (9.6)	2.3 (1.2–4.3)
Personal compatibility	73 (30.8)	74 (23.6)	1.4 (0.9–2.4)
Lack of individuals interested in mentoring me	91 (38.4)	93 (29.6)	1.5 (0.9–2.4)
Finding someone that can support me psychologically	98 (41.4)	76 (24.2)	2.2 (1.4–3.5)
The process is time consuming	119 (50.2)	113 (36.0)	1.8 (1.1–2.8)
I have never faced any barriers finding a mentor	64 (27.0)	110 (35.0)	0.7 (0.4–1.1)
Have you benefitted in any of the following ways from your relationship with your mentor(s)?			
Career advancement	184 (78.0)	242 (77.3)	1.0 (0.6–1.8)
Work–life balance	122 (51.7)	163 (52.1)	1.0 (0.6–1.5)
Development of clinical skills	189 (79.8)	257 (81.9)	0.9 (0.5–1.5)
Feeling supported	220 (92.8)	289 (92.0)	1.1 (0.5–2.6)
Improving self-confidence	196 (82.7)	264 (84.4)	0.9 (0.5–1.6)
Improving academic productivity	174 (73.4)	229 (73.4)	1.0 (0.6–1.6)
Mentor responses	Women n = 217	Men n = 273	OR (95% CI)
Was your most important mentee formally assigned by a program or institution?	71 (32.7)	102 (37.4)	0.8 (0.5–1.3)
How important are the following factors in choosing a mentee?			
Gender	67 (30.9)	26 (9.5)	4.2 (2.2–8.1)
Race/ethnicity	35 (16.1)	27 (9.9)	1.8 (0.9–3.5)
Age	49 (22.6)	45 (16.5)	1.5 (0.8–2.7)
Your personal compatibility	199 (91.7)	240 (87.9)	1.5 (0.7–3.3)
Their previous experience	84 (38.7)	134 (49.1)	0.7 (0.4–1.1)
Geographic location	118 (54.4)	162 (59.3)	0.8 (0.5–1.3)
Their standing in the anesthesia community	37 (17.1)	66 (24.2)	0.6 (0.4–1.2)
Have you faced the following barriers when choosing a mentee?			
Lack of individuals the same gender as me	17 (7.8)	2 (0.7)	11.5 (1.7–78)
Lack of individuals the same race/ethnicity as me	24 (11.1)	13 (4.8)	2.5 (1.0–6.2)
Lack of individuals the same age as me	20 (9.2)	19 (7.0)	1.4 (0.6–3.2)
Personal compatibility	53 (24.4)	58 (21.3)	1.2 (0.7–2.1)
Lack of individuals interested in being mentored	47 (21.7)	53 (19.4)	1.1 (0.6–2.0)
The process is time consuming	114 (52.5)	92 (33.7)	2.2 (1.4–3.5)
I have never faced any barriers finding a mentee	59 (27.2)	67 (24.5)	1.1 (0.7–1.9)
Have you benefitted in any of the following ways from your relationship with your mentee(s)?			
Career advancement	86 (39.6)	110 (43.3)	1.0 (0.6–1.6)
Work–life balance	50 (23.3)	74 (27.2)	0.8 (0.5–1.4)
Development of clinical skills	67 (31.3)	118 (43.2)	0.6 (0.4–1.0)
Feeling supported	155 (72.1)	175 (64.1)	1.4 (0.9–2.4)
Improving self-confidence	136 (63.0)	160 (58.6)	1.2 (0.7–1.9)
Improving academic productivity	111 (51.4)	148 (54.4)	0.9 (0.6–1.4)

Values are number (percentage). Significant odds ratios (ORs) are shown in bold.

