



Health and Medical Education Scholarship in Calgary

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Contact

Office of Health and Medical Education Scholarship (OHMES)
3330 Hospital Drive NW, Calgary, AB T2N 4N1
T: 403-220-4342
E: ohmes@ucalgary.ca
W: cumming.ucalgary.ca/office/ohmes

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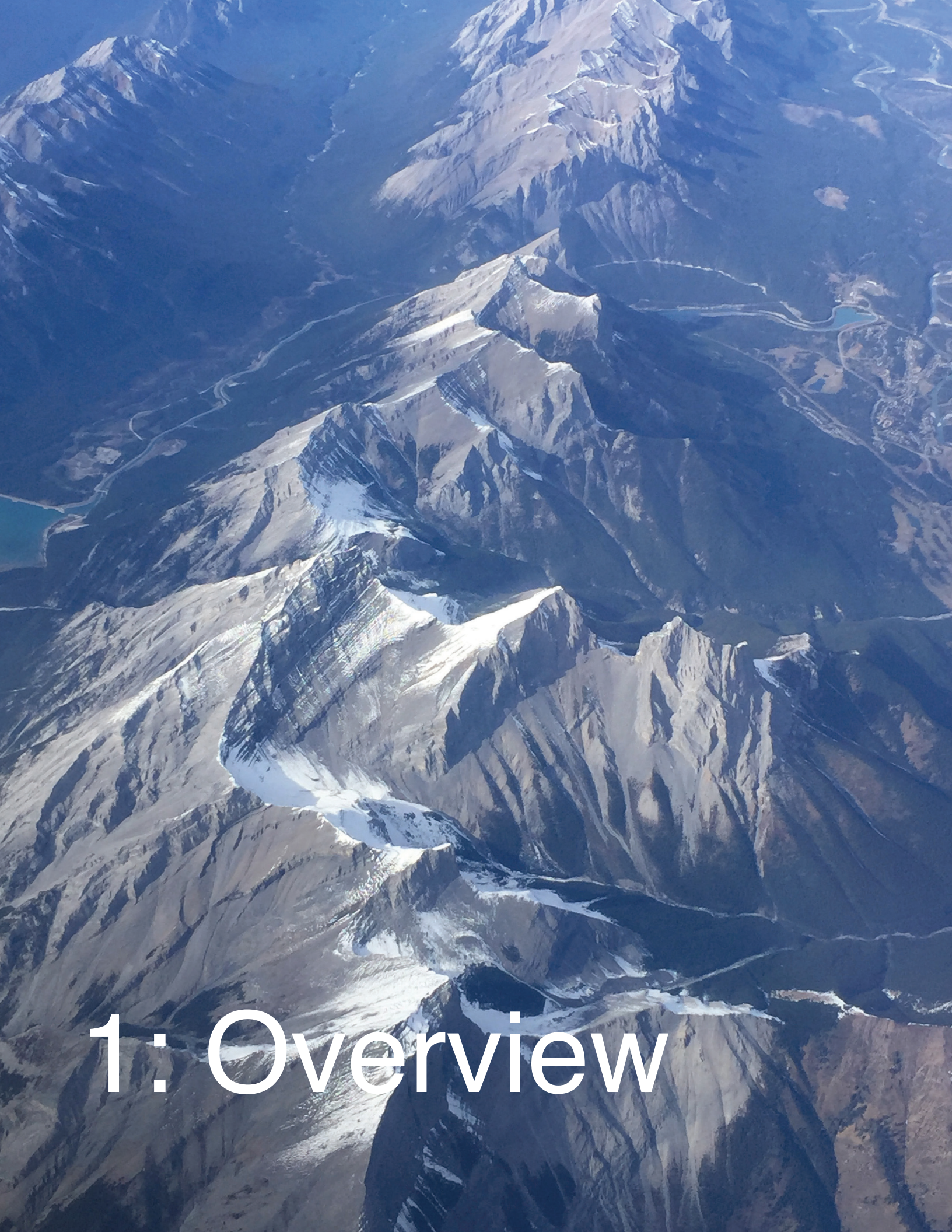
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1: Overview

Welcome

Medical schools are all about education; we train doctors to MD level, we oversee residency training, we are the largest providers of continuing medical education, we run undergraduate programs in the biomedical and health sciences, we train tomorrow's health scientists in our graduate programs, and we are highly invested in the professional development needs of our constituent communities. Of course, medical schools are not the only entities invested in training healthcare professionals, our veterinary schools, schools of nursing, dentistry, kinesiology, social work, and many other professional disciplines are also part of this landscape.

Medical schools and other health professional schools also focus on research, from laboratory-based basic and biological sciences, through clinical research, to public health and health policy research and much more. Our research portfolio also includes those whose work focuses on education-related matters, both within and around the healthcare professions. This intersection of education and research in the context of healthcare is the Health and Medical Education Scholarship (HMES) space.

**“medical education is accountable through its research arm, where ... research evidence provides the rationale for practices”
(Bleakley et al 2011)**

HMES takes many forms and has significant impacts. It shapes curriculum and assessment, it directs policy and philosophy of education, it addresses social, political, and economic issues, and it explores and challenges the moral and ethical basis for education in and around the health professions. Indeed, none of these things can happen reliably or robustly without the evidence base, rigour, and energy that HMES brings to educational practices in health professional schools.

When someone asks what impact HMES has had on the educational practices and programing, and on the culture of a health professional school, the answer is simply ‘all of it’. From admissions to assessments, from syllabi and

curricula, and the instructional and assessment strategies we employ, to the policies and procedures we use, and the infrastructure and administration of education of and for the health professions, it is all founded on educational scholarship. Indeed, the very purpose, validity, and social value of our work in health professions education rests upon education scholarship. HMES is therefore not an add-on in the context of a health professional school, it is its very lifeblood.

Not surprisingly then, there has been ongoing HMES activity in Calgary since the founding of the university more than 50 years ago. While the scholarly activities and those undertaking them have changed and developed over the years according to the needs and culture of the institution, there is a tradition of excellence in HMES in this institution that continues to today. The Office of Health and Medical Education Scholarship (OHMES) was founded in 2013 as a catalyst and support group for the many education scholars in the Cumming School of Medicine.

Now, after 6 years of OHMES operations, we are exploring how we will support and nurture health and medical education scholarship in Calgary in the years to come. To that end OHMES has undertaken a strategic planning process to focus the activities and potential of the education scholarship community for the coming decade. This strategic plan is the culmination of this process and sets out a road-map for HMES at the University of Calgary.

Predicting the future can be a hazardous undertaking. However, it is more hazardous to ignore the future altogether and hope to chance. By understanding where we have come from and by outlining clearly where we are today, we hope to ensure that we continue to grow and serve our many educational communities in an effective and dynamic way.



Dr. Rachel Ellaway, Director of the Office of Health and Medical Education Scholarship (OHMES)

Executive summary

Medical education and scholarship

Medical education is the core activity of a medical school with undergraduate, residency, and CME programing, along with bachelor and graduate degree programs in medical sciences. Medical education scholarship (research, evaluation, innovation etc.) plays a critical role in evaluating and quality assuring education practice, in effecting innovation and change, and in developing and testing new techniques and approaches.

Over the years Calgary has had different units responsible for medical education scholarship with different mandates and varying levels of success. The latest of these, OHMES, was established in 2013. This report is the result of the OHMES strategic planning process.

“the science of education is not about creating and sharing better generalizable solutions to common problems, but about creating and sharing better ways of thinking about the problems we face”
(Regehr, 2010)

Where we are today

Our history of medical education scholarship stretches from the original vision for the school through to the present day. Today, Calgary has a living and vibrant education scholarship community (see infographic opposite). For instance, **Calgary has quadrupled its productivity in terms of journal articles since 2013. We are now third in Canada in terms of publishing in medical education** and we are ahead of many institutions with long-established and much more substantially supported centres, departments, and institutes.

Despite our many successes, our medical education scholarship community in Calgary is somewhat fragmented, distributed as it is across almost every department and unit in the School and beyond. This fragmentation reduces our ability to function as a coherent group. Moreover, we face the usual legitimacy challenges in the context of a medical school where biomedical and clinical research attract substantially more external funding and internal support and attention. OHMES has acted as a critical catalyst over the last five years in drawing our community together and building connections and capacity. The question as to where we go from here remains.

Opportunities

Calgary has compelling opportunities to actively and strategically link education scholarship to:

- Education programing, such as that offered by UME, PGME, CME, and the BHSc and graduate degree programs in the CSM.
- Professional development - developing deeper critical expertise in our educators and education leaders.
- Education science - developing capacity and skills in education analytics and linking this to big data science in the School.
- Other CSM research programs and areas - many research projects have an educational dimension that could benefit from our expertise.
- Education research programs in other areas - other healthcare and professional schools and faculties in the University and beyond.
- Leading and facilitating change in educational and professional practice on a provincial, national, and international stage.

OHMES

157 full members

284 consultations since 2014

\$268,791 project funding provided

6 associated research labs

Graduates in medical education

31 PhD and 72 MSc

Many graduates in leadership positions in Calgary and elsewhere

Funding

> \$6M in grant funding since 2013

11% international, 51% national, 21% provincial, 17% internal

Productivity

> 600 papers in peer-reviewed journals since 2013

3rd most productive school in Canada

OHMES Meetings

5 symposia, 15 invited keynotes, 75 orals, 101 posters & demos,

543 attendances from 7 faculties and 16 other institutions

466 attendances at 21 seminars, 191 attendances at 37 webinars

116 journal club sessions with >1,000 attendances

Recommendations

Our community's expertise in education and education systems is substantial and ready and eager to contribute to the broader missions of the School as well as to continue shaping the debates and directions of medical education on a national and global basis. Making this opportunity a reality is the challenge we face. To that end we have five main recommendations:

1 IDENTITY and COHERENCE: Education scholars are distributed throughout the School and beyond, which makes it challenging to work together, to organize together, and to support each other. OHMES was established as a service support organization and has had significant success as such. However, what is needed is a community model rather than a service approach, one that focuses on building, enabling, and sustaining an academic community. To that end, we also need to explore options for better and more effective co-location of HME scholars in the School and beyond.

2 PARTICIPATION in a COMMUNITY: OHMES has a membership model but this is little more than a contact list. We therefore need a more robust model to engage our members and build a respected and self-sustaining academic community. To that end we plan to move to three levels of membership:

- 1) OHMES Scientists would be PhD-trained education scholars with a substantial commitment to and track record in HMEs;
- 2) OHMES Fellows would be those undergoing training as HME scholars, both on our own specialization and those participating in programs elsewhere; and
- 3) OHMES Members would be general interested individuals, essentially the current membership profile.

While anyone can be an OHMES member, OHMES scientists and fellows need to apply and be mentored to meet the criteria for these prestigious appointments. We also see a clear need for outreach and knowledge engagement around what HMEs is and the value it can have in the broader life of the School and beyond.

3 CONNECTION and CONTRIBUTION: Despite the research and scholarship strengths within our community, we often do not make the most of these capabilities in support of broader initiatives and undertakings in the School and beyond. After all, there are few projects or studies that don't have some kind of educational dimension. We also have expertise in methodologies and the use of theory-informed inquiry that can apply outside of educational scholarship. We therefore need better functional connections with the School's educational programming, with its research support and planning services, and with the University as a whole.

4 CAPACITY and COLLABORATION: Funding for education research and scholarship is not on the same scale as that, say, for biomedical or clinical research, nor does it need to be. Health professional schools and medical facilities are our laboratories after all. However, we do need funding for our research and innovation, and we need funding to support our community building activities. To that end, we need to establish better collaborative relations with advancement for philanthropy, and with communications to get our message out there, and with leadership to ensure that education scholarship can play its rightful role in the life of the School. We also need to be better able to collaborate with our peer centres across Canada and beyond.

5 ADVOCACY and LEADERSHIP: We need to be 'at the table' to advocate for education scholarship in the life of the School and the University as a whole. We also need to advocate for evidence-informed practice across all aspects of the School's life that intersect with HMEs. This is not to say this is absent at present as many of us undertake leadership and service roles both within and beyond our field. However, as educational scholars, we still have much more to offer.

How do we do this? This report is intended to set an agenda and support it with evidence and argument regarding the strengths and capabilities of educational scholars in the School and beyond. What happens next is something we will need to define together.

Review methodology and methods

In 2018, after 5 years of operations, OHMES started a strategic planning review process. Initially the aim was to refresh and refocus the activities of OHMES as a support unit. However, during this review, through consultation and through ongoing interactions with key stakeholders in the Cumming School and beyond, it became clear that there was both an expectation and a need for a more fundamental review and appraisal of health and medical education scholarship across the CSM and beyond.

We therefore changed the focus of the strategic planning and review process from OHMES as a support unit to the community of scholars OHMES serves, to expand the scope of the review to include a more substantial review of the history of HME in Calgary and how the current arrangements came about, and to appraise our current performance as a scholarly community. This involved a more substantial data gathering exercise, which identified a lack of readily available and reliable information on scholarly activity in our field. However, these kinds of challenges also proved useful both in terms of evaluating our current ability to fully understand the breadth and range of medical education scholarship in Calgary and the need for better tracking and reporting mechanisms in the future.

