UOJM JMUO

Spring/Summer 2021
Volume 11 Issue 1

MEDICAL RESEARCH IN THE COVID-19 PANDEMIC

uojm.ca
ISSN: 2292-650X

UOJM

UNIVERSITY OF OTTAWA JOURNAL OF MEDICINE

JMUO

JOURNAL MÉDICAL DE L'UNIVERSITÉ D'OTTAWA

VOLUME 11 ISSUE 1 JULY 2021

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 and health-related research. We publish manuscripts in the form of original research (including study protocols and meta-research), reviews and clinical practice, news and letters, commentaries, case and elective reports, and interviews, in both official languages of the University of Ottawa.

Le JMUO est un journal international à comité de lecture, dirigé et publié par les étudiants de la Faculté de médecine. Nous encourageons les soumissions d'une variété de différents domaines en recherche biomédicale ou reliée à la santé. Nous publions des articles de recherche originale (incluant les protocoles de recherche et la méta-recherche), des revues et pratiques cliniques, des nouvelles et lettres, des articles commentaires, des rapports de cas et de stage à option ainsi que des entrevues, dans les deux langues officielles de l'Université d'Ottawa.

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ISSN: 2292-650X (print), 2292-6518 (online)

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Manuscripts can be submitted online via http://uojm.ca
Articles published in the UOJM can be digitally archived and indexed at uO Research:
http://www.ruor.uottawa.ca/en

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UOJM Article Award

UOJM has always sought to give a platform to students and researchers to disseminate high quality manuscripts. This goal and the growth of the journal would not be possible without the dedication and contribution of the authors who choose to submit to UOJM. Research can be an arduous task, with both challenging and gratifying moments. However, it is essential to advancing knowledge in any field. Whether it is a review paper or an original research article, authors have the heavy task of supplementing existing literature with their own valuable perspectives.

Continuing in the tradition set by our immediate predecessors, we are pleased to offer the UOJM Article Award in recognition of the outstanding works submitted by our authors. Key criteria for selection of the article included scientific merit, rigorous design and methodology, originality, significance, timeliness, and clarity of writing style, as applicable. After careful review of all articles selected for publication in Issue 11.1, we are pleased to announce the following paper as the winner of the UOJM Article Award:

"Introducing the COVID-19 Misinformation Toolkit" by Channarong Intahchomphoo and Michelle Brown

Managing Editor
Faizan Khan

Co-Editors in Chief
Zacharie Saint-Georges & Omar Dewidar

Prix de l'article de UOJM

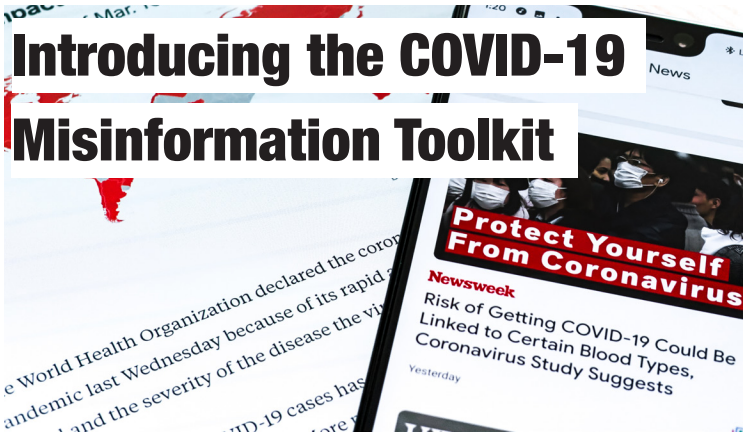
Le JMUO a toujours cherché à offrir une plateforme aux étudiants et aux chercheurs pour partager des manuscrits de haute qualité. Cet objectif et la croissance de la revue ne seraient pas possibles sans le dévouement et la contribution des auteurs qui choisissent de soumettre leurs articles au JMUO. La recherche peut être une tâche ardue, avec des moments à la fois difficiles et gratifiants. Cependant, elle est essentielle pour faire avancer les connaissances dans n'importe quel domaine. Qu'il s'agisse d'un article de synthèse ou d'un article de recherche originale, les auteurs ont la lourde tâche de compléter la littérature existante par leurs propres perspectives.

Poursuivant la tradition établie par nos prédécesseurs immédiats, nous sommes heureux d'offrir le Prix de l'Article du JMUO en reconnaissance des travaux exceptionnels soumis par nos auteurs. Les principaux critères de sélection de l'article comprenaient le mérite scientifique, la rigueur de la conception et de la méthodologie, l'originalité, la pertinence, ainsi que la clarté du style d'écriture. Après une revue minutieuse de tous les articles sélectionnés pour publication dans l'édition 11.1, nous avons le plaisir d'annoncer que l'article suivant est le gagnant du Prix de l'article du JMUO :

"Introducing the COVID-19 Misinformation Toolkit" par Channarong Intahchomphoo et Michelle Brown

Chef D'Édition
Faizan Khan

Co-Rédacteurs En Chef
Zacharie Saint-Georges & Omar Dewidar



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 they provide constructive feedback to authors to help improve their manuscripts. The UOJM editorial team is enormously thankful to all our 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 every issue.

We are honouring an outstanding reviewer 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 **Amaal Abdi** as the recipient of the UOJM Reviewer Award. Congratulations and well done, Amaal!

Managing Editor
Faizan Khan

Co-Editors in Chief
Zacharie Saint-Georges & Omar Dewidar

La publication de manuscrits de haute qualité ne peut se faire sans la contribution de pairs évaluateurs dévoués. Les évaluations par les pairs de haute qualité sont essentielles au processus de publication, car elles fournissent une rétroaction constructive aux auteurs afin de les aider à améliorer leurs manuscrits. L'équipe éditoriale du JMUO est extrêmement reconnaissante envers tous les évaluateurs qui se sont portés volontaires pour participer au processus d'évaluation par les pairs du JMUO. Leur temps et leurs efforts font partie intégrante du processus éditorial et contribuent à garantir la qualité et les normes qui définissent le JMUO lors de chaque édition.

Nous rendons ainsi hommage à un évaluateur exceptionnel en lui décernant le Prix de l'Évaluateur du JMUO. Les principaux critères de sélection des lauréats sont les suivants : être disponible pour l'évaluation par les pairs lorsqu'il ou elle est invité à le faire et soumettre des évaluations constructives en temps opportun qui témoignent d'une évaluation critique. Après un examen attentif de tous les pairs évaluateurs, nous avons le plaisir d'annoncer qu'**Amaal Abdi** est la lauréate du Prix de l'évaluateur du JMUO. Félicitations, Amaal !

Chef D'Édition
Faizan Khan

Co-Rédacteurs En Chef
Zacharie Saint-Georges & Omar Dewidar

Amaal Abdi

Position: MSc student in Cellular and Molecular Medicine

Interests: Regenerative medicine, Alzheimer's disease, Neurogenesis, STEM outreach within the community (especially within low socioeconomic communities and with Black and Indigenous youth)

Quote: "Lying at the heart of scientific advancement is the peer review process and I am truly thrilled to have had the opportunity to participate through UOJM. I've learnt so much and it is such a pleasure reading the excellent manuscripts submitted and providing feedback for the conception of their finalized, high-quality publication. It's been an absolute honor to work with the outstanding UOJM team and I look forward to continuing my role in the peer review process with UOJM and beyond!"

The University of Ottawa's Journal of Medicine

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UOJM: Preface

It's now been more than a year since the beginning of the COVID-19 pandemic and we would like to acknowledge the resilience of the University of Ottawa community and the Canadian people. In these times of heightened sense of urgency and fear, polarized viewpoints, and, unfortunately, demonstrations of intolerance, we would like to call the student body at the University of Ottawa, and the greater Canadian academic community, to lead by example in terms of openness, tolerance, respect, freedom of thought and belief, inclusivity, and compassion. A united community is a stronger community. This is a crucial time to recommit ourselves to building inclusive, caring, compassionate, and multicultural communities in medicine, academia, and across Canada.

Despite the challenges of the pandemic, the University of Ottawa Journal of Medicine (UOJM) has witnessed one of its greatest years in student engagement and editorial team and journal development.

We have introduced the first annual UOJM National Commentaries Contest which has received over 80 submissions from 11 faculties of medicine across Canada, in both official languages. In addition, the UOJM Summer Research Scholarship Program was established, supporting University of Ottawa research trainees in healthcare research with a total of $10,000 in funding. In turn, the students will be sharing their research with the UOJM audience by publishing in the journal. We have also sustained UOJM talks throughout the year; a long-standing tradition of research rounds with world-leading researchers in our esteemed University of Ottawa.

UOJM has taken huge steps to improve the editorial process of the journal. In addition to the UOJM training package for new editors and reviewers, we have introduced peer-review courses provided by the Web of Science Academy. Furthermore, faculty experts have been incorporated into the peer-review process. Aside from providing content expertise to the peer review, the experts also mentor our student reviewers on providing constructive and comprehensive reviews. We have also mandated the use of reporting guidelines by authors to ensure that submissions conform to current reporting standards. Given the continuous output of UOJM throughout the year, we have added new roles within the executive team to support UOJM's new involvement and initiatives: two publication co-directors, two publication assistants, and an executive vice-president. To ensure that principles and ethical standards of the UOJM hold up in all levels of decision-making, we developed a constitution and editorial policies according to internationally renowned organizations and committees.

Commencing 2021, we are implementing a continuous online publication model, in addition to our biannual printed issues to continue to support and share student research on all health-related topics. We are also welcoming study protocols that describe the rationale, hypothesis and planned methods for studies that are the cornerstone for high quality and transparent research. Additionally, we are considering meta-research; research on methods, reporting, reproducibility and evaluations.

UOJM's earnest efforts have led us to the creation of Issue 11.1: Medical Research in the COVID-19 Pandemic which contains a collection of articles relevant to researchers and students alike. We encourage our readers to peruse our very interesting interview with Dr. Marc-André Langlois, Canada Research Chair in Molecular Virology and Intrinsic Immunity, Professor in the Department of Biochemistry, Microbiology and Immunology (University of Ottawa), and head of the Coronavirus Variants Rapid Response Network (CoVaRR-Net). The issue also features UOJM's first invited commentary by Dr. Tracy Vaillancourt and colleagues entitled "Assessing the quality of research examining change in children's mental health in the context of COVID-19". Dr. Vaillancourt is Canada Research Chair in School-Based Mental Health and Violence Prevention as well as cross-appointed Professor in the Faculty of Education (Counselling Program), in the School of Psychology, Faculty of Social Sciences, and at Brain and Mind Research Institute, Faculty of Medicine (University of Ottawa).

Finally, we would like to thank our executive and editorial teams that made all this innovation possible. We wish to also thank our sponsors that have generously supported our endeavours and vision, especially Les Affaires francophones de la Faculté de médecine, who sponsored the totality of Francophone prizes for the UOJM National Commentaries Contest. Lastly, we sincerely thank our readers again for another successful year of biomedical science dissemination. We would also like to take this opportunity to also encourage everyone, who may find themselves struggling through this pandemic, to seek help from colleagues, family, friends or professionals.

Zacharie Saint-Georges and Omar Dewidar
Co-Editors in Chief

University of Ottawa Journal of Medicine

JMUO: Préface

Plus d'un an s'est maintenant écoulé depuis le début de la pandémie de la COVID-19 et nous tenons à souligner la résilience de la communauté de l'Université d'Ottawa et du peuple canadien. En ces temps d'urgences, de peur, de polarisation des points de vue et, malheureusement, de manifestations d'intolérance, nous appelons le corps étudiant de l'Université d'Ottawa et la communauté universitaire canadienne à donner l'exemple en matière d'ouverture, de tolérance, de respect, de liberté de pensée et de croyance, d'inclusion et de compassion. Une communauté unie est une communauté plus forte. C'est un moment crucial pour nous engager à nouveau à bâtir des communautés inclusives, bienveillantes, compatissantes et multiculturelles en médecine, dans les universités et à travers le Canada.

Malgré les défis posés par la pandémie, le Journal médical de l'Université d'Ottawa (JMUO) a connu l'une de ses meilleures années en matière d'engagement des étudiants et de développement du journal.

Nous avons lancé la première édition du Concours national d'écriture d'articles commentaires du JMUO, qui a reçu plus de 80 soumissions provenant de 11 facultés de médecine à travers le Canada, dans les deux langues officielles. De plus, le programme de bourses de recherche d'été du JMUO a été créé, soutenant les étudiants de l'Université d'Ottawa faisant de la recherche reliée au domaine de la santé avec un financement total combiné de 10 000 $. En retour, les étudiants partageront leurs recherches avec l'audience du JMUO en publiant dans la revue. Nous avons également maintenu les conférences du JMUO tout au long de l'année; une tradition de longue date invitant des chercheurs de renommée mondiale dans notre estimée Université d'Ottawa.

Le JMUO a pris d'énormes mesures afin d'améliorer le processus éditorial de la revue. Outre le programme de formation du JMUO destiné aux nouveaux rédacteurs et réviseurs, nous avons introduit des cours sur la revue par les pairs dispensés par l'Académie Web of Science. En outre, des experts de la faculté ont été intégrés dans le processus d'évaluation par les pairs. En plus d'apporter leur expertise en matière de contenu à la revue par les pairs, les experts offrent également du mentorat afin que nos étudiants évaluateurs améliorent leurs compétences critiques. Nous avons également ajouté l'utilisation de lignes directrices internationales pour les rapports afin de garantir que les soumissions soient conformes aux normes actuelles en la matière. Compte tenu de la production continue du JMUO tout au long de l'année, nous avons ajouté de nouveaux rôles au sein de l'équipe de direction pour soutenir les nouvelles implications et initiatives du JMUO : deux co-directrices de la publication, deux assistantes à la publication et une vice-présidente exécutive. Afin de garantir que les principes et les normes éthiques du JMUO soient respectés à tous les niveaux de la prise de décision, nous avons également élaboré une constitution et des politiques éditoriales conformes aux organisations et comités de renommée internationale.

