



## “Like, we can't keep adding”: A mixed methods study to explore the feasibility of implementing co-produced 24-Hour Movement Guideline content

### « Nous ne pouvons pas continuer à en ajouter » : une étude de devis mixte afin d'explorer la faisabilité de la mise en oeuvre d'un contenu coproduit de directives en matière de mouvement sur 24 heures

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Résumé de l'article

**Contexte :** Les étudiants en médecine doivent démontrer leur compétence en matière de promotion de la santé et de prévention des maladies. Cependant, le contenu relatif à la promotion du mouvement fait défaut dans les programmes d'études médicales. Les directives canadiennes en matière de mouvement sur 24 heures offrent l'occasion de transformer les programmes d'études médicales afin de promouvoir le fait de bouger sur 24 heures. Nous avons précédemment coproduit une cartographie ainsi que 14 objectifs d'un curriculum favorisant le mouvement sur 24 heures au sein d'une faculté de médecine au Canada. Le but de cette étude était d'obtenir un consensus sur cette cartographie et sur les objectifs du curriculum proposé parmi les professeurs et étudiants en médecine et d'explorer les déterminants de sa mise en oeuvre.

**Méthodes :** Cette étude a suivi un devis méthodologique mixte utilisant une méthode Delphi modifiée afin d'évaluer le niveau d'accord et de désaccord avec les composants de la cartographie, suivi d'entretiens pour explorer l'opérationnalisation de celle-ci. Un sondage préliminaire a été distribué pour recueillir des données démographiques et sur les comportements de mouvement, suivi de trois sondages Delphi modifiés en ligne. Les suggestions d'amélioration de la cartographie ont été collectées par le biais de questions à réponses courtes ouvertes. Les entrevues étaient semi-structurées et réalisées en ligne. Les données des entretiens ont été analysées à l'aide d'une analyse de contenu guidée par le Consolidated Framework for Implementation Research (CFIR) 2.0.

**Résultats :** Un consensus a été atteint pour 156 des 180 points (86,7 %) dans l'enquête 1 (professeurs, n = 6 ; étudiants, n = 8), 49/51 points (96,1 %) dans l'enquête 2 (professeurs, n = 4 ; étudiants, n = 7), et 8/8 points (100 %) dans l'enquête 3 (professeurs, n = 3 ; étudiants, n = 7). Les déterminants de la mise en oeuvre englobaient les cinq domaines du CFIR 2.0, concernant principalement l'environnement interne (par exemple, la culture, les obstacles structurels).

**Conclusions :** La réciprocité et la communication ouverte entre les facultés de médecine et les agents de changement externes devraient être prioritaires lors de la coproduction d'un changement de curriculum dans le paysage actuel d'inflation et d'épuisement professionnel des médecins.

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# “Like, we can't keep adding”: a mixed methods study to explore the feasibility of implementing co-produced 24-Hour Movement Guideline content

« Nous ne pouvons pas continuer à en ajouter » : une étude de devis mixte afin d'explorer la faisabilité de la mise en œuvre d'un contenu coproduit de directives en matière de mouvement sur 24 heures

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## Abstract

**Background:** Medical students must demonstrate competency in health promotion and illness prevention; however, movement behaviour promotion content is lacking in medical curricula. Canada's 24-Hour Movement Guidelines (24HMG) present an opportunity to transform medical curricula to promote movement behaviours within a 24-hour paradigm. We previously co-produced a 24HMG curriculum map and 14 curriculum objectives at one Canadian medical school. The aim of this study was to gain consensus on the curriculum map and objectives among faculty and medical students and explore implementation determinants.

**Methods:** This study followed a concurrent nested mixed methods design using a modified Delphi method to assess the level of (dis)agreement with map components followed by interviews to explore the implementability of the map. A preliminary survey was distributed to collect demographic and movement behaviour data, followed by three online modified Delphi surveys. Suggested improvements to the map were solicited through open-text boxes. Interviews were semi-structured and conducted online. Interview data were analyzed using content analysis guided by the Consolidated Framework for Implementation Research (CFIR) 2.0.

**Results:** Consensus was reached on 156/180 items (86.7%) in Survey 1 (faculty,  $n = 6$ ; students,  $n = 8$ ), 49/51 items (96.1%) in Survey 2 (faculty,  $n = 4$ ; students,  $n = 7$ ), and 8/8 items (100%) in Survey 3 (faculty,  $n = 3$ ; students,  $n = 7$ ). Implementation determinants encompassed all five CFIR 2.0 domains, mostly the inner setting (e.g., culture, structural barriers).

**Conclusions:** Reciprocity and open communication between medical schools and external change agents should be prioritized when co-producing curriculum change in the present landscape of inflation and medical professional burnout.

## Résumé

**Contexte :** Les étudiants en médecine doivent démontrer leur compétence en matière de promotion de la santé et de prévention des maladies. Cependant, le contenu relatif à la promotion du mouvement fait défaut dans les programmes d'études médicales. Les directives canadiennes en matière de mouvement sur 24 heures offrent l'occasion de transformer les programmes d'études médicales afin de promouvoir le fait de bouger sur 24 heures. Nous avons précédemment coproduit une cartographie ainsi que 14 objectifs d'un curriculum favorisant le mouvement sur 24 heures au sein d'une faculté de médecine au Canada. Le but de cette étude était d'obtenir un consensus sur cette cartographie et sur les objectifs du curriculum proposé parmi les professeurs et étudiants en médecine et d'explorer les déterminants de sa mise en œuvre.

**Méthodes :** Cette étude a suivi un devis méthodologique mixte utilisant une méthode Delphi modifiée afin d'évaluer le niveau d'accord et de désaccord avec les composants de la cartographie, suivi d'entretiens pour explorer l'opérationnalisation de celle-ci. Un sondage préliminaire a été distribué pour recueillir des données démographiques et sur les comportements de mouvement, suivi de trois sondages Delphi modifiés en ligne. Les suggestions d'amélioration de la cartographie ont été collectées par le biais de questions à réponses courtes ouvertes. Les entrevues étaient semi-structurées et réalisées en ligne. Les données des entretiens ont été analysées à l'aide d'une analyse de contenu guidée par le *Consolidated Framework for Implementation Research* (CFIR) 2.0.

**Résultats :** Un consensus a été atteint pour 156 des 180 points (86,7 %) dans l'enquête 1 (professeurs,  $n = 6$  ; étudiants,  $n = 8$ ), 49/51 points (96,1 %) dans l'enquête 2 (professeurs,  $n = 4$  ; étudiants,  $n = 7$ ), et 8/8 points (100 %) dans l'enquête 3 (professeurs,  $n = 3$  ; étudiants,  $n = 7$ ). Les déterminants de la mise en œuvre englobaient les cinq domaines du CFIR 2.0, concernant principalement l'environnement interne (par exemple, la culture, les obstacles structurels).

**Conclusions :** La réciprocité et la communication ouverte entre les facultés de médecine et les agents de changement externes devraient être prioritaires lors de la coproduction d'un changement de curriculum dans le paysage actuel d'inflation et d'épuisement professionnel des médecins.

## Introduction

There is an apparent growing interest in embedding physical activity (PA) content in medical curricula due to its recognized utility for preventing and managing many chronic illnesses.<sup>1,2</sup> Indeed, health promotion and illness prevention must comprise 20% of the Medical Council of Canada Qualifying Examinations (MCCQE) that medical students complete upon graduation.<sup>3</sup> In Canada, the Canadian Medical Association (CMA) has supported this momentum to include PA content in the medical curriculum nationally.<sup>4</sup> Undergraduate medical programs in Canada follow a Competency-Based Medical Education (CBME) framework, which stipulates that multiple opportunities or ‘learning events’ be designed to facilitate medical students in progressing toward clearly outlined competencies to meet established program outcomes.<sup>5</sup> In line with CBME, Capozzi and colleagues recently developed a set of 14 PA objectives to support Canadian medical schools in developing PA curricula that nurture key competencies in PA prescription and counseling.<sup>6</sup> Multiple implementation initiatives have also been made to embed PA content, such as PA behaviour change prescription and counseling, into the medical curriculum.<sup>1,7,8</sup> For instance, in the United States, task forces of researchers and medical educators have promoted a set of lifestyle medicine curriculum implementation standards.<sup>9</sup> While a step in the right direction, these initiatives have not often considered the co-dependent relationships between PA and other movement behaviours, namely sedentary behaviour (SB)—which unfortunately is often conflated with physical inactivity—and sleep.

We initiated a strategic partnership with our local medical school to devise an initial competency-based curriculum map aimed at integrating content on how to promote these three interrelated movement behaviours for optimal health.<sup>10</sup> The importance of considering the composition of multiple movement behaviours across each day has been highlighted within recent advancements in public health guidelines.<sup>11</sup> The 24-Hour Movement Guidelines for Adults (24HMG) provide such combined recommendations on optimal daily levels of sleep, sedentary behaviour (SB), light intensity PA, and weekly levels of moderate-to-vigorous intensity PA, that adults aged 18+ should engage in for the greatest health benefits.<sup>12</sup> Some of these health gains include improved cardiometabolic indicators, bone health, brain function, stress levels, and mental health.<sup>11,12</sup> A novel aspect of the 24HMG is that even small improvements to these movement behaviours can accrue health benefits.<sup>12</sup> Therefore, implementing this 24HMG curriculum map to

enhance learning on promoting a continuum of movement behaviours, rather than only PA, has the potential to greatly enhance societal health.