This strategic review reflects the past and current state of HME at the University of Calgary and it considers ways in which HME can be advanced in the years to come. Although the Office of Health and Medical Education Scholarship (OHMES) was its starting point, we should be clear that our focus is on the community of HME scholars in Calgary, wherever they are based and whatever their approach to scholarship might be.

Our review process had a number of steps. We started with a series of consultative meetings, both large and small, with HME participants and stakeholders, including 2 large focus groups; one of active HME scholars, researchers, and students (most of whom were OHMES members); the other with leaders and managers from across the school and beyond.

These meetings helped to develop and direct our thinking and they shaped the following steps in undertaking the review, in particular the need to: 1) consider the whole HME scholarship community rather than OHMES as a

service provider; 2) conduct a careful audit of available performance metrics associated with HME; and 3) situate the review within broader trends and directions, both in HME and in medical education as a whole.

Our review of academic publications from Calgary scholars started with a structured Pubmed search, which indicated higher than expected performance data. In order to test the objectivity of this analysis, we hired a research assistant and had her repeat the analysis but with a more objective and detailed eye. In doing so we were able to track departmental contributions as well as compare our publication performance to that of other schools across the country.

Our review of grant funding started with our providing the CSM Research Services Office with a list of all OHMES members and asking for all funding activity they had received since 2013. We then screened out all non-education-related activity. It was apparent when this had been prepared that there had been more funding activity in HME than was being tracked by the RSO. We therefore asked all OHMES members to provide details of their funding which we used to augment the list. We were unable to identify a database of student funding we could query so we also asked all graduate students (active and completed) in recent years to provide details of any bursaries, awards, or other funding they had received.

Our review of the graduate specialization in medical education involved reviewing the CVs of OHMES members and querying the PRISM vault of Calgary theses and dissertations to identify students and supervisors and to build a database of activity in the program since it started.

Our history of HME in Calgary drew on an unpublished draft manuscript from Lampard and colleagues setting out a history of the Calgary medical school, and on various historical documents, and on personal communications with various stakeholders including Drs. Jennett and Lockyer.

This report was largely prepared by OHMES but with many contributions by our members and friends. We would like to thank all of them for their assistance in drawing this report together.



Image of the Health Sciences Centre at Foothills under construction in 1971 from the University of Calgary Archives and Special Collections - <https://asc.ucalgary.ca/building/health-sciences-centre/>

2: Yesterday

Health and medical education scholarship in Calgary

Origins

Calgary has a history of scholarship in HME that reaches all the way back to its creation in the 1960s. Founding Dean Dr. William Cochrane identified the necessity for a group tasked with medical education research and evaluation in order that the school could succeed and grow.

In the development of any curriculum it is necessary that there be adequate methods of assessing and evaluating the program. It is intended, before the introduction of medical students, to develop a subdivision of Medical Education Research and Evaluation, which will be charged with the responsibility of developing methods and techniques that will provide objective data regarding the performance of the undergraduate, but more particularly of the graduate student of the Faculty of Medicine of The University of Calgary.

Finally, in the development of any new medical school it is imperative that reasonable experimentation in medical education be implemented. The present outline of the proposed program at The University of Calgary must remain flexible to allow for modification and adjustment. If the project is to be successful, not only must the faculty be enthusiastic and aggressive, but it must have the support and understanding of the community, of organized medicine and of government.

From: Cochrane WA. Philosophy and program for medical education at the University of Calgary Faculty of Medicine. Can Med Assoc J. 1968 Mar 9; 98(10): 500–505.

Division of Evaluation, Performance and Assessment (DEPA)

This led to the creation of the Division of Evaluation, Performance and Assessment (DEPA) in 1970 under Dr. Lawrence Fisher. DEPA was tasked with tracking “attainment of program objectives; congruence of the evaluation and educational

processes; adequacy of sampling techniques; objectives that could not be reached, along with the reasons; and the technical quality of the evaluation procedures. Student perceptions were accumulated through questionnaires, interviews conducted by the Committee on Evaluation, and class discussions conducted by the chairman of the Committee on Medical Education. Teachers were offered a five-weekend course on how to present their material.” [Unpublished History of CSM]

DEPA followed this remit for more than a decade, however by the early 1980s it was noted that DEPA had “*failed to live up to its high hopes and expectations. It became a service arm, interested only in evaluation. It did very little, if any, research, which was an expectation in the original faculty plans—research was expected to guide the evolution and improvements in the curriculum.*” . . .

Another shortcoming of DEPA was that, unlike McMaster, they did not want to or were afraid to play on the national or international stage. The result was that Calgary missed an opportunity to be viewed as an innovator in medical education.” [Interview by JR Wright with previous Dean Dr. Mamuro Watanabe (henceforth Interview transcript), Calgary, Alberta, March 21, 2014]

Office of Medical Education (OME)

While most of the School’s original divisions were reorganized into departments in the early 1980s, DEPA was reorganized into the Office of Medical Education (OME) in 1981 to function as part of the Dean’s Office, with a direct report to the Associate Dean of Education. The OME was initially run by Dr. Fisher working with Drs. Harasym and Harris. Dr. Penny Jennett was appointed as part of the OME which she went on to lead between 1988 and 1993.

The Office was “*like a Department, where [the OME Director] reported directly to the Dean, attended all Department Head meetings, retreats etc., met with each Department Head and Associate Dean each year to comment on each faculty [member’s] contributions to medical education etc., to ensure [they] were recognized for their contributions for annual reviews and merits.*”

The OME created a Medical Education Research Group in 1988, initially as a journal club: *“we met monthly and reviewed papers that were published from across the continuum and used various research methods. Members of the Group continued through their posters and presentations at conferences, remained active in APMC and APMC to help build up the Office’s profile. Each department had two to three Faculty members interested in, or involved, in Medical Education and they became part of the formal group, as did the Associate Deans and their representatives.*

We had about 10 very active members, and about 10 who came to most events and were very helpful with their expertise and time, when it came to curriculum courses and exams. Many in this small Group were active with completing posters, attending APMC and APMC, and in preparing manuscripts for publications, so we emphasized this, and started to be seen as a place to visit to see what could be done by the Group which covered the educational continuum, and worked with a three-year curriculum medical school. Dr. John Parboosingh and Jocelyn [Lockyer] were great CME contributors to OME, and Dr. Keith Brownell [Associate Dean PGME] represented the Graduate Clinical Education area. They brought in some of their ‘medical educators’.” [Personal communication from Dr. Jennett, December 2018]

Although the OME continued to operate through to the millennium, the focus of medical education scholarship in the school shifted to the deaneries with the undergraduate program taking a focus on case presentations and cognition with Drs. McLaughlin and Coderre, and Continuing Medical Education on knowledge translation with Dr. Jocelyn Lockyer.

Medical Education Research Unit (MERU)

By the millennium there was a resurgence in interest in having a discrete medical education research group, which was highlighted in the following report:

“The ‘Supporting the Educational Mission’ (STEM) task force was formed in July 2000. STEM made a number of recommendations, including that a group be formed to foster medical education research and provide a graduate program in medical education. In the original plan, this group was also to be involved in recruiting and supporting educators and education leaders, bringing about more cohesion among departments in the UME curriculum,

and helping to bridge the continuum of medical education in the faculty.

STEM recommended (and it was subsequently approved) that the group should have its own staff, a common physical space to promote exchange of ideas and collaboration, an operational budget, and should report to [Council of Associate Deans Education]. The group was envisioned as a component of “the heart of the medical school” and architects were hired to design a space to facilitate this role. After a formal search and selection, Dr Claudio Violato was appointed the first director of MERU on January 1, 2003 and the unit began to officially operate under the name MERU on February 3, 2003.

As the MERU space was not yet built, Dr Violato was provided with a temporary office in the UME area. His faculty appointment was in community health sciences (CHS). The MERU Office plans did not materialize; nor did an operating budget despite the office of STEM, CADE, and Violato between 2003 and 2010. With the 2011 HMRB renovations for PGME and partners, MERU was accommodated inside G02 [which] provides for the exchange of ideas and collaboration as [any other education units were] all housed in the same area.

MERU’s original mission was to be “a multidisciplinary team of teachers and researchers dedicated to leadership in instructional design and delivery, and research in medical education”. The strategic goals included providing service and consultation (e.g. examination metrics), teaching of students, faculty development, research, a graduate program, and educational resources. (Faculty development was later dropped from this list.) The graduate program was housed under Medical Sciences.” [Source: MERU External Review Report 2011]

The work of MERU included both academic and service activities. A great many academic publications and presentations resulted from the research initiatives undertaken by the five full-time (core) and twelve part-time faculty members of MERU. The core members alone were responsible for over 330 peer-reviewed articles, proceedings/abstracts, and monograph/book chapters between 2008-2013. Beyond scholarship activities, service work was also performed by MERU members. This included participation on faculty education-related committees including the Undergraduate Medical Education Committee and UME Admissions Committee, as well as support for some assessment activities within

Post Graduate Medical Education and Continuing Medical Education. On a national stage, one of the more notable products of MERU was the creation of the Canadian Medical Education Journal in 2010. This was run by MERU for 7 issues until 2013 when responsibility for the Journal was transferred to the University of Saskatchewan.

In 2011, a formal review of MERU was requested by the Senior Associate Dean Education (SADE). The review recommended that: 1) MERU needed to engage in regular strategic planning linked to the Faculty's Strategic Plan and updated annually; 2) MERU should have an oversight committee and directly report to the SADE; 3) MERU should undergo regular external reviews; 4) there should be recognition of MERU's research and service roles; 5) the Dean's Office should provide the unit with a reasonable operating budget, based on a business plan; and 6) MERU's profile in the Faculty should be raised and the unit should be resourced and governed for success.

Based on this review, the Council of Associate Deans of Education (CADE) recommended that the graduate degree specialization be moved from Medical Sciences to the Community Health Sciences (CHS) graduate program. This was done to take advantage of existing links between the program and the department (e.g. goals, faculty members, etc) and better align the program through department affiliation with the rules and regulations of the Faculty of Graduate Studies and the University.

Following the review, a retreat was held to create a common vision, mission and set of purposes for a unit that will enhance and support educational scholarship and service within the Faculty of Medicine. It included members of MERU, Associate and Assistant Deans within the Education portfolio, the Department Head of Community Health Sciences, and graduate students. The retreat paved the way for a re-visioning of the unit.


With the departure of key MERU personnel, the unit was renamed the Office of Health & Medical Education Scholarship in 2013 in order to reflect the broad spectrum of educational activities across the Faculty, to be inclusive of educational programs beyond UME and PGME (i.e., GSE and BHSc), and to better align with the Eyes High strategy of the University.

Calgary's Education Innovations

Calgary has a long history of publishing and sharing educational materials and resources with the broader community. Based on the Medical presentation schemes conceived by Henry Mandin and founded by Brett Poulin, the 'Black Book' is now in its 12th Edition (blackbook.ucalgary.ca). The Calgary Guide to Understanding Disease is "a compendium of flow-charts that link disease pathophysiology and disease manifestation" and is also freely available (calgaryguide.ucalgary.ca). Educational technology tools such as OpenLabyrinth (openlabyrinth.ca) are also freely available as open source software and in use around the world. The Cards system (cards.ucalgary.ca) can be freely accessed online, as can The Lindsay Atlas (lindsay.ucalgary.ca).


Endlessly Replayable Patient Cards

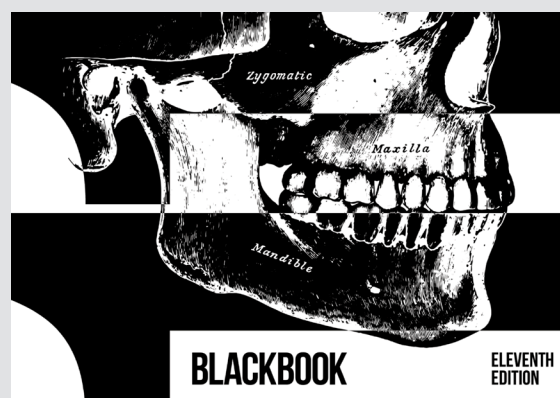
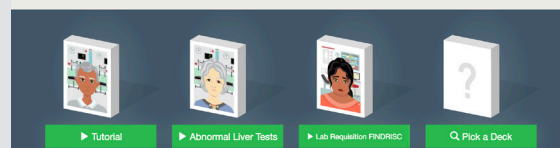
Prepare for your MCG exam - Practice clinical problem solving skills



Register

- Each card is different from the last
- Authored by practising physicians
- Supported by the University of Calgary





Office of Health and Medical Education Scholarship (OHMES)

The Office of Health and Medical Education Scholarship (OHMES) was established to enhance health and medical education scholarship at the University of Calgary. The OHMES mission was to capitalize on the School's high quality education programs and the growing cadre of active and potential educational scholars, to provide support and leadership to bring these activities together and to take them to a higher level. More specifically, OHMES was to:

- Provide leadership in medical, health and science education scholarship
- Build capacity through educational events and mentorship
- Enhance and support initiatives to improve the quality and breadth of learning
- Seek out opportunities to integrate with community of educators
- Promote and disseminate research and scholarly work in medical, health and science education

An operating budget was provided out of the CSM Contingency Fund under the auspices of the Senior Associate Dean Education (SADE). The founding director of OHMES was pediatrician Dr. Ian Mitchell with Gretchen Greer appointed as an administrator in 2014 with a 0.5FTE support role for her OHMES activities. However, it was recognized that OHMES needed leadership from an individual who was an active and well-respected scholar in the field and in 2015, Dr. Rachel Ellaway was recruited from the Northern Ontario School of Medicine into the Director role. Dr Mitchell stepped down at the end of 2015 and in 2016 Dr. David Topps was appointed as Medical Director of OHMES.

