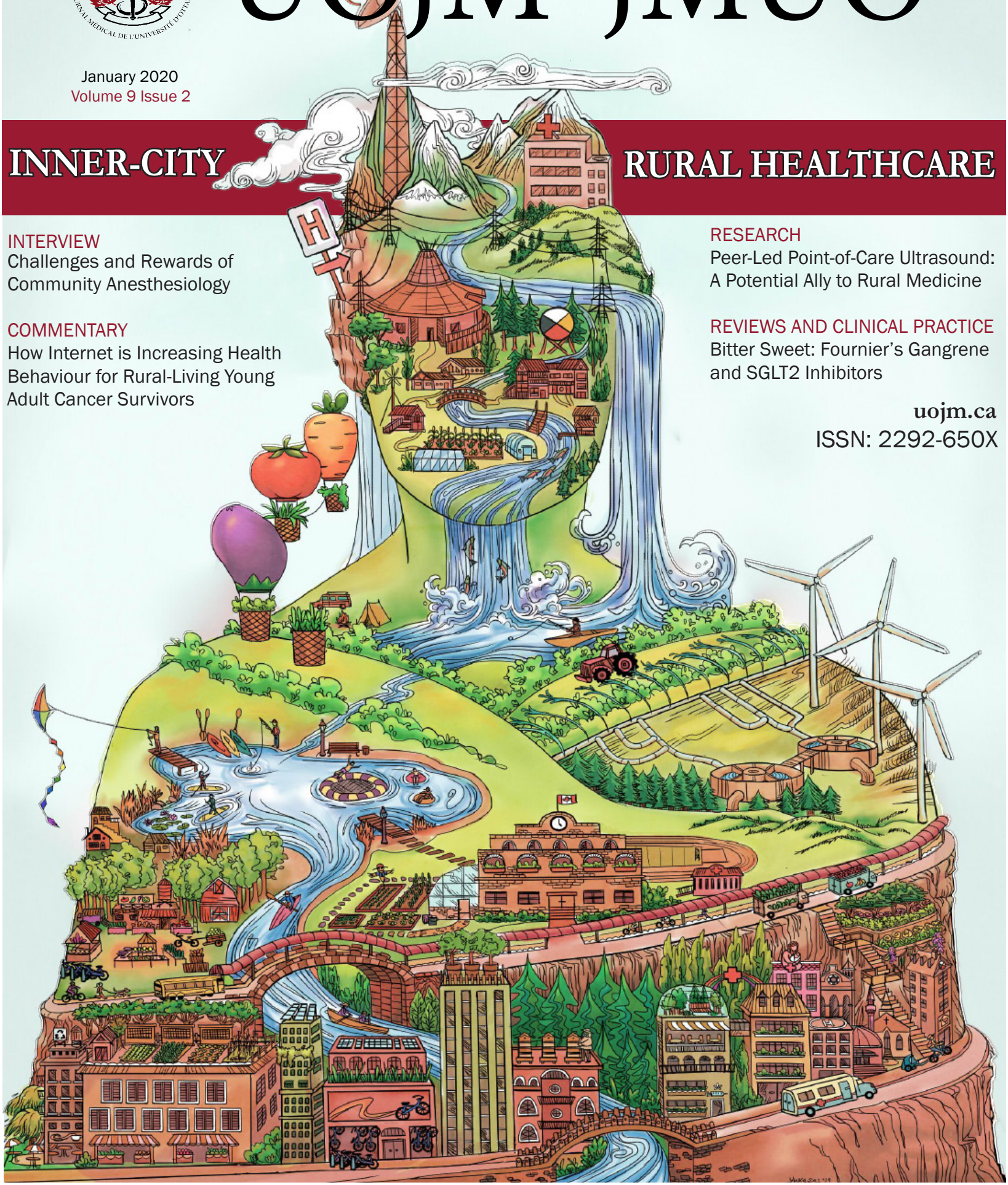
UNIVERSITY OF OTTAWA JOURNAL OF MEDICINE
JOURNAL MÉDICAL DE L'UNIVERSITÉ D'OTTAWA

UOJM JMUO

January 2020
Volume 9 Issue 2

INNER-CITY RURAL HEALTHCARE



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ISSN: 2292-650X

UOJM
UNIVERSITY OF OTTAWA
JOURNAL OF MEDICINE

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VOLUME 9 ISSUE 2 JANUARY 2020

The student-run medical journal of the University of Ottawa

ABOUT US

UOJM is an international peer-reviewed journal led and published by the students of the Faculty of Medicine. We welcome submissions in a variety of areas in biomedical research and feature original research, review articles, news and commentaries, case reports and opinion pieces. Our articles are written in both English and French, and represent the only bilingual medical journal in Canada run by students.

Le JMUO est un journal revu, édité et publié par les étudiants de la Faculté de médecine. Nous encourageons les soumissions d'une variété de différents domaines en recherche biomédicale et publions des articles de recherche originale, des articles de revue, des nouvelles et commentaires, des rapports de cas et des pièces d'opinion. Nos articles sont écrits en français et en anglais et représentent le seul journal médical bilingue géré par les étudiants au Canada.

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University of Ottawa Journal of Medicine
Journal Médical de l'Université d'Ottawa
451 Smyth Rd
Ottawa, Ontario, Canada
K1H 8M5

Website: uojm.ca
ISSN: 2292-650X (print), 2292-6518 (online)

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MESSAGE FROM YUKA SAI, COVER ARTIST

This piece visually integrates determinants of health in both rural and inner city environments. These two settings are represented as one human figure, and therefore as a single system with infrastructure that supports active living, healthy eating, as well as access to comprehensive health services, including maternal care.

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CHEO

Announcing
UOJM Reviewer Award

The publication of high-quality manuscripts cannot be achieved without the contribution of dedicated peer reviewers. High-quality peer reviews are critical to the publication process, as theyprovide constructive feedback to authors to help improve their manuscripts. The UOJM editorial team is enormously thankful to all four reviewers who have volunteered to participate in the peer review process for UOJM. Their time and efforts have been integral to the editorial process, helping to ensure that the quality and standards that define UOJM are upheld for everyissue.

We are honouring two outstanding reviewers with the UOJM Reviewer Award. Key criteria for selection of award recipients included being readily available for peer review when invited and submitting constructive reviews in a timely manner that were demonstrative of critical appraisal. Upon careful review of all peer reviewers, we are pleased to announce Kaitlin Endres and Mina Boshra as the recipients of the UOJM Reviewer Award. Congratulations and well done, Kaitlin and Mina!

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La publication de manuscrits de haute qualité ne pourra pas être achevéesans la contribution d'évaluateurs de pairs dédiés. Des évaluations par les pairs de haute qualité sont critiques pour le processus de publication, afin de fournir de la rétroaction critique aux auteurs pour aider à améliorer leurs manuscrits. L'équipe éditoriale du JMUO est énormément reconnaissante de tous nos évaluateurs qui se sont présentés comme bénévoles pour participer dans le processus d'évaluation par les pairs du JMUO. Leurs temps et leurs efforts ont été intégrants au processus éditorial, en aidant à assurerque la qualité et les standards qui définissent le JMUO sont soutenus dans le présent numéro.

Nous honorons deux évaluateurs exceptionnels avec le prix Évaluateur du JMUO. Les critères pour la sélection des récipiendaires comprennent être disponibles régulièrement pour l'évaluation par les pairs quand inviter, et soumettre des évaluations constructives qui démontrent une estimation critique dans un délai raisonnable. Après une considération prudente de tous nos évaluateurs, nous sommes fiers d'annoncer comme récipiendaires Kaitlin Endres et Mina Boshra pour le premier prix Évaluateur du JMUO. Félicitations et bravo, Kaitlinet Mina!

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Melissa Phuong
Hao Wang

Kaitlin Endres, BMSc
University of Ottawa, MD Candidate 2021
Kaitlin is a third-year medical student at the University of Ottawa. Outside of reviewing for the UOJM, Kaitlin volunteers at the Ronald McDonald House, an activity she has participated in for the past seven years. Kaitlin has a passion for charity work and served as last year's VP Philanthropy for the Aesculapian Student Council. She is also currently involved in a researchproject that aims to explore how trainees are taught and evaluated on Health Advocacy skills throughout theirresidency. Lastly, she loves travelling to new places and also enjoys swimming and playing soccer.

Mina Boshra, BSc.
University of Ottawa, MD Candidate 2022
Mina is currently asecond-year medical student at the University of Ottawa. His research interest is mainly in medical education and the improvement of the learning experience of future medical professionals. He is currently part of a research project to create IntraosseousInsertion Models that can be used for teaching rural physicians at low costs.

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UOJM: Preface

As this winter chill sweeps over the capital, we warmly welcome the release of **UOJM 9.2: Inner-City and Rural Healthcare.** In this time of reflection and gathering, we have chosen to juxtapose the unique healthcare demands of inner-city and rural living. Though the principles of medicine remain unchanged, patient-centred medical practice is heavily dependent on demographics, social landscape, and accessibility to resources that are specific to every region.

A beautifully intricate comparison—the symphonic harmonies and, at times, cacophonous disparities of rural and inner-city healthcare are meticulously captured in the cover art of **UOJM 9.2**. The artist, Yuka Sai, illustrates serenely how the distinct healthcare systems of urban and rural regions can effectively coalesce to promote patient-centered healthcare for all communities. Within the issue, we are privileged to have a number of excellent academic and narrative submissions that address the relationship between urban and rural healthcare. It is our hope that **UOJM 9.2: Inner-City and Rural Healthcare** will inspire clinicians and researchers to always appreciate the societal and environmental nuances that are so critical to effective patient-centred medicine.

We also utilize this issue to welcome the UOJM 2019–20 Co-Editors-in-Chief, Melissa Phuong and Hao Wang. Melissa and Hao previously served as indispensable members of the UOJM academic and editorial teams. We look forward to the innovation that they will bring to UOJM in the coming year. We also welcome our returning Managing Editor, Faizan Khan who filled this role masterfully in the 2018–19 cycle and the new Publication Director, Sarah LaFramboise, who will undoubtedly be a key member of the incoming editorial team.

As we move into the next academic year, we are excited to announce our **Spring/Summer 2020 issue,**which, for the first-time in modern UOJM history, will not have a dedicated theme. We hope this innovation will help to broaden our readership and attract high quality submissions.

The submission deadline for our **Spring/Summer 2019 issue is March 1st, 2020.** High-quality writing will be recognized with an honorarium award. Submissions can be made online, and details regarding article formatting and the submission process can be found on our website at www.uojm.ca.

We hope you enjoy **UOJM issue 9.2: a juxtaposition of inner-city and rural healthcare**!

Editors-in-Chief
Phillip Staibano
Linda Yi Ning Fei

JMUO: Préface

Alors que le froid hivernal tombesur la capitale,nous accueillons chaleureusement la sortie de **UOJM 9.2: Des soins de santé urbains et ruraux**. En cette période de réflexion et de rassemblement, nous avons choisi de juxtaposer les exigences de santé uniques à lavie urbaine et rurale. Bien que les principes de la médecine restent les mêmes, la pratique médicale centrée sur le patient dépend fortement de la démographie, de l'environnement socialet de l'accessibilité aux ressources spécifiques à chaque région.

Une comparaison somptueusement complexe –les harmonies symphoniques et, parfois, les disparitéscacophoniques des soins de santé en milieu rural et urbain sont méticuleusement exhibéesdans la couverture de **UOJM 9.2**. L'artiste, Yuka Sai, illustre sereinement comment les systèmes de santé distincts des régions urbaines et rurales peuvent fusionner efficacement afin de promouvoir des soins de santé centrés sur le patient pour toutes les communautés. Dans cette édition, nous avons le privilège d'avoird'excellentes soumissions académiques et narratives traitantde la relation entre les soins de santé urbains et ruraux. Nous espérons que **UOJM 9.2: Des soins de santé urbains et ruraux** incitera les cliniciens et les chercheurs à toujours apprécier les nuances sociales et environnementales qui sont si essentielles à l'offre de soins médicaux efficaces etcentrés sur le patient.

Nous nous permettonsaussi d'utiliser cette éditionafin d'accueillirles co-rédacteurs en chef de UOJM 2019-2020, Melissa Phuong et Hao Wang. Melissa et Hao étaient déjàdes membres indispensables des équipes académiques et éditoriales de UOJMdans le passé. Nous attendons donc avec impatience l'innovation qu'ils apporteront à UOJM au cours de cette prochaine année. Nous souhaitons également la bienvenue à notre rédacteuren chef, Faizan Khan, qui a superbementrempli ce rôle au cours du cycle 2018-2019, ainsi qu'à la nouvelle directrice depublication, Sarah LaFramboise, qui sera sans aucun doute un membre clé de la nouvelle équipe éditoriale.

Alors que nous approchons la nouvelleannée académique, nous sommes ravis d'annoncer notre édition **Printemps/Été 2020,** qui, pour la première fois dans l'histoire moderne de UOJM, n'aura pas de thème-dédié. Nous espérons que cette innovation contribuera à élargir notre audienceet à attirer des soumissions de haute qualité.La date limite des soumissions pour l'édition **Printemps/Été 2020 est le 1er mars 2020.** Une rédaction de haute qualité sera récompensée par une distinctionhonorifique. Les soumissions peuvent être faites en ligne et les détails concernant le format des articles et le processus de soumissions peuvent être trouvés sur notre site web à www.uojm.ca.

Nous espérons que vous apprécierez **l'édition 9.2 de UOJM: une juxtaposition des soins de santé ruraux et urbains!**

Rédacteurs en chef
Phillip Staibano
Linda Yi Ning Fei

Rewards and Challenges of Community Anesthesiology: An interview with Dr. Dave Riddell MD, Anesthetist at the Cornwall Hospital

Benjamin Weingarten, Aron Weingarten

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ABSTRACT

Dr. Dave Riddell has been practicing anesthesiology at the Cornwall Hospital for thirty years. Medical learners and colleagues, fortunate to accompany him in the operating room, benefit from his vast clinical knowledge but moreover, his wisdom and candidness. In this interview, Dr. Riddell discusses his career path and identifies the rewards and challenges inherent to community practice.

RÉSUMÉ

Dr. Dave Riddell pratique l'anesthésiologie à l'hôpital de Cornwall depuis maintenant trente ans. Les étudiants en médecine et autres collègues qui ont l'opportunité de l'accompagner en salle d'opération bénéficient non seulement de ses vastes connaissances cliniques, mais aussi de sa sagesse et de son honnêteté. Dans cette entrevue, Dr. Riddell discute de son cheminement de carrière et identifie les récompenses et les défis inhérents d'une pratique en communauté.

Buried in the bottom drawer of an antique anesthesia trolley, a hard copy of Katz, Benumof and Kadis's *Anesthesia and Uncommon diseases* rested precariously on layers of forgotten airway equipment. In one motion, Dr. Riddell picked up the book and turned to the chapter on intracranial pressure. Exemplifying humility and in pursuit of protecting patient safety, he occasionally consulted with this text when he encountered uncertainty.

This memory represents a theme that became apparent to me, as I completed my rural community rotation at the Cornwall Hospital. I was impressed by the resourcefulness and professionalism, demonstrated by the hospital's physicians. I was placed in the operating room, under the supervision and instruction of the hospitals glorified teacher, an anesthetist who has practiced in Cornwall for over 30 years. Dr. Dave Riddell graduated medical school from McGill University and trained in anesthesiology at Queens. Anesthesia, as a field, is intimately associated with research and rapid technological advancements. From artificial intelligence monitoring systems to the newest intubation apparatus, the specialty is dynamic, diverse and evolving rapidly. As a medical student, biased by my relative naivety and motivated by curiosity, I wondered how Dr. Riddell managed to stay up to date with pertinent evidence or how he accessed the latest and safest technologies, in a community practice with limited resources. Additionally, the self-perceived abyss, experienced by undifferentiated medical students who question their "career choice", can be addressed by exploring the different settings in which medicine is practiced. As such, I desired to learn more from Dr. Riddell about practicing anesthesiology in the community setting. So, I asked to interview him.

Dr. Riddell chose anesthesiology after a year of locum work as a general practitioner. Amongst many thoughtful reasons, anesthesia was appealing because "It offered skills that bugged me, like starting IVs". When reflecting on the satisfaction provided to him from caring for patients, he said, "If you do your job right, people should not be uncomfortable. That is not a power many specialists have".

Following a brief stint at the Children's Hospital of Eastern Ontario, Dr. Riddell relocated to Cornwall. He explained that the decision satisfied personal and professional desires. The community setting was compatible with his preferences. Substantial research involvement was not central to the career that Dr. Riddell envisioned, "I did not suit the sideline research-oriented aspect associated with expectations at a teaching hospital". He went on to explain, "I may not be leading the cutting edge of research, but I am out here putting the miles in". His candidness enthuses students who learn from him.

Keywords: anesthesia, anesthesiology, medical education, rural medicine and community medicine

The modesty that he demonstrates is a model for students to emulate. Despite being recognized for excellence and achieving many personal goals, Dr. Riddell's focus remains the wellbeing and safety of his patients.

Dr. Riddell shared some of the challenges associated with community practice. He admits that the frequency of being on call is tough. He also explained that ancillary support is limited and that this can complicate patient care.

A member of the Canadian Anesthesiologist Society (CAS), Dr. Riddell stays up to date by participating in CME activities/ events, such as attending the CAS annual conference. When I asked him to share his personal strategies for staying up to date with current evidence and best practice, his answer was quick, short and unequivocal, "read". The simplicity and directness of his answer illustrated to me that despite his vast experience, he is aware of his limitations and continues to seek improvement. Dr. Riddell added, "One of the things I realized is the correct answer is occasionally, I'm not sure I'm going to have to look that up". He referenced the library of books in his anesthesia trolly and explained that he "double checks things all the time". Dr. Riddell said that although the complicated procedures may be reserved for tertiary sites, patients with complicated medical conditions are frequent surgical patients of his. This reality requires him to be prepared to respond to an eclectic range of possible perioperative complications. Sub-specialized physicians, in teaching hospitals, may be extensively trained at managing their respective cases. However, Dr. Riddell considers the approach of a community anesthesiologist to be "let's roll up our sleeves and get on with it", since the incidence of emergencies has no predilection for place.

Dr. Riddell then shared invaluable advice for medical students. He considers students to be "very lucky to travel to the community". He encourages students to appreciate the concept of community medicine.

A report documenting the distribution and migration of physicians in Canada, published by the Canadian Institute for Health Information, demonstrates the disproportionate shortage of physicians practicing in rural communities. In the 2018 report, 8% of practicing physicians were identified as practicing in rural areas. However, a recent Canadian demographic census quoted Canada's rural population as greater than 18% of the total population. This disparity in supply and demand was highlighted in a position paper published by the Ontario Medical Student Association, calling for increased action by medical schools to address socioeconomical status as a detriment to medical school admissions. Initiatives designed to increase exposure to community medicine in medical education, such as the University of Ottawa's mandatory community week, are commendable attempts to introduce students to community medicine. These strategies should be analyzed longitudinally for their efficacy.

Dr. Riddell shared additional advice, "I would encourage you to do electives in a smaller community for two reasons. One, to appreciate the clinical practice and secondly, to see what life may be like to live there".

