

## Extending social accountability mandates to biomedical research in Canadian faculties of medicine

### Élargir les mandats de responsabilité sociale à la recherche biomédicale dans les facultés canadiennes

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### Abstract

**Background:** Social accountability (SA), as defined by Boelen and Heck, is the obligation of medical schools to address the needs of communities through education, research and service activities. While SA is embedded within health profession education frameworks in medicine, they are rarely taught within graduate-level (MSc/PhD) education.

**Methods:** As these programs train future medical researchers, we invited first-year graduate students enrolled in a mandatory professionalism class at our institution ( $n = 111$ ) to complete a survey on their perceptions of the importance of SA in their research, training, and future careers.

**Results:** Over 80% ( $n = 87$ ) of respondents agreed that SA is relevant and felt committed to integrating it into their future research activities, only a limited number of students felt confident and/or supported in their abilities to integrate SA into their research.

**Conclusions:** Specific SA training in graduate education is necessary for students to effectively incorporate elements of SA into their research, and as such support the SA mandates of their training institutions. We posit that awareness of SA principles formalizes the professional standards for biomedical researchers and is thus foundational for developing a professionalism curriculum in graduate education programs in medicine. We propose an expansion of the World Health Organization (WHO) *partnership pentagon* to include partners within the research ecosystem (funding partners, certification bodies) that collaborate with biomedical researchers to make research socially accountable.

### Résumé

**Contexte :** La responsabilité sociale (RS), telle que définie par Boelen et Heck, est l'obligation pour les facultés de médecine de répondre aux besoins des communautés par l'entremise de l'éducation, de la recherche et des activités de service. Bien que la responsabilité sociale soit intégrée dans les cadres de formation des professionnels de santé en médecine, elle est rarement enseignée au niveau des études supérieures (MSc/PhD).

**Méthodes :** Étant donné que ces programmes forment les futurs chercheurs médicaux, nous avons invité les étudiants de première année inscrits à un cours obligatoire sur le professionnalisme dans notre établissement ( $n = 111$ ) à participer à une enquête sur leurs perceptions de l'importance de la RS dans leur recherche, leur formation et leur future carrière.

**Résultats :** Plus de 80 % ( $n = 87$ ) des répondants ont reconnu la pertinence de la RS et se sont engagés à l'intégrer dans leurs futures activités de recherche, mais seul un nombre limité d'étudiants se sont sentis confiants et/ou soutenus dans leurs capacités à intégrer la RS dans leur recherche.

**Conclusions :** Une formation propre à la RS dans le cadre des études supérieures est nécessaire pour que les étudiants puissent intégrer efficacement des éléments de la RS dans leur recherche, et ainsi promouvoir les mandats de RS de leurs établissements de formation. Nous estimons que la sensibilisation aux principes de la RS formalise les normes professionnelles des chercheurs biomédicaux et qu'elle est donc fondamentale pour l'élaboration d'un programme de professionnalisme dans les programmes d'études supérieures en médecine. Nous proposons d'élargir le *pentagone du partenariat* de l'Organisation mondiale de la santé (OMS) pour y inclure les partenaires de l'écosystème de la recherche (partenaires financiers, organismes de certification) qui collaborent avec les chercheurs biomédicaux pour rendre la recherche socialement responsable.

## Introduction

Scientific advancement has the potential for significant societal benefit and as such receives substantial investment, including direct funding and funding to train and support highly qualified personnel. In order to ensure that scientists and institutions are accountable for these investments, many governments have implemented policies and frameworks that formalize the criteria for responsible research (eg. Tri-Agency Framework,<sup>1</sup> Horizon Europe<sup>2</sup>) including, but not limited to, public engagement, open access, research ethics and equity, diversity, and inclusion. Good science requires close bonds between the scientist and society, which promotes public trust.<sup>3,4</sup> Accountability of researchers to the communities they serve emphasizes science in a role for the greater good, and formalizes the highest of ethical standards, open communication, and reproducibility to meet this goal.<sup>3</sup>