At the time of preparing this report, OHMES has no directly funded appointments as Drs. Mitchell, Ellaway, and Topps undertook/undertake their OHMES leadership roles as part of their service workload (<0.2 FTE each), and Gretchen Greer (0.5 FTE) is funded by the SADE Office. A full description of OHMES' operations over the last 5 years is provided in the following section of this report.

Graduate Specialization in Medical Education

Dr. Jennett and colleagues initiated graduate training in medical education in the late 1990s through graduate programs in education and other schools and faculties in the university. This was developed to establish a specialization in medical education at the MSc level. In 2003, a PhD stream was added and the Graduate Specialization in Medical Education was set up under the auspices of Medical Sciences but run by MERU. The 2012 MERU Review recommended that it be moved under Community Health Sciences. In 2013 the specialization became one of the specializations in the Community Health Sciences graduate program.

In 2015-2016, recognizing that the specialization had not had undergone any major revisions in nearly 20 years, a refresh of the curriculum was undertaken which involved redesigning some courses and introducing new courses and a clearer differentiation between the MSc and PhD streams. It has also been noted that, while students on the medical education specialization focus exclusively on topics in health professions education, there have been and there still are students in other specializations and programs who are also completing graduate research in topics in health professions education, making it difficult to assess how much activity there has been in this area across the university over the years.

Other HMES activities in the University of Calgary

Although we have focused on medicine and medical education in this report, we acknowledge that there is much high-quality education scholarship taking place elsewhere in the university. For instance, Dr. Kent Hecker has been active in establishing the Veterinary Education Research Group (VERG) and there has been a healthy level of sharing and integration between scholars in medical and veterinary education. We also acknowledge the scholarly work in health professional education coming out of nursing and other health professions streams in Calgary. We also note that Mount Royal University in Calgary also has a growing interest in this area, as evidenced by the number of its faculty participating in our graduate specialization program.

In context

In appraising what has happened in Calgary over the last 50 years, it is important to understand the broader landscape of research and scholarship in health professional education. Canada has become a world leader in HMES, with innovations such as problem-based learning, CanMEDS, the multiple mini interview for admissions (MMI), and Practice Based Small Group Learning shaping practice and theory around the world. It should also be noted that 50 years ago there were no medical education scholars per se, those few individuals that were active in the field had all trained in other disciplines, and there were very few HMES units then. HMES is therefore a relatively recent development that is still establishing its identity. Regehr and others (2010) noted that HMES is a field rather than a discipline, in that it is a confluence of different research paradigms and traditions, with a strong focus on implementation and quality improvement.

How HMES has been and is supported across Canada is highly varied. At the time of writing, of Canada's 17 medical schools, 1 has a department of medical education (Ottawa), 1 recently redeveloped its centre into an institute of health professional education scholarship (McGill), 4 have explicit and institutionally supported centres of medical education scholarship (Toronto, McMaster, UBC, Western, Alberta). These departments, institutes, and centres maintain their own staff and facilities, have their own appointed scientists, and play a strategic role in their respective institutions. Of the remaining 10 institutions, 5 have smaller support groups for HMES (Calgary, Dalhousie, Sherbrooke, Queens). The other 5 have a named individual with some coordinating responsibility for education scholarship.

There are recurring issues and challenges for those tasked with supporting education scholarship. The first of these is the tension between service and academic responsibilities. Some units are given substantial responsibility for supporting local academic programming but this displaces academic activity and these units tend not to last, as the mismatch of roles, expectations, and metrics of performance tend to burn them out on service expectations and fail to meet academic expectations (something that was noted about DEPA in Calgary in

the 1970s). A second issue is one of legitimacy, visibility and support. HMES does not need and does not attract the scale of funding of clinical research and it is harder to show how it saves lives, even though poor education clearly contributes to poor outcomes and system inefficiency. Related to this is the question of who should fund this work, to what extent and in what way? Federal funding is low in this field and often can only be secured for studies that are not directly educational in nature. While NGOs like the Royal College and the Medical Council are significant funders, who supports HMES remains a common concern in centres and schools across Canada and beyond.

Finally, we should also ask the question; who does HMES, should it be MDs or PhDs, or both? While the mixed model seems best (and it is the one we pursue in Calgary), the number of faculty positions for PhD HME scholars remains relatively thin across the country. Medical schools have a clear responsibility to ensure the quality and quantity of the next generation of scientists who can sustain HPE, improve it, refresh it, and ensure it meets the social contract. How they are doing this and with what success is a work in progress.

Summary

The medical school in Calgary was founded with a clear mandate for education scholarship in support of its educational programming and as a key contributor to the school fulfilling its vision and mission. In the intervening half century, quite how this has been supported and organized has changed a number of times, partly in response to the institutional culture of the time, and partly reflecting the developing nature of health and medical education scholarship as a distinct field of academic inquiry.

The next sections of this report go on to describe the current state of education scholarship in the Cumming School of Medicine, provide a number of performance indicators of the productivity and impact of the HMES community in Calgary, and suggest ways in which this community can be better organized and supported in the years to come.



3: Today

Health and Medical Education Scholarship in Calgary today

Healthcare is one of society's most central functions and one of its greatest responsibilities. Sustaining and developing healthcare services is a core societal responsibility, a key part of which is health professions education; the educational programs and activities that prepare individuals for healthcare practice and then sustain and develop them in practice. As with any other undertaking, scholarship and research in health professions education can test, evaluate, direct, and reinvent healthcare professional education. Indeed, it has been argued that scholarship is an essential part of our social contract: "medical education is accountable through its research arm ... research evidence provides the rationale for practices" [Bleakley et al 2011]

However, there is a long-standing tension between the role of health professions education scholarship (HPES), as it is seen by some as insufficiently rigorous and scholarly because of its applied focus, while being seen by others as being too esoteric for practical use because of its scholarly grounding. [van Enk & Regehr 2018] This tension defines a field where clinician educator scientists and PhD medical education researchers engage in scholarly activities that are intended to advance both the practice and the science of health professions education.

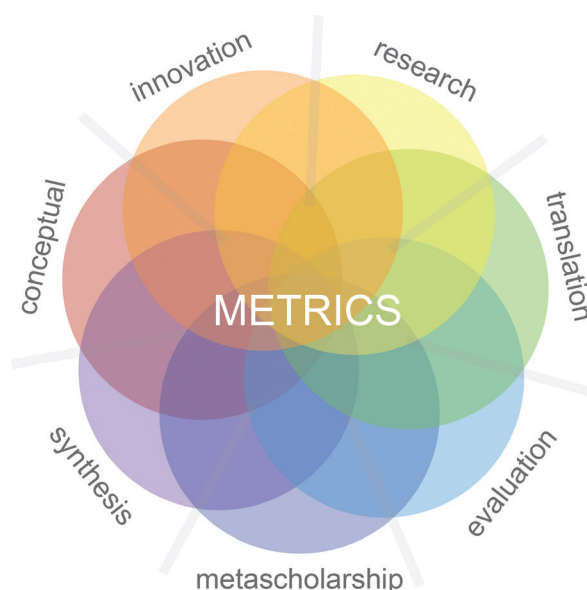
Scholarship is about engaging in structured inquiry that has: clear goals; adequate preparation; appropriate methods; significant results; effective presentation; and reflective critique. [Glassick et al 1997]

One of the challenges we face in health professions education is that HMES is more than research. There are many other legitimate ways of being a scholar or making a scholarly contribution. To that end, we developed the METRICS model to reflect the different kinds of scholarly activity that legitimately form this field.

The METRICS model reflects the seven common domains of scholarship used in HMES as a teaching tool, as a way of recognizing the different kinds of contributions made (in promotions, appointments, and academic reporting), and to articulate a vision of scholarship as being more than research. Here we consider scholarly activity as spanning and often combining metascholarship (the scholarship of scholarship), evaluation (questions associated with value and decision making), translation, research (hypothesis and theory testing and generation), innovation, conceptual, and synthesis (such as systematic reviews). [Ellaway and Topps 2017]

METRICS reflects the breadth of scholarly activity within our Calgary community and allows us to consider many different contributions, positions, and career trajectories within our community.

In this chapter we describe the current state and variety of scholarly activity in HME across the Cumming School of Medicine and beyond. This includes the activities and services offered by OHMES, the graduate specialization in medical education, the scholarly productivity of HME scholars in Calgary (particularly in terms of publications and funding), the labs and other HME scholarly support activities currently in place, and the impact of Calgary HMES locally, nationally, and internationally. We seek to paint a picture of a diverse yet highly collegial community that is a key part of this institution.



The Office of Health and Medical Education Scholarship

A distributed community

In talking about the HME community at the University of Calgary there are a few things to be born in mind. First is that there is no central institute, department, unit, or other centre for HME. The entity closest to fulfilling this role is the Office of Health and Medical Education Scholarship (OHMES), that organizes events and provides a range of supports and services to the HME community. OHMES functions as a virtual organization within the CSM as it has no staff or faculty, its operating budget comes out of contingency funding, and it reports to the Senior Associate Dean Education alongside the other education Associate Deans.

There are other supports for HME in the School. For instance, Family Medicine, Postgraduate Medical Education, Undergraduate Medical Education, and DLRI all have PhD medical education scientists working to support their programming and development. Moreover, Undergraduate Medical Education also supports an Assistant Dean Evaluation and Research, both as a facilitator and to manage the load that education researchers place on students in the program.

Indeed, HME scholars are to be found in almost every department, deanery, and other organizational unit in the School with many more in other faculties and schools (such as veterinary medicine and nursing), and in other institutions (such as Mount Royal University and AHS) - see the breakdown of member departments and units on p22 for details.

Despite OHMES' many activities, we regularly come across individuals who are interested or even active in HME but are not functionally a part of our community or in many cases are quite unaware of it. Not only is HME in Calgary highly distributed, it lacks coherence and visibility, which in turn limits our ability to function as a community and to support and encourage our colleagues to develop as professional medical education scholars. We will return to this issue in this report.

Nevertheless, OHMES is the *de facto* hub and catalyst organization for health and medical education scholarship in the Cumming School of Medicine and we therefore start our narrative with a description of OHMES' activities.

OHMES as a support mechanism

OHMES has built a solid reputation as a support and catalyst for education scholarship in the Cumming School of Medicine. To that end, we have stayed within our original scope to focus on supporting CSM faculty, although we have had a lot of involvement with students and faculty from other schools and faculties.

We continue to receive a \$90k annual operating budget from CSM contingency funds. Of this, we allocate roughly \$60k to small project grants, \$20k to running the symposium and other meetings, and \$10k to the travel fund. PGME also provided a one-off tranche of funding for office operations and Director travel in 2017. For details on OHMES finances, see the annual reports on the OHMES website. A small fund for administrative costs has been provided by PGME. One-off additional funding has been provided out of contingency for several strategic initiatives.

In terms of our location in the School, until 2018 OHMES had two offices in the PGME space at Foothills Medical Campus. OHMES now has G253 at Foothills as an office for the administrator and a small meeting space for members to use. We have no presence at the other teaching sites in Calgary or beyond.

OHMES has no full-time staff; the Director, Rachel Ellaway (0.2 FTE), is a professor in Community Health Sciences, the Medical Director David Topps (0.2 FTE) is a professor in Family Medicine, and the Administrator Gretchen Greer (0.5 FTE) is employed as part of the SADE's office and supports accreditation and other strategic education initiatives within the CSM as well as working with OHMES. The activity we describe in the following pages should be evaluated in the context of there being less than 1 FTE in aggregate working on OHMES support activities.

OHMES reports through the OHMES Executive Committee to the Strategic Education Council (SEC). Funding for activities and services, as well as operating funds, are approved by SEC and provided by the Office of the Senior Associate Dean Education. OHMES is also a unit of the O'Brien Institute for Public Health, but maintains its primary reporting relationship to SEC.

Educational Scholarship Symposium

OHMES has run five educational scholarship symposia between 2015 and 2019. Our annual symposium is intended to showcase work in health and medical education research and innovation in Calgary and beyond, and encourage future collaborations among researchers and scholars.