À partir de 2021, nous mettons en place un modèle de publication en ligne continue, en plus de nos numéros imprimés bi-annuels, afin de continuer à soutenir et à partager les recherches des étudiants sur tous les sujets liés à la santé. Nous considérons maintenant les protocoles d'étude comme type de soumissions, lesquels décrivent la justification, les hypothèses et les méthodes prévues pour les études. Nous considérons aussi les articles de méta-recherche, c'est-à-dire la recherche sur les méthodes, les rapports, la reproductibilité et les évaluations.

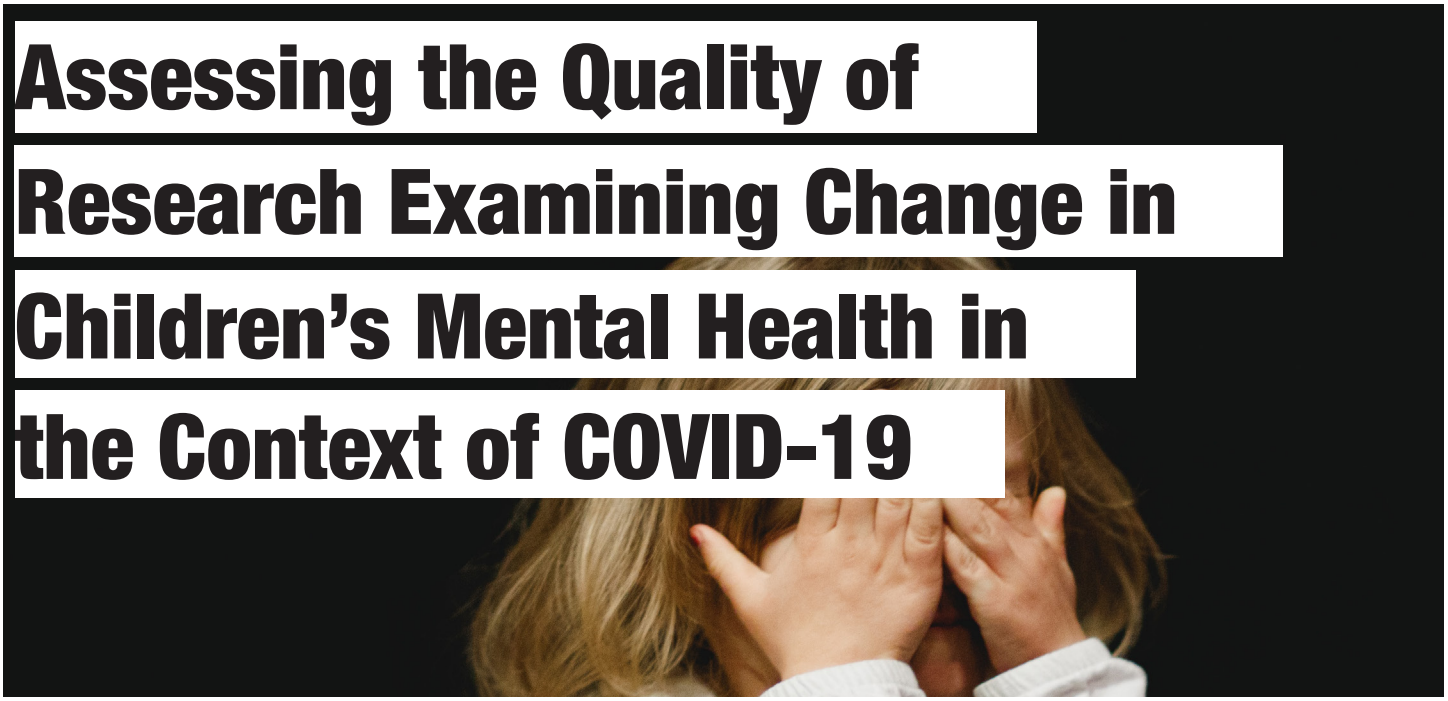
Les efforts sérieux du JMUO nous ont conduits à la création de l'édition 11.1 : La recherche médicale durant la pandémie de la COVID-19, qui contient une collection d'articles pertinents pour les chercheurs et les étudiants. Nous encourageons nos lecteurs à lire notre très intéressante entrevue avec Dr Marc-André Langlois, titulaire de la Chaire de recherche du Canada en virologie moléculaire et en immunité intrinsèque, professeur au Département de biochimie, de microbiologie et d'immunologie (Université d'Ottawa) et responsable du Coronavirus Variants Rapid Response Network (CoVaRR-Net). Le numéro présente également le premier article commentaire invité du JMUO par Dre. Tracy Vaillancourt et ses collègues, intitulé "Assessing the quality of research examining change in children's mental health in the context of COVID-19". Dre Vaillancourt est titulaire de la Chaire de recherche du Canada sur la santé mentale en milieu scolaire et la prévention de la violence, ainsi que professeure nommée conjointement à la Faculté d'éducation (programme de counselling), à l'École de psychologie de la Faculté des sciences sociales et à l'Institut de recherche sur le cerveau de la Faculté de Médecine (Université d'Ottawa).

Enfin, nous tenons à remercier nos équipes de direction et de rédaction qui ont rendu toute cette innovation possible. Nous souhaitons également remercier nos commanditaires qui ont généreusement soutenu nos efforts et notre vision, en particulier les Affaires Francophones de la Faculté de Médecine, qui ont commandité la totalité des prix francophones du Concours national d'écriture d'articles commentaires du JMUO. Enfin, nous remercions encore sincèrement nos lecteurs pour cette nouvelle année réussie de diffusion de sciences biomédicales. Nous profitons également de l'occasion pour encourager tous ceux qui se trouvent en difficulté face à cette pandémie à chercher de l'aide auprès de leurs collègues, de leur famille, de leurs amis ou de professionnels.

Zacharie Saint-Georges et Omar Dewidar
Co-rédacteurs en chef

Journal médical de l'Université d'Ottawa

Assessing the Quality of Research Examining Change in Children's Mental Health in the Context of COVID-19



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Date Submitted: June 14, 2021
Date Accepted: June 18, 2021
Date Published: July 30, 2021

DOI: https://doi.org/10.18192/UOJM.v11i1.5950

ABSTRACT

There is an urgent need to disseminate findings on the impact of COVID-19 so that appropriate steps can be taken to provide suitable services for those in need. In the area of children's mental health and the pandemic, many published and preprint studies do not meet the standard of good research practices. One common error is the use of cross-sectional data to describe change (e.g., saying children are more depressed during the pandemic). Although an all too familiar occurrence, statements about change require longitudinal data that pre-date the pandemic along with follow-up evaluations that are carefully timed to assess differences. In this commentary, we outline gold-standard research practice guidelines when assessing change in children's mental health in the context of the pandemic.

RÉSUMÉ

Il est impératif de partager les trouvailles sur l'impact de la COVID-19 afin que des mesures appropriées puissent être prises pour fournir des services adéquats à ceux qui en ont besoin. Dans le domaine de la santé mentale des enfants et de la pandémie, de nombreuses études publiées et préimprimées ne répondent pas aux normes des bonnes pratiques de recherche. Une erreur courante est l'utilisation de données transversales pour décrire un changement (par exemple, dire que les enfants sont plus déprimés à cause de la pandémie). Bien qu'il s'agisse d'un phénomène bien trop familier, les déclarations sur le changement nécessitent des données longitudinales antérieures à la pandémie, ainsi que des évaluations de suivi soigneusement programmées pour bien évaluer les différences. Dans cet article commentaire, nous présentons des lignes directrices de référence en recherche lors de l'évaluation des changements dans la santé mentale des enfants dans le contexte de la pandémie.

Keywords: *Children's Mental Helath, COVID-19, Pandemic, Impact of COVID-19*

In their policy brief on the impact of COVID-19 on children and youth, the United Nations identified the need for "a rapid accumulation of data on the scale and nature of impacts among children."[1] Although an important goal, this call to action defies how research typically unfolds. Science is a slow, methodical process that requires careful

consideration of prior evidence, ethics, measurement, sampling, analysis, and implications, to name a few. Still, we appreciate the call to shift priorities and allocate resources to conduct research about this global event. The stakes are high, and information is needed to guide us on how children and youth are faring during this unprecedented time. One problem is that sub-standard studies, often released as non-peer reviewed preprints, are being promoted on social media and in news outlets, and this attention can influence the public's perception of risk, the credibility of scientists, and policy makers' decisions related to funding and programming. Some scholars and medical professionals see preprints as a necessity during the pandemic to circumvent the lengthy review process and to arm professionals with the most up-to-date data.[2] Others see this growing trend as facilitating the spread of misinformation because, unlike scientists who approach non-peer reviewed research with caution, popular news outlets and the public may take preprints at face value.[3,4] Our goal is thus to remind readers of what constitutes good science in the field of child and youth mental health.

ASSESSING CHANGE AND TEMPORAL PRIORITY IN CHILD AND YOUTH MENTAL HEALTH

Since COVID-19 was declared a global pandemic, it is common to hear about how children and adolescents have become more depressed, anxious, or lonely. Although a familiar occurrence in the literature, statements about change cannot be made based on cross-sectional or retrospective data. Rather, assessing change in mental health requires longitudinal data that pre-dates the pandemic in addition to follow-up evaluations that are carefully timed to assess differences. This type of design also requires a close consideration of developmental norms. Some change, like the development of language, takes place quickly in the early years and then levels off over time.[5] Other change occurs over a longer time frame, like the development of personality.[6] Change, especially in child and youth mental health, is often non-linear and therefore requires the assessment of the phenomenon over an extended period of time using an analytic approach that can account for heterogeneity, such as person-centered approaches. Take for example the development of depression symptoms. Vaillancourt and Haltigan[7] examined the trajectories of depression symptoms from Grade 7 to Grade 12 in a sample of 700 Canadian children and youth and found that 75.8% followed a trajectory of low depression symptoms over time, 15.7% followed an increasing trajectory, and 8.5% followed a trajectory that began high in early adolescence and decreased over time. Longitudinal studies that include only three time points cannot examine this type of non-linear change.[8] However, this type of analytic approach, centered on heterogeneity, cannot adequately assess temporal priority (i.e., the sequential ordering of variables across time).

The assessment of temporal priority requires the use of variable-centered approaches, like cross-lagged panel models. For example, in a Canadian sample of 612 children and youth assessed yearly from Grade 7 to Grade 11, Lee and Vaillancourt[9] found that elevated levels of disordered eating consistently predicted depression, and not the reverse, suggesting the temporal ordering was from disordered eating to depression and not from depression to disordered eating. Lee and Vaillancourt suggested in their study that "early interventions that target problematic eating behavior may mitigate the risk of future depression."[9] Knowing what initiates a cascade is important for intervention and prevention work. More recently, analytic approaches have expanded on this type of cross-lagged panel model to disaggregate within-person relations (e.g., a child's level of depression relative to their own level) and between-person relations (e.g., a child's level of depression relative to other children's levels[10,11]). This separation allows for the interpretation of true age-related processes. Autoregressive latent trajectory models with structured residuals are now being used to provide stringent tests of within-person cross-lagged associations. Using this analytic approach, Lee and Vaillancourt[12] examined the intraindividual (within-person) temporal patterning of internalizing symptom development in a sample of 669 Canadian children and youth assessed yearly from age 11 to 17, and found that generalized anxiety consistently predicted depression, while anxiety and depression consistently predicted somatization. Of note, anxiety also had an indirect effect (mediating) on somatization via depression. These results suggest that focusing on anxiety could potentially help "curb symptom continuity and the development of comorbidity."[12]

Longitudinal research is complicated. In addition to planning and collecting data, which takes time, the analysis must be carefully selected to answer the specific a priori research question and the conclusions must be precisely drawn to match the specific analytic approach used. Assessing

change also requires the use of measures that are developmentally appropriate and psychometrically sound; they need to have demonstrated reliability and validity within prior research, but also within the study sample. Particular attention should be paid to measurement invariance; that is, whether a scale represents a construct in the same way across different contexts or conditions.[13] Measures need to be invariant across time, and ideally, across gender and other features that have a notable impact on the prevalence and presentation of children's mental health. For example, normative discontent (i.e., weight dissatisfaction) is common in adolescent girls and so the assessment of cognitive features of eating disorders may be different for girls and boys.[14,15] Therefore, measures of adolescent eating disorders need to, at a minimum, demonstrate invariance across gender.[16] Verbal ability is a key indicator of autism spectrum disorder (ASD), and verbal ability is strongly linked to age. ASD is also more commonly diagnosed in boys than in girls and the clinical presentation differs across gender as well.[17-19] Thus, when examining the autism phenotype, it is important to use measures that demonstrate equivalence across subgroups of participants (age, verbal ability, and gender; see Duku et al.[20] for example). Establishing measurement invariance helps demonstrate that the same empirical meaning is present for key modifiers like age and gender.[21]

COMMON CHALLENGES AND LIMITATIONS WITH LONGITUDINAL STUDIES

Although longitudinal studies are better than cross-sectional studies, they often suffer from a loss of participants over time (i.e., attrition) and rely on convenience sampling, which means that extrapolating findings to other populations must be done with caution. Loss of participants in longitudinal studies tends to be systematic rather than random, resulting in a less representative sample.[22,23] In fact, the participants you most want to retain in the study tend to be the ones to drop out early.[24] For example, children and youth often systematically drop out of studies because of their mental health difficulties and/or behavioural problems (see Wolke et al.[25] for example). It is also common to lose participants from lower socioeconomic brackets and racialized communities (see Lee and Vaillancourt[12] for example). Accordingly, attrition must be carefully considered in the study design. At the onset of the study, decisions need to be made about how to reduce attrition (e.g., renumerating participants),[26] how to manage attrition (e.g., imputation, the use of statistical weighing), and identifying the minimum sample size (i.e., power) required to address the questions of interest.[24]

