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Title: Equity, diversity, and inclusion of pediatric clinician scientists in Canada: a thematic analysis

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REVIEWER 1: Steven Lewis / Access Consulting Ltd.

Reviewer comments and author response

Author: We would like to express our appreciation to Reviewer #1 for their thoughtful comments and reflections. We have only highlighted the comments where reviewer #1 has specifically asked us to address a specific comment/question.

Question #1-1. It is taken as a given that there should be more CS and that the community should increase representation among certain groups. Is this an intrinsic argument or is it related to substantive outcomes, e.g.., there would be better science that concretely benefits more people?

Response: This is an important point of clarification and we have added a sentence to our paper to capture the importance of diversity among certain groups of clinician scientists. Research shows that this diversity will improve care in groups. Race and gender concordance between P-CS and patients has the potential to improved communication and trust, higher rates of patients accessing preventative care, and CS who are more likely to work in communities of need, thus making their inclusion in public health important. Weave also provided references to substantiate this statement.

Question #1-2: It would also help if there were some references to the historical trajectory. Are things getting better or worse? It seems to be improving at CIHR according to its self-reported progress (https://cihr-irsc.gc.ca/e/52551.html) in at least some areas.

Response: There is research indicating marginal upward trends for some groups. We have included the following addition to the manuscript: Representative gains have been made in some groups of racialized academics in the university sector. Overall, racialized university professors increased from 17% in 2006 to 21% in 2016. Growth in the proportion of Black university professors increased from 1.8% to 2.0% during that same timeframe. Women are becoming better represented among university professors albeit more represented in lower ranks making up 48.5% of assistant professors compared to 27% of full professors. Post-secondary teachers who are racialized, Indigenous, and women are less likely to have full-time employment. Racialized women are the most under-represented among full-time, full-year employment. The wage gap is deepest for racialized women professors, earing an average of 68 cents for every dollar.

Question #1-3. What might be even more helpful is a little more depth on the root causes of some of the inequities. For example, granting agencies and universities either embrace and perpetuate, or at least have to accommodate prevailing reward structures and notions of merit. They are often judged and ranked on criteria such as no. of publications per scientist per year, no. and size of research grants, bibliometric scores, success in national competitions, no. of

prestigious awards, etc. Many of the participants in this study either explicitly or implicitly acknowledge that those underrepresented in the CS community may be less competitive on these measures for perfectly legitimate reasons. This raises the issue of whether proposed remedies can be achieved without a broader societal consensus on both what needs to be done, and who should bear the costs.

Response: We agree that there are many factors that perpetuate these inequalities. We have added the following to the manuscript: Longstanding institutional structures, practices, and patterns of discrimination perpetuate inequalities and discrimination which limit opportunities for marginalized individuals and contribute to gaps in employment and wages.

One way to better understand the problem and measure progress would be for post-secondary institutions to improve reporting on employment and pay equity as well as data on successful/unsuccessful applicants, retention, tenure and promotions. This data will assist in measuring change and determining if institutions are living up to their principles of EDI policies and practices.

Question #1-4: No one seems to care if the fast-food industry or coal mining has an inclusive and diverse workforce. But there is a great deal of concern about universities, law, medicine, and other highly regarded and rewarded occupations. Does EDI scholarship need to account for these seemingly asymmetrical concerns? I raise it to inquire about the nature of proposed remedies is the end goal to change the game or modify factors that impede some people's opportunities to succeed in the game that remains in general acceptable.

Response: While outside of our scope and we did not include this in the manuscript we did feel the need to acknowledge that there is a stark imbalance between pay for men and women as well as representation across industries and social hierarchies. Women often play a ‘silent’ role in society, women spend a significant amount of time doing unpaid work such as caregiving for homes, children, aging parents, and family members experiencing medical crisis. While women are spending time caregiving, their career trajectories are delay or halted. Women pursuing success in the workplace may not necessarily be giving up anything, they are continuing traditional female work in the home – this is considered the double day for employed women. Alternatively, they may forgo marriage and/or motherhood in the pursuit of success. This is not necessarily the same for men, they can maintain careers and home/family life.

We added this section to our manuscript: Potential solutions for gender inequities and women’s departure from academia include: 1) recruiting diverse applications and training search committees, 2) mentoring, networking, and professional development through women faculty networks, 3) improving the academic climate and environment.

Question #1-5: Is there anything useful to be learned from the experiences of historical victims of implicit and often explicit bias that have nonetheless succeeded to a remarkable degree? Jews and Asians have gone from major underrepresentation to overrepresentation in the academy despite a long history of discrimination. At the very least this suggests considerable variation in how groups experience and deal with barriers to opportunity, which may in turn enrich understanding of the factors that enable progress.