Each year we invite external experts in educational scholarship as keynote presenters and workshop facilitators. We have been delighted to profile the work of local researchers during the poster and oral sessions. Members of our community have also provided demonstrations of their labs, equipment, and activities - including the use of Halo devices and board games! We have also explicitly profiled student work and the work of OHMES grant recipients during the symposium, usually with dedicated sessions for these two key stakeholder groups. The opportunity to celebrate and develop emerging scholars and to champion the work of the scholars we fund is a key element in this annual meeting.

In 2016 we added the Jones Medical Education Lecture as a feature of the symposium with a topic focusing on an issue of strategic importance to Undergraduate Medical Education in Calgary. These have included Indigenous Truth and Reconciliation, student mistreatment, and interprofessional education. The lecture is funded by the generous support of the Jones family. Dr. Allan Jones

was previously the Associate Dean for Undergraduate Medical Education. The Jones family have established an endowment in honour of Donald Jones to provide recognition for outstanding UME teachers and to fund a visiting speaker on a topic of particular interest to the UME community. OHMES would like to acknowledge the support the Jones endowment has provided for medical education scholarship at the Cumming School of Medicine.

Other symposium activities have included personal arranged learning sessions (PeArLS) where participants present questions and challenges for other participants to discuss and problem solve, and unconferences where participants identify topics for discussion around emerging issues in HMES. We are currently exploring adding a Fringe session to the mix.

Over the years the symposium has become one of the landmark events in HMES community in Calgary and has become a regular fixture for faculty and scholars from other schools and institutions. In terms of numbers, we have had 15 keynote presenters, 75 oral presentations, 101 posters and demonstrations, and 543 attendees from 7 different schools and faculties within the university and 16 other institutions in Alberta and beyond.



The OHMES symposium has brought many of the leading thinkers in medical education to Calgary. From top row, left to right: Lorelei Lingard (Western U), Kevin Eva (UBC), Meredith Young (McGill), Marcia Anderson (UManitoba), Stella Ng (UToronto), Shiphra Ginsburg (UToronto), Shelley Ross (UAlberta), Glenn Regehr (UBC), David Cook (Mayo Clinic), Vernon Curran (Memorial), Stanley Hamstra (ACGME), Kevin O'Brien (U South Florida), Farhan Bhanji (RCPSC), and Cynthia Whitehead (UToronto).

The Office of Health and Medical Education Scholarship

OHMES Seminars and Webinars

OHMES runs a series of one off seminars throughout the year with visiting scholars from across Canada and around the world. Our speakers have included: Drs. Stuart Lubarsky (McGill), Luc Cote (Laval), Joanna Bates (UBC), Chris Skinner (Notre Dame, Australia), Ryan Brydges and Walter Tavares (Toronto), Marcel D'Eon (USask), Harold Bok (Utrecht University), Olav Krigolson (University of Victoria), Martin Pusic (NYU, Harvard), Tanya Horsley (RCPSC), Ian Curran (University of London, UK), Nitya Iyer (Vancouver), Anna Ryan (Melbourne, Australia), and Joan Sargeant (Dalhousie). We ran a joint seminar with our sister organization the Centre for Health Education Scholarship (CHES) at UBC in 2018 with Dr. Ali Walzak presenting from Calgary. Three of the other lectures were jointly organized with OIPH and three with Veterinary Medicine. We have had 450 attendees across 20 external speaker seminars since 2014. OHMES also hosts local viewings of webinars sponsored by CAME and AMEE. We have recorded 191 attendees at 37 webinars since 2014. In recent years we have also run sessions where scholars who have presented at major national and international medical education meetings can also present their work to the local community.

Medical Education Journal Club

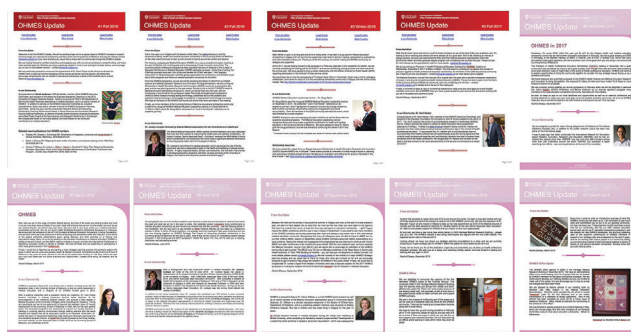
OHMES co-sponsors a journal club with the Medical Education Specialization in CHS. Overseen by Dr. Aliya Kassam, meetings are held weekly between September and May to review and critique current journal articles in medical education. All CSM students, faculty, and staff are welcome to take part in these lively discussions that are one of the keystones of scholarly engagement in medical education in the School. In addition to reviewing papers, the journal club also invites local authors and visiting scholars to present their work whenever possible. Guest facilitators have included Drs. Joanna Bates (UBC), Tim Dornan (Queens Belfast), and Simon Kitto (University of Ottawa). Internally, guest presenters have included Drs. Jocelyn Lockyer, Heather Armson, Kent Hecker, Lindsay Crowshoe, and Laura Delgaty, and students Allison Brown and Julia Haber. In March 2019 we ran our 100th journal club session. We recorded more than 1,000 journal club attendances between 2016 and 2019.

OHMES Leadership Lectures

Initiated in 2016, the Medical Education Leadership Lecture recognizes those who have made a significant contribution to health and medical education. Invited speakers are asked to reflect on their journey into medical education scholarship and the ways in which it has influenced their careers as leaders, educators, and practitioners, as well as scholars. Speakers have included Drs. Doug Myhre, Jocelyn Lockyer and Irene Ma, Rachel Ellaway, Sylvain Coderre, and Joan Sargeant. We have had more than 200 attendances for these five lectures over the past three years and we continue to seek out suitable speakers.

OHMES Professional Development

OHMES scholars have hosted a series of workshops on developing health and medical education research. A core part of this has been the 'Scholarship in Health Education Research & Innovation' (SHERI) workshops. SHERI is based around three in-depth sessions using a flipped classroom format that allow participants to develop their scholarship ideas in a collaborative small-group setting. We have had 45 attendees from the Cumming School and beyond complete these workshops. Feedback on the workshops has been very positive. OHMES continues to run these workshops according to community need.



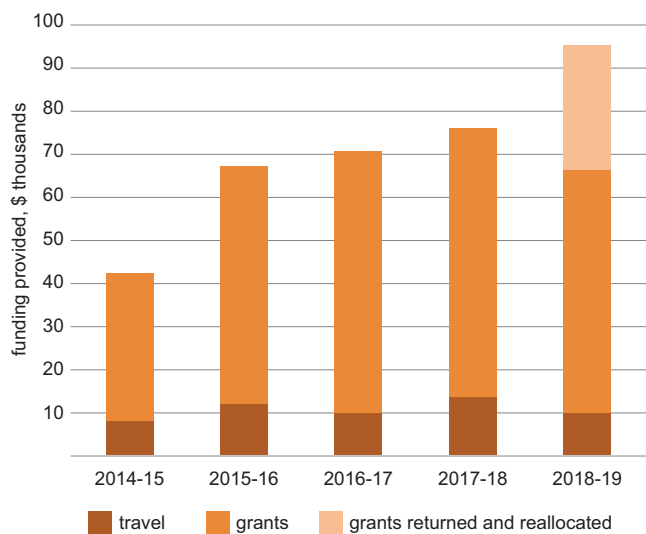
The OHMES newsletter goes out four times a year to profile scholars and scholarly activities, and to inform members of new developments and opportunities in and around HMEs.

OHMES Health Science and Medical Education Research and Innovation Funding Competition

This project funding competition welcomes both research and innovation projects, and begins with a Letter of Intent process to ensure that the proposed project has a direct link to medical education before proceeding to the full proposal stage. All LOIs and full proposals are subject to a competitive peer review process conducted by members of the OHMES community. Since 2014, we have supported 38 projects allocated a total of \$297,611 in grant funding. Of these \$28,820 returned, which gives a total of \$268,791 in OHMES funding over the last 5 years.

OHMES Medical Education Travel Fund

The Medical Education Travel Fund provides funding to CSM faculty to present their scholarship at medical education conferences, to attend education-related meetings, and to receive awards for education scholarship. OHMES assumed responsibility for administering this fund in 2014 and has awarded 24 grants for a total of \$45,426 since that time.



OHMES funding 2014-2019

OHMES funding for scholars and their work

As Principal Investigators: Ghazwan Altabbaa, Heather Armson, Tahara Bhate, Marcia Clark, Lara Cooke, Janet de Groot, Janeve Desy, Shirmeem Doshi, Ben Gibbard, Elaine Gilfoyle, Vince Grant, Sean Grondin, Julia Haber, Adrian Harvey, Heather Jamniczky, Rahim Kachra, David Keegan, Martina Kelly, Adam Kirton, Julie Kromm, Sonya Lee, Jason Lord, Diane Lorenzetti, Deirdre McCaughey, Conor McKaigney, Kevin McLaughlin, Mone Palacios, Catherine Patocka, Jean Rawling, Amanda Roze des Ordons, Preet Sandhu, Francine Smith, Amelie Stritzke, Amy Tan, Joseph Vayalumkal, Jason Waechter, and Ian Walker.

As co-Investigators: A Boscan, A Bromley, A Klepacki, A Kramer, A Stang, A Walker, A Warren, A Cheng, C Adegbesan, A Polachek, A Kassam, A Brown, A Deacon, A Roze des Ordons, H Amin, A Hall, M Assaad, C Rajakumar, CH Lee, C Doig, C Tsang, C Constantinescu, D Duncan, D Piquette, D Keegan, D Topps, D Dersch-Mills, D Myhre, M Dube, E Fiedrich, E Laflamme, E Oddone-Paolucci, R Eng, F Bhanji, F Kalu, J Gaudet, H Amin, H Armson, A Howlett, I Walker, I Ma, J Desy, J Haws, J Trier, J Lemaire, J Waechter, J Sargeant, J Lockyer, J Newbigging, K Kelly-Turner, K Burak, K Millar, K Hecker, K McLaughlin, J Kortbeek, K Fraser, L Rivera, L Cooke, L Nixon, L Davies, L Rang, M Lohman, M Suri, M Zetkalic, M Mackenzie, M Raman, M Clark, M Sibbald, M Topps, M Lemay, N Dharampal, N Sharma, P Couillard, P Murthy, P Hruska, P Veale, P Ciechanski, P Dyjur, R Kearney, S Bannister, S Cunningham, S Pokharel, S Hall, Serieska C, S Murphy, S Ross, S Faremo, S Mintsoulis, S Lopushinsky, S Makarchuk, T Tryon, T Beattie, T Wu, T O'Neill, V Grant, W Eppich, W Tavares, and Y Lin.

As presenters (through the Travel Fund): Aliya Kassam, Amonpreet Sandhu, Anthony Seto, Catherine Patocka, Claudio Violato, Ebba Kurz, Elizabeth Oddone Paolucci, Fabiola Aparicio-Ting, Fareen Zaver, Ian Mitchell, Keith Wycliffe-Jones, Kent Hecker, Maitreyi Raman, Marianna Hofmeister, Martina Kelly, Mone Palacios, Rachel Ellaway, Rahim Kachra, Rosario Talavera, Sergiu Ciubotaru, Suzette Cooke, Tanya Beran, Tyrone Donnon, and Wayne Rosen.

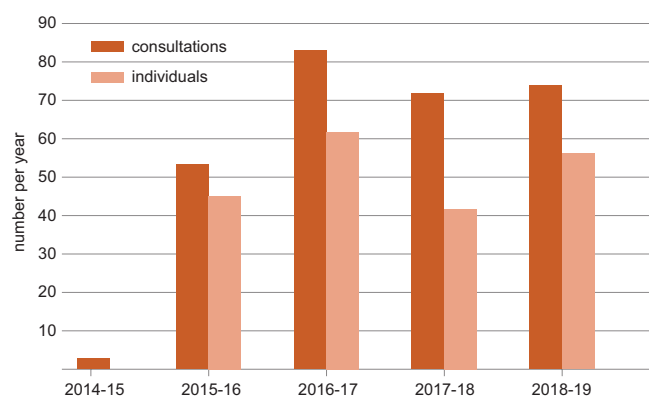
The Office of Health and Medical Education Scholarship

OHMES Consultations and Mentorship

A mark of a healthy community is the willingness and capacity to help others in the community. To that end, OHMES offers expert assistance consultancy for health and medical education research project development as well as broader advice and support in pursuing scholarly activities as part of individuals' professional and faculty development to all CSM members and staff. OHMES consultants undertook 284 consults between 2014 and 2019.

OHMES consultancy services are provided at no cost by OHMES volunteer consultants who are also members of the OHMES Advisory Committee. Our consultants have various areas of expertise, and specific areas of assistance include research study design, research methods, proposal writing, and dissemination. These consultations have led to successful grant and other funding applications, ethics applications, strengthened study designs, successful data analyses, and successful paper submissions to major journals in the field. They have also led to successful promotion applications and changes in career direction.