Ideally, population-based longitudinal studies that use probability-based sampling methods (random selection) should be used to assess the impact of COVID-19 on child and youth mental health. The problem is that in Canada, there are no such studies. And because Canada has no population-based longitudinal study on child and youth mental health, we cannot "obtain accurate information about how the pandemic is affecting all Canadian children, and how some are being disproportionately affected."[27] We also cannot compare how children and youth in different provinces and territories are affected by their local or provincial/territorial COVID-19 public health policies. Rigorous studies are needed to identify specific conditions that leave children particularly vulnerable to mental health problems. We do have one great hope to remedy this issue. There is mounting pressure to quickly extend the Canadian Health Survey of Children and Youth (CHSCY).[27] The CHSCY is ideal for monitoring changes in the mental health of Canadian children and youth in the context of the pandemic and in the future. In 2019, the CHSCY collected data on children and youth mental health in a nationally representative sample of 42, 871 completed cases of children aged 1–17. Survey sample weights were applied so that the analyses would be representative of the Canadian population. Moreover, the Canadian Child Benefit File was used as the sampling frame, thus the study captured 98% of Canadian children and youth in all provinces and 96% of children and youth in all territories.[28] What is now needed is for Statistics Canada to add more data collection waves to this study to see how Canadian children and youth compare across provinces and territories and to other nations. There are precedents for this type of study design. An exemplar is the follow-up of the Mental Health of Children and Young People (MHCYP) survey which provided early evidence about the impact of the pandemic on child and youth mental health in the UK. This rare resource signaled to the world there was indeed a deterioration of mental health afoot in this vulnerable age group.[29] Additional waves of data collection have also been planned to improve the UK Government's "understanding of the differential effects of the pandemic and inform the policy, commissioning, and practice response."[29]

PROCESSES AND MECHANISMS: UNDERSTANDING CONTEXT

Finally, studies that can answer questions about processes and mechanisms impacting child development are greatly needed. We need to know if the pandemic has led to increases in adversities for some children (e.g., increases in child maltreatment),[30] or if others have seen a reprieve under pandemic conditions (e.g., reduced bullying victimization).[31] Importantly, an increase or decrease in mental health symptoms and the occurrence of a pandemic does not necessitate causality; the impact of specific moderators (which influence the strength of relations) or mediators (which explain the relation) on development must also be assessed. For example, fear of COVID-19 or specific public health interventions during specified periods of time for different geographic areas could impact the development of mental health symptoms. Another possible mechanism could be school closures. According to the United Nations Educational, Scientific, and Cultural Organization's COVID-19 global monitoring of school closures, half of the world's students are still affected by partial or full school closures. In Ontario, all schools have been closed since April 12, 2021.[32] Researchers need to be specific when identifying the processes and modifiers of changes in mental health symptoms of children and youth in relation to the pandemic. Examining mediators and moderators is far more useful for determining what may have helped or harmed different populations because of the myriad of changes that have occurred since the pandemic began. Unfortunately, because of budgetary restrictions, population-based longitudinal studies are often restricted in the number of assessments and measures they can include, which hampers the ability to understand the role of moderators and mediators in child and youth mental health. Thus, comprehensive and/or targeted longitudinal studies are also needed to compliment these larger population-based studies. These more focused studies should still aim to randomly select their sample from the population of interest when possible. This targeted approach will also be needed to complement the CHSCY because children and youth living on "First Nation reserves and other Aboriginal settlements in the provinces" were excluded from the study population. This is a significant omission given that the "pandemic has not only added to the social and educational inequities among young people, but it has also exacerbated the racial injustices with which racialized and Indigenous youth must contend." [33]

UNDERSTANDING AND PLANNING FOR MENTAL HEALTH SERVICES

Good science takes time and investment. Unfortunately, many researchers have not had time to mount good longitudinal studies during the pandemic because we were unprepared for this global event. The dearth of knowledge about how Canadian children are coping during the pandemic signals what our priorities are in Canada; after all, we measure what we value, and we value what we measure. To date, we have not measured the mental health of *all* Canadian children and youth using a longitudinal approach. This is a notable miss. According to Vaillancourt et al.,[34] Canada is failing when it comes to the mental wellbeing of children and youth in part because we have no longitudinal population-based data on them. This gap in knowledge is problematic. How can we engage in evidence-based practice if we do not know what Canadian children and youth have gone through? Moreover, how can we be prepared for another disaster if we do not prioritize the continuous assessment of their wellbeing? These concerns were addressed in a recent commentary by Kurdyak and Patten,[35] who argued that the current dearth of information on mental health burden and associated need for services in relation to the pandemic hampers policy makers' and planners' ability to "meaningfully respond to increased need [for services] if it exists."[35]

In sum, it is important that medical and graduate students, who are consumers of research, recognize that the current quality of COVID-19 research does not often meet the minimum standard to pass the peer-review process ***(see Table 1)***. Moreover, although routinely done, most COVID-19 studies cannot comment on mental health changes in children and youth because longitudinal data were not used. Nevertheless, decisions about the welfare of children and youth are being made using an incomplete, and at times, a faulty knowledge base. Now more than ever, consumers of scientific information need to be vigilant and exercise critical thinking when assessing research on how COVID-19 has purportedly impacted the mental health and functioning of children and youth. We are hopeful that more researchers, and students as upcoming scientists, will attend to rigor in the development (and assessment) of longitudinal studies through the careful attention to ethics, methodology, sample selection, generalizability, selected statistical analyses, and implications, while

also acknowledging the limitations of their study designs. Students, researchers, and physicians alike can also advocate for the continuation of well-designed Canadian studies, like the CHSCY. Only then, will we better understand the impact of the COVID-19 pandemic on specific groups of children and youth and under what conditions. This knowledge will in turn enhance our ability to make evidence-based decisions on their mental health and the services they require.

Table 1: Factors to Consider when Assessing the Quality of Studies Examining Change

1. How many assessments were included and do the intervals between assessments adequately capture change and developmental norms? Non-linear change cannot be assessed with three time points. Moreover, inadequate spacing between assessments (i.e., high stability) can obscure the ability to detect cross-lagged associations.
2. Are the measures used psychometrically sound? Of particular importance when examining change, measures need to be invariant across different groups and across time.
3. Are baseline assessments included? Examining change, especially in the context of the pandemic, requires appropriate baseline assessments.
4. Is the sample randomly drawn? If not, generalizability is challenged.
5. How is attrition managed and what is the level of attrition? Attrition is often systematic and can impact generalizability, especially when not managed statistically.
6. Is the sample size adequate? An appropriate sample size needs to be established formally with suitable power analyses and re-assessed in relation to attrition.
7. Were moderators and mediators examined? Processes and mechanisms should not be discussed in the absence of a formal examination of moderators and mediators.
8. Does the analytic approach match the research question? The examination of heterogeneity requires person-centered approaches, while temporal priority requires variable-centered approaches that ideally account for within- and between-person change.
9. Are the inferences drawn in the discussion consistent with the results? All results should be discussed, even null findings, and study limitations must be clearly articulated.
10. Was the study peer-reviewed? Studies must be assessed by expert reviewers as a quality assurance measure.

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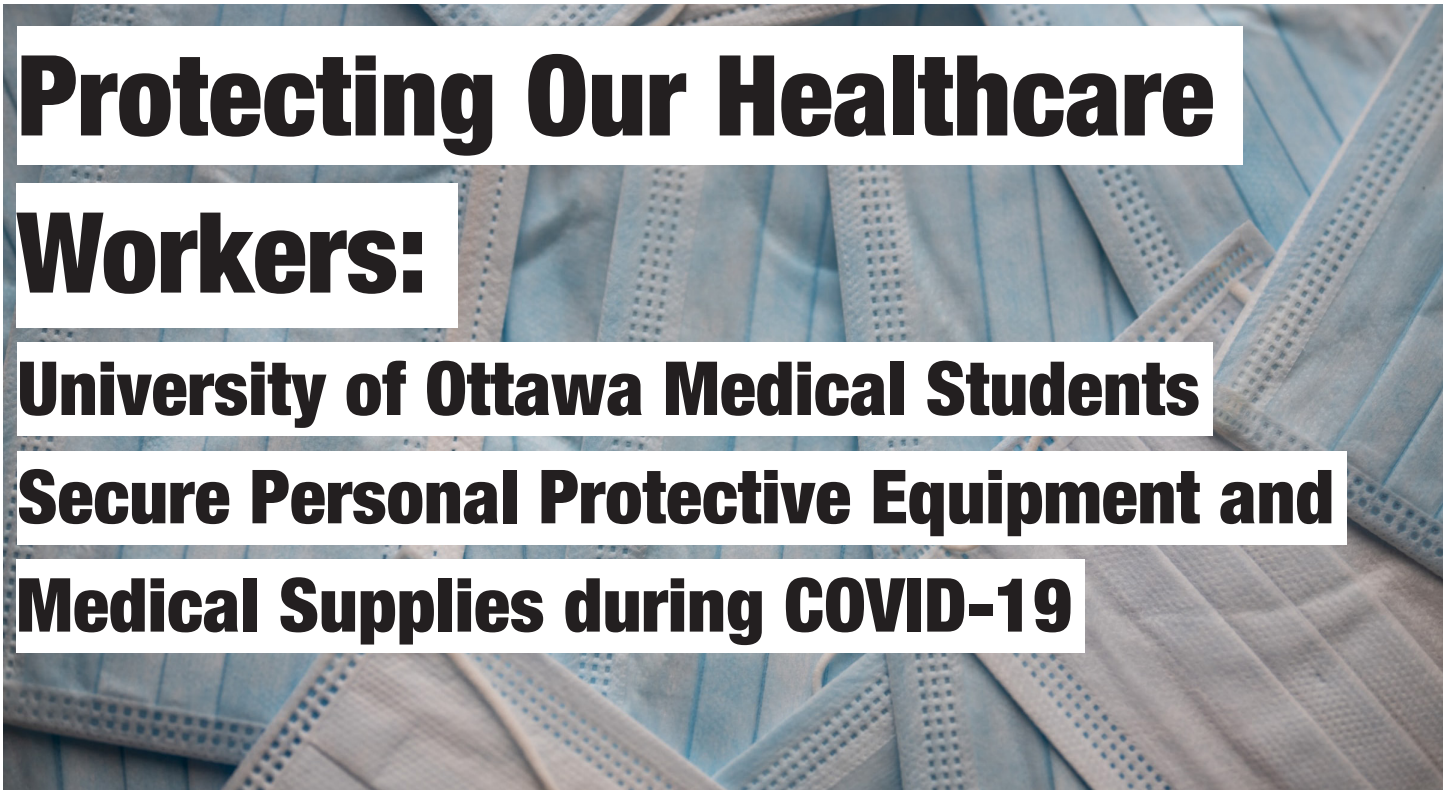

Protecting Our Healthcare Workers: University of Ottawa Medical Students Secure Personal Protective Equipment and Medical Supplies during COVID-19

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Date Submitted: August 2, 2020
Date Accepted: September 15, 2020
Date Published: April 21, 2021

DOI: https://doi.org/10.18192/uojm.v11i100.4770

ABSTRACT

"Our family wishes to make our humanitarian contribution in order to assist in the fight of this COVID-19 pandemic. We want to be a part of the University of Ottawa team. Together we can support each other. The following are the details of what we wish to contribute: 980kg of clear plastic film that can be used in the making of face shields. Our preference is to help our local community and thus we are committed to donating all supplies to your group." - A donor to our University of Ottawa Medical Students Group for Sourcing PPE and Medical Supplies

RÉSUMÉ

"Notre famille souhaite apporter sa contribution humanitaire afin d'aider à lutter contre la pandémie de la COVID-19. Nous voulons faire partie de l'équipe de l'Université d'Ottawa. Ensemble, nous pouvons nous soutenir les uns les autres. Voici les détails de ce que nous souhaitons offrir : 980 kg de film plastique transparent pouvant être utilisé pour la fabrication de visières. Nous préférerions aider notre communauté locale et nous nous engageons donc à faire don de tout ce matériel à votre groupe". - Un donateur au groupe d'étudiants en médecine de l'Université d'Ottawa pour l'achat d'équipement de protection personnel et de matériel médical.

Keywords: *Coronavirus, COVID-19, SARS-CoV-2, PPE, Medical Student, Student Initiative*

In November 2019, reports out of Mainland China described a pneumonia of unknown cause affecting patients in the Hubei Province[1]. Samples isolated from hospitalized patients led to the discovery of the causative agent, a novel coronavirus named SARS-CoV-2, and made international news at the time[2]. Five months later, the same virus had spread globally, leading to local transmission across all continents except Antarctica, which prompted the World Health Organization to declare a pandemic with more than 17 million confirmed COVID-19 cases[3-5]. In response to the rapid spread and mortality of SARS-CoV-2, there have been sweeping changes across all levels of

government and society in an attempt to contain the virus [6, 7].

In Canada, the first recorded case of COVID-19 occurred in a 50-year-old male, on January 27th, 2020, with a recent travel history to Wuhan, China[8]. Shortly thereafter, federal and provincial governments implemented outbreak prevention strategies including closure of the international border, restrictions on public gatherings, closure of non-essential businesses, cancellation of non-urgent medical services and procurement of critical medical supplies[9]. These measures shifted the public's understanding and acceptance that all members of society must play a pivotal role in mitigating public health crises. This was exemplified by social and physical distancing efforts and remotely accessed education, workplaces and healthcare services. However, with an escalating concern for personal protective equipment (PPE) shortages in Canada amidst these outbreak prevention and control measures, medical students from the University of Ottawa and across the country mobilized to serve a nation stretched to its healthcare limits.