Response: While outside the scope of this manuscript, and not included in our writing but our thoughts are that in academia several groups have been oppressed for a long time by other privileged groups, this has deprived them of the opportunity to develop equally. There is an

urgent need to focus on procedural justice and consider affirmative action policies as an effective moral tool to promote individual welfare.

Question #1-6: While the paper and much EDI scholarship and deliberation focuses on gender and race, according to the vast behavioural psychology and economics literature, humans are hostage to literally dozens of biases. The species seems hard-wired to categorize, judge, rank, and - critically - misunderstand a huge range of phenomena. With respect to employment and reward, it is well-established that there are positive and negative biases related to height, body type, perceived attractiveness, personality, health status, and a host of other factors that are unrelated to qualifications and performance. There has been considerable progress in acknowledging them - terms such as "recency bias" have become part of sports commentators' discourse. But overcoming them is of course infinitely harder. Again, it would be interesting to have the authors' take on the extent to which important biases can be overcome and how. If the bias is implicit, we may not even know it exists. And sometimes, while the bias may disproportionately affect certain identifiable groups, its origins may lie in value systems or other preferences.

Finally, as the authors doubtless know, gender and race biases do not operate identically in all respects. It is one thing to deny opportunities to women who spend several years having and raising children, and quite another to deny opportunities to women because they are presumed to have less ability or potential. Similarly, a bias against a certain epistemology is different from a bias against a racial group qua racial group. There are undeniably systemic behaviours based on values, hierarchies, and cultural preferences. Some of these disproportionately favour or disadvantage certain groups. But - arguably at least - not all systematic differences in outcomes are proof of systematic racism or sexism; some may simply demand conformity to institutional or cultural norms - which might be unreasonable or fundamentally unjust but be gender and racial neutral. Conservatives believe they are systematically discriminated against in the contemporary North American academy. EDI has many more dimensions than race and gender and reproductive status, and it is important to know which are at play. Understanding the basis for experiences of bias is important if there is to be an effective and just remedy. Either here or in other research and analysis, the authors could make a great contribution to EDI by creating a sort of taxonomy of origins and causes of unjust differences in experiences and outcomes, and a means to assess which are attributable primarily to identities vs. other factors.

Response: We appreciate this thoughtful reflection.

REVIEWER 2: Name withheld / GTA, Ontario

Author: We would like to thank Reviewer #2 for the excellent questions raised about our background literature and methodology.

Question #2-1:

More is needed in the Introduction to clarify what research has been done in this area, what gaps are missing in the literature, and how that informs the rationale for this specific study.

While I agree that this is an urgent area to address, I think more needs to be said in the Introduction to help the reader understand why “individual and system level factors that may enhance equity, diversity, and inclusion (EDI) among CS are urgently needed to inform the evaluation frameworks and curricular content for CS training programs”. Perhaps more of the arguments from the literature cited can be included in the text to help build a case for why EDI is important in medical training, in scientific training, and specifically CS training.

Response: We appreciate these points that require clarification and have added the following to the manuscript:

The training in both clinical medicine and research enables CS to be specialists in both biomedical research and translational bench-to-bedside medicine. CS training is non-linear, cross-disciplinary in manner, and are essential members of scientific teams addressing grand health challenges and the emergence of precision medicine.

A lack of understanding of individual and systemic barriers to diversity is a critical gap in the literature and further perpetuates the inequity of women and racialized individuals. It is vital to improving knowledge regarding the factors limiting EDI in P-CS to improve health outcomes for diverse populations.

Question #2-2: I think the Introduction warrants another line or two to clarify the connection between diversifying the clinician-scientist workforce and how that is hypothesized to lead to improving care for underserved populations and reducing existing disparities.

Response: Similar to Reviewer question #1-1 This is an important point of clarification and we have added a sentence to our paper to capture the importance of diversity among certain groups of clinician scientists. Research shows that this diversity will improve care in groups. Race and gender concordance between P-CS and patients has the potential to improved communication and trust, higher rates of patients accessing preventative care, and CS who are more likely to work in communities of need, thus making their inclusion in public health important. We have also provided references to substantiate this statement.

Question #2-3: It is not clear to me in the Introduction why the authors chose to focus on women and ethnic minorities and not on other underrepresented groups, such as 2SLGBTQ+ people. I have no issue with the focus on women and ethnic minorities, but I think the Introduction needs to justify the rationale for focusing on these groups and not others.