I conclude by sharing a lesson I learnt from my time with Dr. Riddell. Although community anesthesiology may pose unique challenges to the practitioner, such as fewer resources and greater scope of practice, the satisfaction derived from promoting positive outcomes for patients is proportionally great.

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Student-Run Clinic Association: The Next Generation of Health System Collaboration

John S. Mikhaeil, Bryan C. Ng, Michael-Roy R. Durr, Sparsh Shah, Edmond Lab Bon Chiu

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ABSTRACT

The Student-Run Clinic Association (SRCA) is a pan-Canadian effort that is an official hub for all matters related to healthcare and social efforts where learners are the primary service providers and leaders. Student-run clinics (SRCs) utilize a multidisciplinary team of health professional students to provide accessible primary care services to vulnerable and marginalized populations under the supervision of qualified and licensed healthcare providers. The SRCA provides an official platform for which student-run clinics across the country connect with each other. The outcome of this initiative is to enhance equitable, high-quality care to underserved populations in Canada, while simultaneously providing future healthcare providers with experience serving this population.

RÉSUMÉ

L'Association Clinique dirigée par les étudiants (SRCA) est un effort pancanadien qui constitue un centre officiel pour toutes les questions liées aux soins de santé et aux efforts sociaux, dans laquelle les apprenants sont les principaux fournisseurs et leaders du service. Les cliniques dirigées par les étudiants utilisent une équipe multidisciplinaire d'étudiants dans le domaine de la santé pour fournir des services de soins primaires accessibles aux populations vulnérables et marginalisées sous la supervision de prestataires de soins de santé qualifiés et agréés. La SRCA fournit une plate-forme officielle pour la mise en relation de cliniques gérées par les étudiants à travers le pays. Le résultat de cette initiative est d'améliorer les soins équitables et de haute qualité offerts aux populations défavorisées au Canada, tout en offrant aux futurs fournisseurs de soins de santé de l'expérience au service de cette population.

The Student-Run Clinic Association (SRCA) is a registered non-profit organization funded and supported by the Canadian Medical Association (CMA) as part of the CMA Communities of Interest Grant (1). Founded in January 2019, we are composed of an interprofessional team of volunteers who have had previous experiences in leadership roles at a Student Run Clinic (SRC). Currently, there are 14 SRCs operating across 7 provinces in Canada (2), with several groups developing new clinics (Figure 1). SRCs operate in siloes, creating administrative barriers, inefficiencies, and poor knowledge translation. Further, SRCs lack standardized care and workflow; however, an association aimed at coordinating and improving the operations of SRCs is postulated to resolve these issues (3, 4). The SRCA is a Community of Interest (COI) framed around SRCs in Canada through five main goals (Figure 2), creating a platform for SRCs to communicate, collaborate, and add to the Canadian healthcare landscape (5).

The SRCA connects a wide range of healthcare professions on one main platform. As a collective, we can implement best practices for SRCs to model optimal holistic care and interprofessional collaboration. In this way, well-established clinics may provide mentorship and advice to new clinics and facilitate their growth. The SRCA provides the infrastructure to sustain such partnerships. In that effort, we wish to implement a holistic and interprofessional approach to primary care, improve access to quality healthcare for all Canadians, and train the next generation of healthcare providers to be skilled in caring for vulnerable populations. The SRCA empowers the collective voice of trainees and healthcare leaders to advocate for holistic care and positive change in healthcare and social policy. This will cultivate healthcare students' passion through increased exposure with marginalized patients, thereby providing a safe space to apply interprofessional skills and novel research ideas. More importantly, SRCs create a pedagogical experience that didactic teaching cannot emulate, especially related to developing empathy with patients and an appreciation for the allied health team (6, 7).

The vision of the SRCA is to create a central network of SRCs across Canada built on the pillars of holistic and non-discriminatory healthcare, advocacy, and research. Through an interdisciplinary approach and a social lens, our activities

Keywords: student run clinic, interprofessional, vulnerable populations, medical education

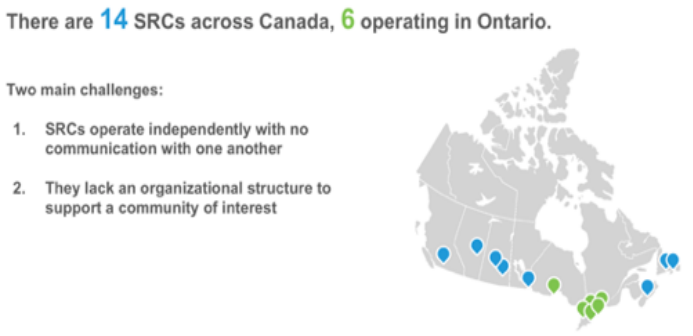

Figure 1. Overview of current landscape of student run clinics (SRCs) in Canada. This figure geographically depicts all of the active SRCs in Canada and highlights current challenges faced by the individual SRC partners. SRCs are found in Toronto (IMAGINE), Vancouver (CHIUS), Edmonton (SHINE), Calgary SRC, Saskatoon (SWITCH), Regina (SEARCH), Winnipeg (WISH), Thunder Bay (Compass North), Hamilton (MacHealth DNA Clinic & HARP), Kingston (OSLER), Halifax (HOPES), St. John's (MUN Med Gateway), St. John's (ACCESS Clinic).

contribute to both a vibrant profession and healthy population. We bring together a group of individuals with shared passions working towards a fulfilling goal of improving the health of those who need it the most. We are engaging in collaborative dialogue and advocacy for marginalized populations and effectively uniting health providers on a cause that matters to Canadians. With our SRCs, Canadians can trust in healthcare regardless of their status. The purpose of this commentary is to introduce the three objectives of the SRCA: reducing barriers, utilizing technology, and establishing and increasing operations of SRCs to improve Canadian healthcare.

SRCA Objective #1: Reducing barriers to healthcare access in marginalized populations

Universality is a core guiding principle as part of the Canada Health Act (8). Healthcare professionals and many members of the public remain unaware of the vast number of people in our community who cannot access healthcare in Canada. We hope to create a united platform for raising awareness to influence a wider understanding, create community supports, and implement policy changes with the support of the public. As medical professionals, we can bring forth the voice of those people in our community, whom the healthcare system all too often leaves behind. Given our position within the system and our interactions with these populations, it is our responsibility and opportunity to create positive change through awareness.

The SRCA plans to host seminars to disseminate information regarding these issues by recruiting speakers in this particular field in order to further engage followership. We will leverage our network of speakers and advisors to host informational sessions for medical professionals, health professional students, and members of the public to ensure we involve all stakeholders. With our experiences in hosting conferences and workshops, we plan to establish an open access platform to host webinars to discuss barriers to healthcare access, nationally and internationally (9). Finally, we also aim to collectively mobilize Canadian SRCs in advocacy across different levels of government, as in our experience we have found that policy change is more likely with the combined and coordinated efforts of all SRCs.

SRCA Objective #2: Explore and support innovative healthcare technologies

The current landscape of the healthcare system is in need of new ways to organize and deliver care. We have come a long way in understanding the merits of holistic interdisciplinary care and engaging the community to create sustainable 'health' (10). We believe there are innovative ways to provide patient care to those currently unable to access the Canadian system. The SRCA aims to leverage innovative telemedicine technologies and point-of-care testing platforms for rapid and reliable disease detection in new and existing student run clinics. Telemedicine will allow clinics to expand their services to underserved rural communities (11). In particular, telemedicine technologies will provide access to allied health services (e.g. social work, occupational therapy, and pharmacy services) that are often lacking in rural regions. Specifically, a common issue that was raised by many of our affiliated clinics was the lack of attendance of allied health services on clinic days. This issue has the potential to be mitigated by connecting with allied health professionals that are willing to volunteer their time remotely to be consulted for services as needed on clinic days. This process would improve patient care, without adding a significant burden on the healthcare professionals volunteering to provide care. Further support will allow clinics to invest in established point-of-care technologies that are normally prohibitively expensive. Such technologies are integral in providing on-site diagnostic testing and continuity of care without the need for referrals to external laboratories, a current issue for many student run clinics.

We aim to achieve innovation through facilitated case competitions, where we bring together students, healthcare professionals, and members of the public to brainstorm ideas to tackle healthcare issues regarding accessing care. The additional

benefits of these symposiums will be to allow students to network with healthcare professional students and staff, aiding in career development and further allowing for mentorship opportunities. The proposed case competition may involve students designing a clinic that can target vulnerable populations more effectively.

SRCA Objective #3: Improve the operations and standards of SRCs across Canada

Many resources such as specific social support resources in that region or available medical services without the need for health insurance are location-specific and challenging for practitioners to keep up to date on. These resources are constantly evolving, a challenge for marginalized populations attempting to develop a system of care. Our goal is to compile a collection of clinical tools, medical supplies, referral or extended healthcare services, alternative specialized clinics, and various other resources that support patient care functions and remove the stress of having to navigating the system for these patients. Ultimately, this will likely translate to decreased barriers felt by the patients to access the existing and developing resources. Through this, we hope to foster a "universally" connected network of resources that eases the burden on individual healthcare practitioners and patients. Our platform will enable a compilation of updated resources that are accessible anywhere in Canada that is constantly reviewed by participants and patients to ensure the resources are relevant and effective.

The SRCA is affiliated with a number of SRCs across Canada which have each been serving persons without health insurance plans or identification collectively for over 5 years. In that time, a bank of resources has been formed and the goal is to share similar resources nationally. Furthermore, each clinic has areas of expertise and lessons learnt so far during their time in operation. Collaboration of resources in a similar setting has been demonstrated in the literature to improve communication (12). We also understand that there are region-specific resources and other tools that have not been discovered by our team which we would like to add to the repository. Ultimately, the goal is to create a website repository that will allow student run clinics to provide accessible and effective care to marginalized populations. Similarly, the open channels of communication between SRCs that has become more accessible through the SRCA's initiatives (i.e. facilitating conference calls between various SRCs and hosting our inaugural SRCA Summit in November 2019) have significantly improved operations for many of our clinics as described qualitatively by the individual clinic leads. To date, the SRCA has signed on ten affiliated clinics nation-wide and helped support the growth and initiation of three additional clinics. Congruent with the objective of raising awareness of care in marginalized populations, the SRCA was invited to the CMA Health Summit to discuss the organization's role in the growing landscape of student-run clinics and the evolving healthcare field. These forums allow the relevant stakeholders to identify key issues and develop novel tools to tackle them and improve the care of our patient population.

CONCLUSION

SRCs are spreading rapidly across the country as a way for marginalized populations without health insurance or identification to access high quality healthcare. In this paper, the idea of student run clinics was discussed and the Student-Run Clinic Association (SRCA) was introduced, a non-profit organization aimed at connecting and establishing communication channels within SRCs in Canada. The SRCA primarily aims to reduce barriers to healthcare, but also among our goals are to explore innovative healthcare technologies and improve the operations of SRCs across Canada. In our inaugural year, the

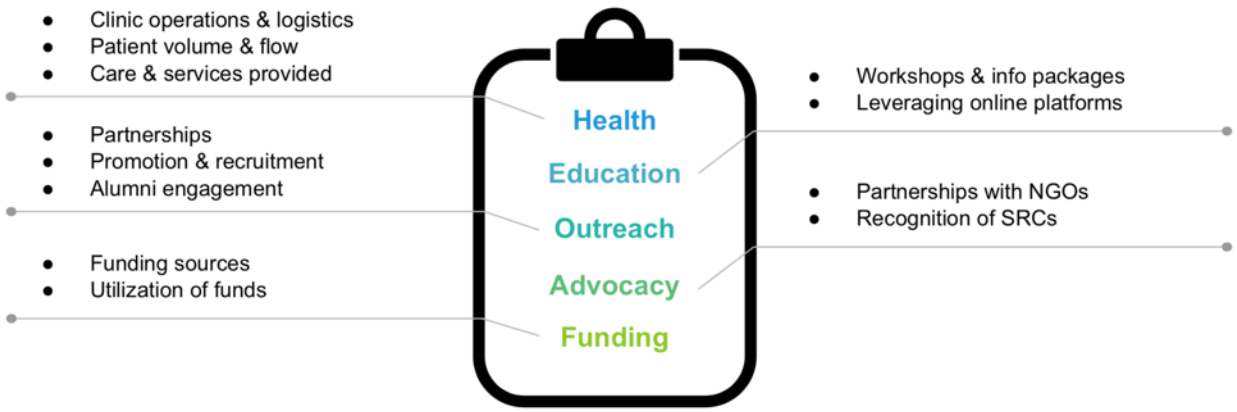

Figure 2. Five major goals of the SRCA Five major goals of the SRCA.

SRCA had notable successes and as such, will continue to grow and help guide SRCs in delivering the best care to their local population.

ACKNOWLEDGEMENTS

We would like to thank our University Consulting Group (UCG) team, Sammy Cai, Dev vrat Khanna, Vipul Shrivastava, Ritchie Truong, Nina Wang, and Tamer Ismail for the design of the figures included in this paper, analysis of the SRCA strategic goals, and surveying the Canadian SRC landscape.

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COMMENTARY

Utilizing the Internet to Promote Health Behaviour Changes Among Rural-Living Young Adult Cancer Survivors

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ABSTRACT

Regular physical activity (PA) participation and fruit and vegetable (FV) consumption confer numerous health benefits for cancer survivors. Rural-living young adult cancer survivors report barriers to participation in health-promoting behaviours such as the lack of physicians/specialists, limited PA programming, lack of affordable FVs, and unreliable transportation to/from PA facilities. Interventions seeking to promote PA participation and FV consumption fail to address many barriers rural-living young adult cancer survivors have because they are traditionally offered in urban centres. Alternative means for delivering PA and FV consumption behaviour change interventions need to be developed, implemented, and evaluated for this population.

RÉSUMÉ

L'activité physique régulière et la consommation de fruits et légumes apportent de nombreux avantages pour la santé des survivants du cancer. Les jeunes survivants du cancer qui habitent en milieu rural soulignent des obstacles à l'adoption de comportements favorables à la santé, tels que le manque de médecins/spécialistes, le nombre limité de programmes d'activité physique, le manque de fruits et légumes abordables et le transport peu fiable vers/depuis les installations d'activité physique. Les interventions visant à promouvoir l'activité physique et la consommation de fruits et légumes ne parviennent pas à répondre aux nombreux obstacles rencontrés par les jeunes adultes survivants du cancer qui habitent en milieu rural car elles sont traditionnellement offertes dans les centres urbains. Des moyens alternatifs pour réaliser des interventions de changement de comportement en incitant l'activité physique et la consommation de fruits et légumes doivent être développés, mis en œuvre et évalués pour cette population.

Each year, approximately 1 million young adults between the ages of 20-39 years are diagnosed with cancer worldwide [1]. On average, 80% of young adults will survive 5 years or more after diagnosis [1]. Physical activity (PA) participation and fruit and vegetable (FV) consumption can prolong life expectancy [2, 3]. Additionally, PA participation and FV consumption can prevent or delay various cancer-related physical and psychosocial side effects and promote overall health [4, 5]. For example, PA can improve aerobic capacity, elevate energy levels, and enhance body composition [6], and, FV consumption can promote physical, psychological, and social health [7-9].

Drawing on cumulative evidence, PA participation and FV consumption guidelines have been developed. For PA participation, guidelines recommend that cancer survivors participate in at least 150 minutes of aerobic training at moderate-to-vigorous intensity each week and strength training twice per week. For FV consumption, guidelines recommend that cancer survivors consume at least five servings of FVs each day. Despite guidelines being widely distributed to the public by various organizations (e.g., Canadian Cancer Society, American College of Sports Medicine; [10, 11]), compliance with both is low [12]. To improve compliance with guidelines, various interventions targeting cancer survivors have been developed. However, there are concerns that most existing interventions may not reach all cancer survivors because they are often delivered by research staff in hospitals or at research facilities located primarily in urban centres [13-15].

RURAL-LIVING YOUNG ADULT CANCER SURVIVOR

There are many health disparities associated with living in a rural community [14]. Individuals living in rural communities report poorer overall health outcomes than their urban counterparts [15-17]. Across developed and underdeveloped nations, data on geographical location point to an increase in cancer-related morbidity and mortality for those living in rural communities [18], which may, in part, be due to lower PA participation [19] and FV consumption [20]. For FV consumption, rural residents experience greater economic burden, increased spatial distance, lower quality, and

Keywords: Rural; Health; Behaviour change; Cancer survivors; Young adults; Telehealth

limited availability of FVs [21-24]. For PA, participation in rural communities is hindered by the built environment (e.g., limited parks, sidewalks, and streetlights), long distances to recreational athletic centres, lack of transportation to/from PA facilities, and poor walkability (e.g., high speed limits, winding roads), and minimal variety for PA types [25, 26].

In addition to the above-mentioned constraints associated with living in a rural community, young adult cancer survivors have unique needs compared to those diagnosed as children or later in life [27]. Young adult cancer survivors not only have to manage the adverse cognitive, physical, and psychosocial sequalae associated with a cancer diagnosis and subsequent treatment (e.g., anxiety, depression, physical decondition, fatigue) [28, 29], but they must navigate a period in their life that is laden with developmental milestones (e.g., gaining independence, establishing romantic relationships) [30]. They also face a myriad of barriers for participating in health-promoting behaviours including competing life responsibilities (e.g., work, children), lacking necessary transportation, having limited guidance from health professionals, and experiencing changes in social support (e.g., transitioning from parental support to independence and/or changes in romantic relationships) [31]. At the same time, young adult cancer survivors report a lack of resources, negative thoughts and feelings, and negative social and environmental influences as barriers specific to PA participation and FV consumption [32]. As a result, many young adult cancer survivors decrease their PA participation at diagnosis and fail to regain PA levels post-diagnosis [33]. FV consumption also remains low post-diagnosis [34].

There is a critical need to develop tailored interventions that adequately address the limited access to and availability of healthcare resources and facilities that reduce lifestyle risks for those living with a chronic illness in rural areas [14]. Using different technologies (e.g., Internet, phone) to deliver interventions is a means of addressing access barriers reported by rural-living young adult cancer survivors. For instance, telephone counselling, websites, online support groups, and mobile applications have been developed for and tested with young adult cancer survivors to ease access to health services [35, 36]. However, such methods used to deliver interventions are not always preferred as they limit interaction between facilitators and participants [37]. Indeed, results of a recent systematic review of health interventions for cancer survivors found that email communications between cancer survivors and service providers (e.g., oncologists, counsellors) are impersonal [37]. This suggests that cancer survivors may prefer and benefit from interventions that incorporate on-going support and interaction with a facilitator. A Gray and colleagues [20] study, in which a 1-year, iteratively-tailored, theory-based behavioural intervention focused on promoting moderate-to-vigorous intensity PA, strength training, and proper nutrition among older, overweight, long-term cancer survivors was implemented, provides support for this contention. The intervention was delivered using mailed print materials, telephone prompts, and stepped telephone counseling. The authors observed modest increases in PA participation and FV consumption for rural participants; therefore, distance-based modes of delivery, coupled with support may be feasible and effective among rural-living cancer survivors. Further, young adult cancer survivors have reported distance-based interventions utilizing the Internet as a favourable means of receiving health-promoting behavioural information [38].