During the first wave of COVID-19 cases in Canada, the need to procure PPE emerged as a central issue for the protection of healthcare workers and patients alike. The global demand for PPE began to exponentially rise in March due to the increasing number of worldwide cases and the alarming rate of COVID-19 fatalities among healthcare workers[10]. With such increased PPE demands, the market became quickly saturated with foreign competition and the infiltration of substandard PPE products, creating a growing concern in Canada of a looming shortage of medical supplies including masks, gowns and gloves[11-13]. Although the federal government issued a national call for businesses to supply PPE and sanitization products, local efforts in Ottawa and nationally began sprouting up in an attempt to rapidly fill the need for PPE for healthcare and other frontline workers[14-16]. For example, infectious disease specialist Dr. Gregory Rose began collecting viral swab kits from the Ottawa Valley community for use in designated COVID-19 assessment centres and hospitals. To the enthusiasm of our local medical student and physician community, we similarly created "uOttawa Medical Students for PPE Sourcing" to collect surgical masks, N95 respirators, face shields, gowns, gloves, goggles and hand sanitizer from businesses and citizens of the Ottawa Valley.

From the group's onset, our main objective was the procurement of supplies rather than their allocation amongst those in need. To this end, we reached out to the local leadership of the Ontario Medical Association (OMA) to gain insights into the needs and advocacy efforts in place regionally. As well, we reached out to The Ottawa Hospital (TOH) and were eventually connected with Mr. Brock Bush, the Section Lead of Donation Management of the Champlain Regional Program. We planned to donate the PPE and medical supplies we received to these well-established networks which had centralized distribution of government and community donations to hospitals, long-term care facilities, retirement homes, inner-city health facilities and family physician practices within the Champlain Local Health Integration Network (LHIN).

Table 1: Types of Industries and Companies Contacted for PPE and Medical Supplies

Healthcare Services	• Dental practices • Optometry clinics • Physiotherapy clinics • Chiropractic clinics • Naturopathic offices • Veterinary clinics
Cleaning Services	• Mold removal companies • Pest control companies • Janitorial services • Waste management services
Government Institutions	• National archives • National museums • Art galleries • Licensed laboratories
Home Improvement Services	• Renovation companies • Construction companies • Contractors
Personal Care Services	• Massage therapy clinics • Tattoo parlors • Nail salons
Commercial Trade	• Agriculture farms • Cannabis farms

By late March, our initiative began to gain traction through the incredible support from our medical student body, who themselves were dealing with such adversity in the form of transitioning to virtual classes, removal from clinical duties and delays in medical licensing board examinations. With over 180 enthusiastic student volunteers on our team, we began calling and emailing different types of businesses and corporations in various industries from manually created spreadsheets ***(Table 1)***. Once a donation was confirmed,

our team of drivers would coordinate contactless and socially distant pick-up with donors. Concerns by donors about fraud (e.g. reselling or diversion of donations) were managed through early engagement from TOH who provided us with a letter outlining our role in the region's PPE sourcing strategy[17].

Remarkably, we began to receive upwards of 25 donations a day from local individuals, organizations, agencies and laboratories. Businesses offered to donate as much PPE as they could despite the economic downturn during the pandemic and the possible consequences of donating on future profits and reopening. PPE donations were also punctuated with positive gestures as we received hand-drawn pictures from children, thank you cards, boxes of chocolates and even a bag of hand-washed coins "for coffee". More broadly, our group began gaining local and national media attention as part of a growing tide of initiatives and community members supporting healthcare and other frontline workers in their own ways. Media highlights include a group interview with CTV Ottawa's Tyler Fleming, Ethan speaking with The New York Times about Canada's community response to COVID-19, Kameela shining on a solo CBC Ottawa interview with Adrian Harewood, Cristina rocking interviews on CHEZ 106 and Boom 99.7 radio stations in the promotion of Conquer COVID-19 PPE drives and Jonathan scrambling off CBC's "All in a Day" broadcasting to collect a donation[18-20].

With lower case numbers, increased government mobilization and the re-establishment of supply chains, our initiative has slowed down in Ottawa as of July 2020[21,22]. That being said, our PPE collection has undoubtedly made a sizable contribution to the local pandemic response, reaching as far as the surrounding communities of Cornwall and Renfrew. With tremendous help from our volunteers, we contacted over 2,400 businesses in the Ottawa Valley, leading to 133 donations from community individuals, 17 donations from organizations/agencies/universities and 140 donations from businesses. Together, we collected 35,029 surgical masks, 2,010 KN95 masks, 3,291 N95 masks, 87,110 pairs of gloves, 743 viral kit swabs, and approximately 284 litres of hand sanitizer ***(Table 2)***. Included in these were impressive bulk donations of 10,000 surgical masks, 980 kilograms of clear plastic film (used for the production of 100,000 face shields at Algonquin College), 1,095 N95 masks, 1,000 safety goggles, 1,800 KN95 masks, and 180 litres of hand sanitizer.

Table 2: Total Collection of PPE and Medical Supplies Sourced

PPE	
Surgical Masks	35,029
KN95 Masks	2,010
N95 Masks	3,291
Hand Sewn Masks	815
Face Shields	74
Pairs of Gloves	87,110
Goggles	1,292
Booties	734
Head Caps	307
Medical Supplies	
Hand Sanitizer	284 L
Disinfectant Wipes	61 tubs
Miscellaneous	
Clear Plastic Film	980 kg
Mask Ear Savers	210
Disinfectant Solution	35.8 L

Despite these final numbers, our efforts were not met without significant criticism and doubt. First and foremost, we struggled in the early stages in establishing distributive connections within the dynamic landscape of PPE needs and demands. As the head coordinators, we felt overwhelmed and ill-prepared when we received urgent requests for medical supplies from local imaging facilities, family doctor clinics, maternal and newborn health centers, pediatrician offices, midwives, coroners, mental health associations, inner-city health organizations and personal support workers. How were we to balance the immediate and obvious needs of hospitals versus those of primary care physicians keeping patients out of the hospital or the escalating outbreaks within long-term care facilities?[23] Until connections with relevant groups at the OMA and the Champlain LHIN were established, we felt frustrated and helpless as we faced head-on the complexity and dynamism of PPE needs. The doubt of being "just" a medical student was gradually replaced with confidence as we found a framework to distribute the supplies.

Being one of the first groups in the Ottawa region collecting PPE from community sources, we were also an unknown entity that naturally generated skepticism

among community members. For example, after receiving word that TOH was seeking two-way baby monitors to facilitate nurse-patient communication without physical interaction, we put out a call via social media for donations with the help of a local volunteer. However, one community member interpreted our message to donate as undue pressure on citizens to purchase new baby monitors for TOH. They then proceeded to question the motives and validity of our group, as well as those of our partnering initiatives, and accuse our actions as fraudulent on social media. We dealt with this setback quickly by reaching out to the individual personally via email, providing them with the letter of support from TOH, assuring them of the telecommunication need in-hospital and that we would not accept newly purchased items for donation.

On another occasion, one of our community partners reached out to us to support a concurrent initiative to deliver PPE supplies to Northern Ontario. Although we explained our lack of connections and experience beyond Ottawa, we were subsequently accused of monopolizing PPE supplies and neglecting the needs of the North. In response, we had an extensive conversation with the individual to explain our scope, our responsibility to our donors in keeping PPE supplies in Ottawa and the establishment of our peer group ("Northern Ontario PPE for Healthcare Providers").

Despite these negative reactions, the overwhelming acts of kindness exemplified by large donations and the eagerness of the community to contribute to our cause reinforced our desires to help healthcare and frontline workers. These difficult interactions challenged us, as a team, to communicate effectively with many stakeholders, continue to show empathy to those who approached us with hostility and to work collaboratively as a united front. We had to accept the fact that not all of our interactions would have positive endings despite our honest intentions. We are incredibly proud and fortunate to have been able to answer the calls to action by healthcare workers[24-26], joining and assisting other medical students from across the country in Toronto, Halifax, Saskatoon, Northern Ontario and Vancouver to source PPE and medical supplies.[27-31] These and other initiatives by our future colleagues during the initial wave of COVID-19 demonstrate the utmost ingenuity and awe-inspiring commitment in a time of great personal, educational and societal uncertainty. Locally, we represented the University of Ottawa Faculty of Medicine in working to reduce the daily impacts of COVID-19, alongside other incredible initiatives including Ride to Connect, FrontlineFeeds Ottawa-Gatineau, Home Care for Healthcare Providers, PPE Fundraising, Bag Half Full Grocery Delivery Service, Creating through COVID, COVID-19 Women's Initiative, COVID-19 Campaign for Homeless Shelters and the 1000 Donors Blood Drive Campaign[32-40]. Ultimately, our initiative has drawn into focus the reasons why we have chosen to pursue medicine; we wish to work collaboratively as part of a larger group of healthcare providers to make a meaningful difference in patients' lives, including those who are the most marginalized and vulnerable.

ACKNOWLEDGEMENTS

We would like to acknowledge the contributions of Gillian Lord, Dr. Laura Trinkle-Mulcahy, and the technical support staff at Roger Guindon Hall for facilitating safe storage, inventory and transportation of our donated PPE supplies. We would like to also acknowledge the contributions of Brock Bush, John Martin, and The Ottawa Hospital staff for their guidance and collaboration in integrating our donated supplies to the Champlain Regional Program.

We would like to thank Dr. Josdalyne Anderson, Dr. Christine Tai, and Marc Tanguay for their dedicated support to our initiative, especially while it was in its early stages. Lastly, we would like to thank our 180 medical student volunteers for their tremendous work in securing and collecting donations, as well as Conquer COVID-19 and St. John Ambulance for mobilizing further medical supply drives and donations in the Champlain Region.

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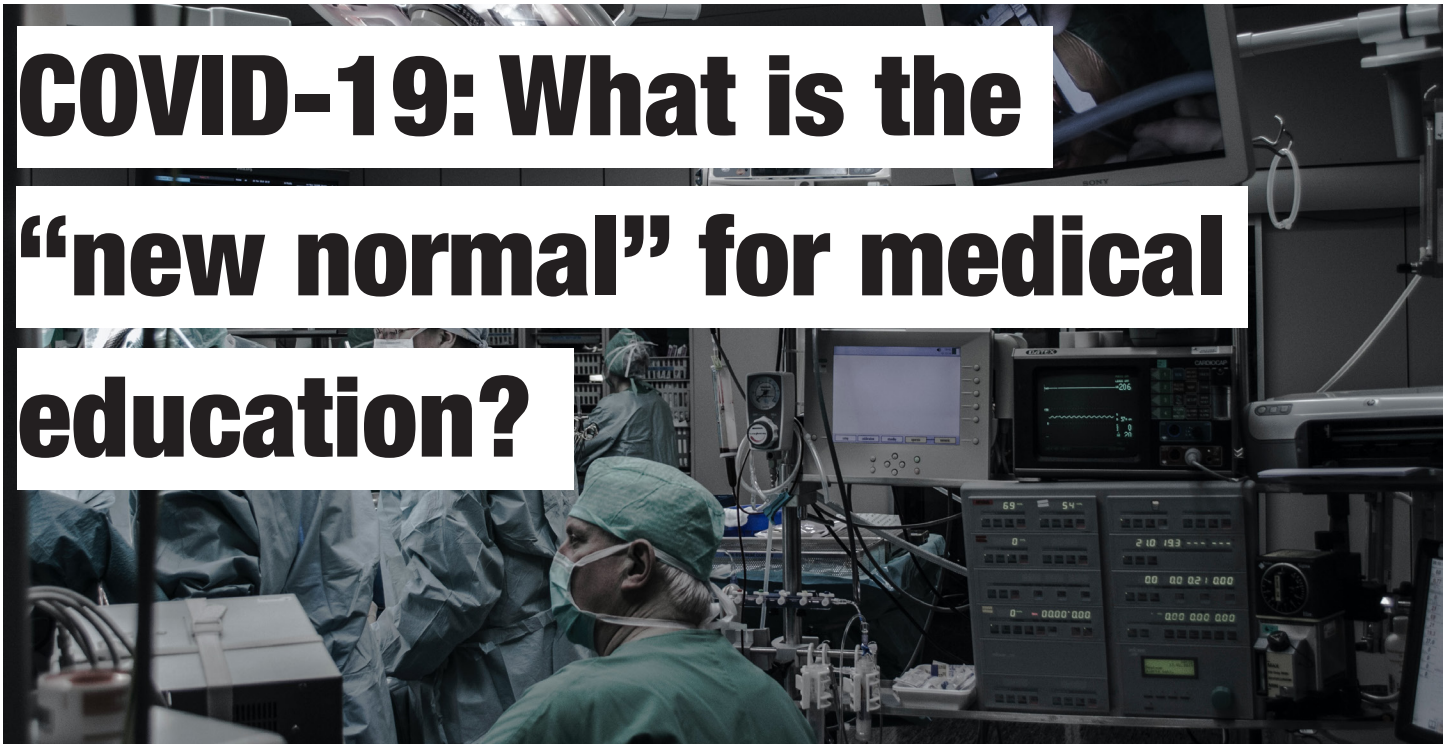
COVID-19: What is the "new normal" for medical education?



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Date Submitted: August 31, 2020
Date Accepted: October 2, 2020
Date Published: April 21, 2021

DOI: https://doi.org/10.18192/uojm.v11i100.4847

ABSTRACT

This commentary discusses the impact of the pandemic on pre-clerkship and clerkship settings, including approaches to adapting to COVID-19, and investigates future implications of COVID-19 on medical education in North America. The profound effects of the pandemic will forever change how future physicians learn and care for patients. In response to the pandemic, faculty members have quickly transitioned the entire pre-clerkship curriculum to an online format. Medical students in clerkship who are assigned to clinical rotations have faced significant interruption in their core clinical activities. It is imperative that the academic community learns from this experience and prioritizes a forward-thinking and scholarly approach while practical solutions are implemented.

RÉSUMÉ

Ce commentaire traite de l'impact de la pandémie sur les études en pré-externat et externat, y compris les approches d'adaptation à la COVID-19, et étudie les implications futures de la COVID-19 sur l'enseignement médical en Amérique du Nord. Les effets profonds de la pandémie changeront à jamais la manière dont les futurs médecins apprendront et soigneront les patients. En réponse à la pandémie, les membres du corps professoral ont rapidement migré l'ensemble du curriculum du pré-externat à un format virtuel. Les étudiants en médecine de l'externat qui complétaient leurs rotations cliniques ont eux été confrontés à une interruption importante de leurs activités cliniques fondamentales. Il est impératif que la communauté universitaire apprenne de cette expérience et privilégie une approche prospective et académique pendant que des solutions pratiques sont mises en place.

