

# Gender segregation in the surgical workforce: addressing economic equity

Jennifer Keller, The University of Queensland

*“Men just aren’t natural leaders.”*

*“Men earn less because they just aren’t very good at negotiating.”*

*“How will you be able to keep up your surgical skills as a dad working part-time?”*

These statements sound absurd when directed at men but highlight very real biases faced by women, particularly those who work in male-dominated fields such as surgery. The most prominent measure of persistent gender inequities in the surgical workforce is the gender pay gap.

The gender pay gap is defined as the difference in earnings between women and men for performing the same job with comparable experience and skill. Despite emerging evidence that the performance of female surgeons is equivalent or even superior to their male counterparts (1-3), remuneration for their work has remained consistently lower (4,5). Within the same speciality, women earn 25-33% less than men, even when adjusting for key factors that influence salary including seniority, age, hours worked, and research output (6,7). There are several structural and cultural barriers that contribute to the gender pay gap – including representation, intrinsic bias/discrimination, gendered cultural norms, and training inflexibility – which culminate in a vicious cycle of exclusion and underemployment of female surgeons (8-16).

As of 2023, women comprised only 32% of surgical trainees, 23% of surgical fellows, and 15% of the active surgical workforce, which was the lowest gender ratio of all medical specialties in Australia, as shown in Figure 1 (17,18). It is well known that women face lower recruitment, higher attrition, and less opportunity for promotion within surgery (8-16). Whilst there has been concerted effort to increase representation, it is predicted that most surgical subspecialties will not achieve workforce gender parity within the next 50 years (13,17). Furthermore, leadership within surgical departments and on collegiate boards has lacked female representation (9,16). A common misconception is that this absence is due to a difference in career commitment or lack of interest, however, it is known that lack of opportunities for career advancement (e.g. research funding,

publications, and teaching) drive inequality in the promotion of women (15,19,20). Since leadership positions influence both policy and culture within surgery, the historic exclusion of women has translated to patriarchal norms and attitudes that have produced intrinsic biases (19,21).

Systemic biases continue to limit professional opportunities for female surgeons across subspecialty and seniority (19,21). Women face significant judgement when negotiating salaries, thus it is unsurprising that they are less inclined to participate in negotiations (22). There is significant disparity in both the number and complexity of cases performed by female surgeons, leading to a relative “underemployment” compared to male surgeons, which cannot be accounted for by familial obligations, subspecialty choice, years of practice, or hours worked (8,23). Female surgeons receive less procedural-based referrals than male surgeons, disproportionate to the number of women within surgical subspecialties, as shown in Figure 2 (24). The achievements and skills of women are consistently under-recognised, reinforcing false perceptions of female surgeons being less competent (21). “Female traits” such as communication, approachability, collaboration, patient-centric decision making, and risk-avoidant behaviours continue to be undervalued and even stigmatised in the surgical workforce (1,2,10,19,25).