Response: Despite an interest in underrepresented groups and trying to recruit a diverse sample, we recruited women and few ethnic minorities. We found that there seemed to be a huge gap around equity, diversity, and inclusivity for women and ethnic minorities. The research team felt there was a need to write a separate paper focusing on these aspects.

Question #2-4: What is the rationale for focusing on a variety of stakeholders specifically “related to CS in child and mental health”? Was it a convenience sample or was there a specific reason for focusing on clinician-scientists in child and mental health?

Response: Thank you for these questions. They are similar to the Editorial team Question #E-2 please above for full response. In summary, we recruited participants who identified as pediatric clinician trainees/early career clinicians and senior clinician scientists who are in leadership/administrator positions and supported these P-CS.

We have included the following in our manuscript to provide clarity around the rationale for the study.

The impetus of the study was the reinvention of Canadian Child Health Clinician Scientist Program (CCHCSP) and there was interest in identifying current gaps and strengths within the program. Based on the findings of this main study, there seemed to be a huge gap around equity, diversity, and inclusivity for women and ethnic minorities. The research team felt there was a need to write a separate paper focusing on these aspects.

Question #2-5: Although qualitative description does not dictate a specific theoretical or philosophical orientation, the study team undoubtedly had a theoretical orientation, such as post-positivist or interpretivist. It would be helpful for the reader to interpret the results and the data analysis process by knowing more about the study team's theoretical or philosophical orientation.

Response: We have explicitly asserted our philosophical orientation in our methods section by adding the following: Guided by an Interpretivist paradigm, the research team sought to explore clinician scientists' perspectives of the education, institutional and relational factors that influence their experiences as clinician scientists to pursue and remain in this field.

Question #2-6: In the Methods section, please clarify how and why the research team used purposive and convenience sampling? In what ways was the sampling purposive? For what purpose was convenience sampling used? Without further description, convenience and purposive sampling methods seem to contradict each other.

Response: Thank you for this question, we hope that our response to similar questions (#E-2 and #2-4) above have addressed these concerns. We also removed convenience sampling from the manuscript to avoid confusion.

Question #2-7: What were the inclusion and exclusion criteria for the participants? Who determined that criteria? How did you confirm that each participant was a relevant CS stakeholder? Why did the team not just interview clinician-scientists? What was the rationale for interviewing other types of stakeholders who are not clinician-scientists (including funders, etc.)?

Response: Similar to the editor's comment (#E-4) and noted above we only interviewed child health clinician scientists as a part of the CCHCSP program evaluation of their training program. Additionally, we included our inclusion and exclusion criteria below and within the manuscript to provide greater clarity.

Inclusion criteria: Individuals were invited to participate if they met the following inclusion criteria: they identified as trainee, early-, mid-career and senior child health clinician scientists or were in administrative and leadership positions, supporting the training and retention of clinician scientists. We also included decision-makers in health care and clinician scientist training programs in Canada and internationally (United States and the Netherlands).

Exclusion criteria: We excluded clinician scientist working outside of child health and primarily in the adult population.

Individuals self-identified as child health clinician scientists we also elected to interview clinician scientists in administrative and funding positions supporting the training and retention of trainees and clinician scientist.

Question #2-8: What was the rationale for interviewing participants in multiple countries, especially when most of the participants ended up being from Canada? Was there a specific purpose for this?

Response: This question was also asked by the Editorial team (#E-4) and we provided this response: We reached out to the countries who run 'identical' P-CS programs to the CCHCSP to make sure the identified issues were not only Canada related but universal. Although the distribution of interviews was heavily skewed to Canadian participants, as the main aim was to understand the Canadian landscape, the US and Dutch participants were used to identify global issues and differentiate these potential local Canadian issues.

Question #2-9: How was data saturation reached? What do you mean by no new information had emerged?

Response: We have deleted the sentence regarding no new information emerging since it is ambiguous. Our qualitative team concluded that saturation of the data occurred when no new codes emerged from our analysis of the data. We have added this sentence to our methods section.

Question #2-10: For data analysis, how did the team resolve conflicts or decide upon final themes?

Response: Thank you for this question, we have now added the following to the manuscript:

The research team used memoing and regular meetings to discuss the codes and through consensus agreed upon the final themes. There was no conflicts nor disagreements over the codes/themes established.

Question #2-11: I find the way that the participant characteristics are currently reported to be lacking. I would like to know how many of the participants are current or former clinician-scientists, and of those clinician-scientists, how many were women and how many were racialized? As it's currently reported in Table 1, it's confusing to me. Only 9 out of 39 participants were racialized. How many of the racialized participants were clinician-scientists?