Keywords: *Pre-Clerkship, Clerkship, Curriculum, Medical Education*

The COVID-19 pandemic has become the singular focus of our healthcare system – halting research activities, disrupting patient care, and significantly affecting medical education. In the setting of a global crisis, the need to prepare future doctors has never been as high a priority as it is now. The profound effects of COVID-19 will forever change how future clinicians learn and care for patients.

COVID-19 presents unique concerns and challenges pertaining to patient safety. It is imperative to recognize that learners may become infected over the course of their training and facilitate the transmission of the virus, especially if they are asymptomatic. This commentary discusses how the pandemic could affect the pre-clerkship and clerkship setting, approaches to adapting to COVID-19, and investigates the future implications of COVID-19 on medical education in North America.

THE EFFECTS OF COVID-19 ON PRE-CLERKSHIP

Pending the development and approval of a vaccine or effective treatment, social distancing is the most effective strategy to prevent the spread of COVID-19[1]. Social distancing precludes learners from assembling in lecture halls or small-group rooms. Before the emergence of the pandemic, many faculties were already experimenting with the "flipped" classroom model[2] – a pedagogical approach focused on learner-centered training – to offer personalized instruction for asynchronous forms of learning. However, students still convened for interactive sessions such as case-based learning, technology-related activities (i.e. point-of-care ultrasound), and clinical instruction involving standardized and authentic patients.

Medical schools across Canada have had to rapidly make changes to the entire pre-clerkship curriculum by transitioning to an online format in response to the COVID-19 pandemic[3]. Learning activities involving small groups now convene in a virtual setting. Clinical skills sessions occurring online, in some instances, may have been deferred or even cancelled altogether. The delivery of examinations has also been adapted to an online setting. At first glance, updating educational materials for a virtual format may offer benefit, but the end result of these reforms will require subsequent assessment and evaluation. The move from a medical school environment to home was not without drawbacks. The transition resulted in isolation, difficulties in setting boundaries between home and work, and an increased reliance on technology for many[4]. This impacted both students and faculty members alike.

The transition from onsite to the virtual environment has led to changes in teaching that impact the curriculum and the learning process for pre-clerks. Didactic teaching has faced the least disruption during COVID-19 as lectures that were once given in person are now given in a virtual format. Such a format permits interaction, as students are able to respond to questions posed by the lecturer or ask for clarification via the audio or chat function. Small group teaching such as, clinical skills and problem-based learning, still continue during the pandemic, however, with suitable alterations. Problem-based learning, implemented by most medical schools in Canada, have transitioned to predominately using platforms such as Zoom or Microsoft Teams. The premise of these sessions remains the same despite the online delivery. Clinical skills also use virtual platforms to allow for students to convene. Each group is comprised of 4-5 students, a tutor, and a standardized patient (SP). The sessions consist of a history taking, creating differential diagnosis, management, plan, and assessment. Some Canadian medical schools are offering a few in-person clinical skills sessions in accordance with public health guidelines to provide students with the opportunity to practice their physical examination skills, which is precluded in the virtual setting.

THE EFFECTS OF COVID-19 ON CLERKSHIP

What does the role of the medical student in the clinical setting entail? The ideal representation of this role is that the student is a learner, in a team environment, who requires guidance and supervision. The development of students' professional identity depends on role modeling and instruction as they learn to appreciate the importance of being selfless and prioritizing the patient. This begs the next question, what degree of student participation during a pandemic best characterizes this prioritization? In other catastrophic occurrences, such as a natural disaster, students were called to action to help in the effort while being able to continue with their learning. Conversely, with the emergence of the highly transmissible COVID-19 pandemic, students may contract or spread the virus inadvertently. Factors that restrain the role of the learner in a clinical setting include unavailability of personal protective equipment (PPE); reduced value of training with the cancellation of routine procedures and appointments, as well as the transition to virtual patient care; and the lack of adequate testing.

Early in the outbreak, medical students were not involved in any capacity with the care of a patient who was confirmed or suspected of having COVID-19, particularly given the

lack of PPE. As the number of infected cases increased, all 17 medical schools across Canada paused clinical placements of students[5]. The Association of American Medical Colleges (AAMC) issued guidelines in March that restricted medical schools from continuing their core clinical rotations[6]. However, differences in the magnitude of cases among regions may lead medical schools to make decisions that best fit their unique circumstances.

What can faculties do to facilitate the learning of students who are traditionally assigned to clinical placements? As the pandemic continually evolves, so do the options that medical schools can offer their learners. These options include generating and utilizing virtual patient cases; deferring clinical rotations; allowing for late entry into the clinical setting by consolidating and shifting online didactic sessions to an earlier period; and integrating students in the telehealth environment to enable them to provide assistance in the COVID-19 crisis while giving them an opportunity to learn at the same time.

It is unclear how long the COVID-19 pandemic will last, and there is increasing awareness that once a "new normal" has been achieved, a second wave may once again impose strict quarantine and social distancing requirements. Under these circumstances, faculty members face the challenge of providing authentic patient experiences for students that allow for core learning objectives to be met. If clinical rotations are deferred, there is the issue of student cohorts overlapping. This would result in a shared clinical environment, potentially leading to adverse effects on education due to the density of learners. Resources regarding accreditation by the Liaison Committee on Medical Education have been provided to aid medical schools[7].

THE FUTURE OF THE MEDICAL EDUCATION ENVIRONMENT

A preceding outlook that doctors would provide care, despite being unwell, was considered an act of altruism. However, the COVID-19 pandemic is vastly different from anything that the world has seen before; it has brought forth unprecedented challenges. Physicians who provide care for patients while they are ill, as well as those who are infected but are asymptomatic, risk facilitating the spread of the virus. Therefore, the ethos of medicine, concerning altruism, must be adapted and take into account the effects of conceivable actions even with virtuous intents. The lack of testing, PPE, and limited availability of human resources makes this situation all the more difficult.

Additional unspecified academic matters that will require consideration include standardized tests when centers are inaccessible, the timeline for the Canadian Resident Matching Service (CaRMS) applications, and the ability to satisfy requirements for specific subspecialties prior to applying for CaRMS.

While medical students across the education continuum are unable to join the "frontlines", they are finding meaning through other avenues by giving back to their communities. A few of the ways students are volunteering their time include calling patients for contact tracing, creating educational materials to keep the public informed, and delivering groceries to vulnerable populations, while adhering to public health guidelines[8,9,10].

It is crucial to recognize that the pandemic could result in a shortage of healthcare resources. In this case, students may be required to serve on the "frontlines" and actively partake in the clinical setting. Due to the rapidly evolving nature of the situation, medical schools will need to be flexible in their response. Some medical schools in the United States are considering an approach that involves early graduation of final-year students in order to prepare them to engage in the clinical environment as early as possible[11]. Early entry into residency may require revised licensing procedures and flexibility in degree conferral by the university.

CONCLUSION

With the onset of the pandemic upending familiar routines and patterns, it is paramount that the academic community demonstrate flexibility by learning from experience. Forward-thinking must be emphasized to implement practical solutions. This process should encompass both reflection and evaluation. In particular, one way in which students can exhibit constructive influence is to adopt the role of an educator. Using tools such as social media outlets in a responsible manner to convey factual knowledge can positively influence health-related behaviours[12].

The evolving challenges that are the result of the COVID-19

pandemic have accelerated the advancement of research protocols, telehealth, and clinical trials with flexible methods in an attempt to positively transform our healthcare system. As well, historical events such as response to previous viral outbreaks have further demonstrated that challenging experiences often lead to novel scientific discoveries and positive changes in patient care. Faculty and learners can support the development of future principles and practices by documenting current changes to the educational milieu. The COVID-19 pandemic has instigated a pivotal moment in medical education, giving rise to new heights in curricular innovation and unprecedented change in the way that doctors learn.

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La Pédagogie Médicale au Cœur d'une Pandémie : Les Cliniques Simulées Sont-Elles Immunes?

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Date Submitted: April 7, 2021
Date Accepted: May 30, 2021
Date Published: July 30, 2021

DOI: https://doi.org/10.18192/uojm.v11i1.5827

ABSTRACT

The dyadic simulated clinic program offered by the Faculty of Medicine at the University of Ottawa is a more innovative form of the conventional simulated clinic. To date, this format has not been explained or even explored in detail. Multiple advantages that this new format has to offer including increased clinical exposure, increased student wellness, and teaching tips are explored in this paper. Moreover, some of the disadvantages such as scheduling overload and health and safety risks in the context of the COVID-19 pandemic are also noted. This new simulated clinic format could benefit clinical medical education in a unique way.

RÉSUMÉ

Le program me de cliniques simulées (CS) en dyade offert par la Faculté de médecine de l'Université d'Ottawa est une innovation des CS conventionnelles. Ce format n'a pas été expliqué et exploré en détail jusqu'à date. Plusieurs avantages tels que l'augmentation de l'exposition clinique, l'augmentation du mieux-être chez les étudiants possible et les astuces d'enseignement que ce nouveau format offre aux étudiants sont explorés. Certains désavantages comme la surcharge des horaires et les risques de santé et sécurité dans le contexte de la pandémie COVID-19 sont aussi notés. Ce nouveau format des CS pourrait bénéficier l'enseignement clinique médicale d'une façon unique.

Keywords: *Pédagogie médicale, Enseignement clinique, Éducation médicale*

Les cliniques simulées (CS) sont une composante importante du curriculum d'éducation médicale de premier cycle de la Faculté de médecine de l'Université d'Ottawa. Elles servent à enseigner des habiletés cliniques aux étudiants du pré-externat. Ce programme, unique au volet francophone, auquel chaque étudiant participe bimensuellement, est conçu pour offrir une formation dans un contexte de simulation qui leur permet de pratiquer leurs habiletés d'anamnèses et d'examens physiques avec des patients simulés en présence des médecins tuteurs. L'accent est mis sur la pratique d'une consultation médicale en fonction d'un

scénario fictif mais réaliste, tout comme dans une situation clinique réelle. Avec la pandémie COVID-19, un nouveau format a été établi pour les CS qui présente divers avantages et désavantages, lesquels seront discutés dans les présentes. Avant la pandémie COVID-19, chaque étudiant francophone jouait le rôle du clinicien en présence d'un patient simulé et d'un médecin tuteur qui agissait comme observateur silencieux. L'étudiant accomplissait une tâche prédéterminée spécifique à la session, par exemple, compléter une anamnèse psychiatrique ou faire un examen physique cardiaque avec le patient simulé. Par la suite, le patient simulé et le médecin tuteur donnaient de la rétroaction à l'étudiant, chacun leur tour confidentiellement. Le processus recommençait ensuite avec le prochain étudiant à l'horaire avec des scénarios différents de semaine en semaine. Chaque étudiant était inscrit à l'horaire bimensuellement, sauf exception, et cette fréquence suffisait à l'apprentissage en étant complémentée par d'autres expositions cliniques pré-pandémiques, comme des stages aux choix en milieu hospitalier.

Depuis l'émergence de la pandémie COVID-19, la distanciation physique et le port des masques ont rapidement été établis comme mesures efficaces pour contrôler la propagation du virus en attendant le développement d'un vaccin ou d'un traitement[1]. L'éducation universitaire partout au Canada a dû pivoter très rapidement vers des méthodes d'enseignement virtuelles et à distance, lesquelles n'étaient pas sans difficultés ni complications. La continuité de l'éducation médicale en particulier s'est avérée être un défi étant donné l'importance des composantes cliniques en présentiel, telles que l'enseignement des examens physiques musculosquelettiques, de l'auscultation cardiaque ou de la palpation abdominale. Malgré les risques inhérents à la rencontre des étudiants, des patients simulés et des tuteurs, la Faculté de médecine a dû choisir de prioriser l'enseignement des aptitudes cliniques en présentiel pour assurer la qualité de la formation médicale. Ceci était d'autant plus important, car les mesures de contrôle pandémique ont nécessité l'annulation de la majorité des opportunités d'exposition clinique pour les étudiants au pré-externat. C'est ainsi que le programme des CS a repris à la rentrée de septembre 2020 avec un nouveau format en dyade et des mesures de sécurité strictes.

Les CS en dyade partagent plusieurs similitudes avec l'ancien format de CS. Le but est le même: mettre l'accent sur le scénario clinique et la pratique des habiletés cliniques avec un patient simulé. La présence d'un médecin tuteur n'a aussi pas changé et il y a toujours de la rétroaction offerte par les patients et les tuteurs. Les différences principales du nouveau format de CS sont le jumelage des étudiants en dyade et l'augmentation de la fréquence de leur participation. Les deux étudiants jumelés reçoivent un rôle spécifique qui alterne généralement chaque semaine, soit le rôle de clinicien ou le rôle d'observateur. L'étudiant clinicien a les mêmes tâches que celles demandées de l'étudiant médical suivant l'ancien format. L'étudiant observateur, quant à lui, observe toute l'interaction clinique entre l'étudiant clinicien et le patient simulé en prenant des notes et en préparant sa propre interprétation clinique comme ses diagnostics différentiels, les pertinents positifs et négatifs ainsi que les investigations additionnelles et examens de laboratoires à suggérer. Cet étudiant observateur quitte la salle en même temps que le médecin pour que l'étudiant clinicien garde une certaine confidentialité lors de la rétroaction du patient simulé. Ensuite, l'étudiant observateur rejoint l'étudiant clinicien pour recevoir la rétroaction du médecin tuteur et participer à une discussion d'apprentissage. Les cas changent chaque semaine, ce qui permet aux étudiants de voir plus de scénarios cliniques et d'obtenir une plus grande exposition clinique. Notons que les règles de distanciation physique sont respectées dans les salles de cliniques simulées où le nombre de personnes est réglementé et que tous les participants portent des masques et des visières.