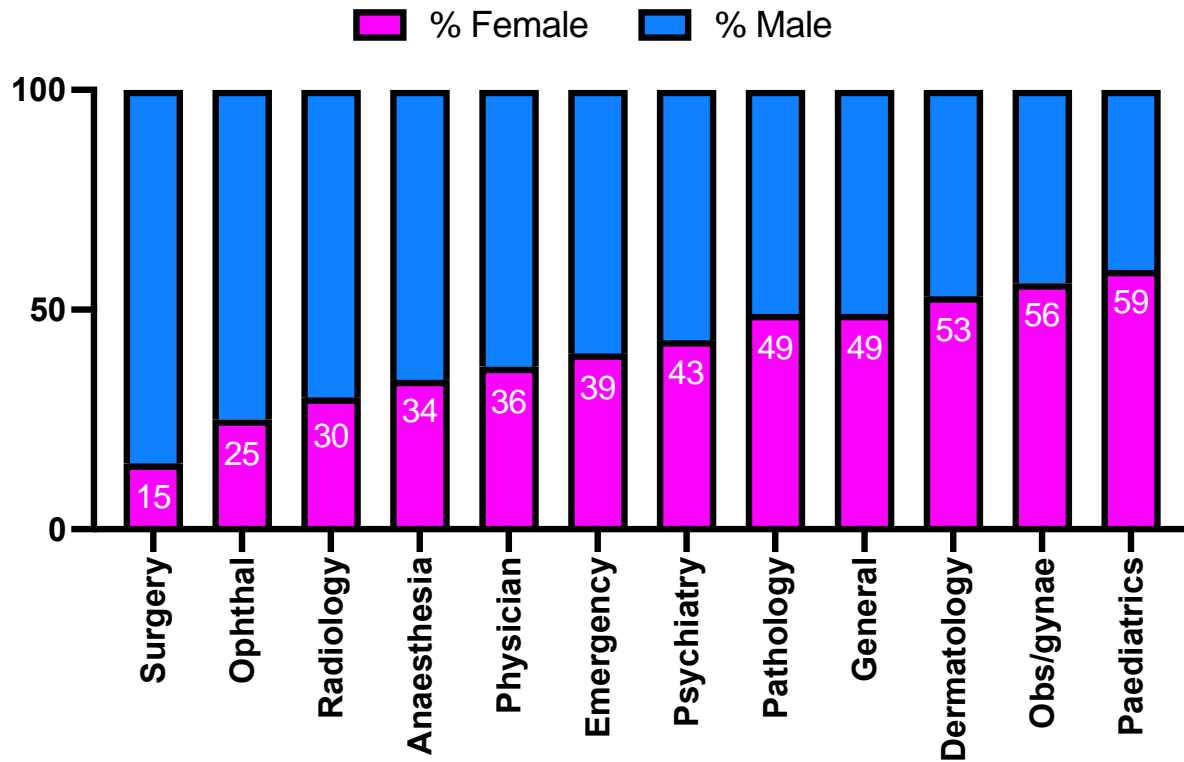
The surgical training model, with inflexible working hours and an unpredictable lifestyle, does not accommodate the needs of women and families. Only 2% of trainees were approved for flexible training in Australia in 2023 (17,18). Work-life balance is further complicated by societal gendered norms of parenting and a surgical culture that continues to stigmatise parental leave and part-time training (16,26,27). Female surgeons who prioritise family are perceived to be less committed and at risk of de-skilling, which translates to career disengagement, stymied career progression, and significant pay disparity (8,10,11,28-30).

Overcoming the gender pay gap within surgery will require structural changes to facilitate career flexibility, increase female visibility, and publicly support women’s careers. By implementing a more supportive training model that prioritises flexibility, surgery will become inherently more inclusive and accepting of necessary changes (11,15,29,32,33).