Response: We have captured this information in our table, and we added this to our manuscript. All nine participants who identified as racialized and all met our inclusion criteria of being child health clinician scientists.

Question #2-12: There was only one Black participant and no Indigenous participants. How was data saturation determined to be reached around the themes of racism with limited participant representation and knowledge?

Response: We acknowledge this is a limitation but representative of the overall population. We had not specifically set out to focus on race rather EDI broadly. We did not have an a priori strategy for engaging CS who self-identify as indigenous. Therefore, our results are not generalizable to this population.

Question #2-13: Was there a reason that more racialized participants were not recruited when their perspectives likely would be crucial for the objective of this study?

Response: Thank you for this question. This is similar to the editor's question (#E-3) above. Please above for the complete response. In summary, we have acknowledge that this is a limitation of our study and have added to our recommendations is that future studies explore EDI in underrepresented groups within the clinician scientist community, maybe expanding the inclusion criteria to be any clinician scientist and hope that this will allow for greater diversity in our sample, including underrepresented groups such as LGBTQ2S+ people, ethnic minorities, and women, as well as researching data saturation.

Question #2-14: The pervasiveness of sexism is not just related to women being asked to fulfill more childcare and family responsibilities. A reduction of sexism to only that dimension is problematic. Were there any other examples of how sexism was pervasive for clinician-scientists?

Response: Thank you for inquiring about other examples of sexism. A thorough review of our interviews and emergent themes demonstrates that the participants in our study viewed and experienced sexism as prevailing because of tensions between their public and private lives including family responsibilities.

Question #2-15: Under the subsection of "Uneasiness Challenging Racism and Bias", I think it would help the reader to understand some examples or types of racism that participants experienced, before explaining that participants felt uneasy challenging racism. I think it is a valuable contribution to the literature to understand what racism looks like for clinician-scientists.

Response: We appreciate the need to provide examples of racism. As such we have included the following in this manuscript:

Participants noted that they experienced both overt and covert racism because of their skin colour, accents, and the origin of their names. The participants in this study felt they were not being invited past the submission phase for trainee and academic positions because they were being screened out of the hiring process based of the origin of their name and their international training background. Another example of racism described by participants as experiencing microaggressions such as being seen and treated differently by patients and aggression such as being spat on by a patient who refused to be treated by them.

Question #2-16: I think this is a crucial finding: "1) the importance of intersectionality and compounded oppression; and 2) heterogeneous experiences of oppression and for others privilege." I think more can be said and clarified to help the reader understand these important results. Sexism and racism are presented as separate issues, but they are intersectional, so I think clarifying what the participants discussed around intersectionality is important.

Response: We have added the following examples to illustrate what participants discussed regarding intersectionality. One participant shared that females who are also visible minorities are confronted with numerous systemic barriers and a profound sense of isolation moving through the education and professional pipeline. This participant described that her female (and

male) colleagues could relate to the experiences of sexism. However, few could understand what it might be like to simultaneously experience sexism and racism from both colleagues and their patients. She described how, throughout her career, she received negative messages and shock from clients and students alike for being a black, female scientist, who was a PI on Tri-council grants and in senior administrative positions. Another female participant who was East Asian described experiencing racist and sexist comments from patients who refused to receive care from her for being a visible minority and a woman. Finally, three other female participants who identified as Asian or Spanish described experiencing discrimination not only for their gender but for their skin colour and having a strong accent. They were less likely to be called on to speak in class and their examples of working with under-represented groups in their communities received less attention and interest from their professors and mentors/supervisors. Participants who were people of colour and females further described incidents where they were erroneously identified as individuals holding service level jobs within their institutions rather than clinicians and scientists.

Question #2-17: I think the subsection on "The Porous and Leaky Pipeline" is particularly excellent in terms of being a meaningful finding that can help programs improve their support of clinician-scientists at all stages. In the Limitations section, the authors describe that "the findings are limited to the experiences and perspectives of a group of Canadian C". Weren't there also CS from other countries? And what about the limitations around the suboptimal diversity of racial representation in the sample?

Response: We have revised this sentence to say primarily Canadian P-CS. With respect to suboptimal diversity, this is similar to the editor's question (#E-3) and your comment above (#2-13) we have added the following to our recommendations future that future studies explore EDI in underrepresented groups within the clinician scientist community, maybe expanding the inclusion criteria to be any clinician scientist and hope that this will allow for greater diversity in our sample, including underrepresented groups such as LGBTQ2S+ people, ethnic minorities, and women, as well as researching data saturation.

