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Identification and Assessment of Strategies to Address Gender Inequity in the Specialty of Critical Care Medicine: A Scoping Review, Modified Consensus Process, and Stakeholder Meeting

OBJECTIVES: We sought to identify and prioritize improvement strategies that Critical Care Medicine (CCM) programs could use to inform and advance gender equity among physicians in CCM.

DESIGN: This study involved three sequential phases: 1) scoping review that identified strategies to improve gender equity in all medical specialties; 2) modified consensus process with 48 CCM stakeholders to rate and rank identified strategies; and 3) in-person stakeholder meeting to refine strategies and discuss facilitators and barriers to their implementation.

SETTING: CCM.

SUBJECTS: CCM stakeholders (physicians, researchers, and decision-makers; mutually inclusive).

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: We identified 190 unique strategies from 416 articles. Strategies were grouped thematically into 20 categories across four overarching pillars of equity: access, participation, reimbursement, and culture. Participants prioritized 22 improvement strategies for implementation in CCM. The top-rated strategy from each pillar included: 1) nominate gender diverse candidates for faculty positions and prestigious opportunities (equitable access); 2) mandate training in unconscious bias and equitable treatment for committee (e.g., hiring, promotion) members (equitable participation); 3) ensure equitable starting salaries regardless of sex or gender (equitable reimbursement); and, 4) conduct 360° evaluations of leaders (including their direct work circle of supervisors, peers, and subordinates) through a diversity lens (equitable culture). Interprofessional collaboration, leadership, and local champions were identified as key enablers for implementation.

CONCLUSIONS: We identified stakeholder-prioritized strategies that can be used to inform and enhance gender equity among physicians in CCM under four overarching equity pillars: access, participation, reimbursement, and culture. Implementation approaches should include education, policy creation, and measurement, and reporting.

KEY WORDS: consensus process; critical care medicine; gender equity; medical specialties; scoping review

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The number of women entering the medical profession has equaled or exceeded men in several countries (1, 2), including Canada (3), yet gender-based gaps in opportunities, compensation, and representation

remain prevalent (1, 2). Despite trends indicating improvement, women in medicine experience slower career advancement (4–6), lower overall compensation (7–9), and fewer prestigious scholarly activities (e.g., serve on clinical practice guideline committees, invited conferences addresses) compared with men, after considering experience and expertise (10–14). Women in medicine are also more likely to experience negative treatment in the workplace, including discrimination or harassment (15). Discrepancies between women and men physicians are pronounced in many medical specialties (15). In 2019, 41% of all licensed medical specialists in Canada were women with representation ranging across specialties from 8% women in cardiac surgery to 82% women in maternal-fetal medicine (16). In Canada, adult Critical Care Medicine (CCM) is a medical specialty requiring at least three years training in one of five primary specialties (Anesthesiology, Cardiac Surgery, Emergency Medicine, General Surgery, Internal Medicine) prior to entry into one of 13 2-year Critical Care programs (17). Both CCM and its primary specialties have a relatively low representation of women licensed physicians (16); the Canadian Medical Association's (CMA) most recent data (2019) reported that 28.5% of CCM physicians were women, the highest rate ever, with a minimal increase of 3% relative to previous years. Furthermore, a national study recently reported that women comprised only 20% of CCM faculty and 28% of CCM trainees in Canadian universities, suggesting the gender gap persists across career stages (18). Previous research has described the scope of the problem, the factors perceived to impact recruitment and retention of women to select medical specialties (e.g., long and inflexible work hours, few women in leadership roles) (19), and the consequences (e.g., effect on patient outcomes) of gender inequities in medicine (6, 12, 20, 21) and specifically in CCM (18). While effective strategies and evidence for improvements are forthcoming, they have been slower to materialize.

Based on our published protocol (22), we conducted a multiphase study that included a scoping review and national consensus process to identify recommendations that may contribute to addressing the gender gap (herein broadly defined as the gap between women and men in levels of participation, access, remuneration, or benefits unless otherwise specified in our study data to encompass a gender spectrum) among physicians in

CCM. We anticipate that our study outcomes will help to continue to effect long-term change in CCM.

MATERIALS AND METHODS

Scoping Review

We conducted a scoping review to identify published strategies—interventions, actions, solutions—focused on improving gender inequity in medical specialties. We followed the methodology for Joanna Briggs Institute Scoping Reviews (23), using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews (24) to inform reporting of methods and results. The study is registered in Open Science Framework (<https://osf.io/ek7yc/>). Our operational definition of medical specialties included all those identified by the CMA (16); **Supplemental File 1, Appendix 1** (<http://links.lww.com/CCX/A887>) details our search strategy and citation selection.