Pour les étudiants du pré-externat qui participent à cette nouvelle expérience, on peut noter quelques avantages généraux. Considérant le but du programme, les étudiants acquièrent plus d'expérience dans ce nouveau format en participant et en s'exposant à de l'apprentissage clinique plus fréquemment. Chaque étudiant participe dans les CS en dyades chaque semaine et donc voit le double des cas en comparaison aux CS suivant l'ancien format. Cela peut améliorer la compréhension du contenu appris pendant les cours didactiques ainsi que la confiance ressentie vis-à-vis des habiletés cliniques. Un autre avantage, moins évident mais notable, est l'opportunité des étudiants d'avoir de la rétroaction d'un nombre plus élevé de médecins tuteurs et de patients simulés. Ce phénomène permet aux étudiants de s'exposer à une large gamme de commentaires et de

styles d'enseignement.

En plus des bénéfices généraux, on remarque aussi des bienfaits qui sont spécifiques à chaque rôle, soit celle du clinicien ou de l'observateur. Chez les étudiants cliniciens, ils ont la chance d'avoir un autre étudiant avec qui discuter après l'entrevue ou l'examen physique. Cela permet aussi d'accroître la pression ressentie par les étudiants cliniciens qui doivent faire abstraction de la distraction, ce qui est plus réaliste et similaire à une situation clinique réelle, où il y a souvent des membres de la famille ou d'autres professionnels de la santé qui observeront l'étudiant à l'externat et durant sa pratique future. Quant aux étudiants observateurs, ils ont la capacité, durant l'exercice clinique, de consulter leurs notes ou des sources fiables et d'approfondir leurs connaissances selon le déroulement du scénario. Ils peuvent aussi remarquer et noter les habitudes et les signes non verbaux que les étudiants cliniciens et les patients démontrent, un exercice très difficile à faire lorsqu'on est au cœur de l'action, mais qui permet d'améliorer leur compréhension de la communication médicale. Ces bénéfices s'avèrent possibles seulement avec les modifications apportées par les CS en dyade.

Tandis que plusieurs des bénéfices se font dans le domaine clinique et médical, l'aspect humain et collaborateur de ces nouvelles CS est remarquable. Particulièrement en temps de pandémie mondiale, où les contacts sociaux sont diminués, ce partenariat entre étudiants encourage la collaboration et le développement de bonnes relations entre collègues de classe. En plus, des avantages psychologiques et émotionnels pourraient se manifester dans la réduction du « syndrome de l'imposteur » qui affecte jusqu'à 60% des étudiants médicaux et qui est associé avec l'épuisement professionnel[2]. Les étudiants observateurs ont l'opportunité de voir d'autres étudiants qui sont dans la même situation qu'eux. Ils comprennent qu'ils ne sont pas les seuls à faire des erreurs, à se tromper de mots, à balbutier, ou à éprouver de la difficulté à formuler les bonnes questions. Cela peut réduire les sentiments d'isolement, de découragement ou même d'autocritique, contribuant ainsi à la santé mentale globale des étudiants en médecine.

Malgré tous leurs avantages, les CS en dyade comportent quelques désavantages; certaines de leurs importunités sont propres à la situation pandémique présente. Étant donné le contexte économique, psychologique, social, physique, émotionnel et politique de la pandémie COVID-19, la modification de la pédagogie médicale doit être considérée soigneusement. Il faut trouver un équilibre entre la sécurité des étudiants, les différents niveaux de confort entre étudiants et la pédagogie médicale efficace, une tâche qui est très délicate et complexe. Certains étudiants sont moins enthousiastes face aux risques envers leur santé personnelle ou celle de leur famille et de leurs proches. Outre les risques en matière de santé, un inconvénient potentiel de ce nouveau programme serait la surcharge à cause du nouvel horaire hebdomadaire obligatoire imposé aux étudiants. C'est un ajout substantiel dans la vie des étudiants en médecine qui sont déjà à risque de se sentir surchargés, surmenés et stressés[3]. Par exemple, avant la pandémie, les étudiants francophones pouvaient profiter de leurs semaines de congé de CS pour faire des stages d'observation au choix, lesquels comportent un atout majeur pour la pédagogie médicale. Dans l'éventualité où ces programmes seraient rétablis, les étudiants auraient plus de difficulté à trouver le temps d'explorer diverses spécialités avec le nouveau format de CS. Cette différence peut sembler modeste, mais les contraintes de temps peuvent s'additionner rapidement dans la vie des étudiants de médecine, ce qu'il faut considérer sérieusement. Les CS en dyade devraient donc susciter la considération de potentielles conséquences sur l'éducation globale des étudiants en médecine.

Il faut également mentionner que la Faculté de médecine est responsable de l'investissement dans tous les aspects de l'éducation médicale. Ces nouvelles CS en dyade permettent à la faculté d'augmenter le rendement de ses ressources financières et logistiques pour l'enseignement d'aptitudes cliniques. Avec ce nouveau format, le rendement du programme de CS est en principe doublé, car l'exposition clinique de chaque étudiant est deux fois plus grande. Cependant, les désavantages mentionnés présentent plusieurs pistes de réflexion et action possibles pour ceux qui gèrent le programme. Pour réduire les risques de sécurité ainsi que la surcharge potentiel du format en dyade des CS, des options comme rendre le rôle de l'étudiant observateur optionnel, prioriser la vaccination des étudiants en médecine et les patients simulés ou avoir des horaires spécifiques à divers activités cliniques entre autres doivent être envisagés et discutés par les facultés

de médecine.

En conclusion, les nouvelles CS en dyade offrent une excellente opportunité aux étudiants en médecine de s'exposer davantage au milieu clinique et de pratiquer leurs aptitudes dans un environnement sécuritaire et motivant. Les étudiants en profitent particulièrement dans le contexte de la pandémie COVID-19 actuelle pour consolider leurs apprentissages avec des patients simulés et des médecins tuteurs en présentiel. De plus, le format de partenariat entre étudiants avec des rôles distincts permet de potentiellement améliorer les taux d'épuisement professionnel, le bien-être, l'apprentissage et même l'amitié entre collègues de classe. Néanmoins, certains désavantages doivent être sérieusement considérés, tels que la surcharge académique et la diminution du temps libre qui pourrait être consacré à d'autres opportunités également bénéfiques à l'éducation médicale, sans oublier les risques de santé et de sécurité qui sont uniques à la situation pandémique actuelle. En somme, l'établissement des CS en dyade est une bonne façon de maximiser les ressources et d'augmenter les occasions d'enseignement clinique pour les étudiants et offre le potentiel de former non seulement de meilleurs étudiants de médecine à l'externat, mais surtout, de meilleurs médecins.

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COVID-19 and Ageism: Has the Pandemic Allowed Prevailing Ageist Attitudes in Healthcare to Go Viral?

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Date Submitted: March 19, 2021
Date Accepted: May 22, 2021
Date Published: July 30, 2021

DOI: https://doi.org/10.18192/uojm.v11i1.5819

ABSTRACT

Current perceptions of older adults are often met with prejudice and misconceptions that constitute what has been characterized as 'ageism'. Rarely are older persons considered indispensable members of the medical community who deserve our respect and support. While it is unclear if and when this pandemic will end, it is clear is how COVID-19 has unveiled the prevalent ageist attitudes against older people, underscoring an unsettling discourse about age and human worth that has allowed us easily to question the value of older adults. In this commentary, we highlight specific recommendations that can be made to combat ageism during and after the COVID-19 pandemic, with exploration of vaccine administration and inequities across long-term care homes.

RÉSUMÉ

Les perceptions actuelles des personnes âgées se heurtent souvent à des préjugés et à des idées fausses qui constituent ce que l'on appelle l'"âgisme". Les personnes âgées sont rarement considérées comme des membres indispensables de la communauté médicale qui méritent notre respect et notre soutien. Bien que l'on ne sache pas si et quand cette pandémie prendra fin, ce qui est clair, c'est la façon dont la COVID-19 a dévoilé les attitudes âgistes répandues à l'encontre des personnes âgées, soulignant un discours troublant sur l'âge et la valeur humaine qui nous a permis de remettre facilement en question la valeur de ces derniers. Dans ce commentaire, nous soulignons les recommandations spécifiques qui peuvent être faites afin de combattre l'âgisme pendant et après la pandémie de la COVID-19, tout en explorant l'administration du vaccin et des inégalités dans les foyers de soins de longue durée.

Keywords: *Ageism, long-term care, COVID-19 vaccination*

"The true measure of any society can be found in how it treats its most vulnerable members."
-Mahatma Gandhi

INTRODUCTION

Older adults are often met with prejudice and misconceptions that constitute ageism. They are seldom given a platform to advocate for themselves and are

infrequently considered when programmatic decisions are made. As the pandemic unfolds, ageism is leading to the revictimization of older populations and catalyzing recurrent waves of disease spread. In this paper, we discuss how the COVID-19 pandemic has accentuated pre-existing ageist attitudes in healthcare, underscoring an unsettling discourse about age and human worth, and we make specific recommendations to overcome such practices in modern medicine.

RESPONSE TO COVID-19 IN LONG-TERM CARE HOMES (LTCHS)

Since the onset of this pandemic, it has become increasingly clear that a tailored and concerted approach to protect older adults in LTCHs is needed. Health care providers worldwide have expressed concerns over the safety of LTC residents, calling for more personal protective equipment (PPE), infection control strategies, and adequate staffing.1 Canada has stood out, internationally, for having a lopsided pandemic response that prioritized the needs of acute care settings (such as hospitals) over LTCHs, despite 73% of COVID-19-related deaths have occurred in LTCHs.[1,2] During the first wave, LTCHs were reticent to transfer residents to hospitals, in an effort to avoid overcrowding, although COVID-19 was spreading more rapidly in these LTCHs. Inconsistencies in masking practices and symptom screening policies among LTCHs were also widespread during the first wave.[3] This further contributed to the high mortality rate among residents in Ontario nursing homes. The majority of these deaths were preventable, unnecessary and negligent, given that jurisdictions in Canada that better supported these settings recorded fewer fatalities.[4]

Chronic understaffing has resulted in lackluster care among LTC residents. It was estimated that more than 6000 personal support workers (PSWs) were needed in the summer to adequately staff LTCHs across Ontario.[5] In the worst-hit COVID-19 LTCHs, emergency staff shortages were addressed by redeploying rapid response (hospital and community-based) health care teams, in addition to the Canadian Armed Forces and the Red Cross.[6] Staffing continues to be a critical issue, in part due to the low pay and few benefits for LTC workers compared to those working in other health care settings. Ontario's new staffing plan includes a $1.9 billion investment to recruit and retain PSWs to achieve an average of four hours of daily direct care.[7] The province's directive to allow staff to work with a single employer,[7] while well-intentioned, further exacerbates the staffing shortage. To address chronic understaffing, accelerated PSW training programs should be made available, similar to the training model implemented by George Brown College in partnership with Rekai Centres.[8] While work on this front is already occurring in Ontario[9], it is imperative for other provinces and territories to follow, as chronic understaffing is an issue that affects LTCHs across Canada. Improving incentives to work in LTCHs should include increased and standardized training and wages for workers, as well as full-time employment contracts that come with hazard and paid sick leave. Toronto's city-run municipal LTCHs proactively implemented the four-hour care standard in 2019 by fundraising $24 million to cover the added staffing costs. Indeed, it was this staffing model that was lauded as the "secret sauce" for containing the virus[10] by preventing at-risk or asymptomatic staff from coming to work and spreading the virus.

IS AGEISM DRIVING THE SECOND WAVE?

As COVID-19 continues to spread, it is invariably making its way into LTCHs, putting older patients at increased risk of infection. A MMWR Report by the Centres for Disease Control and Prevention showed that infection waves among younger populations seeded infections in older adults, suggesting that younger persons act as vectors of transmission.[11] Given the potency of asymptomatic COVID-19 spread, stringent adherence to preventive behaviors and community mitigation strategies are needed to reduce the risk of infection and transmission of COVID-19 to older adults.

Older adults have been drastically affected by a careless response to the pandemic. Particularly, the response in LTCHs across Ontario and Quebec during the initial wave6 was the Achilles' heel that drove the surge in Canada's case fatality rate. Until now, more than half of Ontario's 625 LTC facilities have experienced outbreaks and upwards of 3700 residents have died.[12] The blanket approach to infection control in LTCHs lacks nuance and contributes to further mental and physical challenges for residents. For instance, extremely restrictive visitor policies in LTCHs may not be the best way forward. In guarding the physical health of residents, their mental and emotional well-being is

compromised. Family caregiver access can help alleviate the burden on staff by providing essential care. There is mounting evidence that staff are more likely than visitors to serve as vectors of SARS-CoV-2 transmission in LTC facilities.4 Instead of restricting visitors to the point that resident well-being is compromised, strategies to minimize the potential for infection spread should be implemented. Providing adequate PPE and infection control strategies for staff, residents, and visitors should be made a top priority to mitigate the spread of COVID-19. Further, Ontario now has active symptomatic and asymptomatic screening requirements for staff and visitors. Rapid COVID-19 tests that produce results within minutes will begin to be implemented across LTCHs in Ontario starting in March 2021; however, there is no clear policy as to how this will occur.[13] We also need to think about creating additional spaces to allow for social distancing between residents in LTCHs. Brown et al. found that shared rooms in nursing homes are associated with larger and deadlier outbreaks.[14] Long-term residents in LTCHs were three times more likely to live in a shared space in Ontario than in British Columbia (B.C.).[4] As of Sept. 10, 2020, there were already 1,817 resident deaths in Ontario, compared to 156 in B.C..[4]

VACCINE ACCESS AND VISITOR POLICIES ACROSS LTCHS

Ever since the COVID-19 vaccine rollout began in December 2020, Ontario has been grappling with a series of challenges.[15] Despite the campaign's acceleration throughout January 2021, the province continues to run into problems with vaccine shortages.[15] This has forced the provincial government to create prioritization plans such as giving primary access for vaccination to LTC residents and extending the time between first and second doses for other low-risk individuals.[15] Additionally, the Pfizer-BioNTech vaccine has strict storage requirements (i.e., below -70oC), which has further complicated vaccine delivery.[16] This has sparked ongoing discussions around where the vaccine should be distributed – at LTCHs or at vaccine delivery sites, most of which are hospital-based. Delivery sites are the preferred option as they are better equipped than LTCHs to store the Pfizer vaccine, however, LTC residents would need to be moved to these sites in order to receive their vaccination.[16] There are roughly 78,000 LTCH residents across Ontario.[17] As of May 21, 2021, around 5 percent of LTC residents are not fully vaccinated against COVID-19.[18] In order to continue to protect our most vulnerable population, vaccination delivery to LTCHs must continue to be prioritized and expedited. For this, political parties and vaccine manufacturing companies must work together to reach a consensus.

