

# Women Physicians in Leadership Roles in Critical Care Medicine or Academic Medicine—A Systematic Literature Review

**OBJECTIVE:** To systematically review and synthesize the evidence surrounding factors impacting women rising to leadership positions in critical care medicine (CCM).

**DATA SOURCES:** PubMed, Embase, Web of Science, and Cochrane Library from 2011 to 2024.

**STUDY SELECTION:** Articles included were cohort studies, surveys, and interviews addressing women physicians practicing in CCM and related fields of academic medicine.

**DATA EXTRACTION:** Causes of not rising to leadership among women were extracted and tabulated along with other pertinent study characteristics.

**DATA SYNTHESIS:** The database searches generated 892 records. Thirty-nine studies met inclusion criteria for data extraction. The included articles represented seven countries, with 30 studies originating in the United States. Only two studies were from CCM, whereas others addressed leadership in other academic and clinical fields of medicine, medical journals, and societies and medical faculty. Twenty-six studies were qualitative, observational studies; five were survey based and eight included interviews. Using thematic analysis, the following five domains emerged: pipeline issues, lack of opportunities, lack of self-efficacy, lack of mentorship, and sustaining women in leadership.

**CONCLUSIONS:** While the satisfaction rates of women in CCM were high, challenges remain for women to obtain leadership opportunities. A culture of support could better nurture and sustain women in leadership roles. More CCM-focused gender bias research is needed. Future targets for interventions include gender bias training, awareness, and developing strategies to break through the cycle of gender preferential promotions in CCM.

**KEYWORDS:** critical care; gender; harassment; leadership; mentorship; sponsorship

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Data published in 2020 reported that significant gender disparities exist among critical care practitioners (1–3). Data published in 2019 suggested that despite almost equivalent gender enrollment in medical schools, only slightly more than one-fourth of U.S. critical care physicians were women (4, 5). In addition, a survey study conducted by the World Federation of Societies of Intensive and Critical Care Medicine between 2006 and 2017 uncovered increasing percentages of women intensivists in training (26–37%) and practice (14–26%), but stable and low proportions of female board examiners (15%) and members of critical care certifying boards (fluctuating between 18% and 27%); this survey also noted women remaining underrepresented in academic society leadership positions (0–41%) and among faculty organizing and/or participating in academic symposia (< 20%), chairs, or critical care medicine (CCM) directors (6–8).

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KEY POINTS

**Question:** We aimed to review published data on factors impacting women not rising to leadership in Critical Care Medicine (CCM) and related fields of medicine.

**Findings:** Of 39 studies, only two were from CCM. Most studies used survey or interview methodology. All studies recognized hurdles in leadership paths, while several pointed out facilitators. The barriers ranged from a lack of self-efficacy to bias and lack of mentorship. The studies widely crossed over the emergent domains. There remains a major gap in literature, especially in the CCM domain.

**Meaning:** More rigorous research is needed for understanding the true state and causes for a gender gap in CCM leadership. Perspectives of all stakeholders are essential in developing mitigating strategies. The articles identified valuable tools for overcoming the barriers as well.

We conducted this systematic review to better understand gender equity and disparity, as well as factors impacting women rising to leadership in academic medicine, particularly in critical care.

MATERIALS AND METHODS

The protocol was registered and documented (No. CRD42023390439) at the PROSPERO registry. The team followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Search Strategy

Under the direction of a medical librarian (M.M.), four databases were searched and included the Cochrane Library, Embase, PubMed, and the Web of Science. Using keywords and a standardized search strategy (Appendix A, <http://links.lww.com/CCX/B496>), a systematic review was conducted assessing the literature from database inception (January 1, 2008) to May 31, 2024. The searches were limited to the English language and created using controlled vocabulary, Medical Subject Headings, Emtree terms, and keywords for the research question.

Study Selection and Screening

The search results were exported into the Covidence (Veritas Health Innovation, Melbourne, VIC, Australia) web-based software platform, duplicates were removed, and eligible studies were screened based on the inclusion and exclusion criteria (Table 1).