However, as a multitude of barriers to curriculum renewal prevail, we sought to engage our local medical school in the present study in a consensus-building process to revise the curriculum map and improve its potential for implementation. Curricular inflation has complicated renewal endeavours as the sheer volume of existing content leaves little space in which to add content on new and emerging topics.<sup>13</sup> For instance, attempts to insert 24HMG content is in current competition with other significant topics vying for time like Equity, Diversity, and Inclusion in medicine<sup>14</sup> or opioid crisis management.<sup>15</sup> Given this complexity, addressing contextual factors in implementation, such as reducing curricular content to abate inflation, is necessary.<sup>16</sup> However, past curriculum renewal efforts have sometimes overlooked the needs and available resources of medical education faculty and staff to support curriculum change. Many calls for the inclusion of PA curricula in medical education have largely been initiated from individuals external to the medical school and perceived by faculty and staff as insensitive to their context.<sup>17</sup> Initiatives to embed PA in medical curricula in Canada that have considered the opinions of faculty, staff, and students of the medical school in which implementation is sought have been successful.<sup>c.f.,7</sup> Thus, a greater understanding of local context and facilitation of true partnerships between researchers and medical education decision-makers (e.g., administrative staff, deans, course directors), may be required to successfully embed the 24HMG in medical education.

Co-production approaches, whereby individuals who are invested in and will use the research findings are actively engaged throughout the research process,<sup>18</sup> can help foster true partnerships. Engaging with the intended users of the research has been reported to enhance the applicability, utility, usability, and impact of findings due to an improved mutual understanding shared appreciation between knowledge users’ and researchers’ unique contexts and needs.<sup>18,19</sup> Co-production could arguably enhance the applicability of a 24HMG curriculum and illuminate what is needed to support its implementation. Thus, the aim of the present study was to gain consensus on a 24HMG curriculum map and set of 24HMG curriculum objectives and explore implementation determinants using a co-production approach.

## Methods

We obtained ethics clearance from the Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board (TRAQ#: 6037649) prior to initiating this study.

### Study design

This study followed a concurrent nested mixed methods design underpinned by critical realism, a paradigm amenable to mixed methodologies due to its methodological pluralism, where we used multiple methods to better capture the wide array of mechanisms, ideas, and processes involved in understanding phenomena.<sup>20,21</sup> Critical realism pairs a realist ontology with a constructivist epistemology that acknowledges a single, external reality while considering participants' and the researchers' past experiences as inseparable from the research.<sup>21,22</sup> Reporting in this paper adheres to the Conducting and Reporting of Delphi Studies (CREDES) recommendations.<sup>23</sup> Figure 1 provides a diagram of study flow.

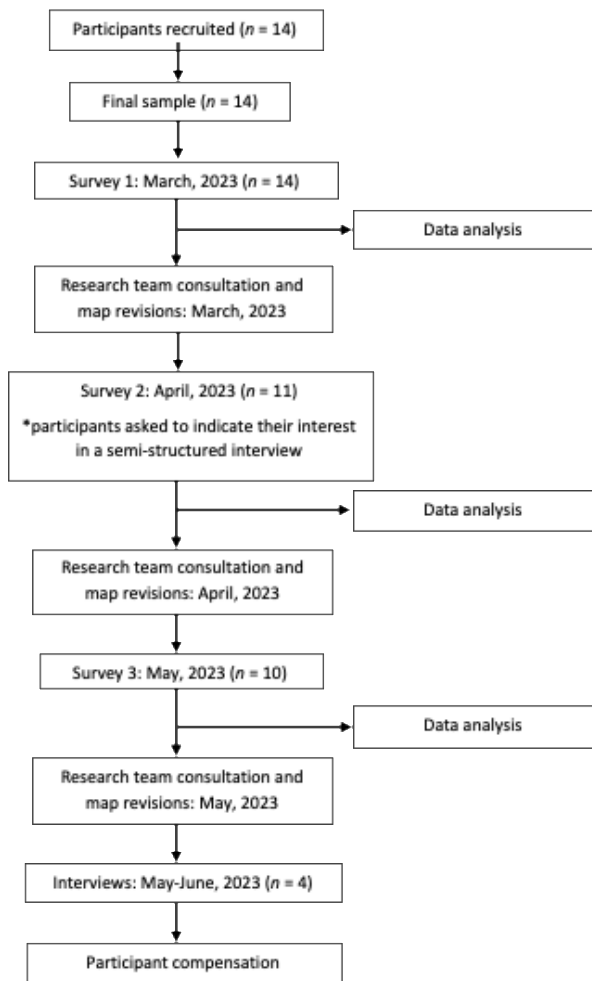


Figure 1. Study flow diagram

### Research context

Several steps laid the groundwork for this study to improve feasibility, applicability, and ownership of the proposed curriculum changes. First, we established a relationship with the Educational Developer of the undergraduate program before the start of the larger project to establish shared goals of the research and of the medical school. We then collaboratively operationalized Capozzi and colleagues' 14 PA objectives<sup>6</sup> to speak to all three 24HMG behaviours and expanded our initial curriculum map<sup>10</sup> to include a total of 20 learning events that targeted all 14 of these operationalized 24HMG objectives. The Educational Developer encouraged us to integrate new content within existing learning events and align with existing assessments, competencies, and program outcomes. For instance, the map suggests how existing PA content could extend to SB and sleep with small time additions (e.g., +10 minutes), or how non-24HMG content could be replaced with 24HMG content (net-zero), across curriculum years and 24HMG-relevant courses. To conduct the curriculum mapping, TLM accessed the medical school's learning management system to retrieve syllabi and learning materials. Finally, the content experts who led the systematic reviews informing the 24HMG recommendations audited the working map and objectives (i.e., draft versions) for content accuracy. Following this groundwork, we used a modified Delphi method to gain consensus on the map and objectives and we used interviews to explore implementation determinants.

### Participants and procedure

We used purposive sampling to invite the 20 faculty members who taught the courses listed in the initial curriculum map at the time of the study and up to 10 first to fourth year medical students based on available funding for compensation. While the targeted sample size was relatively small, it reflected the maximum number of faculty available at our local medical school who would be impacted by the incorporation of the 24HMG content, and the ratio of faculty to student participants sought is reflective of faculty being the primary drivers of curriculum change decisions. The Educational Developer individually emailed all 20 faculty and collectively blind-copy emailed all medical students. We also contacted the student society director, and asked to distribute a recruitment script to the first to fourth year student representatives, who then disseminated the script to all medical students in their respective years. Emails and scripts contained a link to a preliminary survey, which included questions about demographic characteristics (e.g., years in practice, year in

medical school, self-identification), knowledge, awareness, and level of achievement of the 24HMG recommendations, and interest in being contacted for a follow-up interview. All faculty who completed the preliminary survey were invited to complete Survey 1. We created *a priori* selection criteria to guide medical student recruitment if more than 10 students completed the preliminary survey to achieve representation across a range of 24HMG knowledge/awareness, movement behaviour levels, educational backgrounds, years of study, self-identification, gender identities, and highest degrees obtained.

We used three modified Delphi online surveys to solicit feedback on the map and objectives, whereby all surveys included seven-point Likert scale questions (1: “strongly disagree”; 4: “neither agree nor disagree”; 7: “strongly agree”) to collect participants’ level of (dis)agreement with nine components per learning event: (i) the learning event objectives, (ii) title and description, (iii) assessment, (iv) course and term, (v) instruction time, (vi) institutional outcomes, (vii) institutional competencies, (viii) 24HMG objectives, and (ix) overall importance. We used open-text box questions to seek explanations or suggestions for improving the map and objectives for any ratings of 4 (“neither agree nor disagree”) or lower; however, participants were able to comment regardless of their rating. We created, piloted, and administered the surveys on Qualtrics, displaying each learning event on a separate page. Following each survey, TLM, TNS, MSF, and JRT conferred via a 60-90-minute meeting and email correspondence to discuss how to best revise the map and objectives to improve upon the items that did not reach consensus. These revisions were strongly guided by participants’ qualitative comments to incorporate changes that were suggested by participants or to improve sections of the map and objectives that participants commented on. At the start of Surveys 2 and 3, we asked participants to review a copy of the revised curriculum map and objectives alongside a summary of participants’ anonymized comments from the previous survey and what revisions were made to address them, prior to completing the rest of the survey. We provided compensation for completing all surveys rounds to faculty in the form of an e-gift card worth \$100 CAD and medical students in the form of a FitBit Inspire 2 (retail value \$169.95 CAD).