Although some consultations are very practical in nature, some expand into mentorship relationships that persist over time and go deeper in developing scholarly careers.



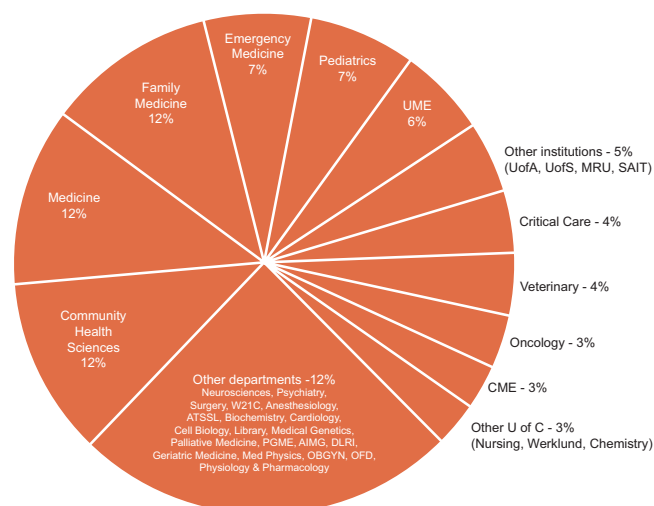
The number of OHMES consultations and unique individuals involved in consultations per year 2014-2019.

OHMES Membership

The OHMES Membership model was launched in July 2016 with the goal of sustaining a focused sense of purpose around the OHMES mission, and to support the productivity and quality of work of all of the members.

OHMES provides members with a formal association with the OHMES community of practice, opportunities to network and form research teams, opportunities for peer review of grants, grant applications, papers and other scholarly works. In return, members agree to support and advance the vision and mission of OHMES, have their name and affiliation disseminated publicly as part of OHMES, and report on their education scholarship activities, including research grants, abstracts and publications.

OHMES accepts membership applications from faculty, residents, fellows, students and staff who are engaged in or are interested in health and medical education scholarship at the University of Calgary. An affiliate membership is also available to those without a University of Calgary appointment. Membership is now required to access OHMES services, funding and events. As of March 31, 2019, OHMES had 157 members registered in the on-line database (<https://cumming.ucalgary.ca/office/ohmes/membership>), and recruitment is ongoing.



OHMES members' department and unit affiliations breakdown as of 2019.

OHMES Community Projects

These are projects where OHMES faculty are involved in a facilitating, mentoring, or consultative role within a study. Examples of these projects include:

The Calgary Admissions to the Medical Program Analysis of Value Networks (CAMPaVaN) study involved Drs. Ellaway, Myhre, Malhi, Doig, and de Groot exploring the axiological aspects of admissions to undergraduate medicine in Calgary. Building on an earlier Best Evidence Medical Education critical scoping review, the study played a critical role in informing a broader admissions review in the School.

With the shift to Competency-Based Medical Education (CBME) in Royal College residency programs, OHMES has been partnering with Postgraduate Medical Education (PGME) in studying this change. Working with Drs. Jason Lord, Kelly Millar, and other members of the PGME community we are exploring attitudes to and preparedness for CBME and its implementation.

The Calgary Student Run Clinic (SRC) study explored the experiences and impacts of this optional extramural medical student activity. Working with successive years of SRC students, OHMES has explored the benefits and drawbacks to stakeholders, the SRC's interaction with other health service providers in Calgary, and its future directions.

OHMES has been working with medical students Nicole Thompson and Angela Schneider on evaluating and researching teaching of transgender and gender nonconforming in the MD program. These sessions have become part of the mainstream curriculum and are being developed as a national model for teaching students how to best serve this marginalized group.

OHMES has been working with scholars led by Amanda Roze des Ordons to explore clinicians' experiences of compassion in critical and palliative care settings. This has led to the concept of 'distributed compassion' in advancing compassionate care.



Precision in Health Professional Education Scholarship

Reflecting the School's Precision Medicine initiative, the Precision in Health Professions Education Scholarship (PiHPES) initiative, led by OHMES, is seeking to leverage the data we capture as part of the School's educational programming for broader scholarly purposes. Central to this is mapping and advancing the 'data readiness' of the Cumming School of Medicine to better support educational scholarship.

The project is exploring data-driven personalized feedback to learners and their teachers. Taking advantage of the principles afforded by big data analytics, the PiHPES is exploring how we can draw data from a wide Variety of data sources, provide rapid or real-time feedback (Velocity), seek Value, decrease the Variability, and seek to improve the ways in which we can Visualize these datasets.

Making better use of the activity streams and value streams available, this laboratory also seeks to bridge the evaluation of outcomes from educational interventions with patient and workforce outcomes. Such data integration will need to be standards-based, promoting the principles of open data and open-source. Monolithic, proprietary systems tend to dominate these organizational areas. Avoiding the silo effects created by such operational practices is central to the tenets of this lab. Members of this project have also been active contributors to the following standards: ANSI/MVP Medbiquitous Virtual Patient standard Healthcare LOM, ADL Experience API, Curriculum Inventory, International Classification of Primary Care, and POSP VCUR security standards. Reports and datasets arising from OLab laboratory activities are published here: <https://dataverse.scholarsportal.info/dataverse/pihpes>

Data, Big and Small: Emerging Challenges to Medical Education Scholarship

Ellaway, Rachel H. PhD; Topps, David MBChB; Pusic, Martin MD

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Perspectives

Abstract Author Information Article Outline Article Metrics

The collection and analysis of data are central to medical education and medical education scholarship. Although the technical ability to collect more data, and medical education's dependence on data, have never been greater, it is getting harder for medical schools and educational scholars to collect and use data, particularly in terms of the regulations, security issues, and growing reluctance of learners and others to participate in data collection activities. These two countervailing trends present a growing threat to the viability of medical education

Education Scholarship Laboratories



We already collect a great deal of data on our teachers and learners in the health professions, yet much of this remains siloed into multiple, disconnected databases. Recent attempts to explore more detailed learning analytics have found it very difficult to use traditional data mining approaches on existing datasets. Under the Precision in Health Professional Education Scholarship project, we have set up a research platform around the use of online simulation that supports researchers and teachers in the CSM, the University, and beyond, in generating and using learner and teacher performance data in meaningful and creative ways.

In alignment with the principles outlined in the Precision Health prospectus last year, this platform provides data-driven personalized feedback to learners and their teachers. By making better use of the activity streams that they generate as they interact with their various learning and workplace tools, researchers can explore the utility of this data to shape learning, and to address issues such as earlier detection of problems and enhanced learner performance tracking that is more immediate, detailed, and dynamic.

Led by Dr. David Topps, the OLab laboratory has established a platform of interconnected web services, using common, open-source, educational tools, integrated via a Learning Records Store, which enables common tracking of activity streams across the various tools in the platform. Examples of the services integrated include: Desire2Learn, DestinyOne, OLab4, Moodle, WordPress, OpenLabyrinth, CURIOS, Turk Talk, Drupal, and ScaR/iKNOW. Reports and datasets arising from OLab laboratory activities are published here: <https://dataverse.scholarsportal.info/dataverse/olab>



Led by Dr. Aliya Kassam, the Wellness Innovation Scholarship for Health Professions Education and Health Sciences (WISHES) is a virtual laboratory aimed at enhancing the learning experience at CSM by reducing stigma related to illness and creating a safe culture for help seeking. WISHES engages key stakeholders across the CSM, the University, as well as across the province and country to advocate for a more accessible and sustainable approach to managing learner wellness and illness. WISHES is bringing together practitioners and scholars alike to collaborate on learner wellness projects focused on the areas of mental health, physical health, occupational health, social health and intellectual health.

Specific examples include conducting a realist evaluation of resident wellness groups for family medicine residents in rural Alberta, developing and testing the Learner Education Handover (LEH), a document for learners which allows them to voluntarily disclose their health and learning needs when transitioning from medical school to residency and conducting an environmental scan of wellness initiatives in medical schools across Canada.

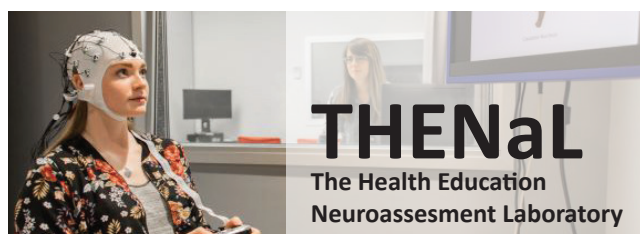
WISHES supports scholarship in four major ways by 1) bringing key stakeholders together to collectively design, implement and evaluate wellness strategies 2) offering a venue for learners to engage in dialogue to develop innovative techniques to enhance their own wellness 3) promoting a safe culture for disclosure and help seeking so that improvements can be made at individual, program and system levels that ensure and sustain wellness, 4) challenging current policies and procedures to better reflect wellness and learner advocacy.

Although HMES labs may not look much like their equivalents in biomedical or clinical research, we do, nevertheless, have a number of education-focused lab activities that bring together researchers from within the School and beyond to pool resources and to work on projects and initiatives of common interest.



Led by Dr. Rahim Kachra and Allison Brown, the Program for Innovation in Scholarship and Medicine (PRISM) aims to stimulate creativity and foster a culture of innovation in educational matters within the Cumming School of Medicine (CSM). PRISM has two main streams. Re-Imagining Medical Education (RIME) is a stream within PRISM that fosters innovation through design thinking – solutions to challenging problems are developed and prototyped to create successful implementations. Design thinking engages end-users from designing questions to prototyping solutions. We seek out the right questions, so we can find, test, and implement the right solutions. The second stream of PRISM focuses on quality improvement as a way of catalyzing change. Given the rise of QI in healthcare and medical education, we serve as a central hub for teaching QI to current and future health professionals, developing QI competencies, and supporting QI champions.

PRISM provides a space to try things out, to learn from failure, and to engage users in creating impactful, valuable, and sustainable solutions for the medical education community. We have worked with Civic Innovation YYC, the City of Calgary, and the Calgary Airport Authority, reflecting the importance of being embedded in the fabric of our city. By challenging the status quo with novel ideas and approaches to medical education, and creating collaborative partnerships, we aim to improve the integration of our students, faculty, and partners within the community. PRISM supports the generation of innovative solutions in a scholarly manner, including the development of proof-of-concept, evaluation, or research strategies. In some instances, this may involve larger rigorous research studies or program evaluations.



Health professional schools (Veterinary Medicine, Medicine, Nursing, etc.) are charged with ensuring their graduates are competent for independent practice for the health of our society. To justify competency, performance scores on tests are taken as proxy measures that students and graduates have properly stored, retrieved and applied correct information to clinical scenarios. However, surprisingly little is known about the brain activities that underpin learning, reasoning and decision making and whether assessment methods properly access these processes in the health professions.

Led by Dr. Kent Hecker, The Health Education Neuroassessment Laboratory (THENaL) is a CFI funded laboratory which is the first research facility in Canada for understanding how brain data relates to learning, education and behavioral test performance within health professions education. The research goal of THENaL is to establish the neural basis of how to optimize learning and assessment within health professional education. THENaL is a 60m² purpose-built lab space that contains 3 EEG systems and two eye tracking systems in purpose built imaging rooms. Between these two imaging rooms is a data collection/control room which runs the experimental and data collection computers (two computers per EEG/eye tracking system). A behavioral research room is adjacent to the experimental/data collection rooms where multiple participants can be briefed/debriefed, wait, and further behavioral data can be collected both pre and post experiments.

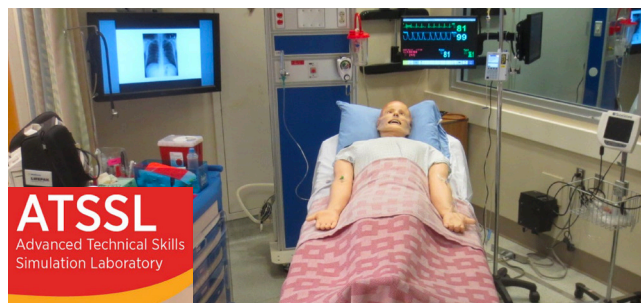
Education Scholarship Laboratories



The Rockyview Internal Medicine Simulation Program was established in 2011 by Dr. Ghazwan Altabbaa and a certified healthcare simulation educator. The program has been fully accredited by the Royal College of Physicians and Surgeons of Canada. Beyond providing education and healthcare practice using simulation, the program's knowledge generation and translation activities focus on human performance, social intelligence, and diagnostic clinical reasoning. The program provides support to researchers at different stages of projects from idea and concept formulation to publication. The program has established a solid foundation for optimal use of experiential simulation environments to explore and improve patient health related outcomes such as hospital acquired infections, diagnostic cognitive errors, communication at times of transition of care, and effect of group thinking on clinical decision making.