Data Synthesis

We analyzed study characteristics using descriptive statistics and free-text strategies using thematic content analysis (25). Thematic coding was done in duplicate to ensure analytic rigor. Two investigators (C.d.G., L.K.) independently read and applied open coding to each strategy, then met with the principal investigator (J.P.L.) to discuss emerging categories and thematic pillars (strategies → categories → pillars) (26). They (J.P.L., C.d.G., L.K.) developed a coding framework that the investigators (C.d.G., L.K.) used to independently analyze the qualitative dataset. The investigators met regularly to review their coding and confirm consensus. Coding discrepancies between investigators were minor differences in categorizing coded data segments; these were discussed and resolved over the course of analysis.

Modified Consensus Process (Prioritization)

We conducted a modified RAND/UCLA Appropriateness method (27) with a panel representing three mutually inclusive CCM stakeholder groups: physicians (hold an MD), researchers (hold an MSc and/or PhD), and decision-makers (defined here as a person who holds a CCM administrative leadership role as demarcated within the context of their organizational

structure). Stakeholders could assume more than one stakeholder group (e.g., a physician with a PhD would be included as a physician and as a researcher). Included stakeholders rated and ranked improvement strategies identified from the scoping review through two remote survey rounds.

Selection of Stakeholders

The ideal number of participating experts for a modified RAND/UCLA appropriateness process has not been determined (28). We established a recruitment target of 45–50 participants (22) committed to gender equity in CCM aiming for diversity in gender, specialty training (e.g., surgery, internal medicine), career stage (early, middle, and late career) (29), professional roles (e.g., department head), and affiliations within national academic programs and national and international CCM organizations (e.g., Society of Critical Care Medicine, Canadian Critical Care Trials Group, American Thoracic Society). In this regard, we created a steering committee of nine study investigators (seven women and two men) representing the stakeholder groups and with expertise in gender equity and broad connections in CCM across Canada and Western, English-speaking, high-income, international countries. The steering committee identified participants through personal contacts and website faculty lists, including the Department Heads of the 13 Canadian CCM training programs. They purposively nominated and invited 40 stakeholders (20 women and 20 men); 25 (15 women, 10 men) of whom agreed to participate. The steering committee generated additional names through similar recruitment strategies as well as asking CCM departments to forward the study invitation broadly through their physician staff. Recruitment continued until we achieved our recruitment target. In total, 20 stakeholders (eight women [40%] and 12 men [60%]) declined participation. Full details of our sampling frame and approach was published previously (22).

Rating Instruments

Round 1. We created an electronic questionnaire using the online platform Qualtrics (Provo, UT). We asked participants to review each unique strategy from the scoping review and rate using a 9-point scale (1—non-essential; 9—essential) perceived level of importance in addressing gender inequity in CCM. In round 1, median scores (interquartile range) were used to

prioritize strategies. We defined consensus as those strategies that had a rating of 1–3 (nonessential) or 7–9 (essential); strategies with a median score 4–6 were considered to not have consensus. For ease of review, we grouped strategies by likeness (e.g., addressed recruitment issues) into categories (in duplicate by C.d.G., L.K.; checked by J.P.L.) and overarching pillars (**Supplemental File 1, Appendix 2**, <http://links.lww.com/CCX/A887>). Participants could also submit additional strategies not represented in round 1.

Round 2. In round 2, participants provided a weighted ranking for each strategy prioritized from round 1 based on their perceived understanding of the strategy's importance in addressing gender inequity in CCM (**Supplemental File 1, Appendix 3**, <http://links.lww.com/CCX/A887>). Allocated weightings could range from 0 to 100; however, the overall allocated value for each category had to total 100. The mean ranking across strategies was used to determine whether a strategy was “prioritized” or excluded from the final list. For a strategy to be prioritized, the mean score had to be equal to or greater than one SD above the category's mean.

Stakeholder Meeting

A full day, in-person stakeholder meeting facilitated by an experienced moderator (N.Z.) was held on November 10, 2019, in Toronto, ON, Canada. All consensus process participants were invited to attend the meeting. The meeting was structured to include several collaborative sessions with a priori goals to: 1) review and refine the prioritized strategies to ensure fit within CCM and 2) discuss facilitators and barriers in implementing prioritized strategies within CCM departments and training programs. One experienced qualitative moderator from the research team was assigned to each of five small groups (C.d.G., L.K., S.J.M., K.K., N.Z.) to take observational notes of important concepts discussed during the sessions. Each group was composed of at least two physicians, one researcher, and one decision-maker, with a mix of women and men in varying career stages. After each small group session, the groups came together to discuss and synthesize group findings. A panel of decision-makers that included five department heads (three women and two men) and two professional society leaders (one woman and one man) facilitated the discussion. All discussions were recorded and transcribed verbatim

by one moderator (L.K.) for qualitative analysis. Participants completed a short online demographics questionnaire (via Qualtrics) after the meeting.