TELEHEALTH INTERVENTIONS

Telehealth is the use of telecommunication (e.g., Internet, phone) and information technology to deliver health assessments, interventions, and/or additional health services from a distance [39]. Telehealth interventions promoting the adoption and maintenance of health-promoting behaviours are increasing in popularity because of the growing need to reach rural-living individuals [40], as they offer a means of facilitating participants' knowledge, skills, and motivation to change their lifestyle behaviours [41]. For individuals unable to travel to urban centres, telehealth interventions provide similar quality of patient care and produce the same outcomes as compared to face-to-face interventions [42]. For this reason, telehealth interventions can increase rural-living young adult cancer survivors' access to care by reducing hospital and travel costs [42].

There is mounting evidence that telehealth interventions can have positive effects on health behaviour in a variety of populations. For instance, based on a review of 34 studies, Davies and colleagues [43] concluded that tailored telehealth interventions that provide educational material on behaviour change are effective in increasing PA participation in a variety of populations (e.g., general population, adults who have diabetes, are overweight, or have mental illnesses). Further, there is evidence to suggest that interventions combining the use of multiple behaviour change techniques (e.g., stress

management, goal setting, motivational interviewing) may lead to greater changes in the desired health behaviours than interventions only using one behaviour change technique [44, 45]. Importantly, telehealth behaviour change interventions may also address the access barriers that rural-living young adult cancer survivors report for PA participation and FV consumption, but this has yet to be confirmed. As such, it is necessary to establish the feasibility and acceptability of telehealth behaviour change interventions for rural-living young adult cancer survivors before continuing their implementation and before undertaking efforts to scale them up.

KEY CONSIDERATIONS

Despite the potential associated with the mode of delivery of telehealth interventions, the limited guiding literature on this style of intervention means it is necessary to conduct research to develop and evaluate feasibility and acceptability before implementing telehealth interventions in large-scale studies or supportive care services. When undertaking such research, it is essential to consider the following.

Develop tailored interventions

For young adult cancer survivors, the burden of research methods, design issues (e.g., multiple data points, time commitment), and limited access to recruitment are potential barriers to participation in research trials [46]. In addition, rural-living and young adult cancer survivors report unique barriers and facilitators that influence their participation in health-promoting behaviours [47, 48]. To encourage recruitment and adherence to a health-promoting intervention, it would be necessary to tailor study design and intervention components (e.g., materials) to address the specific needs and preferences (e.g., flexible scheduling) of this population. Pugh and colleagues [38] have suggested key factors and preferences that may influence young adult cancer survivors engagement in lifestyle interventions. Specifically, they suggest it may be beneficial for interventions to provide guidance, recognition of individual needs, and social support in addition to ensuring ease of access to the intervention [38].

Use robust study designs

Few attempts have been made to assess the feasibility of using different modes of delivery for health behaviour change interventions and most researchers have relied on quantitative measures to assess the impact of interventions on behaviour change. These measures allow researchers to assess outcome related to efficacy and effectiveness of intervention design, but they do not adequately explore the experiences associated with participating in an intervention. In addition, few studies have sufficiently assessed the potential mechanisms of change related to changing health-promoting behaviours [49]. For this reason, it is important to consider study designs that incorporate multiple methods of data collection within experimental studies that collectively aim to understand participants' experiences, evaluate mechanism of change, and assess efficacy and effectiveness of the intervention.

Employ a theory-based approach

To date, most research with cancer survivors has inconsistently applied theory at various stages of interventions. A theory-based intervention requires consistent application of theory from design to evaluation as it allows for a more in-depth analysis of the impact of the intervention on behaviour change [50]. This is especially of concern for the conduct of telehealth interventions as the necessary components that facilitate change are unclear. Moving forward, it may be valuable to employ one (or more) of the four key theoretical frameworks that have been used to guide intervention design thus far when designing telehealth behaviour change interventions, namely social cognitive, humanistic, dual process, and socioecological [51].

Increase recruitment

Young adult cancer survivors and rural-living individuals report limited access to research, which may, in part, explain the difficulty associated with recruiting young adult cancer survivors into research trials [71-74]. To facilitate recruitment in a timely-manner, it is critical to utilize alternative strategies to community-based recruitment, including conducting multi-site trials utilizing hospital or clinic staff as champions of research to increase access to the pool of potential participants from which to recruit from. In addition, researchers could consider partnering with healthcare providers, attending hospital rounds to recruit in-person, emailing and/or mailing the study information using tumour registries and/or well-recognized young adult cancer survivor supportive service providers, and attending cancer-survivorship events/groups [75].

CONCLUSION

Cancer survivors living in rural communities report engaging in less PA and consuming fewer FVs than their urban counterparts [52], which may place them at an increased

risk of cancer recurrence, second primary cancer, and non-communicable chronic diseases [53]. As the number of young adult cancer survivors continues to grow [41, 54], it is critical to increase access to behaviour change interventions for this underserved segment of the population. In doing so, it is necessary to explore novel approaches to intervention design to effectively address the needs and preferences of rural-living young adult cancer survivors.

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The Importance of Mental Health Courts for Psychiatry & the Criminal Justice System

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ABSTRACT

Mental health courts (MHCs) are designed to divert offenders with mental illness away from the criminal justice system and into appropriate treatment programs. This commentary highlights the systemic issues within the healthcare system that led to the development of MHCs. Research has already demonstrated that these courts are associated with numerous positive psychiatric and legal outcomes. However, further research is required to determine what specifically makes them successful, and who is most likely to benefit from them. MHCs have earned their place as an essential part of the criminal justice system and are a promising area of future research.

RÉSUMÉ

Les tribunaux de santé mentale sont conçus pour détourner les criminels atteints de maladie mentale du système de justice criminel et de les orienter vers les programmes de traitement appropriés. Cette critique met en évidence les problèmes systémiques du système de santé qui ont conduit au développement de ces tribunaux de santé mentale. De nombreuses études ont déjà démontré que ces tribunaux sont associés à de nombreux résultats psychiatriques et juridiques positifs. Cependant, de la recherche supplémentaire est nécessaire afin de déterminer ce qui les rend particulièrement fructueux et identifier ceux qui en bénéficieraient le plus. Les tribunaux de santé mentale ont acquis une place essentielle dans le système de justice criminel et constituent un domaine de recherche prometteur dans le futur.

Mental health courts (MHCs) aim to address the needs of those with mental illness entering the criminal justice system by providing access to appropriate services and facilitating diversion when possible. They are based on the successful model of drug courts, in which individuals with substance use disorders are placed into treatment programs (1). These courts vary widely in terms of their function but share the common mandate of rehabilitating those who would be otherwise criminally sanctioned (1).

In Ontario, there are nineteen MHCs in operation, and the provincial Human Services & Justice Coordinating Committee has identified a need for more resources dedicated to MHCs (34). This is, in part, due to the significant increase in the number of hospital beds and other resources dedicated to the forensic population in Ontario (2). Criminally accused individuals often end up in forensic institutions as a result of being found unfit to stand trial (UST) or following a verdict of not criminally responsible on account of a mental disorder (NCRMD) (3,4). Those found UST may then receive a fitness treatment order, which requires them to receive psychiatric treatment in order to be rendered fit. Those found NCRMD are followed by review boards, independent tribunals, that determine the disposition of the accused person (5). The dispositions available include detention in hospital, conditional discharge (typically living in the community under conditions set by the review board), or absolute discharge (5). Accused persons are typically required to participate in individually tailored treatment programs developed by multi-disciplinary healthcare teams (1). There has been an overall national increase in the number of people found NCRMD in Canada (3). The rapid proliferation of MHCs since their establishment in the late 1990s has helped to facilitate this process (6). MHCs are associated with numerous positive outcomes; however, further research regarding their efficacy is required in order to inform public policy.

THE NEED FOR MHCs

Since the deinstitutionalization movement in the second half of the twentieth century, access to mental health services has become increasingly scarce (1). As a result, those with mental illness have often ended up in the forensic system, and the responsibility of providing basic mental healthcare has largely shifted to the criminal justice system (7). A recent study of mental illness in jails found that 14.5% of men and 31% of women had a serious mental illness (9). These individuals often do not have access to mental health services while incarcerated, which may lead to worse long-term outcomes.

Keywords: Mental Health Court; Psychiatry; Mental Illness; Criminal Justice System; Forensic

The shift of those with mental illness into the forensic system has been referred to as the criminalization of mental illness; fortunately, MHCs pose a potential solution. MHCs can help shift those with severe mental illness from the prison system into a court-mandated treatment program. This provides an opportunity for offenders with mental illness to access psychiatric treatment, which they may have been previously lacking. MHC diversion also provides an opportunity for lessened sentences or the withdrawal of charges reliant on the accused participating in mental health treatment. There is increasing demand being placed on forensic institutions to provide mental health services due to inadequate resources elsewhere. Individuals with mental illness who are found UST often must wait in jail, without access to psychiatric care, until they can be admitted to hospital (7). An increase in the number of MHCs could help facilitate the diversion process and reduce demand on the already overwhelmed criminal justice system.

THE EFFICACY OF MHCs

Since their inception, research has rapidly accumulated demonstrating the efficacy of MHCs. One major advantage of MHCs is their ability to link individuals to mental health services (10). One MHC in Florida reported linking up to 82% of its participants with mental health treatment (11). At eight months follow up, MHC participants engaged in a higher level of treatment when compared to individuals in the traditional misdemeanor court (11). MHCs therefore play an important role in making mental healthcare more accessible to those who need it most.

A growing body of research has also shown that MHCs are effective in reducing recidivism (the tendency of a convicted criminal to reoffend) (10,32). Across four diverse MHCs, participants were shown to have significantly fewer re-arrests and incarceration days compared to those in a standard treatment group (12). MHCs are therefore capable of achieving important public safety outcomes in a cost-effective manner. One study estimates that a Pennsylvania MHC saved taxpayers three and a half million dollars over a two-year period (13). This cost saving was achieved by cutting down on more expensive forms of treatment, such as hospitalization (13).

By focusing on rehabilitation rather than punishment, MHCs are also leading to subjective improvements in the quality of life of those with severe mental illness (10). MHC participants and graduates have a significant reduction in psychiatric hospitalization days and a decrease in positive drug and alcohol tests over the course of court enrollment (14). This suggests that MHCs may lead to benefits beyond the evident positive legal outcomes. A recent study found that 91% of MHC clients could cite advantages to their participation in the court program (15). These advantages are often attributed to the fact that MHCs treat participants not as criminals but as individuals who engaged in criminal activity as a result of severe mental illness. MHCs are unique in that they operate generally under the principle of therapeutic jurisprudence (28). Therapeutic jurisprudence refers to the belief that laws can be helpful or unhelpful to defendants, and sometimes even harmful (29). Direct interaction between the accused and the judge during courtroom sessions is another distinguishing feature of MHCs (14). Judges in MHCs often receive additional mental health training and are in an optimal position to establish a therapeutic alliance with the accused (16). Observations reveal a non-adversarial tone in the courtroom in which the use of praise and encouragement far outweigh sanctions (14). The unique rehabilitative focus of MHCs may facilitate some of their positive outcomes. MHC participants have reported that their motivation initially was to avoid jail, but over time they began to make intentional choices leading to their recovery (17). They cited the importance of their relationship with the staff and the judge, as well as the need for trust, understanding and respect throughout the program (17,33). The growing body of evidence supporting the efficacy of MCHs cements them as an important part of the forensic system. However, further research is required to determine what specific features make them successful, and who is most likely to benefit from them.

LIMITATIONS OF MHCs

Despite the many positive outcomes associated with MHCs, there remain some limitations. One major disadvantage of MHCs is that they are reactionary in nature (10). Treatment is only offered to offenders with mental illness after they have committed a crime, rather than intervening before they become involved with the criminal justice system (10). MHCs therefore serve as a solution to a larger problem rooted in the existing deficiency of mental health resources. This issue could be mitigated by increased funding for diversion of offenders with mental illness prior to being charged (e.g. police education) in order to reduce the need for MHCs (34).

Another concern with respect to MHCs is whether participants are joining voluntarily, or if coercion is taking place (10). A recent study found that the majority of participants had agreed to participate in the MHC yet claimed to have not been

told that the program is voluntary (18). Another potential legal concern is related to pleading guilty (10). To participate in a MHC, the defendant typically has to plead guilty under the assumption that charges will be dismissed once treatment has been completed (19). The Bazelon Center performed a review of 20 MHCs and found that the charges were not always automatically dismissed, despite defendants' participation in treatment (19).

An additional disadvantage of MHCs is the potential for gender and race bias in those selected as participants (10). Existing literature suggests that Caucasian males, and in some cases, Caucasian females are over-represented in MHCs (21). Further research is required to understand how MHC participants are selected, in order to avoid such bias.

An overarching limitation of MHCs is the lack of consistency amongst them. The variability amongst MHCs is largely attributed to a lack of regulation at the provincial level. In Ontario, there is no mandate to determine where they should exist, and how they should operate (34). They are therefore quite variable and lack a uniform framework to guide their function. There is also a relative lack of peer-reviewed studies demonstrating what specific features make them successful (10). A lack of dedicated funding and a lack of psychiatrists have been reported as the primary challenges faced by MHCs across Ontario (34). Therefore, an increase in provincial funding and further research into how MHCs can operate most effectively is required.

FUTURE DIRECTIONS

MHCs represent an innovative solution that addresses the needs of offenders with mental illness that are not being met elsewhere. They are a successful, permanent component of the criminal justice system with documented results and should no longer be funded as 'pilot projects' (23). It is clear that MHCs lead to positive outcomes; however, the causal mechanism underlying these outcomes is not well understood. It could be the participants' interaction with the judge during MHC sessions that is contributing to positive outcomes, as is the case in the drug courts (20,24,25). However, it could also be the mental health services received, amount of court supervision, sanctions for non-compliance or some combination of the above (14). Despite their variability, all MHCs in Ontario report an interest in providing clients with access to mental health services (34). This underlying commonality could likely be the source of their success. There is a need for further research into this topic, in order to develop a theoretical framework to guide MHC function.

There is also a need for investigation into who is most likely to benefit from MHC involvement, and under what circumstances (1). This is especially true given the increasing heterogeneity of MHC participants, in both criminal behavior and clinical profile (5). This could lead to more effective selection of participants in order to maximize positive outcomes. An important eligibility criterion required by almost all MHCs in Ontario is a willingness to participate and be treated if necessary (34). The National Institute for Health & Care Excellence recommends that the nature and severity of the mental health problem also be taken into account, as well as any co-existing substance use disorders (35).

It is evident that MHCs are a promising intervention with abundant potential for future research. Methodologically-sound single- and multi-site studies on MHC participants, available treatment services, community characteristics, criminal justice, psychosocial outcomes and cost-effectiveness are required to identify for whom MHCs are truly successful and why (26,27,30).

CONCLUSIONS

MHCs have proliferated rapidly since they began in the late 1990s. They have proven to be an effective solution to stop the revolving door of those with severe mental illness through the criminal justice system. Evidence has shown that they are able to address the unique needs of these individuals and lead to long-term positive outcomes, in a cost-effective manner. More work needs to be done to identify exactly what makes MHCs so successful and who is most likely to benefit. So far research has not been able to keep pace with their rapid growth, and there is yet to be a comprehensive examination of more than a few MHCs (31). Existing MHCs are quite variable in their function due to the lack of a guiding theoretical framework. They are also reactionary in nature and do not address the factors that are leading mentally ill individuals to become involved with the criminal justice system in the first place. Despite their limitations, MHCs have earned their place as an essential part of the criminal justice system and are a promising area of future research.

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COMMENTARY

Substance Use and Homelessness: An Inner-City Group Discussion on Marginalization in Healthcare Practices

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ABSTRACT

Addictions recovery services like the Ottawa Inner City Health Managed Alcohol Program increasingly utilise harm reduction strategies within their care, with strong evidence of success. These harm-reduction strategies provide compassionate substance use recovery services to inner-city individuals who cannot or will not access mainstream care due to stigma. Addictions recovery programs cannot be used to replace mainstream healthcare, however. As such, it is necessary for healthcare professionals to improve accessibility by promoting compassionate healthcare practices and by becoming allies to this population. This study involved a qualitative discussion group composed of 15 individuals utilizing various substance use support programs in Ottawa. The focus of discussions were various strategies to reduce stigma against inner-city individuals, support illicit drug users, and prevent overdoses. Our research suggests that healthcare professionals are well positioned to ensure these strategies are put to action by advocating for patients with substance use issues and promoting equitable healthcare. These initiatives can reinforce the notion of healthcare professionals as allies to inner-city individuals with substance use disorders and further promote a positive environment conducive to improved healthcare accessibility in these populations.

RÉSUMÉ

Les services de traitement de la toxicomanie, tel que le programme de gestion de l'alcoolisme dans les centres de santé du centre-ville d'Ottawa, incluent de plus en plus des stratégies de réduction des méfaits au sein de leurs soins, avec de solides preuves de leur succès. Ces stratégies de réduction des méfaits fournissent des services de rétablissement liés à l'usage de substances aux personnes venant des quartiers défavorisés qui ne peuvent, ou ne veulent pas, accéder aux soins classiques en raison des stigmas qui les accompagnent. Les programmes de traitement de la toxicomanie ne peuvent toutefois pas remplacer les soins de santé habituels. Ainsi, il est essentiel que les professionnels de la santé améliorent l'accessibilité en promouvant des pratiques de soins empreintes de compassion et en devenant des alliés de cette population. Cette étude se repose sur un groupe de discussion qualitatif composé de 15 personnes utilisant divers programmes d'aide à la toxicomanie à Ottawa. Les discussions ont porté sur diverses stratégies visant à réduire les stigmas à l'égard des habitants des quartiers défavorisés, à soutenir les consommateurs de drogues illicites et à prévenir les surdoses. Nos recherches suggèrent que les professionnels de la santé sont bien placés pour veiller à la mise en œuvre de ces stratégies tout en plaidant en faveur des patients toxicomanes et en promouvant des soins de santé équitables. Ces initiatives peuvent renforcer la notion des professionnels de la santé comme alliés des personnes du centre-ville atteintes de troubles liés à l'utilisation de substances et promouvoir davantage un environnement positif propice à un meilleur accès aux soins de santé pour ces populations.

Upon entering the front doors to the lobby of The Oaks shelter, you will typically see a long line of adults waiting in front of a reception desk. Despite the busyness, the reception area will be still and quiet, as the line-up waits in anticipation. These individuals are waiting for their hourly allocation of alcohol as designated by Ottawa Inner City Health's (OICH) Managed Alcohol Program (MAP). The purpose of this program is to provide an alcohol addiction recovery service to inner-city individuals who cannot or will not otherwise access mainstream health services. Although this approach may seem counterintuitive, administering managed amounts of alcohol to people with alcohol addiction is an evidence-based strategy developed from the harm reduction model of addictions, with the goal of reducing harm to the person rather than eradicating socially unacceptable behaviours (1). This harm-reduction approach has been effective at reducing alcohol dependence, decreasing morbidity and mortality, and significantly lowering healthcare costs associated with alcohol abuse across the country (2). In Ottawa specifically, the MAP has resulted in a 36% decrease in ER visits for trauma, convulsion and intoxication; a 51% decrease in police encounters; and a

Keywords: inner-city health, substance abuse and harm-reducton

statistically significant decrease in alcohol consumption for participants from a mean of forty-six drinks per day to eight (3).