We conducted optional semi-structured interviews following Survey 3 with any participant expressing an interest, regardless of survey completion. We grounded interview guides in the Consolidated Framework for

Implementation Research (CFIR) 2.0, which is a determinant framework that categorizes a wide array of factors that may support or impede implementation of an innovation in specific settings.<sup>24</sup> The CFIR 2.0 provided a typology of constructs across five domains: (1) the innovation, or the ‘thing’ being implemented; (2) the inner setting, or the setting in which the innovation is implemented in; (3) the outer setting, or the broader setting in which the inner setting exists; (4) the roles and characteristics of individuals affected by implementations; and (5) implementation processes, or the activities and strategies involved in implementing the innovation. The CFIR 2.0 domains may be used to pre-assess the context in which implementation is to occur, conceptualize barriers and enablers, and contextualize findings.<sup>24</sup> We developed questions in partnership with the Educational Developer, mapped to each of the five CFIR 2.0 domains,<sup>24</sup> and piloted. We audio recorded the interviews, and IKM transcribed verbatim.

### Analysis

We exported survey data into Microsoft Excel and SPSS 29.0 and interview data into NVivo 12 for analysis.<sup>25,26</sup> We calculated descriptive statistics of central tendency (i.e., median, mean, standard deviation, and interquartile range) to describe consensus trends per survey item. A priori consensus criteria consisted of survey items having at least 70% of participants indicate they “somewhat agreed,” “agreed,” or “strongly agreed,” and a mean score of  $\geq$  six out of seven.<sup>27,28</sup> We chose an agreement level of  $\geq$ 70% rather than a lower cut-off (e.g., 60%) based on prior Delphi recommendations<sup>29</sup> and our own work<sup>30</sup> to ensure that more participants were in agreement when consensus was achieved and to enhance methodological rigour. We explored associations between ratings per survey using Kendall’s coefficient of concordance ( $W$ ) as more than two raters (i.e., participants) were present and data were non-parametric. Ranging from perfect disagreement ( $W=0$ ) to perfect agreement ( $W = 1$ ), values between 0 to 0.39 denote poor agreement, 0.40-0.74 denote fair to good agreement, and 0.75-1 denote excellent agreement.<sup>31</sup> We used Chi-square ( $\chi^2$ ) at an alpha of 0.05 to test for statistical significance of  $W$ .

Given the interview guide targeted surface-level questioning, we chose content analysis to develop codes and categories.<sup>32</sup> TLM coded inductively then categorized the data deductively per the CFIR 2.0.<sup>33</sup> At each step, IKM acted as a critical friend by reviewing all codes and categories and prompted reflexive thinking.<sup>34</sup> JRT helped resolve any discrepancies.

## Results

### Modified Delphi surveys

Fourteen medical faculty and medical students consented and completed Survey 1 (faculty,  $n = 6$ ; students,  $n = 8$ ), 11 completed Survey 2 (faculty,  $n = 4$ ; students,  $n = 7$ ), and 10 completed Survey 3 (faculty,  $n = 3$ ; students,  $n = 7$ ). We sent many survey reminders and extensions; however, time constraints remained a driving reason for attrition. Given Delphi studies may be conducted with samples as small as 10,<sup>35</sup> we deemed our final sample sufficient. Table 1 shows all participant characteristics. Appendix A displays the quantitative results of surveys 1-3.

In Survey 1, 86.7% of items (156/180) reached consensus, leaving 24 items for further approval in Survey 2. However, as comments were provided for 27 items that had reached consensus, a total of 51 items were included in Survey 2. Participants provided 90 comments, which spoke to how each of the 20 learning events could be improved. Regarding learning event #3 “Introduction to Health Promotion,” one participant relayed, “Not sure if a summative exam is the best for learning [...]. Case based assessments would be best rather than memorizing and taking a test” [P07]. Another participant suggested that “it would be useful to incorporate an SGL [Small Group Learning] component so students can strategize how to reduce barriers in a group discussion. [...] ie how would you counsel about the 24HMG to someone with X socioeconomic circumstances?” [P06, in relation to learning event #11 “Social and Structural Determinants of Health”]. Further, some participants commented on the implementability of the learning events. As one participant put it, “24HMG is not the most important thing students will encounter. This is too repetitive” [P04, in relation to learning event #20 “Mandatory Encounter on Preventive Care–MCC Presentation #74”]. To address these comments, we removed seven learning events, which were either integrated within one of the remaining 13 learning events or merged into a fourteenth learning event. In these revised 14 learning events, several 24HMG objectives were unmapped due to reallocated content, thus we re-mapped these objectives to other learning events and sought further feedback on these changes in Survey 2.

In Survey 2, 96.1% of items (49/51) reached consensus, leaving only two items for further approval in Survey 3. However, we revised an additional six items in response to participant feedback. Therefore, we put forward a total of eight items in Survey 3. Sixteen comments pertained to appropriate assignment of instructional time and

assessments, structuring of the 24HMG content, placement of one learning event within the term, and approaches for facilitating movement breaks during sessions. For instance, regarding learning event #10 “Half-day symposium on physician wellness,” one participant said, “I don’t think this level of time is necessary to achieve the learning objectives[...] 30-45 minutes is likely enough. Could be combined with wellness sessions already scheduled” [P10]. Several of comments also pointed toward map implementation, which did not inform changes to the map but were noted to guide future implementation. For example, in relation to learning event #9 “Exercise,” one participant suggested to distribute a slide that “instructors could put up a slide that says optional at the top and shows a silent video of the movement of the day” [P10] to facilitate implementation by all instructors

In Survey 3, all items (8/8) reached consensus. The sole comment in Survey 3 echoed concerns with the instructional time and placement of learning event #3 “Assessing and Measuring Health Status” within the term. As the participant stated, “[...] I am still concerned about the critical appraisal content so early in the term. Further, although a DIL [Directed Independent Learning] of 80 minutes is doable (80 plus 10-minute break), the MD Program is trying to get away from learning events of this length” [P03]. This was unsurprising as no changes were made to this learning event following Survey 2. Only future steps were noted to consult the course director and curriculum committee in lieu of any changes. Perhaps, this participant felt the need to further advise us in advance of this consultation.

Concordance analyses supported significant but poor levels of concordance in Survey 1 ( $W = .128$ ,  $\chi^2(179, 14) = 320.87$ ,  $p < .001$ ), Survey 2 ( $W = .246$ ,  $\chi^2(50, 11) = 135.45$ ,  $p < .001$ ), and Survey 3 ( $W = .341$ ,  $\chi^2(7, 10) = 23.87$ ,  $p < .001$ ). Despite low levels of concordance, consensus was reached. Low concordance may suggest that participants continued to report varying ratings across the three surveys even though levels of agreement trended upward.

Table 1. Participant demographic, occupational, and education characteristics.