Analysis

We conducted a qualitative, thematic content analysis of the stakeholder meeting transcription and observational notes (25). Analysis occurred in an iterative cycle. Two investigators (C.d.G., L.K.) reviewed the transcripts and observational data and developed open codes. Codes were then discussed, compared, and pooled in a coding manual from which investigators developed and named overarching thematic categories. Finally, we asked the small group session moderators to review the thematic categories to assess appropriateness. Disagreements were resolved through discussion to generate a final synthesized list of themes.

RESULTS

Scoping Review

The database searches yielded 1,960 articles published between 1981 and 2019 (**Supplemental File 1, Appendix 4**, <http://links.lww.com/CCX/A887>). After removing duplicates, we screened 1,100 unique citations for inclusion. Hand-searching the article reference lists resulted in an additional 542 citations and gray literature sources, to total 914 articles for full-text review. Full-text review resulted in 416 articles for data abstraction. The most frequent reason for article exclusion was no focus on strategies addressing gender inequity.

Article Characteristics

A detailed description of article characteristics is included **Supplemental File 2** (<http://links.lww.com/CCX/A888>). The 416 articles included: 162 (38.9%) research articles (e.g. cross-sectional, cohort, qualitative), 118 (28.4%) opinion articles (e.g. editorials/commentaries/letters to editor), 79 (19.0%) review articles, and 57 (13.7%) other article types (e.g. reports, white papers, books). The primary medical specialties represented were surgery ($n = 117$, 28.1%), academic medicine (nonspecialty specific) ($n = 100$, 24.0%), and radiology ($n = 20$, 4.8%); only seven articles (1.7%) focused on CCM (**Supplemental File 2**, <http://links.lww.com/CCX/A888>). However, 29.8% of the articles

($n = 124$) did not report a medical specialty. Of the 162 research articles, 74 (45.7%) proposed unique strategies to address gender inequity; implementation of one or more strategies was described in 29 articles (17.9%).

Strategies

The scoping review identified 190 unique strategies that were classified into 20 categories under four overarching pillars: 1) Equitable access: strategies that addressed social and institutional imbalances to recruitment, retention, and promotion; 2) Equitable participation: strategies to promote full participation of CCM stakeholders (as defined in this study); 3) Equitable reimbursement: strategies that supported equal pay for equal work, regardless of gender; and 4) Equitable culture: interventions that promoted safety from discrimination and harassment, and reduced detrimental cultural expectations and norms (**Supplemental File 3, Appendix 1**, <http://links.lww.com/CCX/A889>).

Modified Consensus Process (Prioritization)

Forty-eight stakeholders participated in the modified consensus process. Participants were largely from Canada, women, and were physicians (**Table 1**). Participant ratings in round 1 resulted in the prioritization of 187 strategies (65%) (**Supplemental File 3, Appendix 2**, <http://links.lww.com/CCX/A889>). Round 2 resulted in refinement to the prioritization of 22 strategies that spanned 15 categories across four pillars (**Supplemental File 3, Appendix 2**, <http://links.lww.com/CCX/A889>).

Stakeholder Meeting

Forty-three of the 48 consensus process participants attended the in-person stakeholder meeting. Participants refined the 22 prioritized strategies and added four new strategies during morning breakout sessions, resulting in 26 prioritized strategies (**Supplemental Table 1**, <http://links.lww.com/CCX/A885>). Based on the highest mean value assigned in round 2, the top strategies within each pillar were: 1) nominate gender diverse candidates for faculty positions (i.e., recruitment) or for prestigious opportunities (e.g., invited talks) based on relevant expertise (equitable access), 2) mandate training in unconscious bias and equitable treatment for committee

TABLE 1.
Consensus Process Participant
Characteristics (*n* = 48)

Characteristic	<i>n</i> (%)
Location	
Canada	43 (90)
Alberta	6
British Columbia	4
Manitoba	4
Newfoundland	1
Nova Scotia	2
Ontario	25
Québec	3
United States	3 (6)
California	1
Colorado	1
Texas	1
United Kingdom	2 (4)
England	1
Scotland	1
Role ^a	
Physician	42 (88)
Researcher	24 (50)
Decision-maker	21 (44)
Medical specialty ^b	
Anesthesiology	8 (19)
Internal medicine	26 (62)
Pediatrics	5 (12)
Surgery	3 (7)
Career stage ^c	
Early	12 (31)
Middle	25 (64)
Late	11 (28)
Sex at birth	
Female	35 (73)
Male	13 (27)
Gender	
Woman	35 (73)
Man	13 (27)

^a*n* will exceed number of participants as participants assumed more than one role.