Critical Care Medicine Education Research Lab

In 2018 more than 2,800 patients were admitted to the four general system intensive care units (ICUs) across the Calgary Zone. The Critical Care Education Research Lab was formed in 2019 to promote and foster health science education research within this dynamic environment. The lab is presently engaged in a variety of educational research projects spanning many domains of health science education, including assessment of clinical competence, and patient safety and quality improvement. The lab is also examining issues pertaining to end-of-life care and difficult conversations, and is involved in simulation-based education research, procedural skills assessment, ECG and EEG interpretation and analysis of critical thinking and diagnostic reasoning. We actively collaborate with other research streams in our Department to provide a unique educational focus to all academic research activities where possible.



Led by Dr. Marcia Anderson, the Advanced Technical Skills Simulation Laboratory (ATSSL), is a state-of-the-art facility which opened in 2014 that allows medical trainees and practicing professionals the opportunity to acquire, practice and develop their skills in a safe learning environment. The facility currently includes a Surgical Skills Simulation Laboratory, Clinical Skills Simulation Laboratory, and Special Procedures Laboratory. The ATSSL received accreditation as a Simulation Program from the Royal College of Physicians & Surgeons of Canada in June 2018, and has enabled the Cumming School of Medicine to become leaders in simulation based medical education.

In addition to education, the ATSSL is actively involved in research. Beyond providing a space for CSM simulation researchers to conduct their studies, ATSSL leadership, staff and affiliated faculty members have received a number of simulation research grants which have enabled research in surgical and ultrasound skill acquisition and assessment. The ATSSL has also hosted the Postgraduate Medical Education Simulation Education and Research Symposium for four years, which showcased work in simulation research and encouraged collaborations among researchers with common interests.

Although the ATSSL is a relatively new facility and scholarship activities are in the early stages, there is a commitment to continue to pursue research collaborations for the purposes of local education quality improvement as well as to contribute meaningfully to the larger simulation body of knowledge beyond the CSM.



Led by Dr. Adam Cheng, the KidSIM Pediatric Simulation Program has been training health care professionals both as individuals and as part of interprofessional teams since October of 2005. Since that time, the KidSIM Program has become a world-class program, known for delivering top-notch educational programs and conducting cutting-edge research. The KidSIM program works to provide learners surrogate clinical experiences with pediatric patients in as close to a ‘real-life’ situations as possible through the use of high-fidelity mannequins as well as teaching space that mimics the clinical setting. In doing so, learners experience the pressure and stressors of the real situation, as they work as individuals and in teams, in order to learn more about the assessment and management of these cases.

The value of simulation-based education has been proven in various single and multicenter research projects over the past 10 years. Based on this evidence, KidSIM focuses on implementing established and accepted simulation training practices and programs that have proven benefit for the acquisition and retention of skills, improving adherence to clinical guidelines and improving teamwork skills.

The KidSIM Research Program at Alberta Children’s Hospital was established to bring together an interprofessional group of Alberta-based leaders in clinical care, research methodology, education, human factors and psychology interested in improving the delivery of healthcare to sick infants and children. Our team has developed a solid foundation which positions us well to address the main objectives of the acute and

life-saving care pillar of Alberta Children’s Hospital. Studies are formulated to identify novel and innovative methods of healthcare delivery in order to improve effectiveness and efficiency of care. In our collaborative research model, we also aim to facilitate the academic growth of young investigators and trainees by exposing them to established mentors both locally and worldwide and nurturing the skills necessary to become successful researchers.

The KidSIM Research Pillars are:

1. CPR and Cardiac Arrest
2. Team Training
3. Family Centered Care
4. Debriefing and Feedback
5. Technology
6. Interprofessional Education

After completion of several successful large-scale studies that have provided significant results and insight into acute care, the KidSIM Research Program is committed to translating the knowledge gained by the research findings. National pediatric emergency and pre-hospital care conferences, annual nursing education sessions, local nursing conferences, and several simulation conferences are recent venues where the research team has presented findings. Perhaps most importantly, these presentations focused on how recent findings need to be applied to improve provider education and patient care.

Graduate Specialization in Medical Education Research

Most schools with centres (or variations thereon) take graduate students through other departmental, school, or faculty graduate programs. Western and UBC on the other hand function as satellite sites for Maastricht University's MSc program and take PhD students through various other local programs. Calgary is one of the very few schools in Canada with its own graduate program/specialization in medical education. It is, moreover, one of the longest running programs in the country.

The Cumming School of Medicine's unique MSc and PhD graduate specializations in medical education research develop and nurture curiosity-driven research into practical and conceptual challenges spanning the health professions education continuum. The goal of this specialization is to prepare health providers to be educators and researchers who can work as program directors, program administrators, health educators, and health education researchers to address topics relevant to medical education.

The underpinning philosophy of the Medical Education Research graduate specialization is twofold: to provide students a generalist foundational background to pursue meaningful areas of educational research and scholarship that can inform and challenge educational paradigms, and help to optimize learning and health delivery contexts-asking not just "why is this done?" but also "how can this be done better?"

Students in this program span the educational and professional spectrum. Our focus on professionalism and leadership in scholarly work provides a robust basis for future careers and professional roles in health professions education. For those pursuing a PhD, the program provides the foundation for undertaking independent research leadership roles in academic and health care centres. The MSc is structured for health care providers to undertake team based research and lead evidence based educational initiatives across the health care continuum. The program is premised on exploring critical questions and issues rather than pursuing particular methods. Moreover, we have a broad understanding of the different kinds of scholarly work that may be undertaken in a graduate studies context. The specialization is research-focused with an inclusive approach to the skills that scholars need. These are reflected in the METRICS model of scholarly activity.

Courses at both the MSc and PhD levels are structured around competencies that enable students to explore their research interest both in teams and independently. These specialization competencies (modeled after CanMEDS competencies) ensure students engage in practical experiences in a collegial environment that fosters thought and action through discussion and mentorship.

The specialization currently has six core courses: MDCH 627: Medical Education Assessment and Measurement; MDCH 628: Teaching, Learning, and Curriculum Design; MDCH 629: Foundations of Practice and Science in Medical Education; MDCH 630: Designing Medical Education Research; MDCH 631: Implementation of Medical Education Research; and MDCH 730: Doctoral Medical Education Research Seminar.

Facilitated by an interdisciplinary faculty each of whom have strong programs of educational research, the program emphasizes scholarly discourse amongst colleagues across disciplinary and methodological domains. Our students come from across the health care professions continuum as well as those that are interested in pursuing academic careers or adding an academic component to their professional activities.

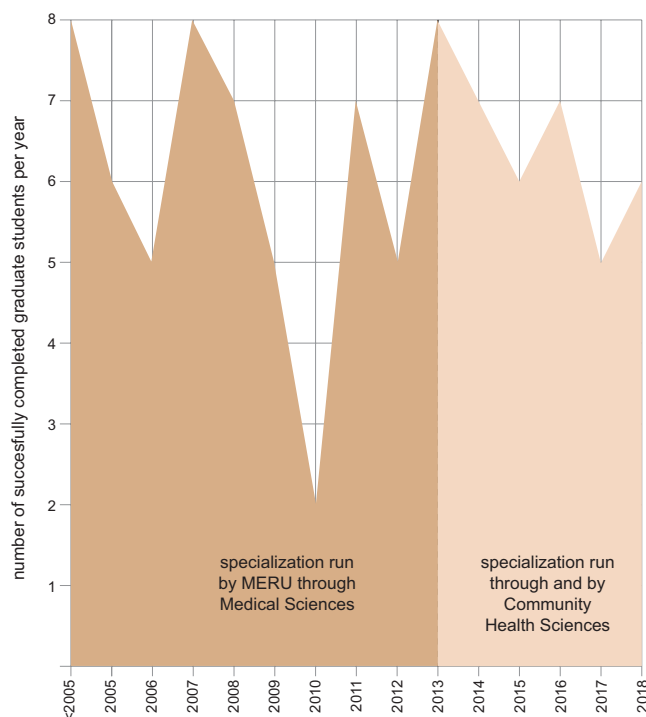
Over the years we have maintained a steady stream of successful graduate students - see the figure opposite - many of whom have gone on to faculty and/or leadership roles in Calgary or elsewhere. In summary, although the graduate specialization is not particularly large in terms of student numbers compared to others, it is a valuable part of the HMES landscape in Calgary.



Members of our core specialization faculty: (left to right) Drs. Aliya Kassam, Maria Palacios Mackay, Elizabeth Oddone Paolucci, Rachel Ellaway, Jocelyn Lockyer, Elaine Gilfoyle, Tanya Beran, and Kent Hecker.



The current Medical Education Research specialization brochure.



Graduation numbers per year from the graduate specialization in medical education up until 2018. Data assembled from faculty CVs and from searching PRISM (the thesis repository held by the University library). One of the by-products of this search is that all of the theses and dissertations completed by individuals in the specialization are now tagged as such within PRISM.

We would like to acknowledge the hard work and successes of our many graduate students in the specialization or who have completed work in HME in other programs over the years including, but not limited to: Ahmad AbuZinadah, Noof Al Baz, Ibrahim Al Ghaithi, Nonf Al Harbi, Azham Al Kadi, Pauline Alakajja, Mohammed Alanazy, Ali Algiraigri, Sarni Albaidar, Abdulaziz Albassan, Syeda Kauser Ali, Azham Alkadi, Sarah Ahyousif, Sarah Anderson, Janice Austin, Lubna Baig, Anke Banks, Adam Bass, Christopher Blackmore, Robert Chan, Oliver Chin, Sophia Chou, Marcia Clark, Sylvain Coderre, Terri Collin, Lara Cooke, Suzanne Cooke, Lori Darroch, Nicole Delaloye, Hilary Delver, Juan Antonio Garcia-Rodriguez, Jonathan Gandet, Estee Grant, Jan Grendar, Julia Haber, Cary Hashizume, Kent Hecker, Marianna Hofmeister, Joan Horton, Pam Hruska, Carmen Hurd, Alysah Kaba, Daniela Keren, Niko Lagumen, Douglas Lawson, Justin LeBlanc, Kathy Lee, Jason Lord, Diane Lorenzetti, Kris Lundine, Irene Wai Yan Ma, Seraj Makkawi, Athena McConnell, Joann McIlwrick, Kevin McLaughlin, Fadi Mohammad Munshi, Mona Nasir, Clara Ortiz, Maria Palacios, Adam Peets, José Pereira, Alexandra Phillips, Alicia Ponton-Carss, Leora Rabatach, Hani Redwan, Amonpreet Sandhu Dhillon, Heather Seabrook, Elaine Sigale, Jason Silverman, Sara Smith, Thomas Stark, Theresa Trotter, Gregory Trueman, Charity Tsai, Dennis Valdez, Amy Warren, Jonathan White, Galt Wilson, Alia Zawawi, James Zimmer, Martha Ainslie, Janice Barkey, Cynthia Card, Stephen Dougherty, Karen Joughin, Leanna McKenzie, Anne Roggensack, Alexander Shysh, Andrea Valleand, Pam Veale, and Curtis Lee-Sing.

The background of the slide features a series of overlapping circles in various shades of purple and pink. The circles are semi-transparent, creating a layered effect. The colors range from a deep, dark purple to a very light, almost white lavender. The circles are of different sizes and are positioned in a way that they overlap each other, with some appearing in the foreground and others in the background. The overall composition is abstract and modern.

4: Performance and impact

Performance and Impact of HMES

We now turn to performance indicators of our community's activities. Measuring academic performance is a multi-factorial undertaking and one moreover for which there is no truly reliable or representative metric. Mapping activity in an applied field is particularly challenging given the diversity of activity and applications, and the contexts within which they are realized. Nevertheless, we can present metrics and indicators to reflect the overall productivity and impact of our distributed community.

In terms of performance, we start with a review of the academic productivity of our community, based on papers published in peer-reviewed journals. This includes overall figures, comparator data from other Canadian medical schools, and the distribution of activity across different CSM departments. We next look at OHMES members' funding for scholarly projects and initiatives in education and the different sources from which this funding comes. In terms of impact, we describe the impacts HMES has had both locally and on the national and international stages. We close with data on awards and other indicators of the impact of Calgary scholars.

Ideally, we would like to be able to show direct causal connections between educational scholarship and clinical and/or healthcare system outcomes. However, this is notoriously difficult to do given the multitude of confounders and modifiers that lie between learning and practicing medicine. Acknowledging this issue, there are several initiatives underway in our community using 'big data' and analytic approaches to allow us to start to draw out these associations wherever we may find them.

In preparing this data, we were struck time and again how rich yet diversified the activities of our community are, and how difficult it was to draw together a complete and representative dataset to reflect in this report. We consider it likely therefore that we are, despite our best efforts, still under-reporting the breadth and depth of activity and impact of our community. In part this represents some of the challenges members of our community have had in interfacing with research support services, however, the bigger challenge is in establishing who is functionally a part of our community and what legitimately can be counted as education scholarship. This remains, as with so many aspects of what we do, a work in progress.