This approach stands in stark contrast to the moral model of addictions previously used in mainstream healthcare which considered addictions to be a social or criminal problem separate from health (4). This moral perspective on disease resulted in the disconnection of substance use as a facet of healthcare, and instead largely offloaded care of individuals with addictions to law enforcement or involuntary hold psychiatric facilities (5). This had the unfortunate outcome of stigmatizing substance use and ostracizing patients (4) .

The result of this marginalization is that homeless people with substance use disorders (HPWS) are discouraged from accessing care in traditional healthcare settings, such as clinics and hospitals, until absolutely necessary (6). Consequently, as many as 38% of HPWS reported having unmet physical and mental needs (7). In the context of inner-city patients, who face a higher burden of chronic disease, particularly substance use, this is especially detrimental (8). Many inner-city individuals have suffered irreversible health outcomes from years of healthcare neglect and unmet health needs.

The evidence of this healthcare neglect pervades the lobby of The Oaks. Many of the inner-city residents now have speech impairments or difficulties with dialogue as a result of cognitive damage from years of alcohol or illicit substance use and overdose. There are some who have discolored or missing teeth due to a lack of dental care and education. Others have had traumatic limb amputations and gait instability from unmanaged chronic conditions like diabetes or peripheral vascular disease. These individuals likely all require a team of medical specialists to manage their complex physiologic and psychiatric comorbidities. However, due to their complex social and substance use background, they cannot benefit from the mainstream healthcare system when it is not prepared to address these challenges adequately. This healthcare inaccessibility is unacceptable, especially in a country such as Canada where the Canada Health Act mandates equal accessibility as a guiding principle of its universal health system.

While programs like MAP have been helpful in providing practical and compassionate substance use recovery, it is necessary to integrate mainstream healthcare services to address the unmet health needs of inner-city HPWS (5). As such, in striving to achieve health equity, healthcare professionals need to advocate for more compassionate models of healthcare delivery. By employing or advocating for a compassionate harm reduction approach, healthcare professionals can reduce the marginalization felt by HPWS and consequently improve accessibility of healthcare in these populations.

Given that the development of harm reduction approaches had their origin through the grassroots advocacy of HPWS themselves, a qualitative discussion group consisting of inner-city HPWS was assembled to identify key factors affecting healthcare accessibility (4). This discussion group was assembled during the OICH's weekly optional health literacy session and consisted of 15 inner-city individuals utilizing substance use harm reduction programs. The discussion questions were introduced by OICH staff and participants were permitted to participate as much or as little as they liked. The focus of this group was to identify some key factors affecting healthcare utilization in homeless HPWS and potential solutions or healthcare priorities to improve healthcare access, utilization, and satisfaction.

An Inner-City Group Discussion on Substance Use and Marginalization in Healthcare

Reducing Stigma

One of the primary aims of this group discussion was to address some of the barriers which make it difficult for inner-city persons to access healthcare services for their substance use. When asked about factors affecting accessibility to addictions recovery services, the group was candid about discrimination in healthcare settings. The discussion group emphasized the importance of reducing stigma against inner-city individuals, specifically those with substance use. In fact, they reported that poor treatment has previously been a barrier which has prevented them from accessing healthcare. This perceived mistreatment is widespread, with as many as 40% of homeless people reporting that they faced discrimination from a healthcare professional within the last year (9–11). Specifically, HPWS reported feeling dehumanized, unwelcome, and severely mistreated in healthcare settings (6). They also reported that healthcare professionals were not willing or able address the full extent of their concerns (6). In a qualitative study on perceptions of homeless people in healthcare settings, one patient describes "I got treated [poorly] the first time over there, and I'm not going through that again. I'd rather sit here and […] die on a bench than go

over there" (6). As such, it is evident that until marginalization and stigma are eliminated from healthcare settings, HPWS will be discouraged from accessing care and health inequity will continue to be significant in this vulnerable population.

Advertising Open-Door Policies

In addition to reducing the discriminatory behaviours of health workers, healthcare policy and practice must be revised to better support patients with substance use disorders and promote safer personal drug use. The group suggested that supportive and non-punitive approaches to policy making would be the most helpful to individuals with active substance use problems. For healthcare workers, one such practice change suggested was to employ more 'open-door' policies where users can talk freely about their own drug use without fear of consequences or stigma. Although there are currently no laws on mandatory reporting of illicit substance use for physicians in Canada, it is important to alert HPWS to this, so that they feel welcome to openly discuss these issues.

Decriminalization of Drug Use

The group further suggested complete decriminalization of drug use as a potential strategy for improving user safety. Decriminalization has gained popularity after its success in Portugal in decreasing illicit drug use and minimizing harm related to substance use (13). The decriminalization of drugs has the potential to promote safety because it can avoid risky needle-sharing practices that are commonly used in informal 'underground' settings (14). This can prevent the spread of diseases like HIV or Hepatitis C, which are commonly transmitted amongst injection drug users, thereby promoting positive health outcomes (14). In addition, decriminalization and rehabilitative approaches to drug use may decrease stigma and encourage more patients to seek help from public healthcare services (14). This is a controversial suggestion, however, because it has never been trialed in Canada for substances other than marijuana.

Enlisting Peers into Care

Another strategy suggested by the group discussion to enhance drug user safety was to create community initiatives which connect individuals with lived experiences of substance use and addictions. The group had positive perceptions of their peer overdose prevention program and recommended others like it. This program recruits and trains recovering inner-city individuals to distribute safe injection kits and counsel friends on their use, in known drug use hotspots. Peer-based programs have been used within Canada for mental health and addictions services with significant success (15). Programs which involve others who currently share or have shared similar struggles can help patients to feel more comfortable and less distrustful when accessing care. In fact, the literature has demonstrated that the use of peer-support addictions services results in increased treatment follow-through rates and more long-term success (16). These programs also have the potential to provide benefit to the support workers themselves, both through a source of income and by providing them with a sense of community. Healthcare professionals can incorporate this into their practice by initiating and facilitating peer support communities for HPWS, as well as counselling patients on the importance of securing a support system.

Safe Injection Sites

In cases where individuals refuse to change their substance use behaviours or to access care for their addictions, healthcare professionals may only be able to support the well-being of these patients by preventing fatal overdoses or developing more effective overdose response plans. The discussion group explained that one significant way to prevent overdoses is to prevent cuts to harm reduction programs. They specifically mentioned that services such as 'The Trailer', an OICH supervised injection site in the ByWard Market, Ottawa, Ontario, would help better protect individuals using injection drugs from overdose. This point is well supported in the literature, which has shown that the use of supervised injection sites decreases the number of overdose deaths, skin-related infections, and HIV transmissions of injection drug users (17). In Canada, supervised injection sites operate in only 5 provinces: Alberta, British Columbia, Québec, Ontario and Saskatchewan (18). Healthcare professionals should continue to advocate for supervised injection sites in order to expand the accessibility of these services throughout Canada.

Non-Toxic Drug Supply

The discussion group also emphasized that the administration of a non-toxic drug supply would be helpful in preventing overdose as many drugs obtained illegally may have additional toxic substances which can lead to overdose. One common example of this is illegally-obtained opioids which have been found to contain toxic levels of fentanyl and have led to many deaths by overdose (19). Although routine practice suggests that healthcare professionals should identify drug-seeking patients and avoid administering drugs to them, this may encourage patients to buy drugs from unregulated sources,

which further exposes them to harm. Instead, healthcare professionals can refer or advocate for harm reduction services when possible. One such service is the OICH Managed Opioid Program, which supplies non-toxic pharmaceutical grade hydromorphone to those suffering from opioid addiction, who would otherwise be obtaining opioids from a non-regulated source. A similar program exists in Vancouver and has been validated as effective in the treatment of opioid use through the SALOME trial (20). Beyond these two programs there are very few harm reduction programs to address the toxic drug supply and as such, there is a need for physician advocacy to expand these services.

Naloxone Distribution and Overdose First Responders

In the case where an overdose cannot be prevented, the group suggested wide-spread naloxone distribution in public places like businesses and community centres and training for emergency workers on overdose response. Several studies which investigated the widespread administration of community naloxone kits and training have identified a significant increase in overdose recovery (21). While Canada has ensured the distribution of Naloxone to emergency workers and hospitals in all 13 provinces and territories, distribution of Naloxone kits to public spaces has not been as widespread (22). As such, it is important for healthcare professionals to continue to develop high quality evidence and engage in advocacy to ensure naloxone kits are readily available. Finally, the group also suggested that police should not be dispatched to overdose emergency calls, as this has the potential to deter people from calling for life-saving emergency services. Healthcare professionals can advocate for policy changes such as these to position themselves as allies of HPWS and promote greater use of healthcare services in emergency overdose situations.

CONCLUSION

In conclusion, it is essential that healthcare providers and allied health workers advocate on behalf of all individuals with substance use issues to ensure equal accessibility, which is a guiding principle of universal healthcare under the Canada Health Act. HPWS have faced and continue to face stigma within mainstream healthcare settings, which prevents them from accessing these services, and contributes to poor health outcomes in these populations. Although OICH's substance use programs have been helpful to HPWS, there is an additional need for more holistic substance use recovery programs, which address the extensive unmet healthcare needs of this population. As suggested by the OICH discussion group, healthcare professionals are at the frontline of initiating changes like these as they can directly impact the marginalization experienced by patients through their interpersonal relationship with patients as well as by employing and advocating for compassionate harm reduction approaches in their practice. Strategies suggested by the group included reducing stigma, advertising open door policies; advocating for decriminalization; enlisting peers into care; promoting the use of safe injection sites and non-toxic drug supplies; and expanding naloxone distribution. Future research should evaluate the quality of evidence supporting these harm-reduction interventions to identify which strategies are most successful and which should be deprioritized.

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An Opinion 11,000km in the Making

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ABSTRACT

How is medicine practiced on the other side of the world? As medical students in Canada, we learn much about disease pathophysiology and the North American healthcare system. Yet important observations made about how other cultures deliver care can be used to help us address our own shortcomings. In this opinion piece, I use my experience studying cardiac surgery in Shanghai, China to explore how both China and Canada confront a common problem: access to care in rural communities. Despite their differences, each country arrive at creative solutions, reflecting the incredible diversity of their patients.

RÉSUMÉ

Comment la médecine est-elle pratiquée à l'autre bout du monde? En tant qu'étudiants en médecine au Canada, nous apprenons beaucoup sur la physiopathologie des maladies et sur le système de santé nord-américain. Cependant, des observations importantes sur la manière dont les autres cultures fournissent des soins de santé peuvent être utiles afin de nous aider à remédier à nos propres faiblesses. Dans cet article d'opinion, j'utilise mon expérience lors de mes études en chirurgie cardiaque à Shanghai, en Chine, afin d'explorer comment le Canada et la Chine font face à un problème commun: l'accès aux soins de santé dans les communautés rurales. Malgré leurs différences, chaque pays parvient à des solutions créatives, reflétant l'incroyable diversité de ses patients.

The patients stood lined up one after another in front my preceptor's desk. Outside the room, mayhem reigned, with many similar lines spilling into the hallway and confusing the hot, exhausted people waiting to be seen. "You see, we do things a little different here," said my preceptor, a cardiac surgeon, as he finished with one patient at the desk who was immediately replaced by another. It was a busy day in the cardiac surgery clinic of Renji Hospital, Shanghai, with over thirty patients to be seen in hardly an hour, and a dozen angiograms booked for later that afternoon; however, not any busier than most other days, my preceptor assured me. But still, I couldn't help but feel a little culture-shocked. Pushed by massive queues that extended into the hospital lobby, many patients crowded into the same room we were seeing our current patients in. What about confidentiality, I wondered, with some uneasiness. More than that, what about their care? My preceptor seemed to have a superhuman ability to greet patients, understand their concerns, address them – all within minutes. Even more baffling, he somehow managed to find the time to catch up with old friends and teach me as well (in a different language, no less)! Whatever he was doing, it was working. By the end of the clinic, the examination bed was piled high with gifts of teas and fruits from grateful patients. He collapsed in his chair, rubbed his face with his hands, then suddenly got up and clapped his hands. "Alright," he said cheerfully, "It's time for a smoke!" A little different here, indeed.

This July, I had the fantastic opportunity to do a placement at Jiao Tong University in Shanghai, China as part of University of Ottawa's Global Health program. It was an exciting prospect; having been accepted into both this and our school's Medicine and Humanities' International Summer School, also in Shanghai, I would be spending over a month in the city to learn about the practice of "Western Medicine" and Traditional Chinese Medicine (TCM). Despite my excitement, I was also intimidated. I had never been to Asia, did not speak Mandarin, knew close to nothing about Chinese Medicine, and only slightly more about Western Medicine, for that matter! It felt like no time at all until I was packing and on my way to what would become the best trip I have ever had. My placements were scheduled so that I would begin with two weeks studying the humanities, the arts, TCM, and how these all intersected with the practice of medicine in North America. The second part, at Renji Hospital, was meant to be more along the lines of our placements in Ottawa – but even that, I was soon to learn, was not quite what I had anticipated.

I must admit – despite our interest in the humanities, most of us in the summer school, myself included, soon found ourselves struggling to understand what things like Chinese opera and poetry had to do with medicine. We all loved the humanities, but how would Madame Butterfly help us care for patients? As I discussed these questions with my preceptor later on, the answer began to form; over 43% of China's massive population

Keywords: China, Canada, Global Health, Access, Alternative Medicine

of 1.4 billion live in rural areas (1). Many face poverty and seek better opportunities, including more advanced medical care, in larger cities such as Shanghai. The result is a noticeable dichotomy between rural and urban medicine. With more than 1600 admissions per day, most Chinese metropolitan hospitals face incredible patient loads (2). The reason for this is simple; despite China's large population, only a handful of hospitals in the country offer services for complicated conditions – this was particularly true at Renji Hospital. Furthermore, due to poverty and the large distance from medical care, many patients neglect their symptoms and only present to hospitals at a critical stage. For example, a patient with an abdominal aortic aneurysm may only present to the hospital when the aneurysm has ruptured. The result was striking. I regularly saw more aortic dissections, a condition with a very low incidence, in half a day than I could count on both hands. This should sound familiar to healthcare professionals practicing in North America. Canada faces many of the same issues in providing medical care to rural areas. In particular, our northern regions often struggle with access to care (3). In fact, despite our belief that infectious diseases are well-managed in Canada, some infamous and deadly diseases, such as tuberculosis, heave reached epidemic levels in Northern Canada in recent years (4).

Well, how do our eastern counterparts respond to barriers in accessing care? Due to the difficulties of getting to hospital and being seen, the Chinese people have sought out other methods to treat their woes, many of which involve the use of alternative medicine. In addition to legendary art and folklore, Chinese culture has some of the most diverse and longstanding techniques of traditional medicine, some of them so popular that they have secured a place amongst Western social mores. Acupuncture, tai chi, and herbal products, to name a few, make up common remedies the population uses on a frequent basis to supplement – and sometimes replace – our Western treatments. The allure is obvious; simple, longstanding remedies that not only calm the body, but also calm the soul. Acupuncture, for example, can be found all across China, and in most major cities around the world. Alternative medicine practices are also usually more affordable for patients, especially those that lack publicly-funded health care, and fulfill a desperate need for spirituality and hope that Western Medicine sometimes loses in its long lines of patients. Yet there is still the million-dollar question; does it work? The truth of the matter is that TCM has been tested vigorously by Western scientists and the results are mixed. The debate is ongoing, and whether there is a physiological basis to these treatments is beyond the scope of this article. What we do know is this: traditional medicine is here to stay, and arguing against it will not make it go away.

In the face of the ongoing popularity of TCM, the Chinese healthcare system has evolved in interesting ways. Rather than looking down upon alternative medicines, which can frequently be seen in places like North America, the Chinese have taken steps to embrace TCM. Many hospitals in China, for example, have begun to create hybridized centers offering both Western and Traditional Chinese Medicine. In fact, TCM herbs were requested in as many as 70% of outpatients in these combined hospitals, a testament to their ongoing popularity (5). Some Chinese universities even offer degrees in TCM, much like the path to an M.D. Moreover, significant scientific research is being conducted in an attempt to isolate and amplify the active ingredients in herbal remedies.

In contrast, Canada has tackled rural medicine differently. This year, the Canadian Medical Association (CMA) has launched a task force to explore ways to develop telemedicine, the delivery of medicine remotely through audiovisual technologies (6). Despite being a potentially strong solution to the issue of access to care, some have criticized Canada's use of telemedicine as poor (7). With Canada's size and brutal winters, forcing the ill and the frail to trek to clinics for check-ups is fraught with dangers. In Northern Canada, where patients face even harsher weather and greater travel distances, it is easy to see why health expectancy, an indicator often used as a proxy for quality of life, is lower for those patients than their southern counterparts (3). Telemedicine is by no means a universal solution, but it is a step in the right direction. Perhaps Canada should also look eastward for some advice on how to deal with our ongoing issues in access to care by providing physicians more education on alternative medicines. Experience with and integration of alternative medicine could not only avoid the antagonism and unease many physicians feel when they are brought up, but also, in the case of acupuncture for example, help certain populations of patients such as those suffering from chronic pain (8). Repeating doctor visits for untreatable pain can be frustrating to patients, who may feel like they have tried everything already, and add more visits to an already backlogged physician schedule. In contrast, some alternative medicines have been shown to decrease the need for health care visits (9). Furthermore, education on alternative

medicines will serve to increase physician cultural awareness and spirituality. This would make physicians more comfortable helping different peoples from around the world, something especially important in Canada's diverse population.

Ultimately, while medicine may be done quite differently in China, many problems that they face are also our own. Their culture, strongly rooted in history and tradition, leads them to integrate longstanding solutions, while Western medicine tends towards the new and innovative. Influenced by who they are as a people, each seeks to improve the way its population navigates rural medicine in different ways. But both societies, ultimately, have an unwavering desire to help patients and tackle inequalities present in the way we deliver care – an essential quality of a just and equitable medical system no matter where you are in the world.

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My Journey from the Inner-City to Medical School

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ABSTRACT

As an immigrant who grew up in the inner-city Toronto and Hamilton community to a low income family, this article highlights some of the challenges faced by me and countless other students living in these communities on their route to pursuing a career in medicine. While becoming a physician requires many things including academic excellence, growing up in these circumstances is filled with challenges that extend far beyond the classroom. More specifically, a lack of mentorship, experience, and financial resources disadvantage marginalized students' medical school applications and subsequently might impede them from pursuing a career as a physician.

RÉSUMÉ

En tant qu'immigrant ayant grandi dans les quartiers urbains défavorisés de Toronto et de Hamilton, au sein d'une famille à faible revenu, cet article met en lumière certains des défis auxquels j'ai, moi-même, été confronté, mais aussi ceux auxquels d'innombrables autres étudiants vivant dans ces communautés font face lorsqu'ils décident de poursuivre une carrière en médecine. Bien que devenir médecin exige beaucoup de choses, y compris l'excellence académique, grandir dans ces circonstances est rempli de défis qui vont bien au-delà de la salle de classe. Plus précisément, le manque de mentorat, d'expérience et de ressources financières désavantagent les étudiants marginalisés à poser leur candidature aux écoles de médecine et pourrait donc ultérieurement les empêcher de poursuivre une carrière en tant que médecin.