^bProportions calculated on the number of physician-certified participants (*n* = 42).

^cDefined by the number of years the participant had been out of training; early ≤ 10 yr, middle = 11–20 yr, and late = 21 or more years.

(e.g., hiring, promotion) members (equitable participation), 3) ensure equitable starting salaries regardless of sex or gender (equitable reimbursement), and 4) conduct 360° evaluation of leaders (including their direct work circle of supervisors, peers, and subordinates) through a diversity lens (a term used by participants to evaluate from multiple perspectives including sex, gender, ethnicity, and discipline) to help promote equity (equitable culture).

Our qualitative content analysis of the transcribed meeting recordings and notes resulted in five overarching themes that described participant's refinement of strategies for application to CCM: 1) ensure accountability (i.e., multilevel; from individuals being accountable for their own bias training to departments mandating equitable practices), 2) prioritize transparency (i.e., awareness and access to the same information across hiring and promotion criteria), 3) build in flexibility (i.e., embrace progressive approaches to recognizing merit in the tenure and promotion process, such as a formalized reward system for excellent mentorship that impacts promotion decisions), 4) increase scope of diversity mandates (i.e., new initiatives should have built-in mechanisms to acknowledge overlapping impacts of discrimination based on characteristics such as gender, race, physical ability, ethnicity, etc.), and 5) enhance cultural climate (i.e., strategies should focus on improving norms that do not encourage equity across all levels of medicine) (**Supplemental Table 2**, <http://links.lww.com/CCX/A886>).

Implementation

Participant discussions of implementation centered on how the 26 refined strategies could be implemented, who ought to be involved, and perceived facilitators and barriers to implementation. Three overarching themes emerged: 1) education reform to include mandatory gender equity and unconscious bias training, 2) policy solutions to prompt structural change (e.g., diversity and code of conduct policies should be mandatory for accreditation from governing bodies), and 3) measurement and reporting (e.g., aggregate demographic data of department) to increase awareness and benchmarking of gender equity data (**Table 2**).

Participants identified several key barriers to implementing gender equity strategies in CCM, including: finances (e.g., reallocation of resources from other

TABLE 2.
Themes and Exemplar Quotations From Stakeholder Meeting Discussion Regarding Process for Implementation of Prioritized Strategies

Implementation Process	Exemplar Quote
Education Implicit bias training, diversity, and inclusion seminars	“I can see the merit for why every last one of us needs to do this [implicit bias] training, so that we can implement in terms of the behaviors that we exhibit, when we’re doing some, ... an example would be about assessing a resident on an entrustable professional activities (EPA). And without changing that EPA, it’s all how we view that EPA, the resident doing that EPA, or reviewing the project.”—Group 4
Structural and policy solutions Prioritize open communication, acquiring federal funding for gender equity research initiatives, including gender equity in the organization’s mission, vision, and values	“We utilize my office [Department head] as a mechanism for feedback. The trainees see behavior that they don’t like. They report it, and then myself or another will sit down with the individual resident, fellow, faculty and talk about perception and behavior and communication style as one mechanism to try to help improve or facilitate that communication. We also provide that feedback to medical students as well as think about what is the greater context? What was that background and why do you think that particular faculty members said or did this? Maybe there is X, Y, Z to help to try to facilitate a more effective communication between [for example] the generational differences.”—Group 1
Measurement and reporting Audits, adjusting metrics, creating benchmarks	“It’s great to actually have data [to benchmark with] and then what’s your target, and what time scale are you going to achieve [the target], and what’s your strategy for achieving [the target]? That’s what I want to see.”—Group 3

initiatives), time (in addition to clinical care, mentoring, committee work, scholarly activity, call, professional society work, as well as personal health and family life), perspective (e.g., unacceptance of a gender equity problem, rollout of changes could alienate if perceived as militant), and decisional structure (e.g., one chair ultimately responsible for committee decision on hiring). Participants identified the need to engage three priority groups to effectively develop and implement initiatives: 1) interprofessional collaborations—branching outside of medicine for input from other fields (i.e., human resources, law, business); 2) leadership—individuals in established positions in CCM (i.e., department/division/section heads, deans) to endorse, implement, and promote the initiatives; and (3) local champions—individuals in various positions within CCM must take on champion roles to promote established initiatives (Table 3).