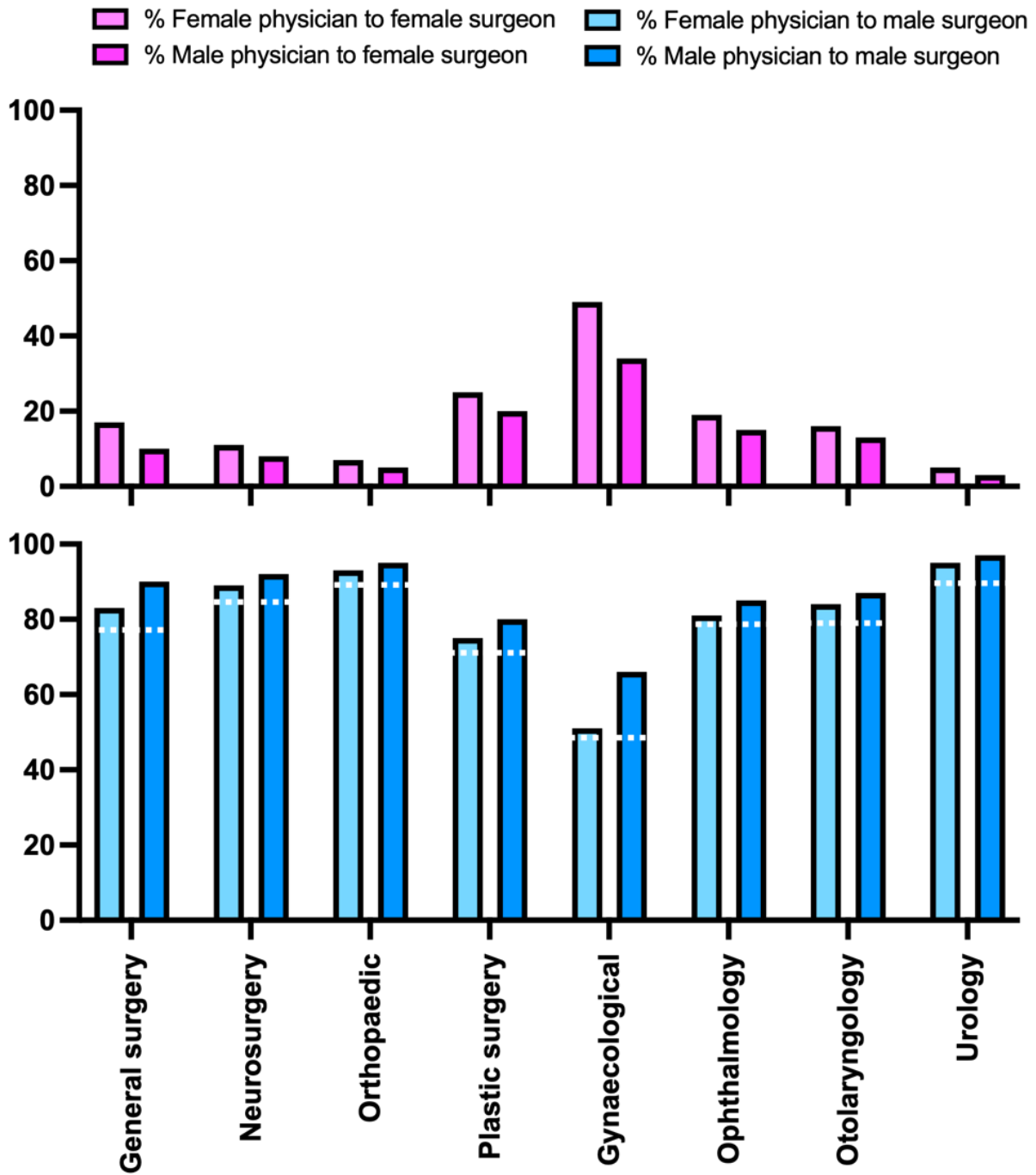
Accessible and visible career pathways for women, such as quotas and financial exemptions, are required to increase representation until equity in both representation and remuneration can be sustained independently (14,31,34). Simply recruiting and promoting women without support networks, however, has historically led to perceived underperformance, which inevitably perpetuates the misconception that these candidates weren't suitable for the role (15,31). A focused effort to facilitate mentorship and sponsorship at all career stages is the most effective measure to empower women through personal development, career guidance, salary negotiation advice, and opportunities for professional advancement (1,2,11,12,33,35-37). Furthermore, a diversified surgical leadership portfolio is required to foster a culture of inclusivity and respect from the top down (10,15,16).

Measures to address the gender pay gap will only be successful with significant cultural changes. Particularly dispelling pervasive misconceptions such as (1) that correcting for intrinsic biases constitutes "special treatment" and (2) that gender-based inequities, including as the pay gap, will naturally improve with gender parity (9,30,38). Importantly, cultural acceptance of career pathways and resources for female surgeons will remain important even once gender parity has been achieved, since increased female representation within male-dominated fields is known to paradoxically reinforce intrinsic gender biases (39). Consistent with this, women in Obstetrics/gynaecology face significant disparities in training, career advancement, and remuneration (40), despite achieving gender parity (18). Leadership in Obstetrics/gynaecology remains male dominated (40). It will be interesting to see whether gendered cultural norms dissipate as female representation in surgical leadership increases and whether this translates to financial equity.

Surgery remains an unwelcoming career for women. Persistent inequities, such as the gender pay gap, are blamed on perceived deficiencies in women rather than acknowledging intrinsic biases that limit the advancement of highly skilled female surgeons. It is the shared responsibility of surgical colleges and individual surgeons to enforce both structural and cultural changes that empower women, focusing on diversifying leadership, fostering support networks, challenging male-dominated cultural norms, and modernising the surgical training model.



**Figure 1. Surgery has the lowest female representation within medicine.** Specialist registration by gender in Australia for 2023, based on public national registration and accreditation data (18).



**Figure 2. Female surgeons receive less procedural-based referrals than male surgeons, particularly from male physicians.** Proportion of referrals from physicians to surgeons in Canada, separated based on gender of both physicians and surgeons. Dashed line represents the proportion of male and female surgeons within each subspecialty. Bars above the dashed line represent over-referral (i.e. there is greater proportion of referrals made to male surgeons than the proportion of male surgeons within that subspecialty) (24).