At Canadian faculties of medicine, the link between academic medicine and society is enacted through their commitment to social accountability (SA). In essence, SA defines the relationship between academic medicine and society and articulates a social contract between medical professionals and the communities in which they practice.<sup>5</sup> SA is an accreditation standard for all Canadian Medical Schools<sup>6</sup> and is embedded in the strategic orientation of newer schools of medicine.<sup>7,8</sup> SA can be visually represented by a *partnership pentagram*<sup>9</sup> between five distinct partners (policymakers, health administrators, health professionals, academic institutions and community members) that collaborate in a health system centred on societal needs. Using this framework, medical schools can readily adapt health professional education to include both an understanding of, and a connection to, the communities they are serving.

This SA framework naturally extends to the training of clinical and public health researchers whose outputs can directly impact patients and populations. However, Dzau et al argue that the future of academic medicine relies on a bidirectional continuum from “bench science to society.” meaning that these principles are equally relevant to biomedical research. In addition, basic biomedical research represents a significant proportion of research revenues for Canadian faculties of medicine, who received over three billion dollars in 2018-2019,<sup>10</sup> of which one-third was directed towards basic medical/biological sciences research. Further, in 2019-2020, Canadian faculties of medicine trained 5599 MSc, 6223 PhD students and 1179

postdoctoral fellows and granted 2430 graduate degrees.<sup>11</sup> Despite these significant investments and their potential social value, there is a notable absence of literature that specifically addresses the role for SA and strategies to integrate SA into biomedical research programs and higher education.

Dzau et al.’s bench science to society framework emphasizes interdisciplinary inputs to ensure tangible progress in issues of societal importance.<sup>4</sup> To achieve this, educators have attempted to implement topics of SA in higher education<sup>12-14,15</sup> but challenges concerning how to practically engage students in SA in biomedical research remain.<sup>12,13</sup> To address this knowledge gap, we conducted a study to understand students’ perceptions of SA in research to inform the development of a graduate-level course for biomedical students at our institution.

## Methods

### Setting

We conducted this study at the Faculty of Medicine at the University of Ottawa in Ontario, Canada. Ethics approval was waived by the University of Ottawa Research Ethics Board as the project falls under program evaluation/quality assurance.

### Participants

Participants were recruited through convenience sampling of a cohort of first-year graduate students through their compulsory Professionalism Course.

### Intervention

Students who attended the 3h Social Accountability in Biomedical Research session were invited to participate.

### Instrument development

Informed by the literature and the New World Kirkpatrick Model (Levels 1-3),<sup>16</sup> we developed an online questionnaire delivered via Survey Monkey that included 10 close-ended items exploring students’ (a) perceptions of the relevance of SA to their future research activities (Reaction); (b) attitudes towards SA in research (Learning); and their perceptions of potential applications of and support for SA in research (Behavior). We concluded the questionnaire with two demographic questions.

### Analysis

We analysed the data using descriptive statistics (i.e., frequencies and percentages) in IBM SPSS Statistics 27.

## Results

Eighty-seven (78%) of the 111 students who attended the session completed the questionnaire. Seventy-four students (85%) were in Masters programs, 12 students (13.8%) were in Doctoral programs, and one student (1.1%) was in a MD-PhD program. With the exception of one MD-PhD student (1.1%), 25 students were registered in the Cellular and Molecular Medicine (28.7%), 24 in Epidemiology (27.6%), 18 in Biochemistry (20.7%), 14 in Microbiology and Immunology (16.1%), and six in Neuroscience (6.9%) programs.

Over 80% ( $n = 71$ ) of the students ‘moderately’ or ‘strongly’ agreed that SA is relevant to their future research. They specifically identified topics related to SA in research ( $n = 78$ ; 90.7%), certification standards and ethics ( $n = 69$ ; 79.3%), strategic planning by funding organizations ( $n = 68$ ; 78.1%), fundraising efforts ( $n = 58$ ; 66.7%), patient and community engagement ( $n = 62$ ; 65.9%), and community outreach ( $n = 67$ ; 77.0%) as ‘moderately’ to ‘greatly’ relevant to their future research activities. Seventy-two percent of students ( $n = 73$ ) also identified that having a Social Accountability Student Research Grant Program that would support their SA activities would be of ‘moderate’ to ‘great’ relevance to their future research endeavours.