Question #2-18: From the analysis, do the authors think there is any relevance to the focus on pediatric clinician-scientists? Any thoughts on how that may or may not have affected the results and findings?

Response: We appreciate this excellent question about how the results of our research contrast to those of other clinician scientists. To the best of our knowledge, there are few studies available examining equity and inclusion in the training and retention of clinician scientists in kidney disease (please see Rampersad et al 2021) and in radiology (Suneja et al 2020). We have added the following in our manuscript: The results of our research are congruent with research about clinician scientists, specifically in other fields such as radiation and kidney disease, which show that there are many personal and systemic barriers that hinder underrepresented minorities from pursuing the role of clinician/physician scientists.

Minor comments

Question #2-19: I don't think I understand this sentence as it is currently written in the Introduction: "A recent scoping review found that researchers have yet to examine supportive of the training and career paths of CS from equity seeking groups"

Response: We have revised this sentence and it now reads as:

Our scoping review found that research exploring the training and career paths of P-CS of under-represented groups does not currently exist (Li et al., 2021 – accepted).

Question #2-20: Is it possible to include the semi-structured interview guide in the Appendix?

Response: This comment is like the editor's question (#E-5) and we have added the interview guide as Appendix A in the manuscript.

Question #2-21: As per COREQ, how many people refused to participate? Any reasons for this?

Response: We are unable to ascertain the number of people who received information about the study since we shared our recruitment material via twitter and on the CCHCSP website. Only 1 participant declined to participate in the study after receiving additional information because too much time had lapsed since they provided clinical care.

Question #2-22: It's not clear to me in the section on "The Pervasiveness and Invisibility of Sexism" why the "Balance" subsection is named as "Balance". I also don't understand why the "Balance" subsection is separate from the "Competing Demands" subsection when it seems that the two subsections overlap significantly.

Response: We agree there is overlap and have removed competing demand and new title is Work-Life Balance.

Question #2-23: How were participants "penalized for not attending a professional conference"?

Response: Thank you for asking this critical question. We have added the following to the manuscript:

Participants revealed that they were penalized for not attending a professional conference in the following broad ways: 1) decreased number of presentations and invited talks on CV; 2) a reduced opportunity to network and build new collaborations with national and international colleagues; and 3) diminished exposure and learnings of emerging advancements in their fields.

Question #2-24: Is there a citation for this sentence? "These interviews took place in 2020, during a time when issues of institutional racism had risen to the forefront of public consciousness in Canada." Cite an article such as one from the globe

Response: Citation has been added to this sentence in the manuscript.

Question #2-25: I'm not sure why the subsection "Identifying Mentors with Shared Experiences" and the subsection of "Diversity in Mentoring" are two separate subsections rather than one subsection on Mentorship as a proposed individual-level solution.

Response: We agree there is overlap and have removed diversity in mentoring and renamed this section Identifying Diverse Mentors with Share Experiences

Question #2-26: I am interested in the concept of "the creation of safe (and brave) spaces", particularly wanting to understand what brave spaces mean in this context. What would that look like as per the participants?

Response: Upon reflection, we think it is imperative to create brave rather than safe spaces for clinician scientists. We have removed the reference to “safe spaces” and added the following statement. We strongly encourage brave spaces in academic and clinical settings to promote authentic and deliberate dialogues among clinician scientists about their experiences of racism, sexism and other forms of oppression. Such brave dialogues must occur regardless of whether conversations elicit discomfort, strong emotions and fierce debates with those who hold power and privilege (Stanlick, 2015, Ali, 2017, Arao and Clements, 2013).

“Safe doesn’t mean, cause think about people who come from different communities who never had a seat at the table, they never feel safe, really. And they have to, and you know just like people say, for example racism is one example, if you’re uncomfortable having to have discussions about racism, imagine what it feels like to live with it” (ID 24)

Question#2- 27: This sentence assumes that there are two parents and that one of them is a man and the other a woman: “Caring responsibilities remain highly gendered, regardless of whether both parents work full time, with women expected to maintain the responsibility for household chores and to be the primary caregiver.” Not every home has two parents. I also wonder if there is a way to phrase the sentence in a way that is less heteronormative

Response: Thank you for this suggestion, We have added the following to this manuscript: Caring responsibilities remain highly gendered, regardless of the number of caregivers in the home 10, women are expected to maintain the responsibility for household chores and to be the primary caregiver 28.