## References

1. Wallis CJD, Jerath A, Aminoltehari K, Kaneshwaran K, Salles A, Coburn N, et al. Surgeon Sex and Long-Term Postoperative Outcomes Among Patients Undergoing Common Surgeries. *JAMA surgery*. 2023;158(11):1185–94.
2. Wallis CJ, Ravi B, Coburn N, Nam RK, Detsky AS, Satkunasivam R. Comparison of postoperative outcomes among patients treated by male and female surgeons: a population based matched cohort study. *BMJ (Online)*. 2017;359:j4366–j4366.
3. Blohm M, Sandblom G, Enochsson L, Österberg J. Differences in Cholecystectomy Outcomes and Operating Time Between Male and Female Surgeons in Sweden. *JAMA surgery*. 2023;158(11):1168–75.
4. Gender Segregation in the Workplace and Its Impact on Women’s Economic Equality. Parliament of Australia; 2017.
5. Slama EM, Arjani S, Sulciner ML, Riner AN, Yu YR, Maxwell J. The Gender Gap in Surgeon Salaries - Striving to achieve pay equity. *The American journal of surgery*. 2023;225(2):436-438. doi:10.1016/j.amjsurg.2022.09.037
6. Cheng TC, Scott A, Jeon SH, Kalb G, Humphreys J, Joyce C. What factors influence the earnings of general practitioners and medical specialists? Evidence from the medicine in Australia: balancing employment and life survey. *Health economics*. 2012;21(11):1300-1317.
7. Jena AB, Olenski AR, Blumenthal DM. Sex Differences in Physician Salary in US Public Medical Schools. *JAMA internal medicine*. 2016;176(9):1294-1304.
8. Chen YW, Westfal ML, Chang DC, Kelleher CM. Underemployment of Female Surgeons? *Annals of surgery*. 2021;273(2):197–201.
9. Mundy J. The glass ceiling – is it really made of glass? *ANZ journal of surgery*. 2023;93(1-2):10–2.
10. Hutchison K. Four types of gender bias affecting women surgeons and their cumulative impact. *Journal of medical ethics*. 2020;46(4):236–41.

11. De Costa J, Chen-Xu J, Bentounsi Z, Vervoort D. Women in surgery: challenges and opportunities. *IJS global health*. 2018;1(1):e02–e02.
12. Haruno LS, Chen X, Metzger M, Lin CA, Little MTM, Kanim LEA, et al. Racial and Sex Disparities in Resident Attrition Among Surgical Subspecialties. *JAMA surgery*. 2023;158(4):368–76.
13. Graham V, Arora B. Women in surgery: trends in nine surgical specialties. *ANZ journal of surgery*. 2023;93(10):2344–9.
14. Ip EC, Carrarini M, Nestel D, Incoll IW. Gender associations with selection into Australian General Surgical Training: 2016–2022. *ANZ journal of surgery*. 2023;93(10):2350–6.
15. O'Brien W, Hanlon C, Apostolopoulos V. Women as leaders in male-dominated sectors: A bifocal analysis of gendered organizational practices. *Gender, work, and organization*. 2023;30(6):1867–84.
16. Wells K, Fleshman JW. Women in Leadership. *Clinics in colon and rectal surgery*. 2020;33(4):238–42.
17. Royal Australasian College of Surgeons: Workforce & Activities Reports [Internet]. Melbourne Australia: RACS, 2022. [Updated October 2023; cited December 2024]. Available from URL: <https://www.surgeons.org/en/Resources/reports-guidelines-publications/workforce-activities-reports>
18. Medical Board of Australia. Medical Board of Australia registrant data [Internet]. 2023 [Cited December 2024]. Available from URL: <https://www.medicalboard.gov.au/News/Statistics>
19. Lim WH, Wong C, Jain SR, Ng CH, Tai CH, Kamala Devi M, et al. The unspoken reality of gender bias in surgery: A qualitative systematic review. *PloS one*. 2021;16(2):e0246420–e0246420.