On October 8th 1989, I was born on the outskirts of rural Lahore, Pakistan. As a child, I grew up in a part of the world where major illness and death are commonplace. My mother, a physician, ignited my passion to be a part of the healthcare profession as I observed her struggle to serve those living in one of the most medically-underserved parts of the world. At the age of 8, my family and I left Pakistan for Canada to start a new life. My parents along with my older brothers and I first moved to a one-bedroom apartment in the Thorncliffe Park neighbourhood in Toronto where nearly 50-53% of children live below the low income cut-off, which is calculated in 2016 as $20,386 for one person or $38,544 for a family of four after taxes (1). As new immigrants, my parents had a difficult time finding work related to their previous academic and professional training in Pakistan as it was not recognized. Thankfully, after an exhaustive search, my dad was fortunate in getting a factory job in Hamilton and moved our family accordingly. I spent the next few years of my life living in the inner-city Jamesville community in Hamilton where the majority of residents are visible minorities, where students are twice as likely to not finish high school when compared to the rest of the city, and where almost half of all children live in poverty (2). In addition, the residents of Jamesville were much less likely to have a family doctor, had a higher rate of emergency room visits, and had a lower life expectancy than the average Hamilton resident (2). While the relationship between poverty, education, and life expectancy is complex; one plausible explanation could be that living in these impoverished communities increases the likelihood that individuals might participate in health deteriorating behaviors such as substance abuse which could increase the risk of developing diseases that can cause premature mortality. As a child, I was oblivious to the realities of these neighbourhoods, and it is only as an adult that I am able to reflect back on and truly appreciate the dire circumstances my family endured and how incredibly thankful I am to be studying medicine at the University of Ottawa despite this upbringing.

A few years after moving to Hamilton, my dad was unfortunately laid off his factory job. As the main breadwinner of our family, he had a difficult time finding another job given his age and physical limitations. Despite my family's continued financial struggles, I was fortunate to be starting my first undergraduate degree at McMaster University in Kinesiology through government student loans. At this point in my life, I was unclear about what career path I wanted to follow, I did not have any mentors that I could reach out to for help, and I certainly had no idea of what the requirements were for getting into medical school. All I knew is that I had

Keywords: Medical school, medical school applications, medical education, undergraduate

a passion for helping others. Shortly after completing my first undergraduate degree, I wanted to help my family financially and began working at the Wharton Internal Medicine Clinic located in the heart of inner-city Hamilton. At this clinic, I was a part of an interdisciplinary healthcare team that designed a comprehensive lifestyle intervention program catered specifically to the needs of patients with chronic health conditions which are often exacerbated by a mixture of physiological, psychological, and sociological factors. Specifically, this clinical experience instilled in me the importance of displaying an empathetic attitude towards all patients, especially those who are marginalized. By actively interacting with these patients and their family members on a regular basis, I have had the opportunity to see the real face of medicine, its frustrations and above all, its joys. This clinical experience helped me recognize how rewarding interacting with patients can be on a daily basis and ultimately convinced me that becoming a physician was the right career path for me.

The combination of my personal, educational, and professional experiences motivated me to take the next logical step in pursuing a career in healthcare by applying to medical schools. Upon critically reflecting on my potential application for medical schools, I was certain that admission into a Canadian medical school at this time was unlikely given the grades of my first undergraduate degree, and my best chance of studying medicine would have to be abroad, which could potentially allow me to return to Canada for residency training in the future. Unfortunately, due to the fact that my family is classified as low income, my professional line of credit application to help finance my international medical education was denied by every single major bank in Canada. I acknowledge these rejections as a major turning point in my life; I decided to use this time to revaluate, and ultimately, refocus my attention on doing everything necessary to gain admission into a Canadian medical school. While my family's financial status restricted my opportunities, the affluent familial financial status of many other applicants is considered a strong predictive factor for admission into medical school (3). More specifically, an affluential familial background benefits prospective medical students by allowing them to take preparatory courses for the MCAT which allows them to score higher, hiring personal tutors to assist them with individual prerequisite courses for medical school, increasing the likelihood they personally know a recent or current medical student that can guide them through the nuisances of applying to medical schools, being able to finance international medical education options without the need of a professional line of credit, and etc. The combination of these factors and many more allows prospective medical students from affluent backgrounds to obtain a very competitive medical school application which increases their likelihood of admission. As a result, it is estimated that 52% of medical students in Canada come from households that make over $100,000 annually, which represents only 23% of Canadian households (4). On the other hand, only 15.4% of Canadian medical students come from a household income of less than $40,000, which represents roughly 39.7% of all Canadian households (5). In addition, Black and Hispanic medical students in the United States of America were also three times as likely to come from a familial income of less than $50,000 than their white colleagues (6). Thus, it became clear to me that it was more than just my grades that were potentially working against me on my journey to becoming a physician.

I continued on my journey to becoming a physician by enrolling into and completing the Master of Science in Global Health program at McMaster University which emphasised providing care to vulnerable populations around the world. However, even after completing an undergraduate and graduate degree, I understood my journey was far from complete and I needed to remain steadfast in reaching my goal. Accountability is a core competency of medicine, and I will be the first to admit that my academic performance of my first undergraduate degree was mediocre at best and I take complete responsibility for that. I knew that in order to be considered as a competitive applicant for Canadian medical schools, I would have to increase my undergraduate academic performance. Thus, I continued on my journey by completing a second undergraduate degree in Life Sciences at McMaster University with a near perfect GPA all while working to financially assist my family. Altogether, I had completed 6 years of full time undergraduate study, 2 years of part time undergraduate study, and 1 year of full time graduate study before my application for Canadian medical schools was deemed competitive.

On May 8th 2018, I was extremely fortunate in gaining admission into the University of Ottawa to study medicine. As an aspiring physician, I would love to make a positive impact on the lives of not only patients, but the community as a whole. In the future, I will focus my attention on communities where there appear to be a lack of medical facilities, so that vulnerable populations who are most in need of medical care are able to access it. Moving forward, it is important for medical schools across Canada to encourage applications from and subsequently matriculate marginalized students as the communities they come from tend to have some of

the worst health outcomes in Canada. By doing so, medical students from marginalized backgrounds will be more likely to relate to marginalized patients and subsequently will be able to build a stronger physician-patient relationship, which is one of the most important steps necessary in reducing the burden of disease in these communities (6). More specifically, a recent study found that increasing the number of Black medical students and physicians in the United States of America could help to reduce the national disparity between black men and white men in cardiovascular mortality by 19% (7). Furthermore, a simple way to encourage applicants from marginalized communities is to have academic health centers provide financial, educational, and healthcare resources for the residents that live in these communities (6). One specific example of such as a strategy has been implemented by Southern Illinois University School of Medicine which has mentored more than 1000 disadvantaged youth since 1972 who have subsequently matriculated into its own medical or dental school (6). In addition, medical schools that take an holistic approach to admissions which emphasises an applicant's background, experiences, and challenges on their journey to medical school in addition to academic excellence reported an increase in diversity amongst their medical students (8). As a whole, by using an holistic approach to admissions and by building partnerships with local marginalized communities, medical schools can help to increase the diversity of their medical student population which can subsequently allow them to move one step closer to successfully fulfilling their societal obligation by caring for the wellbeing of all members of society.

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Road Tripping across North America: A Medical Student's Perspective Trip

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ABSTRACT

This explorative report provides an overview of the experiences and insights of a Canadian medical student's seven-week, solo road trip across the United States and Canada. Enriched with stories of acute musculoskeletal injuries, close calls on the road, locksmith services and small-town celebrations, travel moments and mishaps are used to guide readers into personal insights. This distinctive narrative enables the inspection of meaningful themes which include emotional resiliency in medicine, rural emergency healthcare, personal relationships and travel privilege.

RÉSUMÉ

Ce rapport offre un aperçu des expériences et des idées tirées d'un voyage en solo de sept semaines, mené par un étudiant en médecine canadien à travers les États-Unis et le Canada. Enrichis d'histoires de blessures musculo-squelettiques aiguës, d'incidents de la route évités de justesse, de services de serruriers et de célébrations dans des petites villes, ces moments du voyage et les incidents sont utilisés afin d'inciter les lecteurs à refléter sur leurs propres perspectives personnelles. Ce récit distinct permet d'apprécier certains thèmes y inclus la résilience émotionnelle en médecine, les soins de santé d'urgence en milieu rural, les relations personnelles ainsi que le voyage en tant que privilège.

Spurred by the prospect of one final summer break, I decided to pursue photography and driving growth for the summer of 2019. This entailed putting aside all medical endeavors after the end of pre-clerkship on May 31st and committing to a solo United States-Canada road trip. Armed with hours of podcasts and Elton John's Greatest Hits, I took off from my hometown of Rothesay, New Brunswick on June 19th. With a rough travel itinerary, I stayed with family and friends in larger cities (e.g., Toronto, Chicago, San Francisco, Vancouver, Calgary), camped in protected parks (e.g., in Colorado, Utah, California, Alberta, Saskatchewan, Manitoba, Ontario) and boarded in cheap Airbnb accommodations (e.g., Lincoln, Denver, Las Vegas, Portland).

My seven-week road trip consisted of twelve U.S. states, seven Canadian provinces, twelve Na-tional Parks and thirty-seven gas tank fill-ups. The trip further included a total driving distance of 16719 kilometers which is equivalent to the direct distance between Melbourne, Australia and Ottawa, a walking distance of 522 kilometers on the iPhone Health App, one near-collision with a moose in Northwestern Ontario, one lost set of car keys and correspondingly the services of one Utah locksmith. It should be noted that one detail not included above was the elevated blood pressure of my mother during the weeks I was gone.

When I returned to Ottawa on August 5th, one of my friends asserted that "trips and travel allow us to grow in ways we could only have dreamed about." Being alone for most of the trip, I learned a lot about myself and my overall temperament. Even though I am not a life guru, as exemplified by past medical school rejections for lack of life experience, these are some of the lessons that I took away from my travels. So, prepare the imaginary campfire and smores because here we go.

Appreciating the Small Moments with People

While on the road, I largely felt comfortable being alone and pursuing my own self-interests. However, it was very gratifying when I used my small moments with strangers to create new conversations and the space for positive experiences. In this way, I had connecting moments with travelers and locals alike. From these interactions, it dawned on me that you interact with people for variable amounts of time in life. You may interact with some individuals for a brief second or minute within a café, gas station, hospital corridor or grocery store. With some individuals, your interaction may be extensive on the order of months and/or years (e.g., friends, colleagues, etc.). Irrespective of the length of interaction, all individuals deserve to be treated with the same dignity and respect. Equally to this point is expressing respect for our patients. Regardless of the clinical context, the length of clinical interaction or the patient's demographics (e.g., sex, race, socioeconomic status,

Keywords: person, wellness, humanities, resiliency, compassionate Care, healthcare sustainability, cimmunication

geographic location), we must provide respect, humility, professionalism and empathy to all our patients.

Things Will Not Always Go as Planned

In medicine, like the broader sense of life, things will not always go as planned or predicted (1). Despite the best medical care, procedures will elicit unexpected complications, patients will become suddenly unstable on the medical floor and patients will not always make full recoveries from diseases (2,3). Under these stressful circumstances, medical professionals must demonstrate flexibility, perseverance and emotional regulation in their care for patients (4). Incurring my own unanticipated situations on the road trip, I developed awareness of my emotional responses in stressful moments and the ways in which I can improve upon these shortcomings.

Before hitting the open highway, I prayed that my Honda Fit would hold up the entirety of the trip and that my essential valuables would not be misplaced (e.g., passport, phone, wallet, keys). Despite these high hopes, I did not foresee the following moments occurring on my trip:

1. I would have a near head-on collision with a moose on the highways of Northwestern Ontario between Winnipeg and Thunder Bay at midday.
2. I would lose my only set of car keys in the Virgin River of Zion National Park over the fourth of July weekend and totally ruin my mother's Sunday in the process.
3. Owing to an unmarked road condition change to gravel, I would scramble to prevent a rollover and control my car's severe fishtailing on a local Saskatchewan highway.

I reacted in a multitude of ways in these stressful moments: hopelessness and despair with the loss of my car keys, frustration with the unmarked Saskatchewan highways and anger with the unlikely moose encounter.

In high acuity medical situations, health professionals must obtain and interpret pertinent medical information to weigh treatment options for benefits and risks (5). Since emotional regulation can improve patient care in these stressful situations, the regulation of reactive emotions and the adoption of resilient emotions such as calmness, acceptance and resolve are necessary (6). Even though I was able to overcome these stressful travel situations, I did not effectively manage and suppress my undesired emotions in these moments. Reflecting in this manner, I must continue to work on the adaptation of my emotions under stress. Ultimately, stressful situations are inherent in medicine, thus, to effectively manage and process these situations, one must achieve emotional regulation.

Rural Emergency Healthcare

There were many moments on my road trip when the landscape had me shaking my head in amazement and completely speechless. These included the Rocky Mountains of Colorado, the rock formations of Utah, the massive Redwood trees of California, the seaside cliffs of the West Coast and the glacier water of Alberta. I gained a greater appreciation for the beauty of North America after seeing these spectacular natural wonders. Additionally, I also gained a greater understanding of the expansive rural North American land.

Although consensus varies on the exact numbers, rurality is defined as areas with minimal population size and density (7). With roughly 95% of North America's landmass considered rural, I drove through rural towns across the Plains, Prairies, Rocky Mountains and Northwestern Ontario (7,8). I must admit I fell in love with one rural town in Utah named Hanksville (population 220) after enjoying their ten-minute July 4th parade and straws of Pixy Stix candy.

These rural towns and their access to medical services were on the forefront of my thoughts when I visited San Francisco though. My friend dislocated her shoulder rock-climbing and was able to receive medical treatment at a nearby walk-in clinic within twenty minutes. This access to acute healthcare services would not have been as timely in the rural towns I visited as the majority of rural residents have to travel up to 120 kilometers to access a physician or nurse practitioner (9). This barrier leads to longer onset-to-imaging and onset-to-treatment times for rural patients in acute clinical situations compared to urban patients (10, 11). Consequently, rural patients have greater morbidity and mortality rates from these longer pre-hospital times (12).

Innovative approaches are needed to negate the inequitable access to emergency healthcare services and technology for rural patients. Greater investment into paramedic services in rural areas would improve ambulance networks, coordinate quicker ground transfers and increase the provision of advanced care on scene (13). Since rural emergency departments provide care on average to 15,000 patients a year, medical supplies and equipment should be standardized on patient volume and appropriately allocated across rural emergency departments (13, 14). Lastly, with rural emergency departments often distanced 150 kilometers from tertiary care centers, well-organized systems of inter-facility transfer and reception are needed for patient transports. This includes organized transport teams, early activation and mobilization pathways for the transport system and improved

multihospital communication upon transport activation (14,15). Fundamentally, these efforts will enable the provision of more equitable and improved emergency care for rural patients.

Valuing Time with Family and Friends

In a few of the bigger cities, I was able to trade in my camping gear to stay with friends and family members (e.g., former McGill classmates, my uncle and my sister). It was great to catch up with these loved ones over fun outdoor activities. However, I always felt sad saying goodbye and continuing my road trip because some of these individuals I had not seen or talked to in years. I typically wished I could have a few more days to continue reconnecting by delaying my future reservations. Reflecting on this now, I am extremely grateful and honored to have such people in my life that make me feel this way. These relationships give me a strong network of support in addition to my family and classmates closer in proximity to Ottawa. These relationships will be critical for my well-being and mental health during the strenuous hours of clerkship as they will be relied on during fourth-year medical electives. Beyond medical school, these relationships will foster psychosocial support to mitigate my work-related stress and prevent professional burnout (16). With that said, we must not forget to maintain and nurture the social relationships in life. Even though exhaustion might set in with work-related stress, interacting with family and friends will facilitate greater emotional satisfaction and reduce job isolation (17). It could be as simple as keeping friends and family updated with life activities.

Conclusion

When discussing this trip with my physician mentor, she remarked that this adventure was so important for me to experience "in order to have more empathy" for my patients. This resonated with me because my trip increased my self-awareness of my position in society. I am privileged to have been able to pursue such a trip. Many people are not able to travel in their lifetime due to significant financial insecurities, safety concerns, limiting health illnesses or family obligations. Given this new perspective, I now ask patients in a gentler way if they have recently traveled for my medical histories. I also reassure the patient it is okay to say "no" or I urge them we will strive towards travel in the future.

With that final reflection, that is the completion of my commentary as I hope it connected with you in a personal way! Of course, if you ever need playlist or podcast recommendations, you know who to ask. From my hours of solitude and unpredictable moments on the road trip, I was able to nurture greater emotional and leadership skills. I hope these advances will make me a better colleague and caregiver for my all future co-workers and patients.

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Peer-Led Point-of-Care Ultrasound: a Potential Ally to Rural Medicine

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ABSTRACT

Objective: Point-of-care ultrasound (POCUS) is increasingly used in rural settings where its portability and imaging capabilities make it effective clinically. POCUS teaching has traditionally relied on faculty instruction, which is limited by the small number of certified faculty members. The University of Ottawa POCUS interest group deployed peer-teaching in 2018, which overcomes the instructor barrier by employing experienced medical students to train pre-clerkship students. This paper will explore student perceptions around peer-led POCUS workshops as a learning format.

Methods: 3-hour POCUS workshops were held for cardiac, MSK, aorta, and eFAST scans from October 2018 to June 2019. Students with prior experience in POCUS were identified as peer-teachers and were trained by an expert physician prior to the workshop. Peer-teachers taught a small group, with physician experts rotating through groups for technical support.

Surveys were sent out to students who participated in the workshops assessing the following categories: utility, learning experience, workshop efficacy, tutor competence, and interest. Descriptive statistics and thematic analysis was reported for the quantitative and qualitative data, respectively.

Results: 45 participants completed the survey. The surveys showed positive support for the aforementioned categories, with the average score being greater than 4 on 5 on the Likert scale. From the thematic analysis, the four main strengths of the peer-led format were: trainer competence, learner comfort, situational teaching, and opportunity to practice.

Conclusion: Peer-led workshops are an effective format for POCUS training in instructor-constrained settings. These workshops can be translated to rural settings in lieu of a formal POCUS training program.

RÉSUMÉ

Objective: L'échographie ciblée (POCUS) est de plus en plus utilisée en milieu rural où sa portabilité et ses capacités d'imagerie lui confèrent une efficacité clinique. L'enseignement POCUS s'appuie traditionnellement sur la formation offerte par des professeurs, ce qui est souvent limité par le petit nombre de membres certifiés au sein du corps professoral. Le groupe d'intérêt POCUS de l'Université d'Ottawa a déployé l'enseignement par les pairs en 2018, ce qui permet de surmonter l'obstacle des instructeurs en embauchant des étudiants en médecine expérimentés pour former des étudiants au pré-externat. Ce document explorera les perceptions des étudiants sur les ateliers POCUS dirigés par les pairs en tant que forme d'apprentissage.