The impact of medical education scholarship is not just reflected in numbers of publications and grants, it is a fundamental part of being a medical educator, as Dolmans et al. observed:

"There is one fundamental aspect of research in medical education that is quite unique and which holds promise for research impacting educational practice ... the participation of medical teachers – the practitioners of medical education – in conducting the research and in disseminating it.

In general education, there is much discussion about the gap that separates educational research from educational practice. Education research is accused of being too theory oriented and of failing to address the problems of educational practice. On top of that, the users of general education research, the teachers, are disengaged from participating in the research.

Very characteristic, but also unique, is that the teachers within the medical domain participate in conducting the research and in disseminating it. There is no other domain that has so many international journals dedicated to education. [The] thriving community of education specialists and representatives from the domain itself, we believe, is the agent of the impact of research on educational practice.

This community is slowly but clearly professionalizing in terms of educational research standards and the use of theory. It is crucial, however, that we professionalize at the right pace. We need to strike a careful balance between research that has practical relevance and research that is of high scientific quality and clarifies what works well under which conditions and why.

We should never risk becoming disengaged from the medical teacher or any other person having a direct responsibility in educational practice. We believe and are determined to continue to cherish this participative community in medical education."

Dolmans D, van der Vleuten CC. Research in medical education: practical impact on medical training and future challenges. *GMS Z Med Ausbild.* 2010; 27(2): Doc34.

Scholarly productivity: publications

It is not enough that we are an active community of shared interests, we need to show the productivity and impact that our work has had. A key indicator of academic productivity in HME is our publications in peer-reviewed journals. To that end, we conducted structured searches of Pubmed to build a picture of Calgary HME scholars' publication patterns.

Our first search explored publication rates of Calgary HME scholars for the five years before OHMES was opened and for the 5 years after (2008-2013). See the figure opposite (top) - details of the search and analysis methodology are given in the figure legend. We were surprised to find that **Calgary productivity in HME has more than tripled since OHMES started in 2013.**

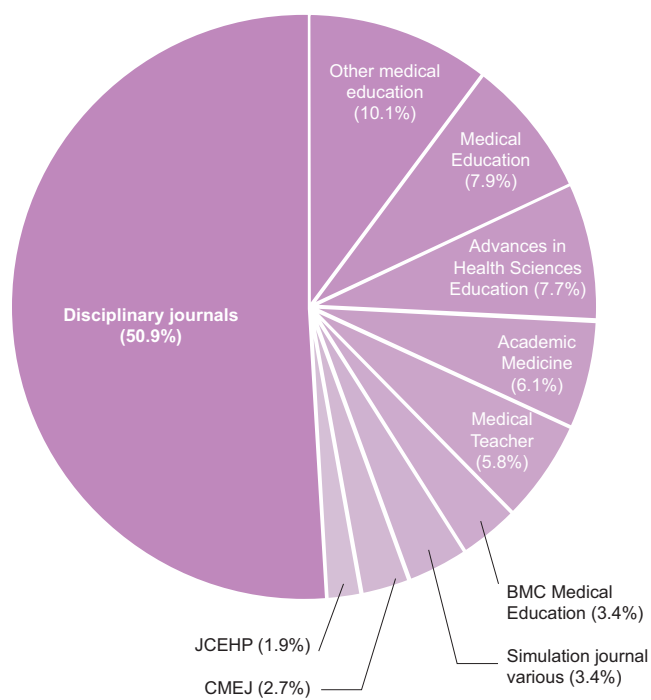
While there has been a gradual increase in the number of publications in HME across the board, this increase is much larger than can be accounted for by this general trend. Although OHMES cannot take all the credit for this growth in productivity (after all it is the many scholars across the University that are doing the writing and publishing), the evidence suggests that OHMES has been a major catalyst in this upswing. It is notable that the number of full-time education scholars did not increase over this time period, the growth in publication productivity was generated entirely within the existing scholarly community in Calgary.

However, we wanted to make sure that we were not overemphasizing Calgary's performance and we engaged a research assistant to run the figures again and to check them carefully to ensure they were indeed attributable to Calgary scholars in HME. The data we present here comes from this second search.

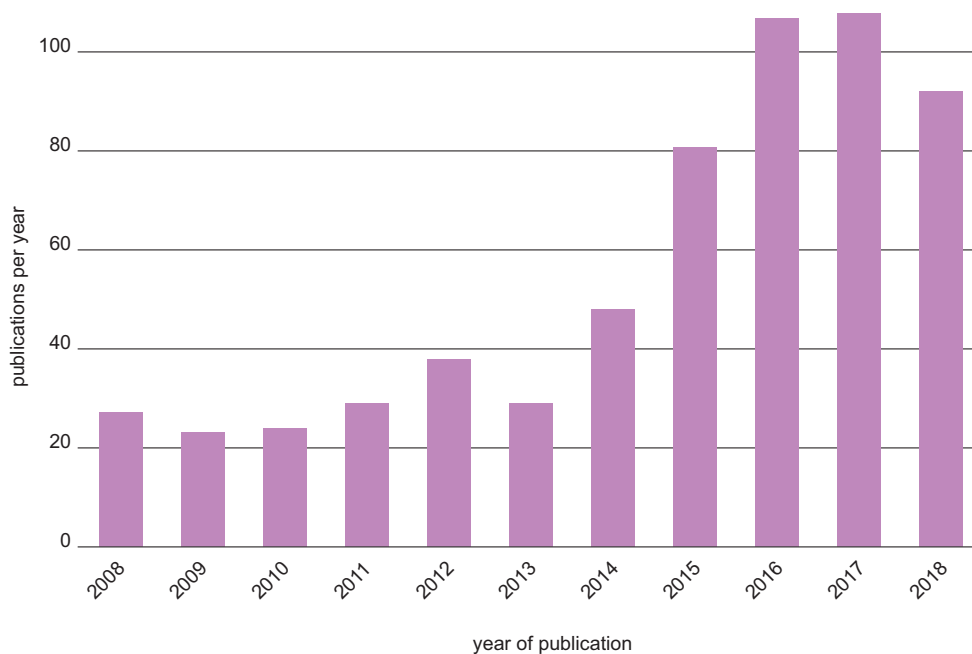
Next we wanted to look at the productivity of Calgary HME scholars compared to other medical schools. The 2014 study of publication patterns in medical education by Doja et al. placed Calgary fifth in the country behind Toronto, Montréal (McGill and Udm), Hamilton (McMaster), and Vancouver (UBC). The study also found that (adjusting for population) Canada was the most productive country in the world in HME followed by the Netherlands, New Zealand, the UK, and the United States.

When we looked at publications in medical education in late 2018 we were again surprised to find that **Calgary now ranked third nationally behind Toronto and Ottawa** - see lower figure opposite. Again, we had the search and analysis redone and this came up with essentially the same result: Calgary is currently the 3rd most productive school in Canada and is (in terms of numbers of publications) more productive than a number of schools with full medical education research centres and other long-established and well-recognized units.

We next looked at where Calgary HME scholars have been publishing - see the figure below. Slightly more than half of all HME publications have been in disciplinary journals related to a particular specialty or to general topics in medicine and healthcare. The rest were in dedicated HME journals. Slightly more than 20% of Calgary publications were in the top three journals in the field: Academic Medicine, Medical Education, and Advances in Health Sciences Education.



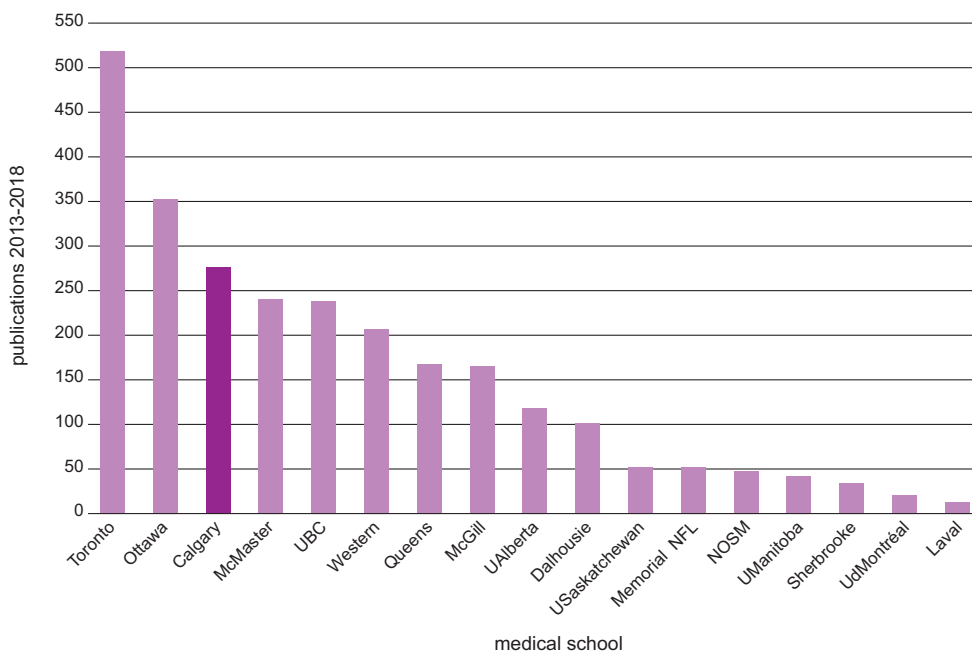
Where Calgary medical education scholars have published in peer-reviewed journals between 2008 and 2018. Method: data and processing as per top figure opposite. JCEHP = Journal of Continuing Education in the Health Professions, CMEJ = Canadian Medical Education Journal.



Productivity of UCalgary medical education scholars in terms of publications in peer-reviewed journals per year between 2008 and 2018.

Method: Search run in November 2018, updated in March 2019.

Publications per year on "medical education" from Calgary scholars in Pubmed - (((("medical education") OR ("medical training")) AND calgary) AND ("2008"[Date - Publication] : "3000"[Date - Publication]) – no filters.



Productivity of UCalgary medical education scholars in terms of publications in peer-reviewed journals over last 5 years compared to other Canadian schools.

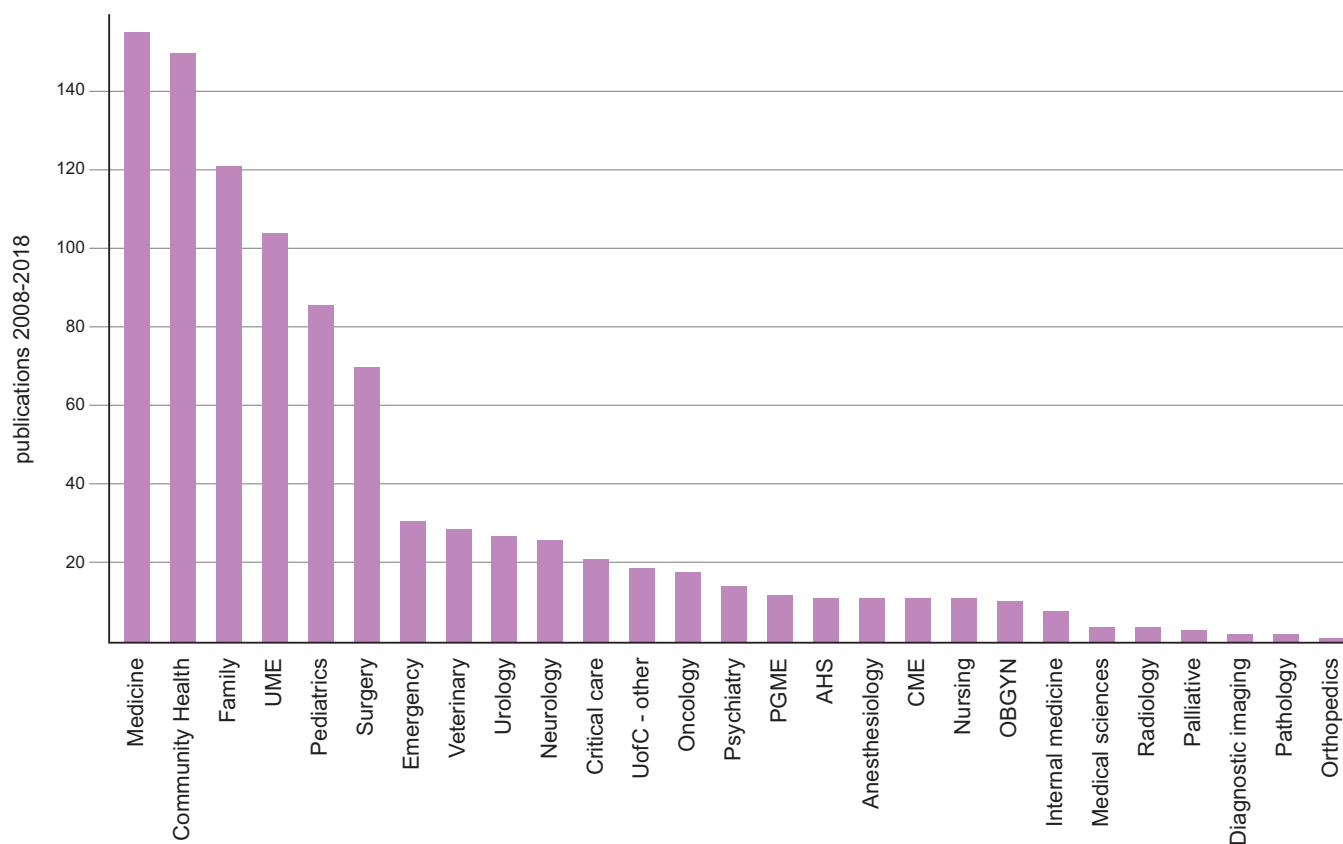
Method: Search run in November 2018. Comparator with other Canadian medical schools – number of publications in medical education since 2013. Based on search of Pubmed for medical education and location e.g. for Queens [((("medical education") AND "kingston" AND "canada") AND ("2013"[Date - Publication] : "3000"[Date - Publication]))]. Results filtered where >100 publications in a given year by screening first 100 results for relevance to medical education and then pro rating counts accordingly.