In addition to continuing to prioritize the vaccine campaign in the LTC sector, policies surrounding social outings for highly vaccinated LTCHs should be reconsidered promptly. Currently, the Ministry of Long-Term Care allows for some social interactions such as communal dining. However, resident outings for social reasons and temporary absences remain banned, as are visits from family members who aren't official caregivers.18 Visitor policies in LTCHs have changed very little since last fall, despite high vaccination rates that would allow for safe outdoor visits.[19] The delay in updating the policy extends the burden on the family members who have qualified as caregivers, while also prolonging the suffering of both residents and loved ones who have been separated for a year. Policies should reflect the high vaccination rates present in LTCHs and the directive on visitor policies in LTC needs to be reconsidered now.

LIMITATIONS OF ONTARIO'S COVID-19 RESPONSE

The province of Ontario has failed to properly protect residents in LTC. As of May 21, 2021, 95 percent of LTC residents are fully immunized in Ontario.[18] Ontario has shown tremendous progress in the COVID-19 vaccine roll-out to LTC, however, there are still individuals in LTC and retirement homes waiting to be vaccinated.[18] There has been adequate time and vaccinations to provide doses to every single individual across both sectors. What is more concerning is the question of what happens once vaccinations have been completed. While vaccines will contribute to a decrease in COVID-19 mortality, they do nothing to address the structural issues in LTCHs that have caused ongoing abuse and neglect in an increasingly privatized industry. A recent report from the Canadian Armed Forces (CAF) revealed long-known truths of the crisis in LTC that caregivers and family members have been saying for years.[20] The CAF report details disturbing conditions in LTCHs. It also highlighted serious concerns about PPE shortages, staffing shortages, and failure to follow basic procedures to keep both staff and residents safe.[19] There must be coordinated action between the federal and provincial governments to find a lasting

solution to this crisis: a solution that ensures the health, care, and dignity of seniors in all LTCHs.

RECOMMENDATIONS FOR FUTURE SUCCESS

The COVID-19 pandemic has given us a wide lens into the state of Canada's healthcare system. So far, our response has failed older adults. How, then, must we define the way forward? We acknowledge that sustained efforts will be required to respond to COVID-19 over an indefinite period of time. In order to have a meaningful impact on addressing ageism during this pandemic, we urge that attention be paid to five aims: (1) ensure that there is monetary commitment and adequate planning between the government and all those involved to generate a stable workforce that can meet growing LTCH needs, (2) establish strict infection-control strategies in the general population (e.g. follow the COVID-zero policy with test-trace-isolate-support)[21], (3) continue to allow for essential family caregiver access to LTCHs, (4) reconsider visitor policies in highly vaccinated LTCHs, and (5) mandate national standards to correct the longstanding structural issues in long-term care.

ACKNOWLEDGEMENTS

Author Contributions

The authors would like to acknowledge Ashton Applewhite, Dr. Samir Sinha, Dr. Nathan Stall, Dr. Sameer Kushwaha, Dr. Vivian Stamatopoulos, and Michael Liu for their invaluable feedback surrounding the themes within this manuscript.

Conflict of Interest

No conflicts of interest. No funding received.

Sponsor's Role

Not applicable.

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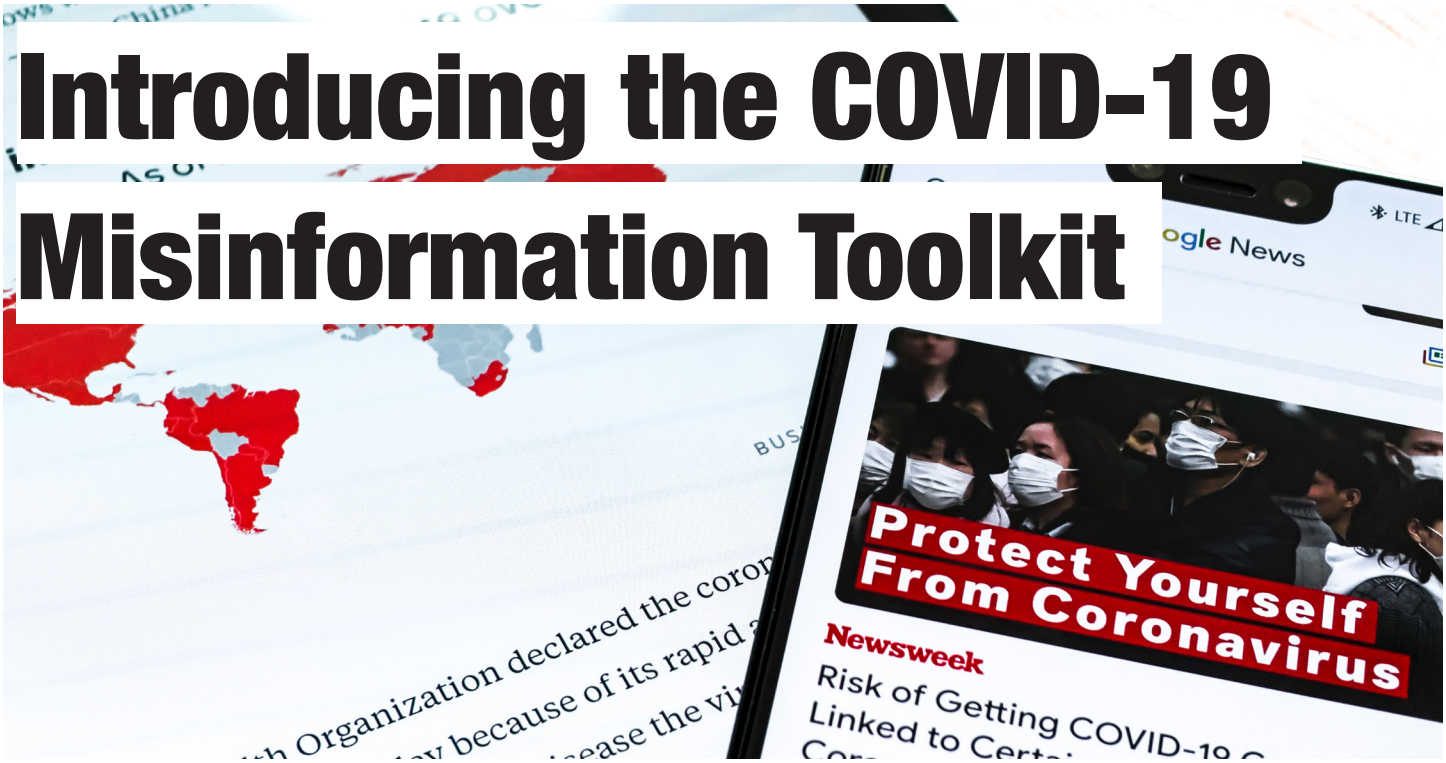
Introducing the COVID-19 Misinformation Toolkit



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Date Submitted: September 24, 2020
Date Accepted: October 11, 2021
Date Published: April 21, 2021

DOI: https://doi.org/10.18192/uojm.v11i100.4858

ABSTRACT

The following commentary article aims to introduce the University of Ottawa Library's COVID-19 Misinformation Toolkit which has two objectives; first, to provide direct links to COVID-19 related library materials and second, to create open educational resources, including details of the authors' systematic review on COVID-19 misinformation on social media, and interviews with interdisciplinary experts regarding COVID-19 misinformation. This toolkit is now available on the library website in both English and French.

RÉSUMÉ

Cet article de commentaire vise à introduire la Boîte à outils de la désinformation COVID-19 de la Bibliothèque de l'Université d'Ottawa qui a deux objectifs. La premier est de fournir des liens directs vers des documents de la bibliothèque liés au COVID-19. Le second est de créer des ressources éducatives gratuites, y compris des détails de la revue systématique des auteurs sur la désinformation COVID-19 sur les média sociaux, et des entretiens avec des experts interdisciplinaires concernant la désinformation COVID-19. La boîte à outils est disponible sur le site web de la Bibliothèque en anglais et en français.

Keywords: *Misinformation, COVID-19, Social Media, Infodemic*

1. INTRODUCTION

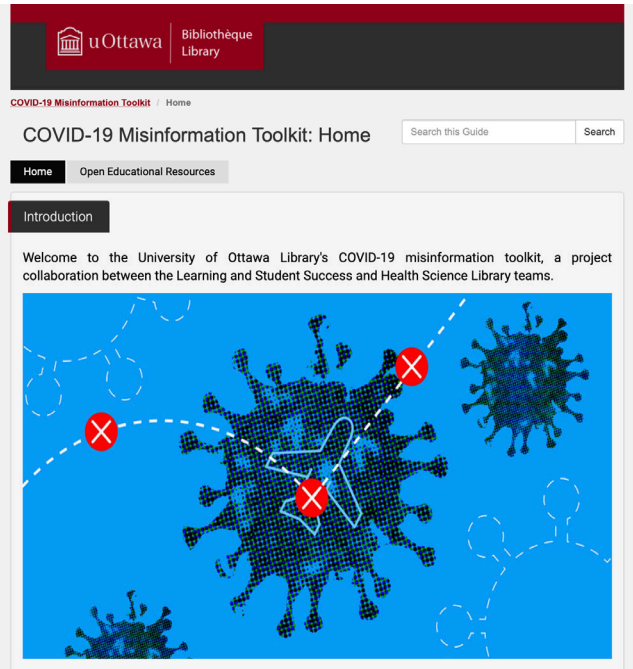
People all around the globe have been directly and indirectly impacted by the coronavirus disease 2019 (COVID-19) pandemic. Beyond the public health consequences, COVID-19 has also been a hot topic of discussion on social media and webpages. A large amount of COVID-19 data and information is available on the internet and with the advanced technology available, can be rapidly shared. Anyone can freely generate and share their thoughts online about the virus. Unfortunately, some users create and disseminate content which are untrue, misleading and lack scientific evidence to support their views about COVID-19. This inaccurate information online has caused

fear and stress for many people and has also made the public health offices' interventions for providing accurate information and resources for the public not fully effective. The topics of disinformation include original sources of the virus, vaccination and treatments of the virus. As information professionals at the University of Ottawa Library's Learning and Student Success Unit, we identified the importance and urgency to help academic communities and the public to learn and become more aware about COVID-19 fake news and conspiracy theories. Therefore, we developed the COVID-19 Misinformation Toolkit which could be accessed by visiting the following URLs below or searching on your preferred search engines **(Figure 1)**:

English page: https://uottawa.libguides.com/c.php?g=715113

French page: https://uottawa.libguides.com/c.php?g=715145

Figure 1: COVID-19 Misinformation Toolkit homepage on the University of Ottawa Library website



The first goal of the toolkit is to provide a list of resources related to COVID-19 misinformation available online and offline at the University of Ottawa Library. This provides users with direct access to the online and print COVID-19 misinformation-related books, journal articles, and webpages of Canadian provincial and federal public offices and the World Health Organization (WHO). We have also embedded the WHO and the Public Health Agency of Canada's Twitter accounts to inform users of recent news development about the COVID-19.

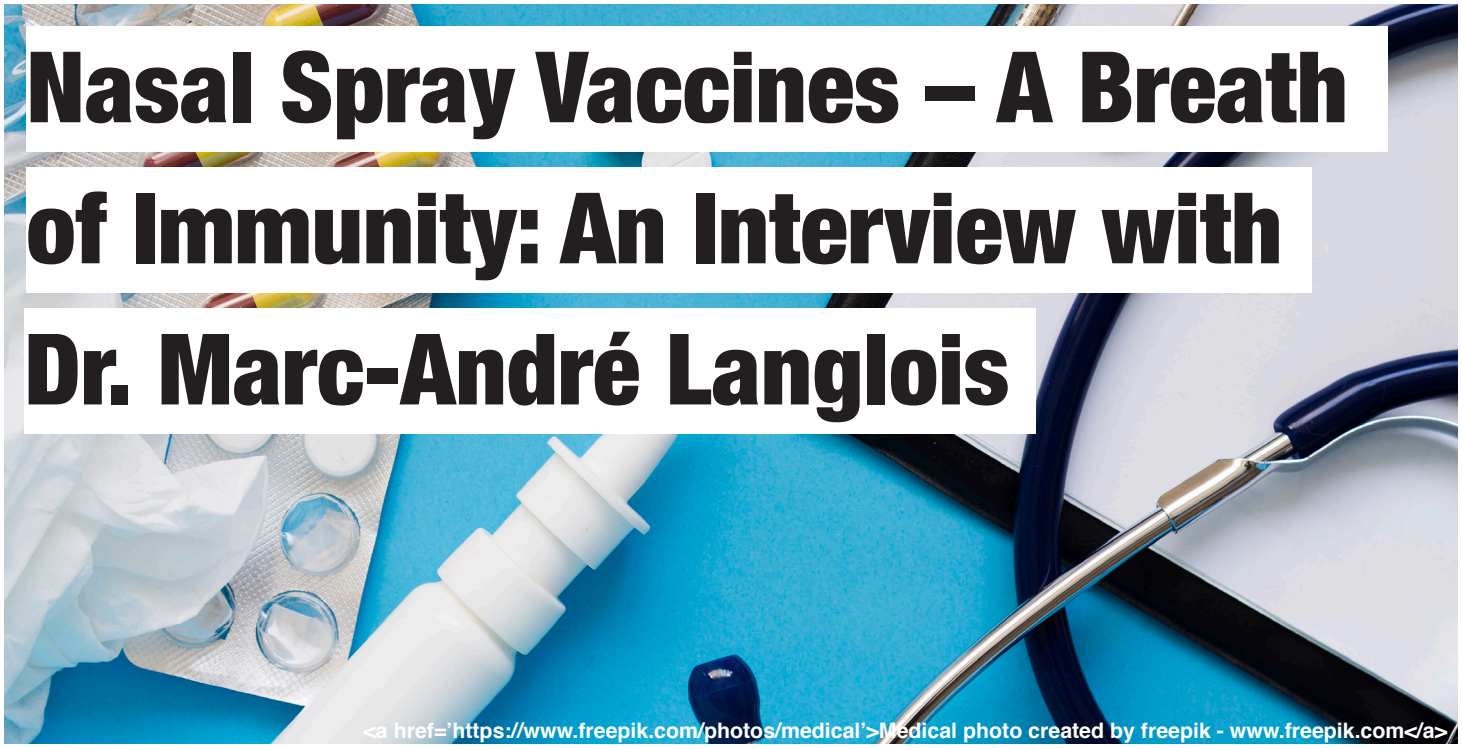
The second goal of the toolkit is to develop open educational resources (OER) to support learning and research activities at the University of Ottawa and also other institutions in Canada and abroad. Thematic content in the OER page includes what we know thus far about COVID-19 misinformation from academic literature, fact-checking strategies, suggestions to help adjust your research in light of COVID-19 misinformation, how to publish your literature review on COVID-19 misinformation, as well as Q&A and feedback between librarians, students, professors, and researchers on COVID-19 misinformation. We also include links to connect with peers or senior academics who are doing COVID-19 misinformation research, as well as provide an opportunity to test your knowledge on COVID-19 misinformation with a multiple-choice test.