DISCUSSION

Following a scoping review of the literature and a modified consensus process and in-person meeting with key stakeholders, we identified, prioritized, and refined 26 strategies to improve gender equity among physicians in CCM. These strategies spanned four

pillars of equity: 1) access, 2) participation, 3) reimbursement, and 4) culture. In addition, participants in our study recommended that effective implementation of priority strategies would require targeted education initiatives, policy solutions, and greater measurement and reporting of equity and diversity data.

Women in medicine continue to face inequities that are rooted in the structure and culture of their profession (10). The consequences for women are significant in terms of career progression and advancement as this is where some of the most entrenched biases persist (30–33). Public health measures such as school closures enacted to mitigate spread of the severe acute respiratory syndrome coronavirus 2 during the COVID-19 pandemic highlighted the disproportionate impacts on women physicians’ research and clinical activities compared with men counterparts. This in part reflected normative expectations that women adjust their professional lives to attend to family obligations (34, 35). The improvement strategy identified in our study for “Institutions to offer clock stopping policies and/or the ability to maintain or delay tenure” might be more highly ranked if this study were carried out now. Underrepresentation of women on hiring and promotion committees may also perpetuate inequitable working environments by favoring the

TABLE 3.
Exemplar Quotations From Stakeholder Meeting Discussions Illustrating Priority Groups in the Implementation of Gender Equity Initiatives

Priority Groups	Exemplar Quote
Interprofessional collaboration	“There should be an interprofessional quality commission or board that appraises the department from [the] outside. We’ll be sitting there feeling that we can be unbiased as much as we want, but simply by being in the organization, you will have biases.”—Group 2
Leadership	“I think [...] having leadership engaged and supportive of the endeavor is, it’s paramount for this work to happen. [...] And when I think about culture, and culture change, leadership sets a tone for culture, sets accountability, and role models the culture, and they are the ones who are in the position to be able to call out those who are the antithesis to that culture change. That being said, you don’t bear the ultimate responsibility. It is the members of that community. So, when you think about culture, it’s how do you build a community to help facilitate that culture change.”—Group 1
Local champions	“I would hope out of this group, you would get champions going back to their eight provinces, six countries, and they would get champions that will take this document to their Dean.”—Group 5

recruitment and career development of men (33, 36). Participants in our study highly supported “mandating 360° evaluations of leaders in medicine through a diversity lens” (i.e., review of their hiring and promotion track records, treatment of staff) to safeguard against such practices. How to conduct such performance evaluations should be tailored to institutional policies and procedures, but participants noted that existing 360 performance feedback tools (37, 38) could be adapted to help assess leadership activities in gender equity. This also aligns with findings from a recent systematic review that identified the application of top-down initiatives as a promising starting point to support the advancement of women in academic medicine (39). This strategy could be adopted more broadly by CCM medical journals and professional societies as a form of audit and feedback. In addition, research is needed to understand why women may or may not participate in academic opportunities (i.e., their participation desires, prominent barriers, etc.). Further lines of inquiry might include: are opportunities available and unable to be pursued because of barriers and if so, what are these barriers, or do opportunities need to be created? Understanding the solutions to these related, but different, problems, is an essential area for future research.

Group education is vital to ensuring broad recognition of the detrimental consequences of gender inequity for women in CCM in Canada. To this end, study participants prioritized “encouraging and supporting departments to understand their own gender biases” and recommended mandatory unconscious bias training

for all department members. Participants also noted that education must be paired with structural solutions to be truly effective. For example, embedding gender equity measures into the organization’s mission and vision and into policies that govern hiring, external review, and consultation procedures. These findings align with a mounting body of evidence demonstrating the need for multicomponent interventions to improve entrenched inequities in medicine (18, 21, 40). In addition, participants viewed the collection and reporting of data on equity and diversity as critical to goal setting, tracking change, and ensuring adjustments are impactful and sustainable. International CCM societies such as the European Society of Intensive Care Medicine have introduced various task forces to address gender inequality, which might leverage existing tools (such as Brüggmann’s index to measure career promotion of women in academic medicine [41]) to determine the success of strategies and programs that aim to create gender balance. It will be crucial to engage with key stakeholders such as institutional leaders and local champions to adapt strategies to local clinical contexts and cultures as gender inequities likely vary based on clinical setting.