Méthodes Des ateliers POCUS de trois heures ont été organisés d'octobre 2018 à juin 2019 pour les examens cardiaques, MSK, aorte et eFAST. Les pairs-enseignants ont enseigné à un petit groupe, tout en présence de médecins experts afin d'obtenir du soutien technique. Des sondages ont ensuite été envoyés aux étudiants ayant participé aux ateliers afin d'évaluer les catégories suivantes : utilité, expérience d'apprentissage, efficacité de l'atelier, compétence du tuteur et intérêt général. Des statistiques descriptives et une analyse thématique ont été rapportées pour les données quantitatives et qualitatives, respectivement.

Résultats: 45 participants ont répondu au sondage. Les sondages ont montré un soutien positif pour les catégories mentionnées auparavant, le score moyen étant supérieur à 4 sur 5 sur l'échelle de Likert. D'après l'analyse thématique, les quatre principaux atouts du format dirigé par les pairs étaient : la compétence du formateur, le confort de l'apprenant, la mise en situation et la possibilité de pratiquer.

Conclusion : Les ateliers dirigés par les pairs sont un format efficace pour la formation POCUS dans des environnements soumis à des contraintes d'instructeur. Ces ateliers peuvent être conduits en milieu rural au lieu d'un programme de formation POCUS formel.

Keywords: Point-of-care Ultrasound, Innovation, Pre-Clerkship, Peer-Teaching

Throughout their careers, doctors continuously partake in mentoring roles while actively contributing to the education of medical students, residents and newly graduated physicians. This echoes the philosophy that medical education is based on the vertical transmission of knowledge from peers and colleagues, which provides a substantial portion of one's training. Hence, peer-teaching competency should be introduced early on in medical education.

Peer teachers are defined as individuals from similar social groupings, who are not professional pedagogues, that help each other to learn a specific subject while enhancing their own knowledge by doing so (1). Peer teachers in medical school are usually comprised of fellow students that have less knowledge than licensed physicians, with little to no formal teaching experience (2,3). Despite this, studies show that peer teaching has a positive impact on both tutors and tutees (2,3). Furthermore, a review concluded that knowledge transmission was similar whether students were taught by faculty or by peers (2). Peer teaching is also a prevalent didactic modality, with nearly 50% of American medical schools using it in their curriculum (4). Compared with conventional faculty members, peer tutors can more appropriately frame the complexity of their lessons around students' level of understanding (3,5–7), fostering a more comfortable and collaborative environment while connecting with students on a more personal level.

Historically, peer mentoring in medical education has been implemented for problem-based learning sessions, clinical skills teachings and in lectures (2). Recently, medical schools have started using this teaching paradigm for more novel subjects, such as point-of-care ultrasound (POCUS). POCUS is where clinicians scan patients at the bedside with ultrasound to aid in diagnosis. With recent advances in portability and affordability, POCUS is allowing clinicians from a wide array of specialties to use it at the bedside (8), allowing real-time imaging, with minimal risks to the patient (9). POCUS requires the ability to properly use the ultrasound machine, understand the patient's anatomy, effectively handle the ultrasound probe, generate adequate images and perform the proper interpretation of the images based on knowledge of ultrasound physics and internal anatomy. It is an advanced technical skill that historically required clinicians to complete intensive 30-hour ultrasound scanning workshops to become competent, along with years of experience performing scans to become an expert. POCUS is a hands-on skill, so it is difficult to master through didactic methods and is best taught in an interactive manner in a small group course. Historically, POCUS courses were led by POCUS competent clinical staff. However, there is a limited number of POCUS experts available so it may not be possible to leverage their expertise to run regular POCUS courses. The use of peer mentors for POCUS education has been proposed as a solution to decrease the number of physicians required for a teaching session, providing alternatives for faculty or resources-deprived settings such as the rural healthcare environment (10).

At the University of Ottawa, curricular exposure to POCUS is very limited. Consequently, the majority of the POCUS teaching was done in an extracurricular manner, with the newly created POCUS interest group that employed a peer-teaching approach. A recent scoping review evaluating the novel integration of POCUS in medical education found

Table 1. Open-ended Questionnaire Responses Categorized into Common Themes

Category	Theme	Number of comments	Examples
Positive feedback	Teacher competence	7	"The trainers were fantastic at demon-strating scans"
			"The peer-teachers were able to answer all my questions"
	Learner comfort	4	"I felt I was able to go at my own pace with no pressure to impress a physician"
			"The concepts were taught at an appropri-ate level"
	Situational teaching	4	"It was good to learn scans relevant to the systems we are study-ing"
			"Cardiac scans during cardiac block was a great idea"
	Opportunity to practice	3	"The teachers would stay as late as we needed them"
			"I felt like I had as much scanning time as I needed to get com-fortable"
Areas for improvement	Inadequate preparatory material	1	"I felt I would have learned better with more preparatory material"

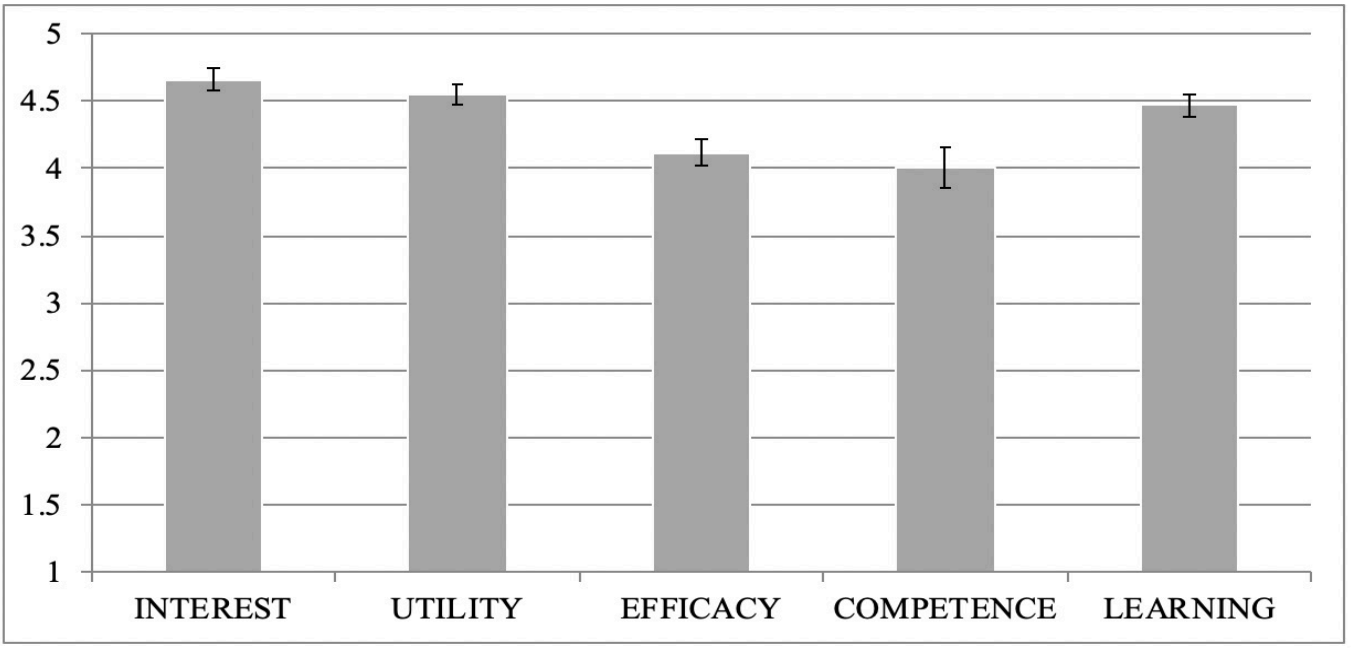

Figure 1. Likert scale questionnaire responses categorizes into common themes

seven studies (8,10–15) which revealed that the majority of designs consisted of clerkship (near-peer) students teaching pre-clerkship students. To our knowledge, studies evaluating pre-clerkship students teaching POCUS to other pre-clerkship students are very limited. Thus, we sought to evaluate the perceptions of students having been exposed to peer teachings during these workshops, where experienced pre-clerkship and clerkship students taught novice pre-clerkship students.

MATERIALS AND METHODS

Ethics

The Research and Ethics Board (Ottawa Heath Science Network) exempted this project as it was deemed a quality improvement study.

Peer-led workshops

Workshops were held for cardiac, MSK, aorta, and eFAST POCUS scans. The workshops were peer-led sessions with a train-the-trainer session held prior to the workshop. Students with prior experience in POCUS (completed POCUS courses/electives, attended POCUS conferences/competitions, recommended by expert physicians) were identified as eligible peer leaders by workshop organizers. The peer leaders were given preparatory materials and attended a train-the-trainer session led by a physician expert prior to the workshop. At these sessions; peer leaders were trained on the relevant scanning technique and instructed on how to teach workshop participants. All workshops identified in this study were led by peer leaders in years 2-4 of their medical training.

Students participated in 3-hour POCUS workshops. The workshop format consisted of a 30-minute large group seminar where they were lectured about the scans, followed by 2.5 hours of scanning sessions in a small group (4-6 people). The small group sessions were led by a peer-leader. To ensure quality control, 1-2 physician experts were also present at the workshops to rotate through the stations to address any inquiries that arose.

Perception Surveys

Surveys were sent to all students who attended a POCUS workshop retroactively by email using SurveyMonkey. Completion of the surveys was voluntary. The surveys assessed five primary categories: I) self-perceived utility of POCUS, II) efficacy of the peer-led format, III) competence of the peer-teachers, IV) learning experience, and V) POCUS interest and motivation. Each question was scored on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Quantitative analysis was performed and the mean, standard deviation, and confidence interval (alpha = 0.05) were calculated. Qualitative analysis was also performed using thematic analysis methodology. Key words in the open-ended comment survey responses by students were recorded into an electronic log book. A reviewer then grouped keywords into categories based on their similarity.

RESULTS

Participation

118 students attended at least 1 POCUS workshop during

the 2018-2019 academic year at the University of Ottawa. Perception surveys (n=45) were completed by participants for a 38% response rate. Seven participants attended one workshop, 14 participants attended two workshops, and 24 participants attended three or more workshops.

Quantitative analysis

Participants who attended the workshop strongly agreed (4.55 ± 0.07) that POCUS is a useful skill to learn during pre-clerkship, for use both as a clerk and as a physician. Participants also agreed (4.12 ± 0.10) that a peer-led format is effective for teaching POCUS and agreed (4.00 ± 0.15) that the peer-teachers running small-group sessions were competent to teach and perform POCUS scans. Participants strongly agreed (4.47 ± 0.08) that peer-led POCUS workshops increased their knowledge. Finally, participants strongly agreed (4.66 ± 0.08) that peer-led workshops increased both their interest in and their motivation to learn POCUS. These results are summarized in Figure 1. When survey responses were analyzed dependent on the number of workshops that participants attended, the same trends were observed in all three groups (see Figure 2).

Qualitative analysis

Adding open-ended comments was a recommended, but not mandatory, portion of the distributed survey to participants. Twenty-five open-ended comments were submitted. Of these, 24 discussed self-perceived strengths of the peer-led workshops, and one comment provided constructive feedback for future events. Thematic analysis highlighted four categories of positive feedback: trainer competence, learner comfort, situational teaching, and opportunity to practice. Participants felt confident that their peer-leaders had adequate knowledge and scanning skills to appropriately train them in POCUS. Participants also felt comfortable in the small-group session learning environment. Additionally, participants felt that the similar level of training between them and the peer-leaders helped tailor teaching in a beneficial fashion. Finally, participants felt adequate time to practice each skill was provided. Thematic analysis also highlighted one category of constructive criticism: 1) inadequate preparatory resources. Participants felt that they would have benefited from receiving learning material to prepare, prior to each workshop.

DISCUSSION

Previous studies at Harvard and McMaster University have shown that pre-clerkship medical students are able to learn POCUS effectively in small-group settings (16,17). The major advantage of this format is it maximizes the hands-on scanning time so that students can practice the techniques and understand the nuances of performing a scan. However, it is difficult to amass enough qualified faculty instructors to teach in a small group setting. Our approach mitigated the lack of instructors by employing a peer-led model comprised of experienced medical students leading the small group sessions. To ensure quality of instruction, the peer-leaders are trained prior to the session ("train-the-trainer") by a faculty expert. In order to maintain a high standard of quality assurance, there are faculty experts who rotate between small groups, helping with image interpretation and image generation while providing clinically relevant applications. Peer-led sessions are increasingly used in medical schools, and have been proven effective for teaching physical exam (18), procedural skills (11) and certain POCUS scans (19).

Results from our surveys show strong support for all 5 categories that were assessed: I) self-perceived utility of POCUS, II) efficacy of the peer-led format, III) competence of the peer-teachers, IV) learning experience, and V) POCUS interest and motivation. Positive perceptions were independent of the number of workshops attended (1 to 3+). Our data shows that our peer-led small group sessions with a rotating expert is an effective method for teaching POCUS to novice learners. Workshop participants were pleased with the learning experience and found the peer-leaders to be technically competent and effective teachers. Our data is consistent with previous studies where peer teachers are rated as effective teachers (14). A teaching strength of peer teachers is their familiarity with the curriculum and ability to tailor teaching towards the student's current knowledge (19). Participants received ample hands-on scanning time, which is a major advantage of small group format, without compromise to the instruction quality. Participants reported increased knowledge in POCUS, motivation to seek out further training and a willingness to use POCUS in clinical settings. Our results match up with previous studies which show how peer teachers can increase POCUS knowledge on par with clinical staff (10). Therefore, peer-led workshops are a resource-effective teaching approach which leads to a positive learning experience, while overcoming the barrier of limited availability from faculty instructors.

Minimal access to a proper ultrasound curriculum is a challenge in rural healthcare settings, where geographical barriers lead to a shortage of certified ultrasound instructors and access to an ultrasound course. Peer-led workshops can be used to

provide ultrasound training to novice practitioners in these settings. A possible format could involve peer-led workshops with an expert available through videoconference, where the most experienced person(s) can train their colleagues with a POCUS expert (who are generally based out of tertiary care centers) available through video link. Videoconference approaches have been used effectively to train healthcare professionals, overcoming geographical barriers (20–22). As learners become proficient, they can become peer-leaders which will propagate and sustain POCUS education in isolated communities. The same phenomenon has occurred at our medical school where some workshop participants developed competency with POCUS and started teaching their colleagues.

Participant feedback on workshops was generally positive. As previously mentioned, four overarching themes were identified through qualitative analysis (see Table 1). The first is that learners felt more comfortable when taught by peers than by expert physicians. Previous studies have reported that peer-led workshops increased learner comfort. In OSCE preparation near-peer workshops, participants reported that learning was more relevant to assessment, at an appropriate level of difficulty and delivered in a less threatening environment than other methods of teaching (23). Secondly, survey respondents reported that they felt the trainers were highly competent in POCUS. This has been a topic of increasing interest in the medical community over the last five years (8,24). It has been shown that medical students are able to retain knowledge learned in POCUS workshops longitudinally (24), which supports the conclusion that these students will have the knowledge base required to teach others.

Participants also reported the theme of useful situational teaching, which refers to synchronizing the topics of our ultrasound workshops with the corresponding system being taught at the time in the undergraduate medical curriculum. For example, the cardiac POCUS workshop was given at the same time as the cardiac block, ensuring that students had basic anatomical and physiological knowledge of the heart. Research at the University of Ottawa has shown that situational system-by-system teaching can be useful in POCUS (24), which supports our participant observations. This has implications in rural settings where workshops can be catered to the needs of the rural team. Lastly, participants identified that ample practice time was provided to learn each POCUS skill. This is an important finding as recent research has shown that deliberate time for dedicated practice in POCUS is a requirement for adequate POCUS performance in medical practice (25).

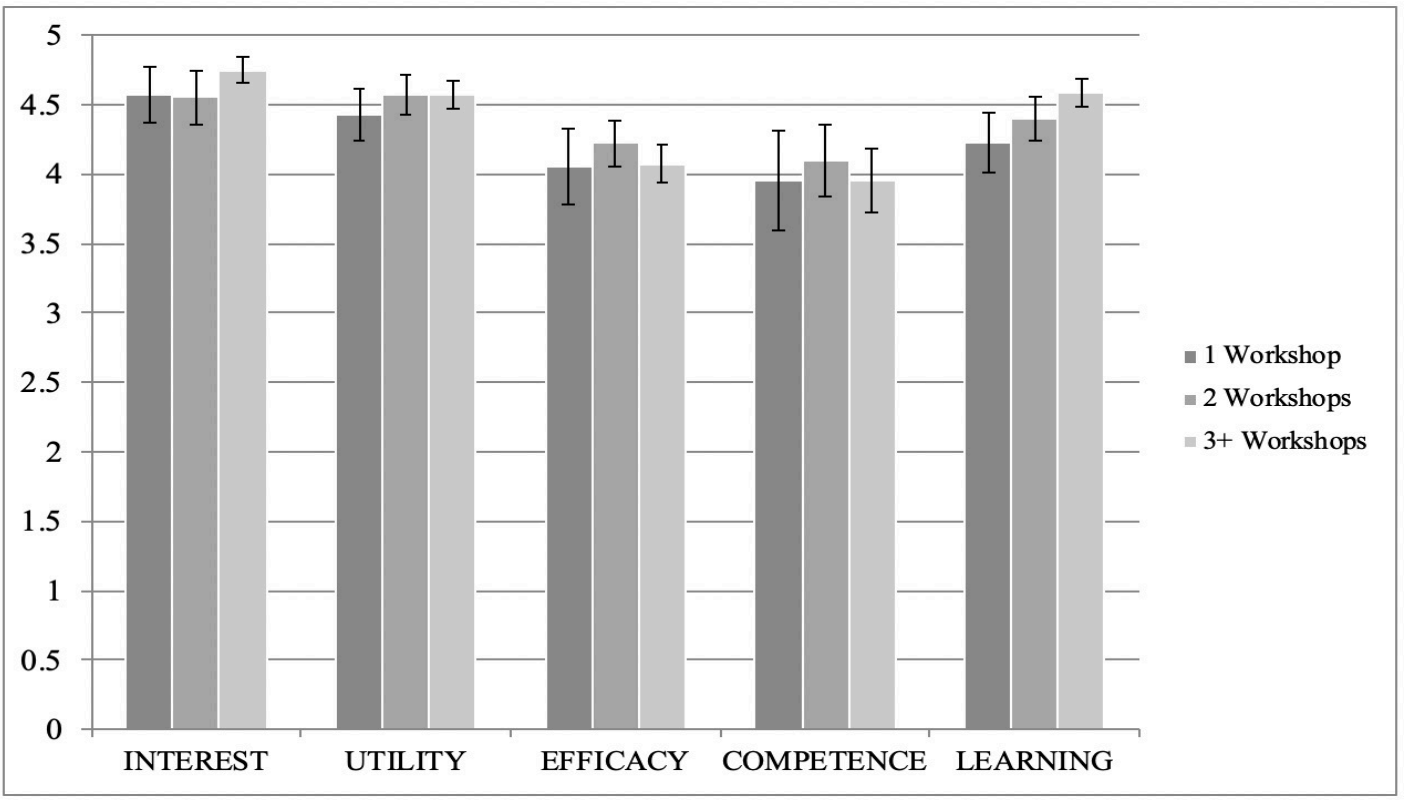

Figure 2. Likert scale questionnaire responses categorizes into common themes, dependent on number of workshops attended

A final theme identified by participants was that preparatory resources were not provided prior to each workshop. Research at the University of Ottawa has shown that workshop participants show strong appreciation for pre-class preparation activities (26), as well as interactive, engaging small group activities. While our peer-led POCUS workshops demonstrated interactive, engaging small group activities, future work will aim to include preparatory material, as well as to assess participant satisfaction with these changes.