	Round 1; n = 14 (%)	Round 2; n = 11 (%)	Round 3; n = 10 (%)
<b>Gender Identity</b>			
Woman	12 (85.7%)	9 (81.8%)	8 (80.0%)
Man	1 (7.1%)	1 (9.1%)	1 (10.0%)
Gender nonconforming person	1 (7.1%)	1 (9.1%)	1 (10.0%)
<b>Self-identification of Descent<sup>a</sup></b>			
White	9 (64.3%)	7 (63.6%)	6 (60.0%)
Other <sup>b</sup>	6 (42.9%)	4 (36.4%)	4 (40.0%)
<b>Title</b>			
Instructor	1 (7.1%)	0 (0.0%)	0 (0.0%)
Course Director	4 (28.6%)	3 (27.3%)	2 (20.0%)
First year medical student	4 (28.6%)	4 (36.4%)	4 (40.0%)
Second year medical student	1 (7.1%)	0 (0.0%)	0 (0.0%)
Third year medical student	3 (21.4%)	3 (27.3%)	3 (30.0%)
Fourth year medical student	0 (0.0%)	0 (0.0%)	0 (0.0%)
Other	1 (7.1%)	1 (9.1%)	1 (10.0%)
Years in Current Position (faculty only)	5.5 years	5.25 years	5.33 years
<b>Topics Currently Teaching (faculty only)<sup>a</sup></b>			
Neurosciences	2 (14.3%)	1 (9.1%)	1 (10.0%)
Health Determinants	1 (7.1%)	0 (0.0%)	0 (0.0%)
Clinical and Communication Skills	1 (7.1%)	1 (9.1%)	0 (0.0%)
Physician Roles	1 (7.1%)	1 (9.1%)	1 (10.0%)
Population Health	1 (7.1%)	0 (0.0%)	0 (0.0%)
Critical Enquiry	1 (7.1%)	1 (9.1%)	1 (10.0%)
Geriatrics	1 (7.1%)	1 (9.1%)	1 (10.0%)
<b>Highest Education Attained (medical students only)</b>			
Bachelor's degree	4 (28.6%)	4 (36.4%)	4 (40.0%)
Master's degree	4 (28.6%)	3 (27.3%)	3 (30.0%)
Doctoral degree	0 (0.0%)	0 (0.0%)	0 (0.0%)
<b>Educational Background (medical students only)<sup>a</sup></b>			
Engineering	2 (14.3%)	2 (18.2%)	2 (20.0%)
Kinesiology	3 (21.4%)	3 (27.3%)	3 (30.0%)
Neuroscience	1 (7.1%)	1 (9.1%)	1 (10.0%)
Life sciences	1 (7.1%)	1 (9.1%)	1 (10.0%)
Public health	1 (7.1%)	1 (9.1%)	1 (10.0%)
Social sciences	1 (7.1%)	0 (0.0%)	0 (0.0%)
<b>Familiarity with the 24-Hour Movement Guidelines</b>			
Not familiar at all	1 (7.1%)	1 (9.1%)	1 (10.0%)
Familiar	13 (92.9%)	10 (90.9%)	9 (90.0%)
<i>Just heard the name</i>	3 (21.4%)	3 (27.3%)	2 (20.0%)
<i>Somewhat familiar</i>	7 (50.0%)	5 (45.5%)	5 (50.0%)
<i>Very familiar</i>	3 (21.4%)	2 (18.2%)	2 (20.0%)
<b>Knowledge of the 24-Hour Movement Guidelines (open text)</b>			
Correctly identified the three main components (i.e., physical activity, sedentary behaviour, and sleep)	7 (50.0%)	5 (45.5%)	4 (40.0%)
Correctly identified two of the three main components	3 (21.4%)	2 (18.2%)	2 (20.0%)
Correctly identified one of the three main components	2 (14.3%)	2 (18.2%)	2 (20.0%)
Did not know/incorrect response/no response	2 (14.3%)	2 (18.2%)	2 (20.0%)
<b>Knowledge of the 24-Hour Movement Guidelines (multi-select)<sup>a</sup></b>			
At least 150 minutes of moderate-to-vigorous physical activity a week, including at least 2 days of muscle strengthening activities per week	12 (85.7%)	10 (90.9%)	9 (90.0%)
Several hours of light physical activity, including standing	4 (28.6%)	3 (27.3%)	3 (30.0%)
Limit sedentary time to 8 hours or less per day	11 (75.6%)	9 (81.8%)	9 (90.0%)
7-9 hours of good quality sleep on a regular basis, with consistent bed and wake-up times (for adults 18-64 years)	13 (92.9%)	10 (90.9%)	9 (90.0%)
7-8 hours of good quality sleep on a regular basis, with consistent bed and wake-up times (for adults 65+ years)	4 (28.6%)	4 (36.4%)	4 (40.0%)
Perform physical activities that challenge balance	4 (28.6%)	4 (36.4%)	4 (40.0%)
Replacing sedentary behaviour with additional physical activity and trading light physical activity for more moderate-to-vigorous physical activity, while preserving sufficient sleep, can provide greater health benefits	9 (64.2%)	8 (72.7%)	8 (80.0%)
Did not know/unsure	1 (7.1%)	1 (9.1%)	1 (10.0%)
Incorrect response	0 (0.0%)	0 (0.0%)	0 (0.0%)
<b>Participants' Movement Behaviours<sup>a</sup></b>			
Meets the sleep recommendation 7-9 hours of sleep	8 (57.1%)	5 (45.5%)	5 (50.0%)
Self reports sleep to be good quality sleep	10 (71.4%)	9 (81.8%)	9 (90.0%)
Meets the recommendation of at least 150 minutes of moderate-to-vigorous physical activity a week ...including at least 2 days of muscle strengthening activities per week	10 (71.4%)	8 (72.7%)	7 (70.0%)
Meets the daily recommendation of several hours of light physical activity, including standing	3 (21.4%)	3 (27.3%)	3 (30.0%)
Meets the recommendation of limiting sedentary time to 8 hours or less per day	6 (42.9%)	5 (45.5%)	5 (50.0%)
Meets the recommendation of limiting sedentary time to 8 hours or less per day	3 (21.4%)	3 (27.3%)	2 (20.0%)
Meets all 4 recommendations	0 (0.0%)	0 (0.0%)	0 (0.0%)
Meets 3 of the 4 recommendations	5 (35.7%)	4 (36.4%)	3 (30.0%)
Meets 2 of the 4 recommendations	4 (28.6%)	3 (27.3%)	3 (30.0%)
Meets 1 of the 4 recommendations	4 (28.6%)	3 (27.3%)	3 (30.0%)
Meets none of the recommendations/did not answer	1 (7.1%)	1 (9.1%)	1 (10.0%)

<sup>a</sup>Category total is greater than sample size due to option to select multiple responses; <sup>b</sup>Other descents self-identified included First Nations, Filipino, Korean, South Asian, West Asian, Filipino, and Western European.

## Interviews

Two faculty and two medical students participated in a semi-structured interview ( $M = 45.17$  [ $SD = 12.47$ ] minutes). Data reflected all five CFIR 2.0 domains; however, most implementation determinants pertained to the inner setting. Most prominently, participants emphasized the need to align the map with program outcomes, such as through teaching holistic skills in 24HMG promotion for individuals of all abilities and contexts (e.g., low socioeconomic status), and to appropriately assess attainment of 24HMG skills across multiple years and courses. For instance, checking a box to indicate whether 24HMG content is taught would be insufficient to indicate whether 24HMG outcomes are being achieved; instead, observable 24HMG promotion abilities should be evaluated across the four-year curriculum. Structural barriers of the inner setting were also raised, such as the map needing to be vetted by the curriculum committee prior to implementation and the curriculum already being overfull. Alternatively, implementation enablers included the map's compatibility with existing courses and institutional values, the existence of opportunities to embed 24HMG content, and the institution's receptivity to external collaboration on curriculum change.

Within the outer setting, individuals external to the medical school who could assist with implementation were identified, such as instructors in the School of Nursing, physiotherapists, exercise professionals (e.g., registered kinesiologists), or other academics in the Faculty of Health Sciences. Additionally, one faculty and one medical student spoke about designing 24HMG curriculum objectives with accreditation standards in mind, whereas the other faculty mentioned that 24HMG content would not contribute to accreditation as it would be lumped under 'health promotion.' Similarly, both medical students reported that the questions in the 'health promotion' category in the MCCQE are not specific to movement behaviours and thus were not confident that the 24HMG curriculum would help in the MCCQE.

Findings within the innovation domain supported that the map should operate as 'starting point' from which to make future improvements to the 24HMG content, rather than as a final product. However, challenges with the map included its complexity and insufficient explanation of *how* medical students will achieve 24HMG promotion outcomes.

In the individuals domain, participants indicated that the 24HMG content may not be that complicated for medical students to grasp and embedding it may not need enormous amounts of instructional time. Characteristics of individuals who could deliver a 24HMG curriculum were highlighted, including faculty who embody healthy movement behaviours or could act as a champion. Finally, participants stressed the importance of engaging key decision-makers, such as course directors of 24HMG-related courses, in the initial curriculum mapping and uptake.

In the implementation process domain, subcategories comprised challenges with forming an implementation team, initiating quality partnerships, and conducting a needs assessment. For example, one participant voiced how prior external collaborators have not considered their medical school's circumstances (e.g., lack of funding and time). All categories and subcategories are displayed in Table 2 with representative quotations.

## Discussion

In this study, we sought to gain consensus on a 24HMG curriculum map and objectives at our local medical school and gather faculty members' and students' perspectives on implementation. Consensus on all items was achieved in Survey 3 after numerous, iterative revisions of the map and objectives, and multiple implementation determinants were emphasized in the interviews for future consideration. Optimizing curriculum change processes is paramount in the rapidly evolving field of medicine and in light of the challenges of curricular changes amidst ongoing pressure for curriculum inflation.<sup>13</sup> During pandemic years, medical school faculty and staff restructured curricula to reduce in-person contact while preserving the successful training of future physicians to avoid future healthcare shortages.<sup>36-38</sup> This restructuring has further complicated curriculum renewal and demonstrates the need for a better understanding of the local context when proposing and implementation curriculum changes. The co-production approach we took helped to understand how to partner with decision-makers at our local medical school to support more successful curriculum changes. As noted by participants, mutual respect of partners' contexts and designing new curricula to be resource-neutral may be required for feasible and sustainable changes.