Our findings align with existing research and policy focused on improving gender inequity in Canadian medicine (42–45). A report published by the Ontario Medical Association (OMA) noted a persistent gender wage gap among Ontario physicians, which they attributed to structural and cultural norms within the workplace (43, 46). In response, the OMA recommended an advocacy campaign to generate awareness on the

gendered gap in pay and billing. In addition, the recent CMA report “Addressing Gender Equity and Diversity” underscored the need to improve the amount and quality of equity, diversity, and inclusion data collected in medicine to address underlying drivers of gender inequity (42). Similarly, the Canadian Critical Care Society recently developed a Diversity Policy that states that “CCCS committees should be balanced by age, gender, ethnicity, language, geography, and discipline to reflect our society and our community” and provides transparent and measurable outcomes to ensure that diversity is explicitly addressed in their governance (47). Our findings can supplement these and other initiatives by offering a list of evidence-informed stakeholder CCM prioritized equity strategies that can be widely applied. Future work is needed to identify aspects of CCM that are not appealing to physicians in Canada to understand all possible contributors to gender inequity in this specialty.

This study had several notable strengths. The scoping review resulted in a comprehensive search and cataloging of published strategies across medical specialties, increasing the validity and transferability of our data. This project also incorporated multiple methodologies and a diverse group of key stakeholders in CCM, allowing us to refine strategies from multiple medical fields. Although most studies were situated in surgery and not CCM, the scoping review provided a comprehensive list of strategies to address gender inequity that CCM stakeholders could systematically review and evaluate based on relevance. Despite the strengths of our study, there are several limitations to note. First, despite aiming for equal gender representation, constraints (time, finances, personnel) to leverage our predetermined stakeholder meeting date (to coincide with a national CCM conference) resulted in participants being disproportionately women. Although participants captured diversity in geographic location, specialty, career stage, and professional roles, it is possible that the gender imbalance introduced measurement (response) bias in our findings such that relying on a predominantly women authorship may have overrepresented the extent and type of disparity faced by women stakeholders in CCM. However, we did circulate the article to all participants for comment and opportunity to validate interpretations. Second, although we included participants from the United States and the United Kingdom, their experiences and suggestions may not reflect those

within their country or the global CCM community, albeit similar issues are salient in both regions. Gender representation in CCM in the United States and the United Kingdom is different from that of Canada; in the United States, 33% of critical care trainees and 26% of ICU physicians were women (48), while in the United Kingdom, 39% of trainee intensivists and 20% of ICU consultants were women (49). We do not know why individuals who received our study invitation declined to participate. Furthermore, the non-Canadian stakeholders that participated in our study may have different experiences and practices in CCM that may have impacted their perceptions and response; however, it is unlikely that data from any single participant would have unduly weighted aggregate analyses. Third, the prioritization of strategies was based on the participants perceived level of importance; consensus rankings were not compared with existing evidence of effectiveness in closing the gender gap, although the original list of strategies was developed from a rigorously conducted scoping review of the evidence. It is possible that another and larger group of experts may have ranked the strategies differently; for example, the viewpoints of invited CCM Department Heads who did not participate were missed. However, our objective was to identify and prioritize issues and recommendations, not to prescribe, and in doing so provide a useful platform for priority setting by individual CCM programs. While our work will help to lay the foundation for future pan-Canadian collaborations to standardize and collect relevant metrics on implementation activities and impacts, future work similar to ours should collect quantitative data from participants to ensure distribution across stakeholder groups, years of experience, and professional roles in CCM. Fourth, we did not collect data on intersectionality (cumulative, overlapping, or intersecting) discrimination that may include but not limited to racism, sexism, and classism to create unique forms of oppression of participants that materially changes the experience of women in the clinical context (50, 51). Future work should assess identity diversity (aside from gender) of the participants. Fifth, we considered gender equality among women and men physicians in CCM. Although at the in-person stakeholder meeting we rethought common gendered phrases and adjusted our language to be more inclusive and gender-neutral, future work should consider nonbinary constructs of gender to include additional designations.

CONCLUSIONS

Despite attention to the problem, we are seeing minimal advancements to solve gender inequity in the medical profession. Our multicomponent program of research identified four overarching pillars and 26 strategies to improve gender inequity among physicians in CCM. Implementation should include education, policy creation, and measurement and reporting. Future research should focus internationally on the barriers that may prevent women from accepting academic opportunities to expand the geographic scope of this work and better understand how the experiences of women and men physicians in CCM differ worldwide.

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The Canadian Critical Care Gender Equity Forum Panel are listed in the **Appendix**.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (<http://journals.lww.com/ccejjournal>).