Search results were imported into Covidence, a web-based software for systematic reviews. Each abstract was independently screened by two reviewers (T.K.B.-J., B.G.) with conflicts resolved by consensus between two members of the research team (S.S., M.M.). The team completed full-text review of included articles with two authors reviewing the full texts and conflicts resolved by consensus and, if needed, adjudication through discussion by the full research team. As only two studies were specific to CCM, studies were considered eligible for inclusion if they reported on women in CCM or in related fields of academic medicine (Table 1). Outcomes of particular interest addressed women in leadership positions, which we defined as Director, Vice Chair, Chair, Dean, or Associate Dean; we also included Corporate Suite positions, such as Chief Executive Officer, Chief Medical Officer, or Chief Financial Officer. Gray literature and non-English articles were excluded. Also, articles that repeated similar themes and did not add to the knowledge, or described populations that were not related to critical care, were nonphysician based, or similar academic medicine fields, or were editorials or consensus statements were excluded.

TABLE 1.  
Population, Intervention, Comparator, Outcomes, Timing, and Setting Question

Inclusion Criteria	Exclusion Criteria
Quantitative or qualitative study	Editorial or commentaries
English language	Gray literature

“Why women are not equally represented in Critical Care Medicine leadership roles and other similar fields worldwide, and what organizational policies and practices impede this progression?” (Population—women in medicine, Intervention—none, Comparator—none, Outcomes—achieving a leadership position, Timing—following medical and/or fellowship training, and Setting—critical care, academic medicine, corporate suite positions in medicine, Colleges of Medicine (i.e., Dean’s office).

## Data Abstraction

For each final selected article, two study team members abstracted the data independently, using a predetermined data sheet that included categories for study design, baseline characteristics of study populations, details of the intervention and control arms, and summary data of intervention outcomes. All abstracted data were reviewed and discrepancies adjudicated by group consensus. Data synthesis results from identified studies were presented in a tabular summary and summarized in a qualitative synthesis. Meta-analysis was not possible because of the varied content of reported data.

## Quality Appraisal

The methodological quality of included studies was assessed by two members of the study team (S.S., T.K.B.-J.) independently using a Critical Appraisal Skills Programme checklist for observational surveys and qualitative studies (9). Disagreements were adjudicated by group consensus. Quality was assessed on a scale of ten parameters and articles with scores greater than 2 were deemed to be of acceptable quality (**Appendix B**, <http://links.lww.com/CCX/B496>).

## Data Analysis

The included studies were transcribed and tabulated, and the qualitative data were analyzed using thematic coding, iterative analysis, and separation into domains. The analysis was conducted by the reviewers (S.S., B.G., T.K.B.-J.) in an inductive manner where the themes were interpreted by allowing them to emerge directly from the data itself, without predetermined categories. Initial coding, reviewing and refining themes, and defining and naming themes were conducted by the reviewer (S.S.) and the two reviewers, and then agreed upon by a series of virtual meetings by the entire authorship. Data from all 39 articles was included and was sufficient to reach saturation. The emergent themes crossed over various articles such that each article may have contributed to a single or multiple domains. These domains were then agreed upon by all the authors.

## RESULTS

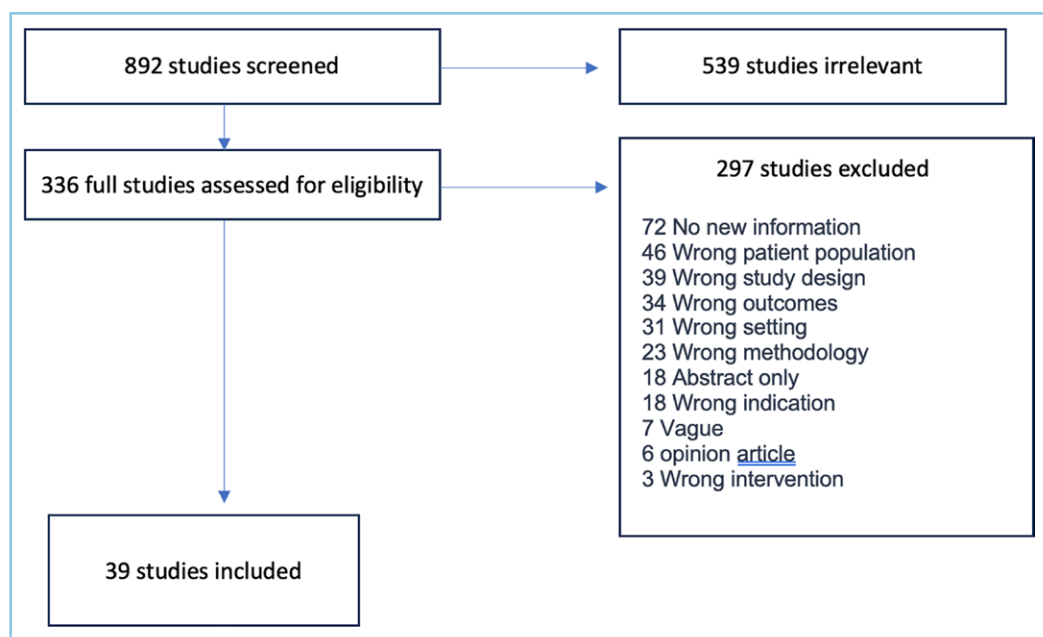
Database searches generated 892 records (**Fig. 1**). After duplicates and irrelevant articles were removed,