20. Hoops HE, Brasel KJ, Dewey E, et al. Analysis of Gender-based Differences in Surgery Faculty Compensation, Promotion, and Retention: Establishing Equity. *Annals of surgery*. 2018;268(3):479-487.  
doi:10.1097/SLA.0000000000002920
21. Bellini MI, Adair A, Fotopoulou C, et al. Changing the norm towards gender equity in surgery: the women in surgery working group of the Association of Surgeons of Great Britain and Ireland's perspective. *Journal of the Royal Society of Medicine*. 2019;112(8):325-329.
22. Gray K, Neville A, Kaji AH, et al. Career Goals, Salary Expectations, and Salary Negotiation Among Male and Female General Surgery Residents. *JAMA surgery*. 2019;154(11):1023-1029. doi:10.1001/jamasurg.2019.2879
23. Winer LK, Kader S, Abelson JS, et al. Disparities in the Operative Experience Between Female and Male General Surgery Residents: A Multi-institutional Study From the US ROPE Consortium. *Annals of surgery*. 2023;278(1):1-7.  
doi:10.1097/SLA.0000000000005847
24. Dossa F, Zeltzer D, Sutradhar R, Simpson AN, Baxter NN. Sex Differences in the Pattern of Patient Referrals to Male and Female Surgeons. *JAMA surgery*. 2022;157(2):95-103. doi:10.1001/jamasurg.2021.5784
25. Schieber AC, Delpierre C, Lepage B, Afrite A, Pascal J, Cases C, et al. Do gender differences affect the doctor-patient interaction during consultations in general practice? Results from the INTERMEDE study. *Family practice*. 2014;31(6):706–13.
26. Vasey CE, Watson EGR, Commons RJ, Liang R, Nestel D. Navigating parenthood in the surgical profession: mixed-methods study. *British journal of surgery*. 2022;110(1):84–91.
27. Department of the Prime Minister and Cabinet of Australia: National Strategy to Achieve Gender Equality Discussion Paper [Internet]. Canberra Australia: PM&C 2022. [Cited December 2024]. Available from URL:

<https://www.pmc.gov.au/resources/national-strategy-achieve-gender-equality-discussion-paper>

28. Dean E. Challenges of combining a career in surgery with parenting. *BMJ*. 2023;380:449–449.
29. Knell J, Kim ES, Rangel EL. The Challenges of Parenthood for Female Surgeons: The Current Landscape and Future Directions. *The Journal of surgical research*. 2023;288:A1–A8.
30. Myers SP, Dasari M, Brown JB, Lumpkin ST, Neal MD, Abebe KZ, et al. Effects of Gender Bias and Stereotypes in Surgical Training: A Randomized Clinical Trial. *JAMA surgery*. 2020;155(7):552–60.
31. Nater C, Heilman ME, Sczesny S. Footsteps I would like to follow? How gender quotas affect the acceptance of women leaders as role models and inspirations for leadership. *European journal of social psychology*. 2023;53(1):129–46.
32. Liang R, Dornan T, Nestel D. Why do women leave surgical training? A qualitative and feminist study. *The Lancet*. 2019;393(10171):541–9.
33. Royal Australasian College of Surgeons: Women in Surgery Section Strategic Plan 2022-2026 [Internet]. Melbourne Australia: RACS, 2022. [Cited December 2024]. Available from URL: <https://www.surgeons.org/en/Resources/reports-guidelines-publications/workforce-activities-reports>
34. Marks IH, Diaz A, Keem M, Ladi-Seyedian SS, Philipo GS, Munir H, et al. Barriers to Women Entering Surgical Careers: A Global Study into Medical Student Perceptions. *World journal of surgery*. 2020;44(1):37–44.
35. Tricco AC, Bourgeault I, Moore A, Grunfeld E, Peer N, Straus SE. Advancing gender equity in medicine. *Canadian Medical Association journal (CMAJ)*. 2021;193(7):E244–E250.

36. Mahendran GN, Walker ER, Bennett M, Chen AY. Qualitative Study of Mentorship for Women and Minorities in Surgery. *Journal of the American College of Surgeons*. 2022;234(3):253–61.
37. Ferrari L, Mari V, De Santi G, Parini S, Capelli G, Tacconi G, et al. Early Barriers to Career Progression of Women in Surgery and Solutions to Improve Them: A Systematic Scoping Review. *Annals of surgery*. 2022;276(2):246–55
38. Zogg CK, Kandi LA, Thomas HS, Siki MA, Choi AY, Guetter CR, et al. Comparison of Male and Female Surgeons' Experiences With Gender Across 5 Qualitative/Quantitative Domains. *JAMA surgery*. 2023;158(2):e226431–e226431.
39. Begeny CT, Ryan MK, Moss-Racusin CA, Ravetz G. In some professions, women have become well represented, yet gender bias persists—Perpetuated by those who think it is not happening. *Science advances*. 2020;6(26):eaba7814–eaba7814.
40. Heisler CA, Temkin SM. Gender Equity in Gynecologic Surgery: Lessons from History, Strengthening the Future. *Current surgery reports (Philadelphia, PA)*. 2022;10(1):8–17.