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REFERENCES

1. Catalyst: Quick Take: Women in Healthcare. 2020. Available at: <https://www.catalyst.org/research/women-in-healthcare/>. Accessed May 5, 2020
2. Organisation for Economic Co-operation and Development: Doctors (by Age, Sex and Category). Paris, France, OECD Publishing, 2019. Available at: <https://www.oecd-ilibrary.org/sites/87e18004-en/index.html?itemId=/content/component/87e18004-en#>. Accessed January 4, 2022
3. Canadian Medical Association: Quick Facts on Canada's Physicians. 2019. Available at: <https://www.cma.ca/quick-facts-canadas-physicians>. Accessed May 5, 2021
4. Carr PL, Gunn CM, Kaplan SA, et al: Inadequate progress for women in academic medicine: Findings from the National Faculty Study. *J Womens Health (Larchmt)* 2015; 24:190–199
5. Metaxa V: Is this (still) a man's world? *Crit Care* 2013; 17:112
6. Ruzycki SM, Franceschet S, Brown A: Making medical leadership more diverse. *BMJ* 2021; 373:n945
7. Jena AB, Olenski AR, Blumenthal DM: Sex differences in physician salary in US Public Medical Schools. *JAMA Intern Med* 2016; 176:1294–1304
8. Appleby J: Is there equal pay in healthcare? Not if you are a doctor. *BMJ* 2012; 345:e6191
9. Rimmer A: Review of £10000 gender pay gap in medicine is launched. *BMJ* 2018; 361:k2366
10. Parsons Leigh J, de Grood C, Ahmed SB, et al: Toward gender equity in critical care medicine: A qualitative study of perceived drivers, implications, and strategies. *Crit Care Med* 2019; 47:E286–E291
11. Buddeberg-Fischer B, Stamm M, Buddeberg C, et al: The impact of gender and parenthood on physicians' careers—professional and personal situation seven years after graduation. *BMC Health Serv Res* 2010; 10:40
12. Carr PL, Ash AS, Friedman RH, et al: Relation of family responsibilities and gender to the productivity and career satisfaction of medical faculty. *Ann Intern Med* 1998; 129:532–538
13. Ruzycki SM, Fletcher S, Earp M, et al: Trends in the proportion of female speakers at medical conferences in the United States and in Canada, 2007 to 2017. *JAMA Netw Open* 2019; 2:e192103
14. Fishman M, Williams WA, 2nd, Goodman DM, et al: Gender differences in the authorship of original research in pediatric journals, 2001-2016. *J Pediatr* 2017; 191:244–249.e1
15. Mascarenhas A, Moore JE, Tricco AC, et al: Perceptions and experiences of a gender gap at a Canadian research institute and potential strategies to mitigate this gap: A sequential mixed-methods study. *CMAJ Open* 2017; 5:E144–E151