Most ( $n = 82$ ; 94.2%) of the students also indicated that SA is of ‘moderate’ or ‘great’ importance to their research activities and that they ( $n = 72$ ; 84.7%) are either ‘moderately’ or ‘greatly’ committed to integrating SA into their future research activities (Figure 1A). However, only a limited number of students ( $n = 14$ ; 16.1%) indicated that they felt confident ‘to a great extent’ in their abilities to integrate SA into their research, and only about half ( $n = 44$ ; 50.6%) believed that they would be supported ‘to a great extent’ by their supervisors, profession, and/or institutions in applying aspects of SA to their research. When asked which aspects of SA they believed they would apply SA to future research activities, over 80% of students ( $n = 70$ ) selected information on how to apply principles of SA in research, indicating a need to move principles of SA from theory to praxis (Figure 1B).

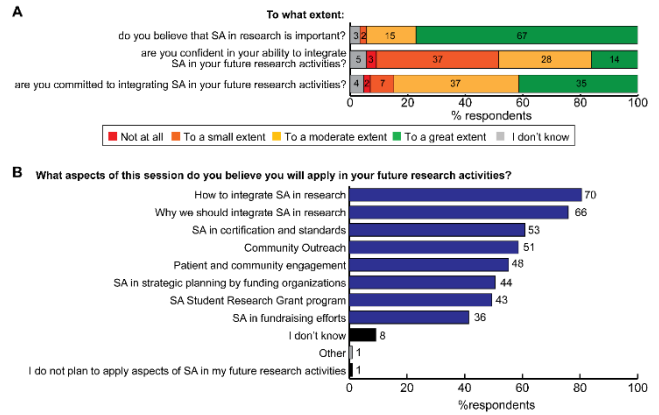


Figure 1. Student perceptions of the role of SA in research activities (A) Distribution of respondents by degree level. Total number of respondents in indicated. (B) Distribution of respondents by program. (C) Perceptions of the relevance of SA in future research activities. Data is shown as % distribution of respondents. Actual number as respondents is included on the graph. (D) Attitudes towards SA in research shown as distribution of respondents. Respondent numbers are indicated on the graph. (E) Perceptions of potential applications of and support for SA in research. Number of respondents per category is indicated.

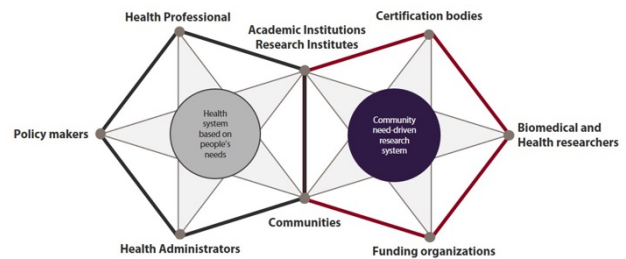


Figure 2. Proposed Double Partnership Pentagonagram, adapted from Boelen and Heck, that unifies the social accountability mandate across health care and research priorities at Canadian faculties of medicine.

## Discussion

In this study, most responding graduate students reported that SA was relevant to their future research, especially in the areas of standards and ethics, patient and community engagement, and community outreach. However, despite a significant commitment to integrating SA into their future research, the majority were not confident in their ability to do so. Further, students indicated that they struggle with knowing how to collaborate with community partners in ways that support the alignment of their research goals with community need.<sup>13</sup> Our findings mirror the outcomes of the European Union’s Horizon 2020 program,<sup>17</sup> a funding program that aimed to tighten the science-society link by fostering community involvement.<sup>17</sup> The program suffered from poor adoption of policies related to research ethics, open-access publication, and public engagement among scientists<sup>3</sup> that was attributed to a lack of awareness of responsible research principles, insufficient training, and resistance to change on the part of established scientists,<sup>3</sup>

highlighting the importance of institutional change to meaningfully embed SA into biomedical research mandates. We envision early training in SA principles, coupled with faculty development, to produce a new generation of socially accountable biomedical researchers equipped to transform academic institutions towards more inclusive and community-oriented initiatives.