Table 2. CFIR 2.0 domain definitions for each of the five categories with illustrative quotations for each of the 21 subcategories

Domain/Category	Domain Definition	Subcategory	Illustrative Quotations
<b>Innovation</b>	The “thing” being implemented, e.g., a new clinical treatment, educational program, city service	<b>Challenges with the map</b>	“During the first survey, I definitely panicked a little bit because I felt like a lot of the planned things were displacing stuff that was also very important.” – P10 “And so that’s part of it. Like, how would you know at the end of four years, as opposed to tick boxes, that students have learned what we think they need to know about the 24-hour Movement Guidelines and that they’re prepared to help their patients navigate that.” – P02
		<b>Map is a starting point</b>	“It would leave at least a base knowledge for the program here to build off should we choose to, so that’s good. So I think in general, it meets the needs people’s needs quite well and it’s provided a malleable base to which one could further direct uh, specialty or subspecialty specific education.” – P08 “And so for me, like the 24-hour Movement Guidelines, I sort of thought like the third iteration is a good place to start and I hope that it sort of can expand.” – P10
<b>Outer Setting</b>	The setting in which the Inner Setting exists, e.g., hospital system, school district, state. There may be multiple Outer Settings and/or multiple levels within the Outer Setting (e.g., community, system, state).	<b>Accreditation</b>	“Umm I think the one thing I’m not 100% clear on is you just would want to make sure it’s not going to break any accreditation things, but I don’t see how adding this would do that.” – P10 “With my experience of the accreditations in the in the postgraduate world, I’d say that hopefully you’ve designed these objectives with accreditation in mind, and if it’s been flagged as an area for growth that we’ve, with these, at least shown a commitment to starting the process of incorporating 24 hour movement guidelines. So I think that would be perceived very favorably.” – P08
		<b>Considerations for external collaboration</b>	“... for me, like the School of Physical Therapy and the School of Medicine really should take training on these guidelines together as a minimum. Umm, but I don’t see why you wouldn’t also include the School of Nursing in there because nurses are key team members after someone has surgery. It’s usually the nurse that’s getting them out of bed first. So, you know, like to me this is an area where radical collaboration could really shine and all the schools could learn on this together.” – P10 “... the easier you make it for them [medical education faculty] to reply and participate, the more likely they are to do it. And it’s not a lack of interest or engagement. It’s just the burnout level is very, very high.” – P02
		<b>External pressure for other priorities</b>	“And it sounds awful, but it just is like, you know, we’re in a healthcare crisis, right? So like everyone who teaches in the curriculum, with a few exceptions or physicians who are dealing with the healthcare crisis, I’m sure everyone else is still dealing with other funding crises and other problems.” – P02 “Sometimes I think the realities of practice are shocking. I know sometimes I go into observe a family practice and I’m shocked because the government doesn’t actually compensate positions to talk to patients about lifestyle interventions.” – P10
<b>Inner Setting</b>	The setting in which the innovation is implemented, e.g., hospital, school, city. There may be multiple Inner Settings and/or multiple levels within the Inner Setting (e.g., unit, classroom, team).	<b>Change must fit the institution</b>	“And I think the other thing was, and you know this is no fault of anybody’s. But, like, some of the suggestions are just impossible. We don’t have 10 minutes to add. We have 50-minute blocks. So, any of that it was like ‘well, no we can’t.’” – P02 “And the assessment has to be part of it too. So everyone does curriculum mapping because curriculum is more available than assessments. But there’s a very like... We assess what we value.” – P02
		<b>Institutional culture supports implementation</b>	“Queen’s in particular is really taking this direction of focusing on primary care, both in terms of pushing our medical students into primary care and having it be a major focus of our curriculum as well” – P06 “I’m all for it! I think it’s wonderful to have people come in and collaborate and provide an alternate perspective. I don’t think there’s any reasons it shouldn’t happen...” – P08
		<b>Curriculum map has high relevance and fit</b>	“I’m really pleased to see these going into the curriculum because I think that the 24-Hour Movement Guidelines are, in general, needed to maintain the health of both physicians and students and patients.” – P08 “The movement guidelines are really relevant to nearly every area of practice, like neonatologists are probably not too concerned about getting enough exercise ‘cause their patients don’t do that. But you know, with that one exception, most practitioners have patients who would benefit from moving more, from sleeping better.” – P10
		<b>Institutional culture supports implementation</b>	“I do think at Queen’s they want to graduate physicians who have those lifestyle conversations.” – P10 “I’d say you won’t necessarily meet resistance to this the higher up you go because, at least at Queen’s, a lot of our leadership team is primary care oriented.” – P06
		<b>Curriculum map must align with desired and current program outcomes</b>	“I’ve kind of learned is that, you know, I already knew how important these things were on paper, but it’s a lot more difficult to implement in the real world. More than I expected. And so if pre-clerks can have, sort of, exposure to some of those barriers early on and actually have to like work through practically counseling people about this kind of thing, as opposed to just reading it on paper, I think that that’s, kind of, the best way to learn it, in my opinion.” – P06 “It’s not about, like, what this objective is or how you tweak the objective because, to be perfectly frank, the objectives are kind of meaningless in terms of learning. Like, we have to use them, but it’s not like... I... The lack of an objective doesn’t mean it’s being taught, and the presence of an objective does not mean anything in terms of what students are taking from that.” – P02
		<b>Resources available to</b>	“It’s funny to me like because I’ve been doing it [teaching about the importance of exercise] for so long and it keeps being reinforced how often it comes back. So, I teach for like 2 hours on the topic in a dedicated fashion in 1st year...” – P02

		<b>support implementation</b>	"Like, I'll just tell you how I assess it in first year. So, there's a few multiple choice questions. So I will describe a patient, who has some various comorbidities and that it's usually framed that either they're coming in with an idea of what they should be doing in terms of exercise or usually I often frame it as like some well-meaning family member has come in and said this is what you need to do, right. And I'll say "what is wrong with these recommendations?"..." – P02
		<b>Structural barriers to implementation</b>	"So, we have a very clear process for any additional time, which is, it has to be... like, we have to justify it... like, the course director has to be in agreement, it has to be justified, it has to go through curriculum committee and be approved." – P02 "Usually, we're saying what else is coming out because we cannot keep adding. If you've looked at our schedule, it's insane. Like we can't keep adding." – P02
		<b>Structural barriers to mapping</b>	"Just looking at what's in Elentra doesn't always tell you what's happening in the sessions or what the focus is and stuff like that." – P02 "... it sounds a bit silly, but like curriculum is very formal. So like, you know, the standing during videos is something I introduced years ago, that's not actually curriculum." – P02
		<b>Structural enablers to implementation</b>	"I didn't think that'd [the size of the medical school] be an issue at all. The class size isn't huge. It's about 106 students now, isn't it? And there's more than enough instructors to fill every single slot, and I don't think this school really dips into using residents or non-staff members particularly extensively, so I don't think that's an issue." – P08 "I would say that, generally speaking, the smaller size of the program is a plus across the board. There really isn't a downside to it. It allows for, I think, more small group teaching which, as I've kind of mentioned, I think is more amenable to this kind of material anyway. I think it also means that with fewer staff you have more access to their time or their... There just seems to be like a closer connection with the faculty here and the students than I've heard elsewhere. And you're more likely to interact with a lot of them down the road when you're actually working in the hospital. So there's more continuity, I guess." – P06
<b>Individuals</b>	The roles and characteristics of individuals.	<b>Characteristics of deliverers of 24HMG curriculum</b>	"Yeah, like they have to believe that it's the right thing to do in order to really give like an impactful implementation." – P10 "Umm, I think it's... you can't sell something you don't believe in. You can say the words and you might fool some of the people all the time, but you're not gonna fool all the people all the time. So, it really needs to be someone who believes in movement." – P10
		<b>Characteristics of recipients of 24HMG curriculum</b>	"I think the new content or information that it brings out is actually just connecting the three movement behaviours. I feel like that's still not a very well understood piece of knowledge." – P06 "Like, they're smart. They can look stuff up. I'm really not that worried that they know the guidelines off the top of their head." – P02
		<b>Leaders to enhance buy-in</b>	"Well, I think to some degree. I think you should [involve people other than key course directors and instructors], I think everyone should be made aware of the incorporation of the guidelines." – P08 "Some of our more powerful changes that have happened have actually come from students." – P02
<b>Implementation Process</b>	The activities and strategies used to implement the innovation.	<b>Challenges assessing local needs during mapping</b>	"I mean, I may be a little bit biased towards my own position. I don't know how well I could have engaged with this process if I had been in the middle of the curriculum. It's only that I'm now a clerk, having taken in the pre-clerkship curriculum and implemented it clinically that I can kind of look at the big picture." – P06 "It's gotta be very focused. It's gotta be like, 'Do you teach on any of these things? Yes or no?' Like I make it as easy as possible for them, and then we're more likely... And then if they say 'yes', then we can follow up and say, 'Can we just chat with you to understand this?'" – P02
		<b>Challenges with forming an implementation team</b>	"And then as I said the tricky part is if people need to be involved, that's really where things start to get difficult so... We've tried over the years to look for a physician lead for anything that you would put under kind of lifestyle and, I don't love the term, but that's what it's been sort of labeled. We don't have that yet." – P02 "I think it takes somebody vetted into the system to fully contextualize how it will be integrated and how it will be received..." – P08
		<b>Supporting true partnerships</b>	"I think it is really helpful to have that sort of back and forth, and if no one has sort of had those hard conversations about 'what is it that every medical student needs to know going off into these incredibly disparate residencies?', because it is a hard question for everyone to ask." – P02 "... if you're gonna come in and pitch it, just make sure you've set in stone who your allies are and biggest boosters are gonna be that actually have contact with students because they'll be doing the lion's share of actually pitching it to us." – P06
		<b>Trialing implementation</b>	"So if you were to come to me and say these are the things that... so it would... If it's a question of can this be highlighted in the session, that's pretty easy and doesn't need any resources." – P02 "I think if you want people to actually practice them, you'd have to roll this out initially just with an announcement to everyone in the medical school, all the faculty, teaching or not, that the 24 movement guidelines are being incorporated into the curriculum and it would be nice to make an effort to actually incorporate them into education. And I think it's nice that comes down from the School of Medicine itself, from the vice Dean for education. Just because then it anchors the whole concept with some perceived authority..." – P08

Note: Any words added to participants' quotes to clarify meaning are presented in square brackets