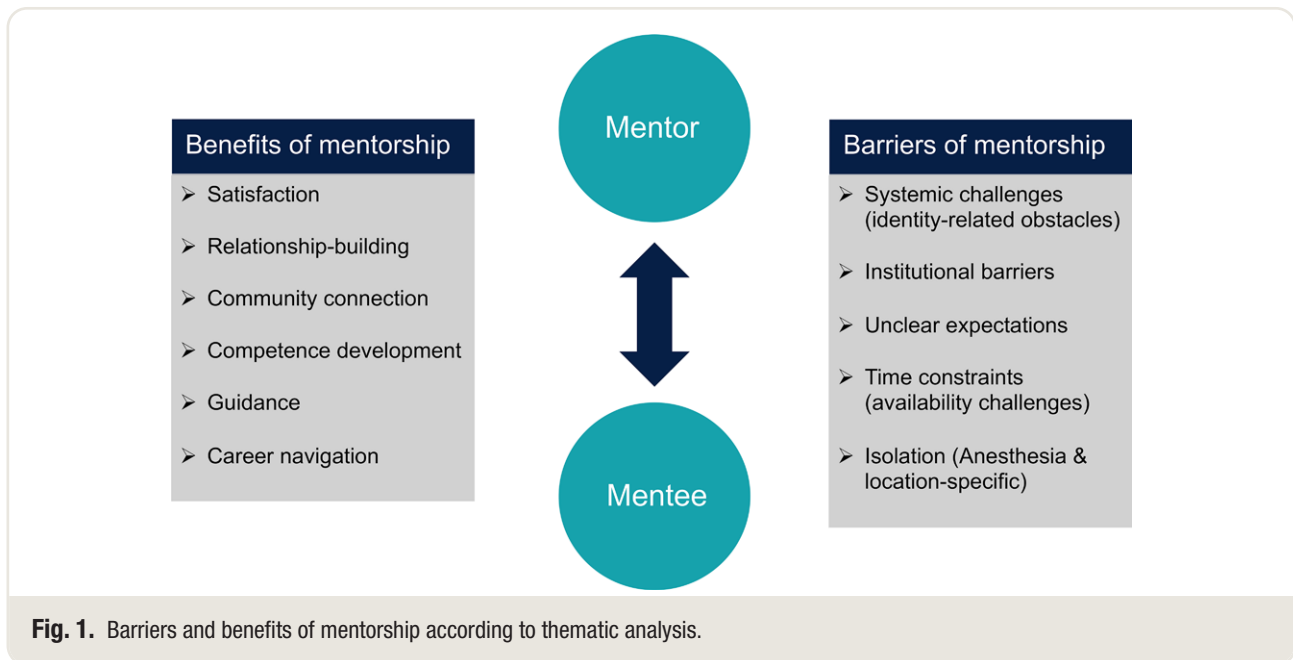


Fig. 1. Barriers and benefits of mentorship according to thematic analysis.

provides professional and personal support. They emphasized the importance of having multiple mentors and stressed the role of mentors in teaching the hidden curriculum and setting clear expectations. The benefits of mentorship included personal satisfaction, relationship building, developing competence, receiving guidance, and fostering a sense of community. The barriers mirrored the survey findings, including a lack of institutional support, time constraints, location, and identity-related challenges (fig 1). One woman noted: “Mentors should have a curriculum they follow. Too often, women are over mentored on their personal life rather than their professional life.” Data from focus groups are summarized in Supplemental Digital Content table S3 (<https://links.lww.com/ALN/E341>), table S4 (<https://links.lww.com/ALN/E342>), table S5 (<https://links.lww.com/ALN/E343>), and table S6 (<https://links.lww.com/ALN/E344>).

The mentoring infrastructure theme underscored anesthesiology’s isolating nature: “I feel like we’re one of those professions where we’re very uniquely isolated from others,” which makes mentorship vital for managing stress and adverse events. Participants valued both formal programs and informal communal spaces. “We’re all congregating in like a communal anesthesia office. And that has just fostered the opportunity to talk to people outside of my very formal mentoring relationships.” However, concerns about overreliance on volunteerism were raised, emphasizing the need for structured programs backed by institutional investment to ensure inclusive and sustainable mentorship.

This study sheds light on gender-related disparities in mentorship among U.S. anesthesiologists. It also highlights the profession’s unique stressors, which amplify the need for effective mentorship. However, several limitations merit discussion. While the 6.6% survey response rate was comparable with other ASA surveys, the low response rate may

limit generalizability, as respondents likely represent those with particularly strong views about mentorship experiences, either positive or negative. Most participants were from academic centers. While this mirrors ASA member distribution, it also introduces selection bias. Nonbinary participants were not included in the statistical analysis due to limited sample size ($n = 8$). The overrepresentation of women in focus groups (60% *vs.* 41.7% in the survey) may have influenced the prominence of certain themes in our qualitative findings.

In conclusion, gender disparities in anesthesia mentorship persist, with women encountering more significant challenges. However, the study was not designed to examine how specific mentorship pairings may perpetuate stereotypes or contribute to professional segregation. We acknowledge this as a limitation and suggest that future research explore these nuanced dynamics and include an in-depth evaluation of the intersection between underrepresented in medicine status and gender in anesthesiology. We recommend employing qualitative methodologies that can capture and be accountable to the lived experiences of anesthesiologists. Academic institutions and professional societies can consider programs prioritizing inclusivity and long-term career development to create a more equitable field.^{9,10} Educating mentors and providing guidance is integral to effective cross-gender mentorship, as men are instrumental in mentoring all genders.

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Competing Interests

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Supplemental Digital Content

Figure S1. Participants, <https://links.lww.com/ALN/E338>
Table S1. Distribution of participants according to their demographic characteristics globally and in each group, <https://links.lww.com/ALN/E339>

Table S2. Focus groups demographics, <https://links.lww.com/ALN/E340>

Table S3. Key aspects of mentorship: definition, mentor multiplicity, hidden curriculum and expectations, <https://links.lww.com/ALN/E341>

Table S4. Benefits of mentorship, <https://links.lww.com/ALN/E342>

Table S5. Barriers to mentorship, <https://links.lww.com/ALN/E343>

Table S6. Mentoring infrastructure, <https://links.lww.com/ALN/E344>

Checklists, <https://links.lww.com/ALN/E345>

Methods, <https://links.lww.com/ALN/E346>

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