To guide faculties of medicine in this endeavor, we propose an expansion of the current SA *partnership pentagon*<sup>9</sup> to include the diversity of partners within the biomedical research ecosystem (Figure 2). Ross and Cameron call for medical schools to place SA within “*unique narratives of place and community, with authentic processes that meaningfully engage community voices*” which reaches beyond traditional outreach/fundraising and can be informed by self-assessment tools (eg. iSAT).<sup>18–20</sup> Using the expanded partnership pentagon, we envision<sup>18,19</sup> academic institutions prioritizing community health concerns through strategic priorities, targeted recruitment of new faculty and revitalization of academic programs. In addition, funding agencies should allocate research dollars to support areas of societal importance, informed by advisory boards. Coupled with peer review that assesses the significance, feasibility and quality of the proposed research, these mechanisms ensure that projects receiving funding have a high potential to address both research (advancement of knowledge) and societal needs (impact). Communities shape research efforts through both fundraising and research participation and in turn, biomedical research programs can prioritize collaborative research approaches, representativeness in study design, integrated knowledge translation (IKT)<sup>21</sup> and accessible dissemination of research findings.

Our finding that graduate students are committed to but not confident in their ability to implement SA principles is reflected in previous literature reporting that SA skills acquisition is enhanced through experiential learning,<sup>22</sup> authentic problem-based learning and group discussions,<sup>23</sup> and participatory approaches to SA training.<sup>24</sup> Graduate programs could consider, for example, the adoption of specific learning objectives related to community-orientation as part of a professional framework for responsible and reproducible science and the development of skills (honesty, transparency, rigour, reproducibility, lack of bias, collaboration, ethical conduct, responsible use of resources and open communication<sup>25</sup>) that advance science in service to society and foster public trust. Our work supports literature reporting that students require

mentorship and role-modelling to implement SA into their research,<sup>12</sup> that requiring educators be skilled in implementing SA into research design.<sup>22,26</sup> However, while faculty want to support students in conducting change to such engagement, the increased time, effort, and flexibility needed requires institutional support and commitment.<sup>12,13,24,26</sup> To achieve this, faculty development can target grantsmanship related to promoting community-partnered/patient-orientated research from development of the research question to knowledge mobilization.

Finally, regulated by certification bodies, societal concerns could direct policies and practices that ensure safe and ethical laboratory science and environmental stewardship. For example, the Canadian Council on Animal Care (CCAC) ensures the certification of federally-funded organizations and that all research involving animals is reviewed for ethical merit by committees consisting of biomedical researchers, veterinarians and members of the public, thus holding researchers directly accountable to the Canadian public. SA is also integral in the intersection of environmental accountability and medicine,<sup>27</sup> resulting in the development of planetary health objectives at our institution and others<sup>28,29</sup> and a push towards sustainable biomedical research.<sup>30,31</sup>

## Conclusion

The study reveals that most graduate students surveyed acknowledge the significance of social accountability in their future research, particularly concerning standards and ethics, patient and community engagement, and community outreach. Nevertheless, students report a lack of confidence to effectively integrate SA into their research. Additionally, they express difficulties in establishing collaborations with community partners that would better align their research objectives with the needs of the community. In response, we propose an expanded SA framework that can promote innovation in higher education within faculties of medicine, creating new points of connection on the *partnership pentagram* through which faculties of medicine can reinforce the bench-to-society continuum.<sup>4</sup> While our study is limited by the small sample size, new unvalidated survey instrument and single-institution viewpoint, we are confident that the principles we advance can inspire and inform other institutions. In order to promote evidence-based culture change within Canadian faculties of medicine, future research should evaluate experiential SA educational initiatives directed at

both biomedical faculty and students. We anticipate that more formal integration of SA mandates into biomedical research training will embed new, critical professional standards within the curriculum and ultimately lead to more impactful use of research investments.

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