336 articles were included for full screening. Of these, 39 studies met inclusion criteria for data extraction. Included studies (**Supplemental Table 1**, <http://links.lww.com/CCX/B496>) were published between 2011 and 2024 and represent seven countries, with 30 studies originating in the United States. Other countries included Australia, Austria, New Zealand, Spain, France, and Pakistan. Only two studies were from CCM, whereas others addressed leadership among women in other areas of academic and clinical fields of medicine, journals, societies, and faculty. All 39 studies used qualitative methodology. Twenty-six studies were observational studies; five were survey based and eight used interviews. None were from private practice medicine. While the articles we found spoke of academic leadership roles, there was no literature describing the advancement of women in corporate suite roles, or of women in allied health roles.

All studies reported and/or addressed existing gender disparities for women in CCM and/or academic medicine leadership, with rationales for these disparities sorting into five emergent domains. Many articles touched on more than one domain and the data could be generalized widely to overlapping domains.

### Insufficient Leadership Development Pathways Focused on Women

Thirteen articles from 2014 to 2022 dealt with this issue from around the world, including the United States, Canada, Spain, Australia, France, and New Zealand. Of these, three were survey based and five were interviews, while the rest were observational studies. The studies reported the following data: women comprise only 10% of academic Chair positions despite reaching a critical mass of 34% of academic medical faculty (10); women reported being unprepared for the leadership role, untrained to cope with the inherited unhealthy department cultures, and negative faculty reactions (11); and women reported feeling a lack of commitment and accountability from leadership in training them for future leadership roles and felt a cultural climate of negativity toward them (12). Helitzer et al (10) also noted that “While women desired to progress in their academic careers, they also delayed or deferred opportunities to participate in career development activities and/or advance and assume leadership roles because they embraced their families as high priorities



**Figure 1.** Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

Exclusion of studies included redundant data, editorials, and consensus statements, noncritical care or related population, nonphysicians, non-English, and not from time period specified.

in making career choices.” Many programs did not accommodate these needs and priorities. Similarly, in another study (13) only 22% of full professors, 18% of department chairs, and 17% of medical school deans were women. This study reported microinequities such as less pay for women compared to men in the same position. Interestingly, in another survey on the gender gap in professorship and leadership, women blamed themselves for not achieving more while men blamed external factors (6). In an interview-based study on intensivists, participants unanimously described CCM as a specialty practiced predominantly by men (14).

Most women described experiences of being personally or professionally impacted by gender inequity in their group. One interview-based study described a lack of coaching and career development programs for women, with concurrent intentional support of institutional leadership pathways (15). One hospital-based study provided data that despite 70% women physician workforce, only 30% rose to leadership roles (16). The global existence of the problem is evidenced by several international studies reporting similar issues among women. One such CCM observational study done in French ICUs described a prevalence of the issue of gender bias and gap, as well as offered ways to improve career growth for women in CCM, including structured pathways and equitable pay (17). Similarly,