Rurality and POCUS

By enhancing diagnostic accuracy and streamlining management (27), the integration of POCUS in healthcare has been shown to improve patient safety (28,29). Furthermore, several medical associations have recognized POCUS as a standard of care (30,31). With a strong rationale for implementation, it is therefore not surprising that a recent Canadian study showed that POCUS use and training have increased over the last ten years (32). In parallel, POCUS' clinical implementation, as an extension of the physical exam in rural medicine is steadily increasing (33). This is reflected by the recent surge of generalist/specialist and rural health care facilities purchasing POCUS equipment (34–36). Thus, with limited access to other formal imaging diagnostic modalities, POCUS has become an attractive ally to rural medicine.

A recent study evaluating rural POCUS' safety and impact on patient management found that rural physicians correctly diagnosed their patients approximately 90% of the time when diagnoses were compared with the results of formal imaging techniques (33). Furthermore, 87% of the POCUS scans improved diagnostic certainty, heightening physician confidence (33). POCUS also decreased hospital admission or patient transfer to urban centers (33). Similarly, another recent study revealed that 87% of patients, which included trauma casualties, patients with shock and patients with cardiorespiratory presentation, had their management changed after a pocket-sized bedside ultrasound assessment was done in a rural hospital (37).

Despite these promising findings, a study found that 3% of rural POCUS scans had the potential to unintentionally harm patients (33). Thus, this clinical adjunct is not without risk, as maintenance of knowledge and scanning techniques can be difficult in resource-scarce environments. This underscores the need for an ongoing POCUS training program in rural settings, ensuring that practitioners are adhering to high-quality and safe scopes of practices. Certain techniques such as peer-led workshop can therefore be used to make sure rural physicians with limited access maintain their skills.

Peer-led and rurality

With bedside ultrasound being incorporated in a wide array of specialties, several Canadian medical schools have started to implement POCUS in their curriculum (38). Despite this, certain barriers still exist around the technology's use in rural setting. As a recent Canadian study concluded, quality assurance and an inability to maintain skills were major impediments to POCUS use in rural settings (39). Peer-led POCUS workshops are a solution to this problem by empowering local experts, who in turn catalyze the training, continuity of skill and ultimately the confidence of their peers. In turn, this model then ensures knowledge sustainability and POCUS clinical expansion. Furthermore, the peer leader does not need to be a traditional sonographer, as generalists and nurses have demonstrated diagnostic exactness after short training sessions (40).

Additionally, early exposure to ultrasound training workshops in pre-clerkship years has been shown to be an effective teaching intervention for the acquisition of image generation (41–46) and interpretation (16,41,47,48) skills. This early exposure, coupled with longitudinal POCUS training have the potential to increase rural physicians' confidence to perform bedside ultrasonography, mitigating a major barrier.

Limitations

While the advantages of near-peer POCUS teaching have been highlighted, this appraisal of near-peer POCUS is not without its drawbacks. While we have highlighted the disadvantages of peer leaders over clinical staff, this investigation provides no evidence to compare the two objectively. Future work will aim to quantify this comparison in a more formal and objective fashion. Furthermore, many of the conclusions reached are based on subjective assessments of learning, without the use of a validated knowledge assessment tool. For this reason, the ability to objectively compare this study to others of similar design will be impaired. Lastly, with a response rate of 38%, a selection bias might have been present. It is possible that students experiencing more positive outcomes stemming from the workshops night have contributed to a larger portion of the study participants, due to their enthusiasm and appreciation of the clinical sessions.

Peer-led teaching has its drawbacks. Compared to clinical staff,

peer tutors do not have the experience to point out the clinical relevance of scans, perform scans on technically challenging patients or interpret abnormal or normally variant images. We mitigated these drawbacks by having clinical staff rotate through the different tutorial groups to address any technical inquiries or shed light on the clinical relevance of certain scans.

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The Role of Learning Styles in the Evolving Landscape of Medical Education: the Canadian Plastic Surgery Experience

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ABSTRACT

Objective: The transition to competency-based medical education and restraints on trainee work hours necessitates re-evaluation of resident education. As is the case in many programs, the role of learning style in plastic surgery residency training has not yet been investigated. The objective of this study is to identify the learning styles of plastic surgeons and trainees in Canadian Plastic Surgery programs.

Methods: A cross-sectional electronic survey was distributed to all members of the Canadian Society of Plastic Surgeons. Basic demographics were captured. Further, the Kolb Learning Style Inventory was used to identify each individual's learning style as either converging, accommodative, assimilative, or divergent.

Results: There were a total of 98 respondents (15% response rate), including 62 staff plastic surgeons (63%) and 36 trainees (37%). All regions of Canada and age categories were well represented. The most dominant learning styles were convergent (47%) and accommodative (29%). No significant difference in dominant learning styles existed between age groups; while males were more commonly convergent learners, females were more likely to be accommodative learners.

Conclusion: The majority of plastic surgery trainees and staff have learning styles that rely heavily on practical application and experiential learning. Accounting for this propensity towards convergent and accommodative learning styles should be incorporated into training programs to maximize efficacy of learning.

RÉSUMÉ

Objectifs: La transition vers une éducation médicale basée sur les compétences et les contraintes sur les heures de travail des stagiaires nécessite une réévaluation de la formation des résidents. Comme dans de nombreux programmes, le rôle du style d'apprentissage dans la formation au niveau de résidence en chirurgie plastique n'a pas encore été étudié. L'objectif de cette étude est d'identifier les styles d'apprentissage des chirurgiens plasticiens et des stagiaires dans les programmes canadiens en chirurgie plastique.

Méthodes: Un sondage électronique transversal a été distribué à tous les membres de la Société Canadienne des Chirurgiens Plasticiens. Les données démographiques de base ont été recueillies. De plus, l'inventaire des styles d'apprentissage de Kolb a été utilisé pour identifier le style d'apprentissage de chaque individu en tant que convergent, accommodateur, assimilateur ou divergent.

Résultats: Au total, 98 personnes ont répondu (taux de réponse de 15%), dont 62 chirurgiens plasticiens (63%) et 36 stagiaires (37%). Toutes les régions du Canada et toutes les catégories d'âge étaient bien représentées. Les styles d'apprentissage les plus dominants étaient convergent (47%) et accommodateur (29%). Aucune différence significative dans les styles d'apprentissage dominants n'existait entre les groupes d'âge; tandis que les hommes étaient plus généralement des apprenants convergents, les femmes étaient plus susceptibles d'être des apprenantes accommodatrices.

Conclusion: La majorité des stagiaires et du personnel en chirurgie plastique ont des styles d'apprentissage qui reposent largement sur l'application pratique et un apprentissage par expérience. La prise en compte de cette propension à adopter des styles d'apprentissage convergents et accommodateurs devrait être intégrée aux programmes de formation afin de maximiser l'efficacité de l'apprentissage.

Keywords: Learning style, Medical education; Experiential learning; Kolb Learning Styles

With all Canadian residency programs transitioning to competency-based medical education (CBME) by 2022, stricter enforcement of work hour regulations, increasing knowledge expected of trainees and Royal College examinations being moved earlier in training, it is ever more important to re-evaluate and optimize the delivery of resident education to ensure learners have acquired the required knowledge in less time (1-6). How learners internalize information through their learning style influences their knowledge and skill acquisition (5, 7-9). Therefore, tailoring the curriculum to the predominant resident learning styles can maximize the efficiency and efficacy of educational delivery (5, 9).

The Kolb Learning Style Inventory (LSI) was first proposed in 1984 and is a validated method to help identify how people learn (10). Its application in medicine and other disciplines has allowed for international refinement and improvement of educational delivery methods (2). The Kolb LSI categorizes individuals into one of four styles: convergent, accommodative, assimilative, or divergent (Figure 1). Convergers are problem solvers who use practical application and deductive reasoning and tend to prefer technical tasks. Accommodators are experientially driven, learning through action and experimentation. They rely on the analysis of others, and act on instinct. Assimilators prefer clear explanations and theoretical knowledge and are adept at organizing wide-ranging information into logical and concise ideas. Divergers view problems from multiple perspectives, solve problems through brainstorming use brainstorming to solve problems and prefer observation to action (1, 6, 9).

Research using this inventory in medicine has shown that learning styles vary considerably between specialties, residency programs, and years of medical training (1, 4, 11-13). Disciplines of medicine tend to cluster towards certain leaning styles. For example, Internal Medicine is typically dominated by assimilative learning style, while surgical residents are more likely to be convergent learners (1). Currently, research is sparse surrounding the specific learning styles of plastic surgery trainees and attending surgeons.

The objective of this study was to identify the learning styles of plastic surgery trainees and attending physicians in Canadian Plastic Surgery programs. Understanding the learning style of residents and staff will give program directors and curriculum designers valuable guidance to help optimize education delivery during curriculum redesign in accordance with CBME. The implementation of rituximab in chemotherapy protocols has also been studied in pediatric Burkitt's lymphoma populations and a recent randomized controlled trial showed favourable results (13). This international study randomized 600 patients with high-risk B cell non-Hodgkin's lymphoma to standard Lymphome Malins de Burkitt (LMB) chemotherapy with or without the addition of rituximab. A planned interim analysis including 310 randomized patients, of which 85% had Burkitt's lymphoma, showed a 1-year event-free survival rate of 94% in the rituximab group, compared to 81% in the standard chemotherapy group. This finding led to an early closure of the study as the rituximab arm had significantly improved outcomes, confirming that this drug's efficacy also extends to the pediatric population.

MATERIALS AND METHODS

A web-based anonymous survey was distributed between November 2016 and February 2017 to 667 attending surgeons and trainees (residents and fellows) who are current members of the Canadian Society of Plastic Surgeons. Study rationale, participant eligibility and informed consent were outlined in a recruitment letter. Participant demographics included sex, age, region, and year of residency or years in practice. The regions were defined as Atlantic (New Brunswick, Prince Edward Island, Newfoundland and Nova Scotia), Central (Quebec, Ontario), and Western (Manitoba, Albtera, British Columbia). The electronic survey was developed using the existing validated Kolb Learning Style Inventory (9). Following completion of the survey, each participant received a description of their individual learning style.

Data was exported to a Microsoft Excel (Microsoft® v. 14.5.6, Redmond, Washington) data sheet that was prepared a priori. Univariate descriptive analysis was performed for all variables and bivariate analysis was also completed. The survey was distributed using Opinio Survey Software (Object Planet, Oslo, Norway). SPSS version 24 was used for all statistical analyses (IBM SPSS Statistics, Armonk, NY, USA). This project received institutional ethical approval by the Dalhousie University Research Ethics Board (File No. 2016-3914).

RESULTS

Demographics

A total of 98 plastic surgeons and trainees responded, with an overall response rate of 15%. Demographic characteristics are detailed in Table 1. Of the respondents, 62 were attending plastic surgeons (63%) and 36 were trainees (37%). Sixty five

percent of respondents were male. There was representation from all regions (Atlantic, Central, Western) and age categories (20-70 years), with approximately 70% of respondents below the age of 50. Respondents in training and early practice (26-40 years) accounted for approximately half of respondents (52%).

Table 1. Demographic characteristics of Canadian plastic surgery staff and trainees responding to a learning based survey (N=98).

Characteristic	Frequency (%)
Gender	
Male	64 (65)
Female	31 (32)
Declined to answer	1 (1)
Age	
20-25	2 (2)
26-30	21 (21)
31-35	17 (17)
36-40	13 (13)
41-45	5 (5)
45-50	10 (10)
51-55	9 (9)
56-60	12 (12)
61-65	7 (7)
66-70	2 (2)
Training Region	
East	13 (13)
Central	46 (47)
West	37 (38)
Year of Training	
1	4 (4)
2	7 (7)
3	8 (8)
4	3 (3)
5	5 (5)
Fellow	9 (9)
Staff	68 (69)
Years as Staff (Staff Only)	
0-5	14 (22)
6-10	5 (8)
11-15	13 (21)
16-20	10 (16)
21-25	7 (11)
>25	13 (21)

Learning style

Table 2 and *Figure 2* detail the dominant learning styles of both trainees and staff. The overall dominant learning style was convergent (47%) followed by accommodative (28%), which was consistent when comparing learning styles between trainees and attending surgeons. This calculation does not include 12 participants who had a tie between two dominant learning styles. The least common learning style was divergent (4%).

There was no significant variation in dominant learning style when compared to age ($p>0.05$). The dominant learning style differed between sexes ($p<0.05$) as males more commonly were convergent learners whereas females were more often accommodative. However, when individuals who tied for dominant learning styles were considered, females had equal convergent and accommodative dominance.

DISCUSSION

In a climate of increasing knowledge expected of residents, transition to CBME and Royal College examinations being held earlier in training than previously, it is more crucial than ever to optimize plastic surgery residency curricula. The way residents learn and internalize information should be incorporated into training style. Our study reveals that among plastic surgery trainees and attending surgeons, the most dominant learning styles were convergent and accommodative.

Table 2. Dominant learning styles of plastic surgery staff and trainees (N=98).

Variable	Frequency (%)
Staff Plastic Surgeon (n=62)	
Convergent	29 (47)
Accommodative	17 (27)
Assimilative	5 (8)
Divergent	4 (6)
Accommodative/Convergent	3 (5)
Assimilative/Convergent	3 (5)
Accommodative/Divergent	1 (2)
Resident/Fellow (n=36)	
Convergent	17 (47)
Accommodative	11 (31)
Assimilative	3 (8)
Accommodative/Convergent	3 (8)
Assimilative/Convergent	1 (3)
Accommodative/Divergent	1 (3)

To optimize the likelihood of knowledge retention, residency programs should aspire to create curriculums that are tailored to the way their residents learn (7). Similar to other surgical specialties, this study demonstrated a predominance for convergent and accommodative learning styles among residents (1, 2, 4-6). With this knowledge, utilizing teaching strategies that play to the strengths of these learning styles will improve learning. Additionally, implementing Kolb LSI assessments within training programs will identify group learning dynamics and provide attendings with the ability to understand a trainee's preferred learning method (14). In cost-conscious training programs, understanding the learning dynamics of the group can guide the selection of the most appropriate and ultimately cost-effective means of curriculum delivery. For example, regular integration of experiential learning may favour lasting knowledge retention and technical skill development in surgical trainees (15-17). Practical examples of experiential learning include case-based or problem-based scenarios, videos, practical simulation, cadaver or model-based skills labs, and practice oral examinations. Table 3 illustrates teaching strategies that are best matched to learning style, which demonstrates what didactic lectures can most effectively be replaced or augmented with. Within the CBD framework, integrating simulation and/or cadaver labs into surgical residency curricula could also potentially be used to help residents achieve required Entrustable Professional

Table 3. Methods of teaching that best compliment the four Kolb learning styles.

Kolb Learning Style	Characteristics	Teaching Strategies To Compliment Learning Style
Converging	- Problem-solver - Practical - Deductive reasoning - Prefer technical tasks	-Assessing clinical literature - Oral examinations - Case presentations - Simulation
Accommodating	- Learn from experience and experimentation - Instinctual	- Simulation - Cadavers/models - Problem-based learning
Assimilating	- Rely on theoretical knowledge - Information organization and categorizing - Logic	- Simulation - Problem-based learning - Textbook learning
Diverging	- Learn by observation and reflection - Brainstorm	- Simulation - Group work - Directed feedback

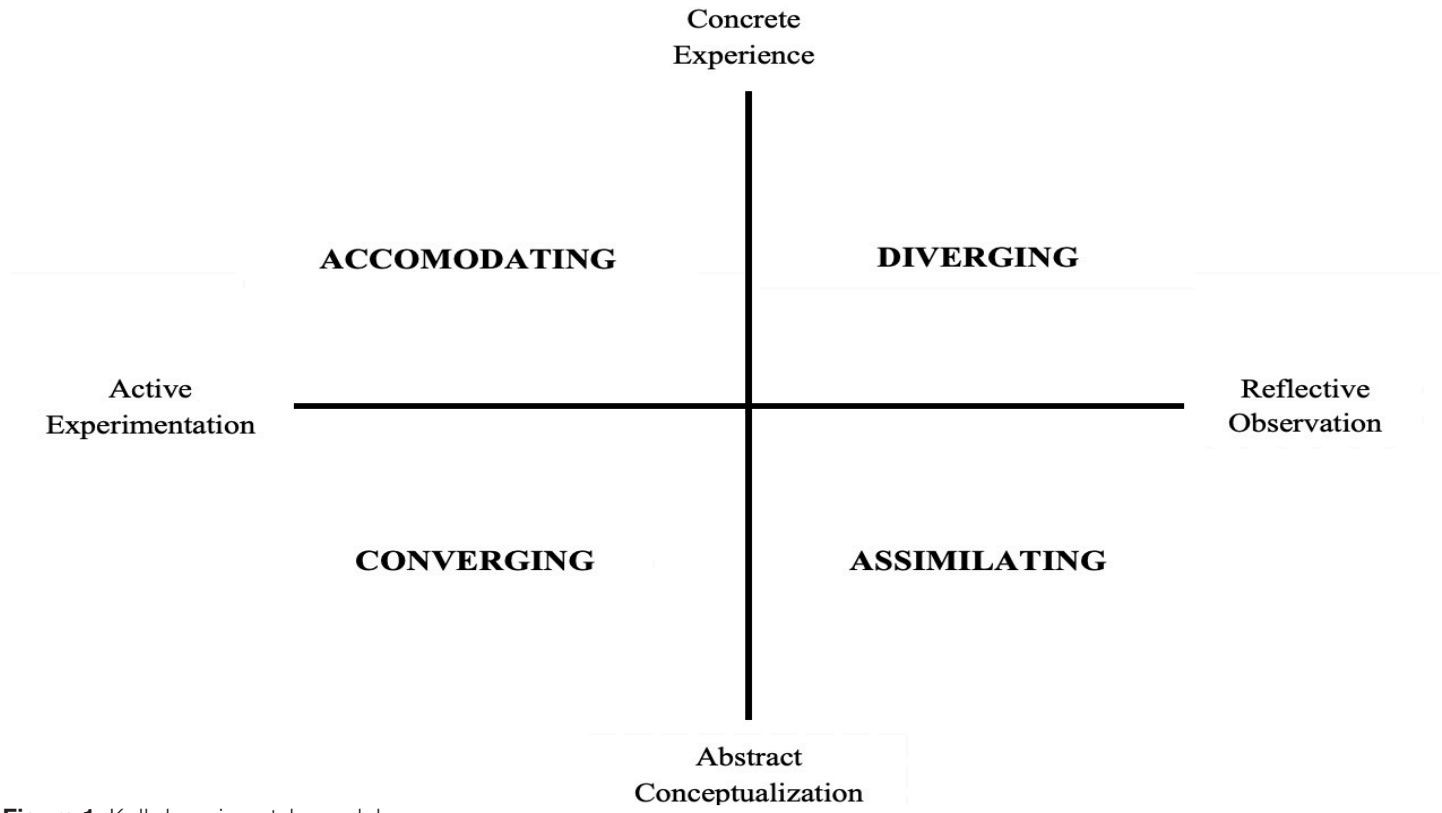

Figure 1. Kolb learning style model.