Across Canada, institutional support and organization of HMEs units (at the time of writing) is as follows: Ottawa is the only one with a full department; McGill recently became an institute; there are full centres at Toronto, McMaster, UBC, and Western; and Small/virtual centres at Calgary, Dalhousie, UAlberta, Sherbrooke, and Queens.

Scholarly productivity: by department and division

We next looked at which departments and units have been publishing in HMES. Scholars within many (but not all) departments and divisions within the Cumming School of Medicine have been active. These include attributions to: Anesthesiology, Community Health Sciences, Critical care, Diagnostic imaging, Emergency Medicine, Family Medicine, Internal Medicine, Medicine, Clinical Neurosciences, OBGYN, Oncology, Orthopedics, Palliative, Pathology, Pediatrics, Psychiatry, Radiology, Surgery, and Urology. Many of the education deaneries have also been active: Continuing Medical Education and Professional Development (CME), UME (Undergraduate

Medical Education), and Postgraduate Medical Education (PGME). It was notable the number of authors in this area who were from outside the Cumming School of Medicine: Nursing, Veterinary, other University of Calgary, and Alberta Health Services. Six departments and units were particularly active in this area: Medicine, Community Health Sciences, Family Medicine, Pediatrics, and Surgery, and the UME Deanery. This illustrates that the HMES community is not located in one facility or even one department or division. Education scholars come from across the school and beyond.



Productivity of Calgary medical education scholars by affiliation. Method: Search run in November 2018, updated in March 2019. Pubmed - (((“medical education”) OR (“medical training”)) AND calgary) AND (“2008”[Date - Publication] : “3000”[Date - Publication]) – no filters. Counts per Calgary author stated affiliation. All affiliations given counted - if an individual noted multiple affiliations each one was counted. Note that although we focused our analysis on medical education, we anticipate that a broader search to include nursing and other disciplines would show similar patterns.

Scholarly productivity: funding

Source	2013	2014	2015	2016	2017	2018	2019 (partial data)	Totals
OHMES	-	\$5,000	\$43,875	\$28,877	\$54,739	\$62,115	\$69,999	\$264,605
CSM	\$56,900	\$7,900	\$89,510	\$34,175	\$41,950	\$252,200	\$10,000	\$492,635
University	\$52,943	\$50,411	\$125,720	\$135,990	\$10,000	\$45,250	\$66,970	\$487,291
Provincial	\$256,500	\$29,975	\$222,491	\$156,000	\$94,818	\$553,092	-	\$1,312,876
National	\$1,508,153	\$471,762	\$305,667	\$269,086	\$127,788	\$458,277	\$45,000	\$3,185,733
International	\$66,535	\$191,925	\$66,130	\$5,210	-	\$357,441	-	\$687,242
Total	\$1,941,031	\$756,973	\$853,393	\$629,339	\$329,295	\$1,728,375	\$191,976	\$6,430,381

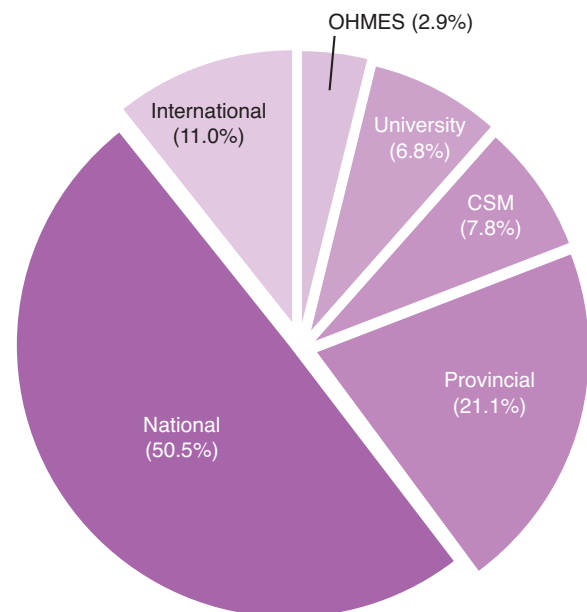
Funding by year and source for health and medical education scholarship projects and activities undertaken by OHMES members acting as PIs between 2013 and 2019 (final year data in progress). The large national funding numbers in 2013 were for Indigenous-related education projects led by Dr. Lindsay Crowshoe. Data was provided by CSM Research Services Office and supplemented by OHMES members' data. Note that only activity directly related to HMES is reported here. Funding was only counted once if there was more than one OHMES member involved as a PI in a grant or other funding activity.

We next considered academic productivity in terms of grant funding and other income for scholarly activity. We identified 163 awards over 5 years that had involved 52 principal investigators. The mean size of award was \$39,349 and the median was \$12,000. Given the difficulty we had in identifying funding in HMES we consider it likely that these data still under-represent the total funding activity in HMES in Calgary.

Nearly \$6.5M dollars of grant and other funding had been secured by Calgary HME scholars between 2013 and 2018. Slightly more than half of this came from national sources (Tri-council, Royal College, CFI etc.). This included just under \$1M in Tri-council funding, 70% of which was for one indigenous education project led by Dr. Crowshoe. A fifth of the HMES funding came from provincial sources (such as Alberta Health and the AMA) and 11% from international sources (almost all from the USA). The University and the Cumming School each provided ~7% of the funding to HMES scholars. OHMES was the smallest funding source at 2.9% of the total funding secured.

In addition to this project funding for HMES, we also found that current and recent graduate students had received \$227,700 in funding between 2014 and 2018 in support of their studies - the total support in this regard is likely to be higher. Finally, we also acknowledge Community Health Sciences, PGME, Family Medicine, and DLRI for funding their PhD medical education researchers, and for the clinical departments that support

MD education researchers. In assessing the significance of this funding it should be noted that HMES is generally not an expensive undertaking. Most funding is used to support research assistants and other personnel. Other costs include transcription, equipment, travel, journal fees, and consultative services. We have no national comparator figures to set these data in context.



Sources of funding for OHMES members acting as PIs between 2013 and 2018. Although OHMES is an important catalyst in building this community, this would suggest that they are not at all dependent on OHMES for research funding.

Scholarly impact

Education scholarship at the heart of the School

Health professions education does not simply appear out of thin air. All of the educational programming in the Cumming School of Medicine and in other HPE across the University is (or at least it should be) based on scientific evidence that establishes what does and does not work and why. This evidence base exists, it is robust, and it has been created by education scholars around the world, many of them from Calgary. Without this evidence base, not only would our programs be less efficient and less effective, we would have no credible way of knowing how well we were doing, nor would we have the means to do something about it. In Calgary, our approach to recruitment, the design and management of our curricula, the teaching and assessment methods we use, and the outcomes our programs lead to have all been and continue to be based on education scholarship. Thus, while education scholarship often goes unnoticed, it is at the heart of all our educational programming and therefore it is at the very heart of the School.

Education scholarship and sustainability

Education programs are not perpetual motion machines. They need to be sustained and quality assured over time to remain viable and effective. Education scholarship plays a central role in this, both in terms of developing and validating the instruments, tools, and frameworks used for quality assurance purposes, and in leading the debates and discourses that shape our thinking about what is important and necessary in sustaining our education programming. Given the current austerity landscape in the public sector in Alberta, the ability for education scholarship to help find more efficient ways of training health professionals should also not be overlooked.

Education scholarship and change

As much as the evidence base for HPE has broadened and deepened over time, we haven't yet 'solved' all of education's problems any more than we have solved all of the problems in health care. Our educational programs are not at all perfect, and change is a constant and necessary part of HPE practice. Education scholarship supports change in response to external drivers such

as accreditation, government policy, and financial and legal constraints. For instance, the shift to competency-based medical education is, and has been for some time, a major focus of scholars in Calgary. There have been a number of scholarly projects in the School that have supported this seismic shift in PGME practice. Similarly, the development of the clinical presentations curriculum in UME, and the work of Dr. Crowshoe and colleagues in indigenous medical education are examples of how HMES has supported change within the School's educational programming.

Education scholarship and leadership

Education scholarship is also bound up with leadership. This is reflected by many of the School's educational leaders also being active as education scholars. For instance, Sylvain Coderre, Kelly Burak, Lara Cooke, Jason Lord, Chip Doig, Jocelyn Lockyer, Doug Myhre, Maureen Topps, Jennifer Hatfield, and Bruce Wright are or have all been active education scholars. The graduate specialization in medical education has an explicit leadership stream to support and encourage individuals in or aspiring to academic leadership traditions to acquire the core skills to function as leader-scholars in and around the health and medical education mission of the school.

Education scholarship and partnerships

While there is clearly much activity in the Cumming School of Medicine, there are several partner organizations whose remit intersects with OHMES and the HMES community. These include the O'Brien Institute for Public Health (OIPH), which has actively supported education scholarship activity through funding, mentorship, and its events, and the Ward of the 21st Century (W21C) which has also maintained a strong educational component. The Office of Faculty Development (OFD) is another player with its Teaching Excellence in Medical Education Program (TEMED), which includes a robust profile of educational scholarship. At an institutional level, the Taylor Institute has supported HMES through its Teaching Scholars program and through its small grants program, as well as through its services and other initiatives related to the Scholarship of Teaching and Learning (SoTL).

National and international

Education scholarship is not just a local concern, it is a national and even international conversation between scholars and schools around the world, and Calgary has long been an active contributor to this conversation. For instance, Calgary has been active in many multi-institutional programs of research including the International Competency-based Medical Education (ICBME) Collaborators, the development of the R2C2 Feedback Model, and the OLab virtual patient platform.

Calgary scholars have been active collaborators with many key national organizations including the Royal College of Physicians and Surgeons (Calgary scholars have made substantial contributions to CanMEDS and to Competency by Design), the College of Family Physicians of Canada (Calgary scholars played a major role in developing the CanMEDS FM and Triple-C competency-based medical education initiatives), the Association of Faculties of Medicine of Canada (Calgary scholars made substantial contributions to all three phases of the Future of Medical Education in Canada (FMEC) initiative), and the Medical Council of Canada. Calgary scholars have also been active contributors to many specialty education groups and activities across Canada and beyond, including the Canadian Association for Medical Education (CAME) where Calgary scholars have served as presidents and in other roles in the leadership team.

Calgary scholars have also made substantial contributions to academic publishing. For instance, the Canadian Medical Education Journal was established by Dr. Claudio Violato, while Dr. Rachel Ellaway was recently appointed the Editor in Chief for the Journal *Advances in Health Sciences Education*. Calgary scholars have also been active as editors and editorial board members for a number of other major journals. Calgary scholars have also been active in the organization and running of many national and international conferences through serving on organizing committees and acting as reviewers, session organizers, and of course presenters. As an example, Calgary has on several occasions been the largest contributor to abstract reviews for the Canadian Conference on Medical Education (CCME). Wherever you look there you will find Calgary scholars making differences in medical education far beyond Alberta.

Awards and other recognitions

In the last 10 years 15 Calgary HME scholars have received 26 awards for their work (17 national and 9 provincial). Of particular note, Dr. Jocelyn Lockyer received the Alberta Medical Association Medal of Honor in 2016, and Dr. Rachel Ellaway received both the Royal College of Physicians and Surgeons of Canada Duncan Graham prize and the Canadian Association of Medical Education Ian Hart Award in 2019. Members of our community have also received a number of Killam Prizes for their educational scholarship. Other scholars have received recognition from the two Colleges, the AFMC, and from a number of professional societies.



Dr. Rachel Ellaway receiving the Royal College of Physicians and Surgeons of Canada Duncan Graham Award in September 2019 from RCPSC President Dr. Ian Bowmer and Dr. Ken Harris, the Executive Director of Specialty Education.

Calgary education scholars are recognized in many other ways including acting as visiting scholars at other centres across Canada and beyond, giving invited keynote addresses at meetings around the world, acting as invited external consultants, and generally playing a substantial role in the international HMES community.

Conclusion

Despite coming from a relatively new school sitting out in the rolling foothills of Southern Alberta, Calgary HME scholars have had and have been recognized as having a significant impact on the training of tomorrow's health professionals around the world.

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