However, as the process of mobilizing knowledge is neither linear nor static, the 24HMG curriculum map may require ongoing adaptation during implementation.<sup>24,39</sup> Implementation considerations were highlighted in the surveys and interviews regarding how the map version that achieved full consensus should not be the final version. This finding may point to the pitfalls of consensus-building processes, such as the concealment of dissenting opinions or failure to capture all relevant opinions, which prior authors have illuminated.<sup>40,41</sup> Some participants in the present study expressed difficulty completing the surveys as they felt the curricular structure was oversimplified, suggesting the 24HMG map may need to evolve beyond this Delphi process. Future curriculum renewal studies should explore the utility of other methods that may help overcome the drawbacks of the modified Delphi, such as using the Supreme Court Model in which both majority and minority opinions are reported to increase transparency of the consensus statement(s),<sup>40</sup> or by pairing modified Delphi studies with qualitative methods and paradigms.<sup>41</sup>

We chose to complement our modified Delphi method with interviews precisely to solicit participants' nuanced opinions of the map and its future implementation, which we anticipated not being able to adequately capture in the surveys. Our interview findings largely pertained to implementation determinants with the inner setting, such as how the curriculum map should explicitly indicate how 24HMG content aligns with existing program outcomes. Participants recommended better defining what observed abilities are sought for 24HMG promotion, either in the map itself or during its implementation. This notion is supported by CBME, which states that the achievement of desired outcomes occurs through assessments that capture observed abilities.<sup>42</sup> Despite our best efforts to align 24HMG learning events with new or existing assessments, there were disparities between the language used in the map and by participants. Had we worked more closely with key curriculum leaders (e.g., deans, associate deans, and course directors in addition to the Educational Developer) during the mapping stage, we may have been able to achieve deeper alignment with the medical school's context, language, and curricular structure in the map from the start.

Additional barriers to implementing the 24HMG curriculum and partnering on curriculum change were highlighted by participants, including lack of curricular time and external change agents' inattention to the medical school's context. Concerns about the 24HMG content 'fitting' within the existing curriculum were mentioned by multiple

participants, including dissenting opinions on how to assess 24HMG competencies, how much time to spend on 24HMG content, and whether some 24HMG should be incorporated at all, presenting factors that could impede implementation if not addressed. External collaborators could try to lessen these barriers by considering the contextual struggles of medical educators (e.g., lack of time and resources), either by financially supporting the change (if funding is available) or by deemphasizing external pressure for change.<sup>43</sup> Such consideration may promote greater reciprocity in partnerships and success in integrating new content.

Enablers to implementing the 24HMG curriculum were reported by participants in this study, including reciprocity between individuals external and internal to the institution and the availability of implementation leaders and champions within the medical school, such as course directors who are enthusiastic about the 24HMG. However, ongoing work will be needed to identify and engage champions who are willing to lead and sustain curriculum changes to embed and deliver 24HMG content, such as deans, faculty, and student champions, who can inspire engagement from other faculty and students and further optimize the mapping and implementation of new curricula.<sup>44</sup> Our main takeaways from this research are presented a list of recommendations for future co-produced renewal efforts in Table 3.

### Strengths, limitations, and implications

Despite our efforts to engage all relevant faculty in our study, the sample was small, limited in diversity, and did not include all course directors connected to the proposed 24HMG content who may have provided unique feedback, influenced how consensus evolved, or been able to support implementation. Accordingly, our results may lack nuance that a broader range of participant opinions could have provided and may not fully represent all relevant implementation barriers and strategies. Further, while we acquired rich insights from faculty and students, this study was conducted at our local institution only; curriculum implementation may unfold differently at other medical schools with unique contexts. Specifically, the faculty at our medical school are open to new topics and the same faculty teach both the pre-clerkship and clerkship courses, as there are fewer faculty. These conditions could make it easier to get buy-in from and build meaningful connections with faculty. A drawback of the smaller program size is that faculty had greater time constraints. However, it can be challenging to engage experts in academic medicine regardless, especially key decision-makers (e.g., deans,

course directors) who sometimes have the least availability. Finally, the Educational Developer at our institution was passionate about research, which may not exist at other institutions to the same degree. Our partnership with the Educational Developer was a notable strength as it allowed us to balance internal and external expertise on medical curriculum design and 24HMG concepts while leveraging each other's networks.

*Table 3. Recommendations for future co-produced curriculum renewal efforts*

Recommendation	Supporting evidence from the present study
A flexible approach is best	Research and academia are unpredictable, especially in the fields of health and medicine. In our research, we had to be flexible by adjusting timelines, study designs, and project goals several times, and this helped us assuage differences in expectations and achieve a quality co-production partnership.
Try to engage the decision-makers who are most influential in implementing the curriculum change from the study design stage	Our approach was lagging in engaging deans and relevant course directors from study outset. Including these individuals on the research team may help strengthen understanding of co-production partners' contexts, establish a shared language, and improve project efficiency and knowledge mobilization.
Minimize the amount of new content, where possible	Instructors who were not participants in this study may feel like the amount of 24HMG content proposed for their course is unattainable. Therefore, attempts will be made to further minimize the content (e.g., adding a single bullet point to a slide deck instead of adding multiple slides). Of note, scaling back content may result in the loss of some content that is essential to meet certain 24HMG objectives. Conversations with course directors and instructors should occur to weigh the benefits of including content that supports all 24HMG objectives (e.g., well-rounded knowledge and skill in 24HMG promotion among medical students) against the costs (e.g., increased burden on instructional time).
Iteratively tailor the new curricular content during implementation, where needed	Participants in this study highlighted multiple implementation considerations that will be acted on during map implementation. Specifically, building course materials in collaboration with instructors affected by the change, finalizing details about structural changes (e.g., changes to instruction time) with course directors, and meeting with the curriculum committee to approve the proposed changes are next steps.

Our results support an integrated process that could be adapted to implement new competency-based content in other higher education programs. Other medical schools or programs, such as nursing, that are seeking to develop and implement co-produced curriculum changes could follow a similar process using consensus-building and interview methodologies, whether by following or adapting our approach for their specific context. Schools or programs interested in teaching the 24HMG could also use the specific learning events in our curriculum map and our operationalized 24HMG objectives to guide their own sessions on movement behaviour promotion. However, accreditation and external policy changes may enable or hinder the implementation of 24HMG content. Mandated policy changes like the CanMEDS roles have been described by program directors as top-down approaches that lack a nuanced understanding of local needs, creating tension and confusion about how to enact said changes, and attempting to implement a 24HMG curriculum in such a climate may be perceived as an additional burden.<sup>45</sup> Conversely, the co-production process we used could be seen as a more supportive, bottom-up change strategy compared to the one-way communication from accrediting bodies, which could enable implementation of the 24HMG content.<sup>45</sup>

Theoretically, this study adds to the implementation theory literature by connecting empirical knowledge with the CFIR 2.0 to understand barriers and enablers that medical faculty and medical students reported about the 24HMG map, the contexts it would be implemented in, the people who would implement it, and the strategies that would be used to implement it,<sup>24</sup> which have not been reported as meticulously in past research. Distally, a 24HMG curriculum can help improve medical students' knowledge and skills on healthy movement behaviour promotion,<sup>46,47</sup> which may better equip our future physicians to meet societal health needs. The 24HMG objectives may also help medical schools fulfill the CMA's call for PA curricula.<sup>4</sup> Finally, implementing a 24HMG curriculum could encourage positive changes in medical students' own movement behaviours,<sup>48,49</sup> which is positively associated with greater confidence and frequency of counseling on movement behaviours.<sup>50</sup>

## Conclusions

Curriculum renewal processes that quell topic competition and avoid curricular creep are imperative. Few researcher collaborations with medical faculty, staff, and students have occurred in curriculum renewal.<sup>c.f.,8</sup> To fill this gap, we initiated a partnership to embed 24HMG content in the local curriculum and improve renewal processes.<sup>10</sup> Our findings indicate that a co-produced 24HMG curriculum is valued but that work remains to support effective change implementation, mainly to overcome barriers within the inner setting. The approach we took in co-producing a 24HMG curriculum map and objectives may help advance curriculum change processes in other competency-based programs and the content we co-developed on integrated movement behaviour promotion may help guide future curriculum design on this emerging topic. We hope other medical school educators and partners use or adapt our co-production process for integrating content into their curricula or our 24HMG learning events and report on their experiences.

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## Appendix A. Results from surveys 1-3.