a survey based study done in New Zealand ICUs showed fewer women in leadership than men (6). While 81% were satisfied with their experiences, 37% felt disadvantaged because of their sex. Major challenges included work-life balance, on-call work affecting child-rearing and family life, sexism in the workplace and difficulties with academic advancement. In another observational study, women from marginalized and historically excluded

groups felt additional barriers including bias and discrimination in rising to leadership positions. One U.S. study pointed out a common lack of institutional culture to advance women as quickly as men and paying them equitably (18). This study pointed out more hurdles for women in achieving leadership roles in academia compared to men. Another qualitative review of men and women in academic medicine survey responses found predominately females concerned with applying for leadership positions too early “I have strong aspirations for leadership roles, but not right now. I do not feel qualified for certain positions” suggesting that women were more inclined to internalize barriers compared with their male counterparts (19). This domain reveals a lack of structured and accessible developmental pathways designed to enable women in leadership roles.

### Insufficient Opportunities for Leadership Advancement

Twenty articles published between 2011 and 2022, originating from Austria, Australia, Canada, and the United States, and involving women in academic medicine addressed this topic. These studies uniformly identified fewer women in leadership roles. Since 2003, women and men have graduated from medical



school in equal proportion. However, the Association of American Medical Colleges reports that women still only account for 25% of full professors and 18% of department chairs (13). One survey revealed that female physicians were less likely to reach leadership roles, primarily due to lack of realistic opportunities, and relationships that foster advancement of women (20). Several disparities were thought to account for this divergence including underrepresentation of women in committees and society leadership, differential promotion of men rather than women, funding discrepancies, and gender bias. These disparities are interwoven with the culminating result being a lack of women in leadership positions (21). As the number of women in high-ranking leadership is low, it is primarily men in the position of identifying future leaders. In an interview study participants thought that through conscious or unconscious bias, people are more likely to identify leaders who reflect themselves, thus continuing the cycle of male leaders not considering females for leadership positions (22). An observational study of 100 transcontinental medical schools showed a male majority in all regions with a persistent deficit of women in all levels of leadership (23). Another study described the role of women on editorial boards of scientific journals and found that, in every category, the proportion of women as editorial board members was substantially lower than that of men (24).

Another study from 2020 revealed that women comprise less than one third of first authors and one fourth of senior authors of critical care research, with minimal increase over the past decade (25). Authorship is an important aspect of academic progress and is a mandatory requirement for tenure. This study also noted that when the senior author was a woman, the odds of female co-authorship rose substantially. However, female first authors also tended to publish in lower impact journals. Similarly, another study pointed out significant and increasing racial and gender disparity in residency training. The proportion of Black and female residents dropped from 5.9% and 36% in 2013 to 5.5% and 33% in 2021 (26). This is also seen among society membership and leadership (27). In this study, organizations with female leaders had a shorter time to gender and racial equity. The authors surmised that active participation in a woman led and focused professional organization enhances members' career retention and advancement, by creating opportunities

and relationships that facilitate leadership. This domain, distinct from the previous one, expounds on the lack of opportunities for women, especially those of underrepresented minorities, to rise.

### Deficit in Self-Efficacy

Four studies (from 2011 to 2021) selected for this domain with three being from the United States and one from Canada and two specifically addressing women in leadership in CCM. The studies described women feeling an internal deficiency in ability to lead, either in confidence in their abilities, or faith in the system to sustain it. CCM was described as male dominated with interpersonal and institutional causes for the gender gaps (14). One study noted that female applicants apply for fewer leadership positions and fewer research grants, which may directly impact promotion in academic medicine (28). It noted that women were less likely to attain the rank of professor (odds ratio, 0.57; 95% CI, 0.43–0.78), and women were less likely to attain senior level positions than men, even after adjusting for publication related productivity. Some of this lack of confidence was ascribed to low self-efficacy, while other causes were institutional, which reflected existence of policies that made it difficult for women to juggle a family and professional life in such roles (29). One survey revealed a predominant feeling of “imposter syndrome” or a lack of belief that one is capable to lead, which is present in both sexes but more common among women (30). This survey also showed that male culture, lack of sponsorship, lack of mentoring, and the “queen bee syndrome” (where women hold back the progress of other women) led to eroding self-efficacy among women in academia and were associated with lower workplace satisfaction (31).