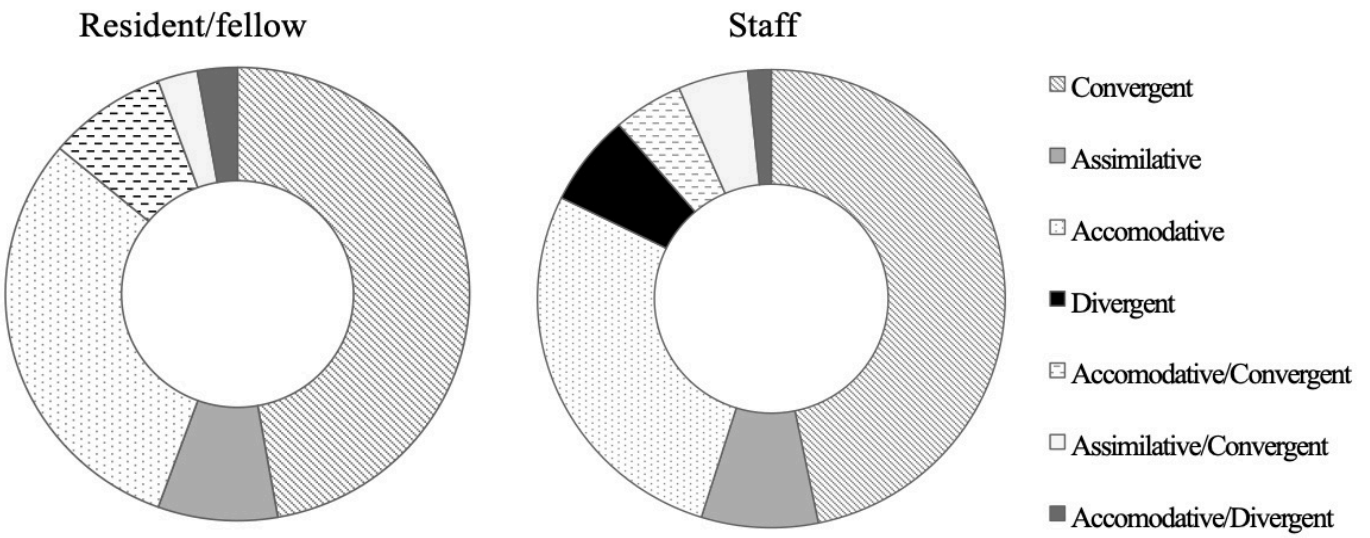

Figure 2. Learning styles of Canadian plastic surgery staff and trainees responding to a learning based survey (N=98).

Activities. Divergence from traditional didactic instruction can be seen beyond residency education. Teaching through videos, most preferred by convergent and accommodative learners, has been increasingly incorporated into academic journals and articles (18). Transitioning to teaching strategies that reflect trainee learning styles will likely prove a more efficient investment of time and energy than a heavily didactic curriculum. Several studies have looked at these instruction methods in medical and surgical residency training and found favorable results (15, 16). These studies showed that integration of practical learning improves initial performance as well as long-term skill retention compared to traditional didactic sessions (15-16). Teaching to trainee learning style may require additional training for existing surgeons. This could be accomplished either as its own workshop or integrated into weekly Divisional rounds presented to both faculty and residents in an effort to build a current and future culture of optimized teaching. Furthermore, since past (attending surgeons) and present trainees share convergent and accommodative learning styles, curriculums incorporating practical learning will likely be effective in future generations of learners.

Review of the literature reveals that no studies that specifically assess the role of dominant learning style in plastic surgery training exist. Research in other disciplines, however, has shown similar results to our study. Similar investigations of general and orthopedic learning styles found that medical school applicants, residents, and attending surgeons most commonly had a convergent learning style (4, 6, 12, 23). The same was found among neurosurgical residents. Interestingly, however, neurosurgical staff physicians showed a stronger preference towards assimilative learning compared to trainees (14). The authors surmised that this may be due to staff having a more mature process of learning, by which they compare new learning in the context of previous successes and failures (14). Regardless of surgical specialty, it is clear that the dominant style of learning is convergent from trainees to surgeons. However, this does not mean that the remaining trainees with divergent or assimilative learning styles should be forgotten. Providing reading resources ahead of experiential learning opportunities followed by group discussions reviewing learning points, tips, and unexpected difficulties after the exercise will similarly favour knowledge retention in divergent and assimilative learners.

A potential new avenue of education delivery that is expected to complement the predominate surgical learning styles is the use of virtual reality (20-22). The American College of Surgeons has recently implemented an approach to general surgery training through computer-based simulations in three phases: skill training, procedure training, and team training (20). While the same approach, to the best of our knowledge, has not been implemented in plastic surgery training, it is an area worth investigating. When relating virtual reality training to learning style, convergent and accommodative learners would benefit substantially from virtual reality training because it complements their ability to improve through abstract comprehension and learned experiences (23). While virtual reality poses a potential role in surgical residency training, the literature has not fully elucidated its benefits (24). Future studies investigating the role of virtual reality training

in plastic surgery training should incorporate learning style as a variable of comparison.

Upon careful review, our study does have some limitations. The response rate of 15% is low by survey standards. Despite this, our survey was able to capture data from all training programs across Canada with a wide variation in both age, sex and level of training. This leads us to believe that our results can still be generalized despite the low response rate. As we examined only plastic surgery trainees and attending surgeons in Canada, our results are not generalizable to other surgical specialties or other countries. However, our results do echo those found in studies in other disciplines. Utilization of the Kolb LSI is also limited by the inherent limitations of the model including, primarily, that some people may not neatly fit in one of the four learning styles. In our study we found that a minority of respondents had equally dominant learning styles.

CONCLUSION

The current state of residency curriculum re-design that will occur in preparation for CBME offers and necessitates the opportunity for optimizing post-graduate medical education. Currently, 75% of plastic surgery trainees and staff have learning styles that rely heavily on practical application and experiential learning. Teaching methods that are tailored to these learning styles should be incorporated to improve knowledge acquisition and cost efficiency. Further research is needed to explore new educational methods that are suited to these learning styles.

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Bittersweet: Fournier's Gangrene and SGLT2 Inhibitors

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ABSTRACT

Type 2 diabetes mellitus is a chronic metabolic disorder associated with a high risk of adverse outcomes, notably cardiovascular disease, with an increased risk of death. There is a growing armamentarium of therapies with Health Canada approved cardiovascular benefit, including two from the sodium-glucose co-transporter 2 (SGLT2) inhibitors class, namely canagliflozin and empagliflozin. Despite their many advantages, the Food and Drug Administration (FDA) issued a black box warning for associated necrotizing fasciitis of the perineum in diabetes treated with SGLT2 inhibitors. This case report highlights a case of Fournier's gangrene (FG) in a male with type 2 diabetes treated with empagliflozin.

RÉSUMÉ

Le diabète du type 2 est une maladie métabolique chronique associée avec nombreuses atteintes défavorables, notamment les maladies cardiovasculaires avec un risque accru de mortalité. Il existe nombreuses thérapies offrant des avantages cardiovasculaires, dont deux provenant de la classe des inhibiteurs du sodium-glucose cotransporteur 2 (SGLT2). En dépit de leurs nombreux avantages, l'Agence américaine des produits alimentaires et médicaments a émis une alerte sur le risque de fasciste nécrosante périnéale avec l'utilisation des inhibiteur SGLT2. Cette étude de cas met en évidence un cas de gangrène de Fournier (FG) chez un homme avec le diabète traité avec l'empagliflozine.

A 49-year-old male, with well-controlled diabetes, presented to the emergency department with progressive pain over his buttock and perineal region that rapidly progressed over the course of four days. This started as a small pustule that ruptured spontaneously. The erythema progressed very quickly along with pain felt as pressure. His presentation was associated with fever, general malaise, decreased oral intake and one day of loose stools. Two days prior, he had been seen at an after-hours clinic and was prescribed a course of cephalexin for presumed balanitis.

His medical history included type 2 diabetes mellitus, with an HbA1C of 7.1% six months prior, hypertension, dyslipidemia, and erectile dysfunction (using a penile pump device for several years). He was being followed by the diabetes clinic with a regimen consisting of insulin glargine 70 units, empagliflozin 10 mg, sitagliptin 100 mg, and metformin 1000 mg b.i.d. Empagliflozin was started a year prior at which time the long-acting insulin was decreased by 30 units. Socially, he was a lifelong smoker with a 40-pack year history, a non-drinker, and denied the use of illicit drugs.

On review of systems, the patient did not endorse any dyspnea, cough, chest pain, abdominal pain, or urinary symptoms. On examination, he was found to have an oral temperature of 36.6°C, a pulse of 100 beats per minute, blood pressure of 91/56 mm Hg, respiratory rate of 16 breaths per minutes, and an oxygen saturation of 100% on room air. The physical examination was notable for erythema of the perineal region bilaterally, which was more prominent on the right side. There were areas of induration and crepitus with exudate noted near the anus. The area was very tender to palpation and extended beyond the outlined erythematous skin.

Initial laboratory values were notable for leukocytosis, with a white blood cell count of 20.3 x 109/L and a neutrophil and monocytic shift, a normal hemoglobin of 162 x 1012 g/L, a baseline elevation of creatinine at 146 mmol/L, a urea of 9.0 mmol/L, and a normal lactate of 1.8 mmol/L. The bicarbonate was slightly elevated at 29.3 mmol/L, sodium was 133 mmol/L, potassium was 4.1 mmol/L, and random glucose was 13.7 mmol/L. A CT scan was requested and revealed evidence of Fournier's gangrene (FG) (Figure 1).

An urgent surgical early debridement was performed on the same day of presentation and diagnosis was confirmed through tissue sampling. On day 1, the patient was started on piperacillin-tazobactam, clindamycin, and vancomycin, and was admitted to the intensive care unit for close monitoring.

Keywords: SGLT2 inhibitors, Fournier's Syndrome, pharmacotherapy, medication adverse effects, urology

The right buttock pus microbiology revealed a growth of mixed anaerobic flora, including heavy growth of Bacteroides ovatus, and no aerobic growth.

On day 5, a laparoscopic diverting loop colostomy was performed due to the proximity of the debridement to the anus. The penile prosthesis was not involved and was left in situ. The patient was discharged home on day 15 and was seen by plastic surgery approximately 2 weeks later, who devised a plan to continue using the vacuum-assisted closure (VAC) device for wound management.

DISCUSSION

Sodium-glucose cotransporter 2 inhibitors are a class of oral anti-glycemic agents introduced in 2013 after the re-discovery of a French chemist's experiments on a compound isolated from the root bark of an apple tree called phloridzin (1). This class of drug acts by inhibiting glucose reabsorption in the proximal renal tubule (2). They are reliable and effective given their insulin-independent mechanism that promotes urinary glucose excretion without increasing the risk of hypoglycemia. Additional benefits comprise of a 2 to 3 kg weight loss, a reduction in systolic and diastolic blood pressure of approximately 5 and 2 mmHg respectively, an alteration in lipid profiles including a reduction in triglycerides and an increase in HDL cholesterol, as well as a reduction of albuminuria by 30 to 40% (2). Recent trials have also demonstrated cardiovascular benefit with regards to certain SGLT2 inhibitors which is of great benefit given the two to fourfold increase risk of cardiovascular disease in patients with diabetes (3). Notably, the EMPA-REG and CANVAS trials showed a significant reduction in the primary endpoint of mortality associated cardiovascular events (MACE) and heart failure with empagliflozin and canagliflozin, respectively (4,5). DECLARE-TIMI58 revealed a reduction in heart failure hospitalizations with dapagliflozin in both secondary and primary prevention (6). The long-term effects of ertugliflozin on cardiovascular outcomes are currently being assessed in the VERTIS-CV trial (7).

However, in August 2018, the FDA issued a black box warning linking SGLT2 inhibitor therapy to FG and have since identified 55 unique cases of FG in patients on an SGLT2 inhibitor (39 men and 16 women of various ages) reported between March 2013 and January 2019 (8,9). In contrast, only 6 cases of FG (all men) were reported for all other anti-hyperglycemic drug

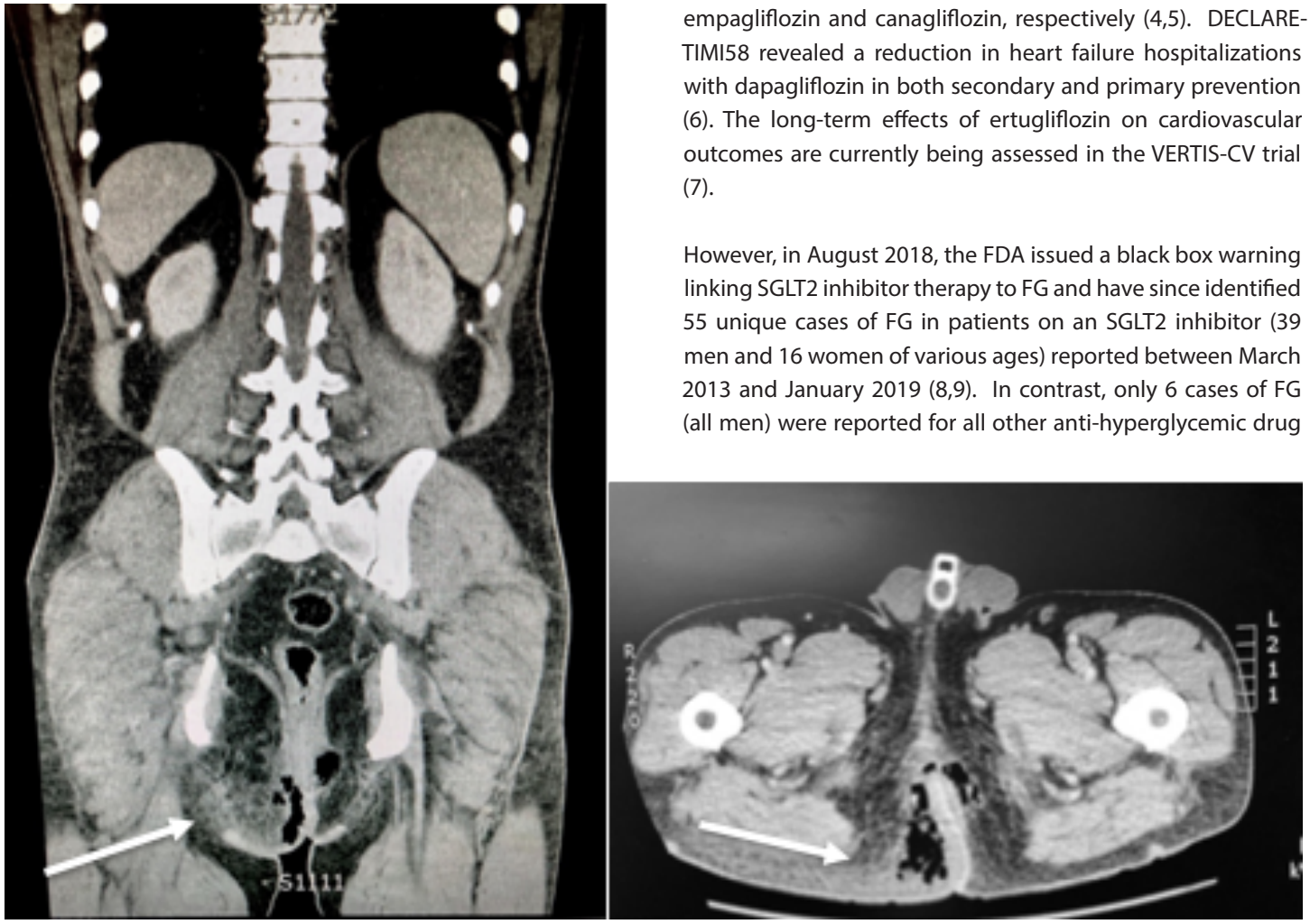

Figure 1. A coronal (left) and transverse (right) view of the CT abdo-pelvis reveals a large amount of gas (white arrows) within the subcutaneous tissue of the right gluteal fold and right buttock. This extends inferiorly and anteriorly to cross the midline of the perineum and involve the left gluteal fold. There is some involvement of the ischio-rectal fossa on the right side. No significant fluid collection is noted. Imaging confirms a diagnosis of Fournier's gangrene.

classes over 30 years (8). FG is a severe and rare polymicrobial infection resulting in necrosis of the perineal and genital fascia (10). Diagnosis of FG is an emergency with a high morbidity and high mortality of 20 to 40% thus, requiring early recognition, immediate treatment with early debridement, and broad-spectrum antibiotics (10).

Meta-analysis of randomized control trials (RCT) confirm an increase in the risk of genital infections with SGLT2 inhibitors versus other anti-hyperglycemic medication classes (11, 12). SGLT2 inhibitors inhibit the absorption of glucose from the proximal tubule of the kidney. This pharmacologically-induced glycosuria is thought to promote the growth of commensal genital microorganisms in addition to the gastrointestinal tract organisms that already colonize the perineum (9,13). Because organisms must enter the host tissue, one proposed mechanism is additional patient risk factors that would predispose patients when initiated on an SGLT2 inhibitor. For example, postcoital trauma, genital piercing, prosthetic penile implants, and rectal foreign bodies have all been implicated as precipitating factors (14). This was the case for our patient due to his history of a prosthetic penile implant. As compared to the 55 cases reported, this patient presented 12 months from the initiation of the SGLT2 inhibitor compared to the mean of 9 months (range of 5 days to 49 months). The majority of reported cases had concurrent anti-hyperglycemic use, similar to the patient in this case report. Although there are several proposed mechanisms, the definite pathophysiology by which SGLT2 inhibitors promote the ideal environment for FG remains unknown at this time (9). All SGLT2 inhibitors were associated with cases of FG except ertugliflozin, likely due to its limited time on the market.

CONCLUSION

Upon reflection of this case, this patient unfortunately developed FG despite adequate control of his diabetes. Several factors predisposed this patient to FG including diabetes mellitus, smoking, and a prior operative procedure or trauma in the perineum area. Some studies report that the rate of infection after penile prosthesis implantation in diabetic patient is six times greater than in non-diabetic patients (15). We believe that given the longevity of the prosthetic penile implant, and his well-controlled diabetes mellitus, the culprit of the development of FG in our patient was likely due to the SGLT2 inhibitor. In patients with predisposing factors, such as in this case, it may be better to avoid this class of medication all-together and use an agent from an alternative anti-hyperglycemic class with similar cardiovascular benefit, if indicated. This is an important consideration moving forward to prevent predisposing patients to the risk of FG, a severe infection with high morbidity and mortality.

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Appel d'œuvres

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