Learning Event Title				
Knowledge Translation	Value	Survey 1 (n = 14)	Survey 2 (n = 11)	Survey 3 (n = 10)
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.79 (0.56) 7.0 0 100%	7.00 (0.00) 7.0 0 100%	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.64 (1.04) 7.0 0 93%	7.00 (0.00) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.71 (0.80) 7.0 0 93%	7.00 (0.00) 7.0 0 100%	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	7.00 (0.00) 7.0 0 100%	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.71 (0.80) 7.0 0 93%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	- - - -	- - - -
<b>Introduction to Health Promotion<sup>a</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.57 (1.12) 7.0 0 93%	7.00 (0.00) 7.0 0 100%	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.50 (1.12) 7.0 0 93%	7.00 (0.00) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.21 (1.61) 7.0 0 86%	7.00 (0.00) 7.0 0 100%	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	5.5 (2.41) 7.0 3 71%	7.00 (0.00) 7.0 0 100%	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	7.00 (0.00) 7.0 0 100%	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	7.00 (0.00) 7.0 0 100%	- - - -

The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
<b>Introduction to Health Promotion Part 2<sup>b</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.57 (0.82) 7.0 0.75 93%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.43 (1.24) 7.0 0 86%	- - - -	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.00 (1.65) 7.0 1 79%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.23 (1.67) 7.0 0 86%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.07 (1.75) 7.0 0.75 79%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.79 (0.41) 7.0 0 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.79 (0.41) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.29 (1.44) 7.0 0.75 86%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.0 (2.07) 7.0 0.75 86%	- - - -	- - - -
<b>Assessing and Measuring Health Status<sup>c</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	6.20 (0.98) 6.5 1 90%
The learning event title and description are acceptable	M (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	- - - -	6.55 (1.44) 7.0 0 91%	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	- - - -	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	- - - -	6.73 (0.86) 7.0 0 91%	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR	- - -	6.45 (1.72) 7.0 0	- - -



	% agreement	-	91%	-
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	- - - -	6.55 (1.44) 7.0 0 91%	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	- - - -	6.82 (0.57) 7.0 0 100%	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	- - - -	6.73 (0.86) 7.0 0 91%	- - - -
<b>PROACTIVE Trial Critical Appraisal<sup>b</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.14 (1.30) 7.0 1.75 86%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.29 (1.10) 7.0 1 86%	- - - -	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.21 (1.21) 7.0 1 79%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	5.50 (2.20) 7.0 2.75 71%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.14 (1.25) 7.0 1.75 76%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.00 (1.46) 7.0 1.75 86%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.00 (1.46) 7.0 1.75 86%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.21 (1.15) 7.0 1.75 86%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	5.71 (1.83) 7.0 2 79%	- - - -	- - - -
<b>Exercise in Medicine<sup>b</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.14 (1.46) 7.0 1 86%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.36 (1.23) 7.0 0.75 86%	- - - -	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.21 (1.37) 7.0 0.75 79%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.07 (2.09) 7.0 0 86%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median	6.43 (0.98) 7.0	- -	- -

	IQR	0.75	-	-
	% agreement	93%	-	-
The Queen's Outcomes are appropriate	M (SD)	6.36 (1.34)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	93%	-	-
The Queens' Competencies are appropriate	M (SD)	6.36 (1.34)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	93%	-	-
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD)	6.14 (1.68)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The learning event is important to include	M (SD)	6.00 (2.07)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
Prevention <sup>d</sup>				
The learning event objectives are acceptable	M (SD)	5.57 (2.19)	7.00 (0.00)	-
	Median	7.0	7.0	-
	IQR	2.5	0	-
	% agreement	71%	100%	-
The learning event title and description are acceptable	M (SD)	5.57 (2.19)	6.64 (1.15)	-
	Median	7.0	7.0	-
	IQR	2.5	0	-
	% agreement	71%	91%	-
The assessment type and durations are appropriate	M (SD)	6.43 (1.05)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The course and term offered are appropriate	M (SD)	6.36 (1.23)	6.91 (0.29)	-
	Median	7.0	7.0	-
	IQR	0.75	0	-
	% agreement	86%	100%	-
The instruction time is adequate given the listed learning event description and course	M (SD)	6.07 (1.75)	6.73 (0.86)	-
	Median	7.0	7.0	-
	IQR	0.75	0	-
	% agreement	79%	91%	-
The Queen's Outcomes are appropriate	M (SD)	6.71 (0.45)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	100%	-	-
The Queens' Competencies are appropriate	M (SD)	6.71 (0.45)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	100%	-	-
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD)	6.43 (1.29)	6.73 (0.86)	-
	Median	7.0	7.0	-
	IQR	0.75	0	-
	% agreement	93%	91%	-
The learning event is important to include	M (SD)	6.71 (0.45)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	100%	-	-
Prevention Part 2 <sup>b</sup>				
The learning event objectives are acceptable	M (SD)	6.57 (1.29)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	93%	-	-
The learning event title and description are acceptable	M (SD)	6.00 (1.93)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	79%	-	-
The assessment type and durations are appropriate	M (SD)	6.93 (0.26)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
The course and term offered are appropriate	M (SD)	6.71 (0.80)	-	-

	Median IQR % agreement	7.0 0 93%	- - -	- - -
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The Queen's Outcomes are appropriate	<i>M</i> (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
The Queens' Competencies are appropriate	<i>M</i> (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	<i>M</i> (SD) Median IQR % agreement	6.79 (0.56) 7.0 0 100%	- - - -	- - - -
The learning event is important to include	<i>M</i> (SD) Median IQR % agreement	6.79 (0.56) 7.0 0 100%	- - - -	- - - -
<b>Lecture Slides<sup>b</sup></b>				
The learning event objectives are acceptable	<i>M</i> (SD) Median IQR % agreement	6.29 (1.58) 7.0 0.75 93%	- - - -	- - - -
The learning event title and description are acceptable	<i>M</i> (SD) Median IQR % agreement	6.36 (1.59) 7.0 0 93%	- - - -	- - - -
The assessment type and durations are appropriate	<i>M</i> (SD) Median IQR % agreement	6.64 (0.89) 7.0 0 93%	- - - -	- - - -
The course and term offered are appropriate	<i>M</i> (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD) Median IQR % agreement	6.07 (1.87) 7.0 0 79%	- - - -	- - - -
The Queen's Outcomes are appropriate	<i>M</i> (SD) Median IQR % agreement	5.86 (2.23) 7.0 0 79%	- - - -	- - - -
The Queens' Competencies are appropriate	<i>M</i> (SD) Median IQR % agreement	6.00 (2.10) 7.0 0 86%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	<i>M</i> (SD) Median IQR % agreement	6.36 (1.67) 7.0 0 86%	- - - -	- - - -
The learning event is important to include	<i>M</i> (SD) Median IQR % agreement	6.29 (1.62) 7.0 0 93%	- - - -	- - - -
<b>Hypertension<sup>c</sup></b>				
The learning event objectives are acceptable	<i>M</i> (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The learning event title and description are acceptable	<i>M</i> (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -

The assessment type and durations are appropriate	M (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	- - - -	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	- - - -	7.00 (0.00) 7.0 0 100%	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	- - - -	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	- - - -	- - - -	- - - -
<b>Suggested 'Movement of the Week/Month'<sup>6</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93%	6.91 (0.29) 7.0 0 100%	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93	6.91 (0.29) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.29 (1.79) 7.0 0 86%	6.64 (1.15) 7.0 0 91%	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93%	6.91 (0.29) 7.0 0 100%	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.57 (1.55) 7.0 0 93%	- - - -	- - - -
<b>Exercise/Falls in Older Adults</b>				
The learning event objectives are acceptable	M (SD) Median IQR	6.50 (1.55) 7.0 0	- - -	- - -

	% agreement	93%	-	-
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.71 (0.80) 7.0 0 93%	- - - -	7.00 (0.00) 7.0 0 100%
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.36 (1.67) 7.0 0 86%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.29 (1.79) 7.0 0 86%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.36 (1.67) 7.0 0 86%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	5.91 (1.68) 6.0 0 91%	7.00 (0.00) 7.0 0 100%
The learning event is important to include	M (SD) Median IQR % agreement	6.50 (1.55) 7.0 0 93%	- - - -	- - - -
<b>Social &amp; Structural Determinants of Health<sup>b</sup></b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	5.71 (1.83) 6.5 1 79%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.36 (1.29) 7.0 1 93%	- - - -	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	5.79 (1.61) 6.5 1.75 79%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	5.79 (1.78) 7.0 2.5 71%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	5.71 (2.05) 7.0 1.75 79%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.71 (0.45) 7.0 0.75 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.71 (0.45) 7.0 0.75 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.14 (1.64) 7.0 1 86%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR	6.29 (1.53) 7.0 1	- - -	- - -

	% agreement	93%	-	-
<b>Introduction to Health Determinants<sup>c</sup></b>				
The learning event objectives are acceptable	<i>M</i> (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	- - - -
The learning event title and description are acceptable	<i>M</i> (SD) Median IQR % agreement	- - - -	6.64 (1.15) 7.0 0 91%	- - - -
The assessment type and durations are appropriate	<i>M</i> (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	- - - -
The course and term offered are appropriate	<i>M</i> (SD) Median IQR % agreement	- - - -	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	- - - -
The Queen's Outcomes are appropriate	<i>M</i> (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	- - - -
The Queens' Competencies are appropriate	<i>M</i> (SD) Median IQR % agreement	- - - -	6.91 (0.29) 7.0 0 100%	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	<i>M</i> (SD) Median IQR % agreement	- - - -	- - - -	- - - -
The learning event is important to include	<i>M</i> (SD) Median IQR % agreement	- - - -	- - - -	- - - -
<b>Exercise</b>				
The learning event objectives are acceptable	<i>M</i> (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The learning event title and description are acceptable	<i>M</i> (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The assessment type and durations are appropriate	<i>M</i> (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The course and term offered are appropriate	<i>M</i> (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The Queen's Outcomes are appropriate	<i>M</i> (SD) Median IQR % agreement	6.50 (1.24) 7.0 0 86%	6.82 (0.39) 7.0 0 100%	6.60 (0.49) 7.0 1 100%
The Queens' Competencies are appropriate	<i>M</i> (SD) Median IQR % agreement	6.50 (1.24) 7.0 0 86%	6.91 (0.29) 7.0 0 100%	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	<i>M</i> (SD) Median	7.00 (0.00) 7.0	- -	- -