### Scarcity of Mentorship

Twelve studies addressed this domain (2011–2022), with one from Pakistan and the rest from the United States. All studies suggested that a lack of mentored training can contribute to gender disparities and poor representation of women in academia and leadership. Two of these studies noted that leadership roles often require new skills acquisition and role requirement adaption, which is enhanced by positive mentorship and coaching (32, 33). These studies stressed that organizations inadvertently undermine this process

when they advise women to seek leadership roles without also addressing policies and practices that reflect a mismatch between how women are seen and the qualities and presence people tend to associate with leaders or providing enabling and structured mentorship (34). In one interview-based study, lack of mentorship was identified as one of the main barriers to advancement of women in academic medicine (35). Many women do not continue to aim for leadership positions, and a proactive mentorship strategy, focused on women mentors, has been proposed as a key method to increase opportunities in academic fields such as global health (36). International literature identifies lack of “quality” mentorship as a key barrier for women in academic medicine (32). Additionally, a survey of medical school faculty found that two of the four main factors associated with lower workplace satisfaction and opportunities for advancement were lack of mentorship and sponsorship (37). Additionally, this study showed that women from historically marginalized and excluded groups, experienced additional barriers, including bias. Another study from 2011 presented a coaching model to promote dialogue about gender equity, together with a checklist developed for women faculty to use as a reflection guide for their career planning (38). Programs developed for leadership pathways such as the Executive Leadership in Academic Medicine (ELAM) program have shown that participants showed a strong preference for serving the institution that supported their training in leadership but also supported their contributions to the institution (39). Another study followed four cohorts of mid-career women in academic medicine, assessing the impact of structured coaching and mentorship on achieving career goals (29). Such programs improved promotion and personal career goal achievement. Another survey-based study provided insights into participants’ suggestions for women focused research grants and strengthening health education especially in resource poor countries. A study from Pakistan (33) highlighted the importance of female role models in having an impact on the promotion of their trainees. The need for sponsorship was also stressed in these studies for women to rise to leadership levels among competitive fields such as CCM. One interview-based study suggested that “leadership development entails a combination of individual support through mentors and sponsors, self-education

and reflection, and organizational structural support to promote diversity” (35).

### **Scarcity of Measures to Sustain Leadership Among Women in CCM**

Nine articles published between 2011 and 2022, originating from the United States, France, and Australia/New Zealand, and concerning women in medical school faculty and in academic medicine addressed this domain. Most studies were surveys or interviews and reported few endeavors to sustain women in leadership roles. Poor career advancement strategies, mid-career goal achievement, unbalanced promotion criteria, and disparate bias against underrepresented minority women and foreign medical graduates led to some of the gaps seen. Three studies identified gaps in understanding the reasons behind why women would not stay in leadership roles or grow in such roles, as well as lack of equal pay and opportunities for women (38, 40, 41). One study revealed academic funding is less among women researchers, and these research metrics were often barriers to promotions and advancement (19). Burnout and harassment were reported among participants in another study (12). Significant gender gaps were notable in the promotion from associate professor to professor and the representation of women at the chair and dean’s level, and female physicians were less likely to feel support for work-life balance (42). Contributing factors include gender bias, bullying and harassment, and difficulty achieving work-life balance. Universities and hospitals often do not provide the support that women in medicine need to return to the workplace post-partum (26). Major challenges included financial disparities in pay, incentives, research funding, on call work structure not favoring child rearing and family life, sexism, and difficulties in faculty advancement (6). The cumulative psychological effects of gender bias, harassment, work-life challenges, and financial strain can lead to burnout and imposter syndrome (37). Women may question their value or contributions in the workplace. The interviewees opined that the cycle continues if they do not find the mentorship or sponsorship they need to build confidence, develop, and advance in their careers (36).

## **DISCUSSION**

Differences were seen among women in leadership in both academic and nonacademic practices. Similarly,

while a high percentage of women in academic medicine identify as having leadership aspirations and skills, they were less likely to be as aggressive about pursuing these ambitions as their male counterparts. Compounding with lack of a female role model in a position of leadership, women were also more likely to have fewer opportunities for leadership and many abandon their leadership aspirations. Statistically, women take on a greater amount of clinical and educational responsibilities, leaving them with reduced hours to excel at traditional promotion-driven activities such as publications and research funding. Without these activities, paths to academic promotion including professorship, editorial boards, and chair positions were not possible; thus, the cycle of reduced promotion continues (17).