16. Canadian Medical Association: Canadian Physician Data. 2019. Available at: <https://www.cma.ca/canadian-physician-data>. Accessed May 5, 2021
17. Royal College of Physicians and Surgeons of Canada: Subspecialty Training Requirements in Adult Critical Care Medicine. Ottawa, ON, Canada, Royal College of Physicians and Surgeons of Canada, 2011. Available at: <https://www.royalcollege.ca/rcsite/documents/ibd/critical-care-medicine-adult-str-f>. Accessed January 4, 2022
18. Mehta S, Burns KEA, Machado FR, et al: Gender parity in critical care medicine. *Am J Respir Crit Care Med* 2017; 196:425–429
19. Peel JK, Schlachta CM, Alkhamesi NA: A systematic review of the factors affecting choice of surgery as a career. *Can J Surg* 2018; 61:58–67
20. Mehta S, Rose L, Cook D, et al: The speaker gender gap at critical care conferences. *Crit Care Med* 2018; 46:991–996
21. Filardo G, da Graca B, Sass DM, et al: Trends and comparison of female first authorship in high impact medical journals: Observational study (1994–2014). *BMJ* 2016; 352:i847
22. Parsons Leigh J, de Groot C, Ahmed S, et al: Improving gender equity in critical care medicine: A protocol to establish priorities and strategies for implementation. *BMJ Open* 2020; 10:e037090
23. Aromataris E, Munn Z (Eds): JBI Manual for Evidence Synthesis. 2020. Available at: <https://synthesismanual.jbi.global>. Accessed January 4, 2022
24. Tricco AC, Lillie E, Zarin W, et al: PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Ann Intern Med* 2018; 169:467–473
25. Braun V, Clarke V: Using thematic analysis in psychology. *Qual Res Psychol* 2006; 3:77–101
26. Benz EJ, Foley C, Gibbons EM, et al: Is there gender equality in academic gastroenterology? A review of gastroenterology literature over four decades. *Gastroenterology* 2018; 154(6 Suppl 1):S-466
27. Fitch K, Bernstein SJ, Aguilar MD, et al: The RAND/UCLA Appropriateness Method User's Manual. Santa Monica, CA, RAND Corporation, 2001
28. McMillan SS, King M, Tully MP: How to use the nominal group and Delphi techniques. *Int J Clin Pharm* 2016; 38:655–662
29. Dyrbye LN, Varkey P, Boone SL, et al: Physician satisfaction and burnout at different career stages. *Mayo Clin Proc* 2013; 88:1358–1367
30. Spector ND, Overholser B: Examining gender disparity in medicine and setting a course forward. *JAMA Netw Open* 2019; 2:e196484
31. Howe-Walsh L, Turnbull S: Barriers to women leaders in academia: Tales from science and technology. *Stud High Educ* 2016; 41:415–428
32. Lautenberger DM, Dandar VM, Raezer CL, et al: The State of Women in Academic Medicine: The Pipeline and Pathways to Leadership. Washington, DC, Association of American Medical Colleges, 2014. Available at: <https://slideplayer.com/slide/4302295/>. Accessed January 4, 2022
33. van den Brink M, Benschop Y: Gender practices in the construction of academic excellence: Sheep with five legs. *Organization* 2011; 19:507–524
34. Brubaker L: Women physicians and the COVID-19 pandemic. *JAMA* 2020; 324:835–836
35. Weiner S: How COVID-19 Threatens the Careers of Women in Medicine. 2020. Available at: <https://www.aamc.org/news-insights/how-covid-19-threatens-careers-women-medicine>. Accessed August 6, 2021
36. Rudman LA: Self-promotion as a risk factor for women: The costs and benefits of counterstereotypical impression management. *J Pers Soc Psychol* 1998; 74:629–645
37. Dehon E, Simpson K, Fowler D, et al: Development of the faculty 360. *MedEdPORTAL* 2015; 11:10174. Available at: https://doi.org/10.15766/mep_2374-8265.10174. Accessed January 4, 2022
38. Berk RA: Using the 360 degrees multisource feedback model to evaluate teaching and professionalism. *Med Teach* 2009; 31:1073–1080
39. Laver KE, Prichard IJ, Cations M, et al: A systematic review of interventions to support the careers of women in academic medicine and other disciplines. *BMJ Open* 2018; 8:e020380
40. Morgan AU, Chaiyachati KH, Weissman GE, et al: Eliminating gender-based bias in academic medicine: More than naming the “Elephant in the Room.” *J Gen Intern Med* 2018; 33:966–968
41. Brüggmann D, Groneberg DA: An index to characterize female career promotion in academic medicine. *J Occup Med Toxicol* 2017; 12:18
42. Canadian Medical Association: Addressing Gender Equity and Diversity in Canada's Medical Profession: A Review. n.d. Available at: <https://www.cma.ca/sites/default/files/pdf/Ethics/report-2018-equity-diversity-medicine-e.pdf>. Accessed January 4, 2022
43. Cohen M, Kiran T: Closing the gender pay gap in Canadian medicine. *CMAJ* 2020; 192:E1011–E1017
44. Alberta Health Services: Sexual Orientation, Gender Identity & Gender Expression (SOGIE): Safer Places Toolkit. 2019. Available at: <https://albertahealthservices.ca/assets/info/pf/div/if-pf-div-sogie-safer-places-toolkit.pdf>. Accessed January 4, 2022
45. Equity Guidelines for Department of Medicine Search Committees. 2022. Available at: <https://www.deptmedicine.utoronto.ca/equity-guidelines-department-medicine-search-committees>. Accessed January 4, 2022
46. Ontario Medical Association: Report to Council: Understanding Gender Pay Gaps Among Ontario Physicians. 2020. Available at: <https://www.oma.org/uploadedfiles/oma/media/public/gender-pay-gap-report-august-2020.pdf>. Accessed January 4, 2022
47. Canadian Critical Care Society: Canadian Critical Care Society Diversity Policy. 2018. Available at: <https://canadiancriticalcare.org/resources/Documents/3.%20CCCS%20Diversity%20Policy%2011%20April%202018.pdf>. Accessed August 6, 2021
48. Association of American Medical Colleges: Physician Specialty Data Report. 2018. Available at: <https://www.aamc.org/data-reports/workforce/report/physician-specialty-data-report>. Accessed January 4, 2022
49. The Faculty of Intensive Care Medicine: Women in Intensive Care Medicine London: Churchill House; 2022. Available at:

<https://www.ficm.ac.uk/careersworkforceworkforce/women-in-intensive-care-medicine>. Accessed January 4, 2022

50. Samra R, Hankivsky O: Adopting an intersectionality framework to address power and equity in medicine. *Lancet* 2021; 397:857–859
51. Wilson Y, White A, Jefferson A, et al: Intersectionality in clinical medicine: The need for a conceptual framework. *Am J Bioeth* 2019; 19:8–19

APPENDIX

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