	IQR	0	-	-
	% agreement	100%	-	-
The learning event is important to include	<i>M</i> (SD)	7.00 (0.00)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
<b>Half-Day Symposium on Physician Wellness<sup>f</sup></b>				
The learning event objectives are acceptable	<i>M</i> (SD)	6.21 (1.57)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The learning event title and description are acceptable	<i>M</i> (SD)	6.43 (0.98)	-	7.00 (0.00)
	Median	7.0	-	7.0
	IQR	0.75	-	0
	% agreement	93%	-	100%
The assessment type and durations are appropriate	<i>M</i> (SD)	4.43 (2.38)	5.09 (1.73)	-
	Median	4.0	5.0	-
	IQR	4.75	1	-
	% agreement	43%	64%	-
The course and term offered are appropriate	<i>M</i> (SD)	6.36 (1.11)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD)	6.00 (1.51)	-	7.00 (0.00)
	Median	7.0	-	7.0
	IQR	1.75	-	0
	% agreement	79%	-	100%
The Queen's Outcomes are appropriate	<i>M</i> (SD)	6.79 (0.41)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
The Queens' Competencies are appropriate	<i>M</i> (SD)	6.79 (0.41)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	<i>M</i> (SD)	6.77 (0.80)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	86%	-	-
The learning event is important to include	<i>M</i> (SD)	6.23 (1.48)	-	-
	Median	7.0	-	-
	IQR	1	-	-
	% agreement	79%	-	-
<b>Half-Day Symposium on Physician Wellness Part 2<sup>b</sup></b>				
The learning event objectives are acceptable	<i>M</i> (SD)	6.07 (1.79)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The learning event title and description are acceptable	<i>M</i> (SD)	6.07 (1.79)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The assessment type and durations are appropriate	<i>M</i> (SD)	5.50 (2.10)	-	-
	Median	7.0	-	-
	IQR	3.75	-	-
	% agreement	64%	-	-
The course and term offered are appropriate	<i>M</i> (SD)	6.07 (1.75)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	79%	-	-
The instruction time is adequate given the listed learning event description and course	<i>M</i> (SD)	5.86 (1.92)	-	-
	Median	7.0	-	-
	IQR	2.25	-	-
	% agreement	71%	-	-
The Queen's Outcomes are appropriate	<i>M</i> (SD)	6.64 (0.81)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	93%	-	-
The Queens' Competencies are appropriate	<i>M</i> (SD)	6.64 (0.81)	-	-

	Median IQR % agreement	7.0 0 93%	- - -	- - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.50 (1.05) 7.0 0 86%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	5.86 (1.64) 7.0 2.75 71%	- - - -	- - - -
Introduction to Pharmacological [and Non-Pharmacological] Management of Type 2 Diabetes				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	6.45 (0.66) 7.0 1 100%	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	7.00 (0.00) 7.0 0 100%	- - - -	- - - -
Diabetes Expo				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.43 (1.40) 7.0 0 86%	6.91 (0.29) 7.0 0 100%	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.50 (1.24) 7.0 0 86%	6.91 (0.29) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.86 (0.35) 7.0 0 100%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR	6.79 (0.56) 7.0 0	- - -	6.70 (0.46) 7.0 0.75



	% agreement	100%	-	100%
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.71 (0.80) 7.0 0 93%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.93 (0.26) 7.0 0 100%	- - - -	- - - -
<b>FSGL #12 Sammy</b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.92 (0.26) 7.0 0 100%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	6.71 (0.79) 7.0 0 93%	6.82 (0.57) 7.0 0 100%	6.60 (0.49) 7.0 1 100%
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	6.57 (1.54) 7.0 0 93%	6.91 (0.29) 7.0 0 100%	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.92 (0.25) 7.0 0 100%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.92 (0.25) 7.0 0 100%	6.91 (0.29) 7.0 0 100%	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.92 (0.25) 7.0 0 100%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.92 (0.25) 7.0 0 100%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	6.57 (1.29) 7.0 0 93%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	6.57 (1.29) 7.0 0 93%	- - - -	- - - -
<b>FSGL #10 Martin</b>				
The learning event objectives are acceptable	M (SD) Median IQR % agreement	6.14 (1.46) 7.0 1 86%	- - - -	- - - -
The learning event title and description are acceptable	M (SD) Median IQR % agreement	5.07 (2.15) 6.5 4 57%	7.00 (0.00) 7.0 0 100%	- - - -
The assessment type and durations are appropriate	M (SD) Median IQR % agreement	5.57 (2.06) 7.0 2.5 71%	7.00 (0.00) 7.0 0 100%	- - - -
The course and term offered are appropriate	M (SD) Median	6.29 (1.44) 7.0	- -	- -

	IQR	0.75	-	-
	% agreement	86%	-	-
The instruction time is adequate given the listed learning event description and course	M (SD)	6.07 (1.53)	-	-
	Median	7.0	-	-
	IQR	1	-	-
	% agreement	79%	-	-
The Queen's Outcomes are appropriate	M (SD)	6.79 (0.41)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
The Queens' Competencies are appropriate	M (SD)	6.79 (0.41)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	100%	-	-
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD)	6.14 (1.60)	-	-
	Median	7.0	-	-
	IQR	1	-	-
	% agreement	93%	-	-
The learning event is important to include	M (SD)	6.36 (1.54)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	93%	-	-
Movement Breaks Anytime a Video is Shown in-session <sup>b</sup>				
The learning event objectives are acceptable	M (SD)	6.00 (2.07)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
The learning event title and description are acceptable	M (SD)	5.36 (2.50)	-	-
	Median	7.0	-	-
	IQR	3.25	-	-
	% agreement	71%	-	-
The assessment type and durations are appropriate	M (SD)	6.43 (1.55)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	93%	-	-
The course and term offered are appropriate	M (SD)	6.43 (1.55)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	93%	-	-
The instruction time is adequate given the listed learning event description and course	M (SD)	5.79 (2.34)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	79%	-	-
The Queen's Outcomes are appropriate	M (SD)	6.46 (1.60)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	86%	-	-
The Queens' Competencies are appropriate	M (SD)	6.46 (1.60)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	86%	-	-
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD)	6.36 (1.59)	-	-
	Median	7.0	-	-
	IQR	0	-	-
	% agreement	93%	-	-
The learning event is important to include	M (SD)	5.93 (2.09)	-	-
	Median	7.0	-	-
	IQR	0.75	-	-
	% agreement	86%	-	-
Mandatory Encounter on Preventative Care – MCC Presentation #74 <sup>b</sup>				
The learning event objectives are acceptable	M (SD)	5.43 (2.23)	-	-
	Median	7.0	-	-
	IQR	3	-	-
	% agreement	64%	-	-
The learning event title and description are acceptable	M (SD)	5.29 (2.37)	-	-
	Median	7.0	-	-
	IQR	4.5	-	-
	% agreement	64%	-	-

The assessment type and durations are appropriate	M (SD) Median IQR % agreement	5.79 (2.18) 7.0 0.75 79%	- - - -	- - - -
The course and term offered are appropriate	M (SD) Median IQR % agreement	6.14 (1.92) 7.0 0 86%	- - - -	- - - -
The instruction time is adequate given the listed learning event description and course	M (SD) Median IQR % agreement	6.00 (2.00) 7.0 0 79%	- - - -	- - - -
The Queen's Outcomes are appropriate	M (SD) Median IQR % agreement	6.36 (1.44) 7.0 0 86%	- - - -	- - - -
The Queens' Competencies are appropriate	M (SD) Median IQR % agreement	6.36 (1.44) 7.0 0 86%	- - - -	- - - -
The 24-Hour Movement Guideline curriculum objective(s) is/are appropriate	M (SD) Median IQR % agreement	5.86 (1.99) 7.0 1.5 79%	- - - -	- - - -
The learning event is important to include	M (SD) Median IQR % agreement	5.86 (2.13) 7.0 0.75 79%	- - - -	- - - -

<sup>a</sup>Learning event was previously titled "Introduction to Health Promotion Part 1" in survey 1

<sup>b</sup>Learning event was removed or had its content merged into another learning event following survey 1

<sup>c</sup>Learning event created following survey 1

<sup>d</sup>Learning event titled "Prevention Part 1" in survey 1

<sup>e</sup>Learning event titled "Physical Activity and Stretching During Break" in survey 1

<sup>f</sup>Learning event was previously titled "Half-Day Symposium on Physician Wellness Part 1" in survey 1