While lack of mentorship for women is an important barrier to academic advancement, targeted programs for women can increase mentorship and sponsorship opportunities, with institutional leadership supporting and promoting these programs (43). Efforts aimed at tackling these disparities and biases encompass various initiatives around mentorship/sponsorship, diversity and inclusion training, and alterations in policies and procedures designed to advance gender equality (44). Mitigation strategies suggested include both individual- and institutional-level solutions discussed by the participants were: gaining and maintaining confidence (individual), maintaining accountability and mission alignment (individual), facilitating teamwork (individual), supporting women's leadership (institution), and creating safe leadership cultures (institution). Strategies to address the need for mentorship have begun to be developed, with a positive impact. Programs such as Hedwig van Ameringen ELAM and Mid-Career Women in Medicine have provided opportunities for networking, mentorship, and sponsorship, in addition to leadership training, with narrative interviews affirming that these programs positively impacted career development (45). Another academic center created a program for mid-career women, with emphasis on networking, career development, leadership, and negotiation, with 32% of the women who participated as associate professors advancing to professors on post-survey. These programs in conjunction with institutional intentional strategies can increase the potential for women to obtain mentorship, sponsorship, and

leadership positions (46, 47). Women are sustained in leadership roles through a culture of support, but in the past, there has been little consensus regarding what this kind of culture would entail.

Certain themes have emerged from the literature to demonstrate distinct but related facets of culture that were conducive to advancing women's careers. The first element is freedom from gender bias. Several priorities have been targeted to achieve equity in medicine including transparency and equity in compensation, tracking promotion of women, evaluating implicit and unconscious biases within subcultures, and tracking of academic production and publications (48).

Another element required for equitable culture is support for work-life balance. While an individual's personal life will collide with the workplace, this conflict should not be a deterrent to pursuing leadership roles. However, this remains a significant challenge for many women. The issue is the difficulty of household tasks and problems associated with childcare balanced against work responsibilities. Flexible work policies, part-time work options, and institutional childcare support are common solutions. However, if women choose this track, their professional growth should not be penalized. An important element of cultural support is equal access to opportunities. Women often begin their careers with less institutional support, and early academic productivity appears to predict those who remain and advance in academic careers (49).

Additionally, much career development was spent on early-career women, with the presumption that the challenges and biases faced by those women will no longer remain impediments with increasing seniority and experience. Unfortunately, that is not the case, and support for women should continue across the career continuum. Other suggestions include organizational strategies, increasing awareness and understanding, structured and focused mentorship, leadership training, and support strategies. This includes flexible hours, onsite childcare, and lactation rooms with protected time to nurse or pump.

The last element of creating an equitable culture is chair/chief support, as culture is partly built on top-down efforts. Chairs can message to the department that gender equity is a priority and facilitate mentorship, coaching, and leadership training. Additionally, chairs can also encourage sponsorship of women, whereby talented women are directly advanced, as



opposed to mentorship, which requires advice and acquiring skills (50). The review shows a clear and distinct differentiation between facilitators of rising to leadership among women in CCM including the factors mentioned above, and hindrances that lack of these factors lead to.

While data exist in similar fields of medicine, there is an evident gap in the literature describing the presence of gender disparities in CCM. Lack of evidence from CCM could point toward a lack of recognition or interest in the problem. We hope that this review can spur future research endeavors designed to examine barriers to the growth of women leaders in CCM. Similar to physicians, there was scant information describing progress of women allied health professionals such as pharmacists, respiratory therapists, and dietitians to leadership roles in CCM. Nurses, however, have well-structured pathways toward the higher echelons of executive roles.

## CONCLUSIONS

While the satisfaction rates of women in CCM are high, challenges remain for women in leadership. By creating a culture of support, we can sustain them in those roles. We also recognize that although this is a long-recognized area of CCM and professionalism, it has been understudied and good quality data are lacking in the literature.

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