At the time of writing, we are very pleased to announce that we have conducted an interview with Dr. Raywat Deonandan, Associate Professor at the Faculty of Health Sciences, University of Ottawa. The interview will soon be posted on the OER page of the COVID-19 Misinformation Toolkit. We asked Dr. Deonandan about the different content categories of COVID-19 misinformation, particularly on social media; how the COVID-19 misinformation spreads; what the motivations are that drive distribution of the COVID-19 misinformation; and, what are the effects of the COVID-19 misinformation for Canadians and people around the world? We plan to conduct similar interviews with computer science and humanity professors to gain different perspectives about the COVID-19 misinformation. Moreover, the authors are also in the process of conducting a systematic literature review on COVID-19 misinformation on social media. The full review will be submitted for publication in a journal and some details from the review will be posted on the toolkit.

2. CONCLUSION

We invite you to visit the University of Ottawa Library's COVID-19 Misinformation Toolkit, available in both English and French. Our goal is to transform our library to not just be a place of housing books and journals, but also be a place for creating accessible knowledge for everyone, as we will all get through the COVID-19 challenges together.

Nasal Spray Vaccines – A Breath of Immunity: An Interview with Dr. Marc-André Langlois



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Date Published: July 30, 2021

DOI: https://doi.org/10.18192/uojm.v11i1.5974

ABSTRACT

Dr. Marc-André Langlois, a cutting-edge virologist, Canada Research Chair in Molecular Virology and Intrinsic Immunity, and Professor in the Department of Biochemistry, Microbiology and Immunology at the University of Ottawa, received 1 million dollars in Canadian Institutes of Health Research (CIHR) funding to develop a nasal spray COVID-19 vaccine. We had the privilege of meeting with him virtually and having a fascinating and informative conversation on the COVID-19 pandemic, vaccines, and its effect on society.

RÉSUMÉ

Dr Marc-André Langlois, virologue renommé, titulaire de la Chaire de Recherche du Canada en Virologie Moléculaire et Immunité Intrinsèque, ainsi que professeur au sein du Département de Biochimie, Microbiologie et Immunologie de l'Université d'Ottawa, a reçu un million de dollars des Instituts de Recherche en Santé du Canada (IRSC) afin de mettre au point un vaccin contre la COVID-19 sous forme de vaporisateur nasal. Nous avons eu le privilège de le rencontrer virtuellement et d'avoir une conversation fascinante et instructive à propos de la pandémie, des vaccins et de l'effet de la COVID-19 sur la société.

Keywords: *Interview, virologist, COVID-19, pandemic, vaccine*

Can you please say a few words about your academic background? How did you choose your career in virology research?

Well, ending up in virology was a little bit of serendipity. During my bachelor's degree in Microbiology, I became very interested in immunology and allergy. So, I did my Master's in immunology. To learn more technical approaches, such as modifying genes and expressing proteins, I did a PhD in molecular and cell biology so that my career could move forward. During my PhD, I learned cloning techniques and worked with viral vectors for gene delivery. After that, I looked around for top labs working on antibody affinity maturation and class switching and ended up doing a

postdoc with Dr. Michael Neuberger in Cambridge, UK. His lab had just discovered a new protein part of the innate immune system, among the first retroviral restriction factors found called APOBEC3. I thought the field of retroviruses was fascinating. The whole sphere around retroviruses and how the immune system restricts them fascinates me. This is what my lab studied until the COVID-19 pandemic. When the pandemic hit, I refocused our efforts on what was immediately necessary at the beginning of the pandemic, such as viral detection and serological assays. My lab's activities pivoted quite significantly at that point.

In what ways is the COVID-19 pandemic similar to other previous viral pandemics?

We haven't had many pandemics in our lifetime. There was the HIV pandemic. However, HIV is not as easily transmitted as an airborne respiratory virus. Influenza is also a pandemic virus, but we have vaccines for it. COVID-19 is so different because it's the first time humans are exposed to such an infectious virus that causes severe morbidity and high mortality levels. And, we had no vaccines for this virus when it started spreading. So, in this instance, the coronavirus is very different from the other viruses so far because we were unprepared for it.

We can make comparisons to the Spanish flu; this is what is done very frequently. However, over a hundred years ago, medical advances were not what they are now. In 1918, the world was coming out of a war and hospitals were filled with injured soldiers. So, the socio-demographic, economic situation was very, very different back then. This is probably why the virus spread so quickly. There were many injured people in dense shelters after the bombing, so the virus could easily be transmitted; there were no vaccines for influenza back then. Therefore, the virus caused a lot of damage and deaths.

The circumstances are entirely different now. The world has a much higher population density. Cities are highly populated, and there's a lot of public transport with a high density of people. In some ways, the current pandemic has its own unique challenges that we were not faced with before, such as air travel. We've realized how reliant we were on air travel to go to conferences and holidays to visit families. And all of a sudden, there's no more air travel. Those are the implications of having a pandemic virus that is airborne and transmitted through aerosols. These viruses are highly transmissible and infectious.

What do you think are the possible reasons that COVID-19 has a differential effect on people across different age groups or people with different comorbidities or characteristics?

We know that if you have an underlying health condition and you're infected with this virus, you will do less well than healthy individuals. Therefore, individuals in long-term care are often afflicted with multiple comorbidities and are impacted much more. We also know that COVID-19 is an inflammatory disease, so it causes severe inflammation in the lungs. Why does it do that more than other viruses? We do not exactly know yet. However, we can observe that most children infected can be carriers of the virus and transmit the virus, but they don't appear to have severe symptoms in most cases; they don't appear to have high levels of inflammation. There are differences in how the virus propagates and causes disease in younger humans, adults, and the elderly. A possible reason is that the angiotensin-converting enzyme levels in children are lower than in an adult. However, it has not been formally demonstrated yet as a probable cause for the difference in infection.

In general, there are a lot of factors that can affect how humans will experience an infection. Indeed, the genetics of the immune system could be a component. We all know that T cell responses are closely linked to human genetics and how these antigens are presented on the surface of T cells. Another parameter that can affect the severity of the disease is pre-exposure to other coronaviruses. There are seasonal coronaviruses that regularly infect us and cause the common cold. We don't make much of them because they usually don't cause severe disease; we cough, have a runny nose and still go to work (when we shouldn't!). These exposures to the seasonal coronavirus do appear to be protective to some degree. If you have had a recent infection of another coronavirus, there is evidence that you could be protected against severe symptoms of COVID-19. So, suppose you look at the complete landscape. In that case, many factors will contribute to whether or not you will be very sick or you will be asymptomatic. Still, we haven't discovered all the factors that are involved in COVID-19 disease severity.

So, you have received massive funding to lead a national group in the development of the nasal vaccine Congratulations, by the way. Could you tell us a bit

more about that project? What are the advantages and disadvantages to nasal vaccines compared to injected vaccines?

A year ago, we received funding to develop a nasal spray vaccine. We were well aware that several companies were developing injected vaccines. The new mRNA vaccines and the vector vaccines would also be coming out very quickly, given the relative simplicity of the Coronavirus. The Coronavirus has one huge antigen on its surface called the spike. All these vaccines are designed to stimulate your immune system to recognize that spike protein, neutralizing it and preventing the virus from infecting new cells. We were well aware that most vaccine approaches would be a standard injection, so we wanted to take another approach to stimulate mucosal immunity in the airways. Given that this is a respiratory virus, you have to inhale it to get infected.

Mucosal immunity is very localized. And, in the case of a nasal spray, it would be just in the upper respiratory tract. This is where the virus comes in. These are the first cells that are infected. When these cells are infected, the viruses can then go down and make their way to the lower respiratory tract. That's when one would get really sick. The idea is that if you can block the virus at the very early stages, at the very entrance to your respiratory tract, you'd have a better chance of neutralizing that virus. The nasal spray vaccine has the advantage of stimulating the immune system exactly where the virus comes in.

Further, vaccine hesitancy is a real impediment to herd immunity, even with very safe vaccines. We expect no more than 65, maybe 70% of the population, will accept both doses of the vaccine. So that exposes 30 to 35% of the people that want nothing to do with the vaccine. A nasal spray vaccine is seen as generally less invasive. There's no needle. It's just a spray; people take sprays for allergies all the time, for instance. Hence, it is seen as generally non-invasive. It almost doesn't feel like a vaccine for most people. And we felt that by developing such a nasal vaccine, we were basically filling the gap in the vaccination campaigns.

Furthermore, the vaccines you receive intramuscularly enable you to develop a potentially severe response. But this immunity wanes over time. So, let's say you took your last shot of COVID vaccines 14 months ago, and you have to take the plane. Perhaps, if you had a nasal spray vaccine that you could get over the counter, you could take it a week or two before boarding the plane. In that case, you could stimulate that mucosal immunity in your upper respiratory tract, which might just give you enough added protection.

Current coronavirus vaccines that are out right now do not necessarily provide sterilizing immunity, which means to protect completely from infection. But by using both vaccine strategies together, you would be stimulating a robust IgA response in the upper respiratory tract and standard neutralizing IgG responses in the lower respiratory tract and blood. So, if you inhale a virus, you can neutralize it at the entry point, and you would have the backup of a standard vaccine. This is how we imagined a nasal spray vaccine to be beneficial; it's not competing with vaccines from giant pharmaceutical companies.

Would this vaccine also be RNA based?

It is a protein-based vaccine, we are expressing parts of the surface spike protein, and we are doing that in plants. Another major issue with vaccines is the global access to vaccines. These mRNA vaccines need to be maintained frozen, and it's challenging to maintain this cold chain if you're going into Africa and Asia. So, there are large populations of humans that would struggle to access these vaccines. Protein-based vaccines have the advantage of being more stable at warmer temperatures and are easier to ship. By developing nasal spray protein-based vaccines made in plants, countries could technically produce their own supplies. The complexity of creating them is much less. There are several advantages for global distribution and accessibility.

Now we're at a stage where we successfully produce the proteins in these plans. We've tested the proteins compared to proteins made in human cells. They're performing just as well in ELISA (enzyme-linked immunosorbent assay) and neutralization assays. It is a very promising approach, but it is still at the experimental stage.

What candidate viruses do you fear the most for future pandemics?

Influenza and coronaviruses are highly infectious airborne viruses. We have seen that such viruses that infect the lungs create tremendous complications in hospitals and

broader society. Specialized protective equipment and stringent protocols are needed to treat such diseases, such as N95 masks, visors, ventilators, and isolation areas. You're also putting all your staff at risk every time you treat a patient; that patient might cough and create more aerosols, and there could be multiple transmissions. There are massive complications with airborne viruses.

In contrast, blood-borne viruses, such as HIV, have much more limited transmission. They can't quickly spread without direct and intimate contact. I think respiratory viruses will be something that will be on everyone's radar for a very long time.

Will our daily lives go back to normal?

The definition of normal will change. The new normal for the future will incorporate the lessons that have been learned. The first lesson is that many of us do not need to go to work every day physically. We've realized that the overall productivity of the human population has not gone down from working at home. In most cases, people are honest and give a genuine fair day's work at home. The advantages of not commuting to work are clear. Suddenly, you gain one to four hours a day of your life by being at home, where you can be productive for yourself and your family. Some individuals do need to physically go to work due to the nature of their employment or for their mental health. Still, overall, we realize that a lot can be done at home. People won't travel as much for conferences and business. Companies have realized they're saving money by not holding all their meetings in person.

The norm will also change concerning sanitary measures in public spaces. Will there be a mandatory mask-wearing time in metros or buses? Next time its flu season, we might be asking everyone to wear a mask inside public buildings. Wearing a mask will now have become part of our norm. It's not a strange thing anymore. So, there will be all these small changes throughout society and in our everyday routine.

In 10 or 15 years, when the next generation who have not lived through the pandemic become teenagers, it will mostly be a historical event for them. The fear of the pandemic will dissipate because it will not be something observable. However, the way the pandemic has changed the population's perspective may remain. The awareness of contagion and transmittable diseases will become ingrained in society, similar to the current culture in Asia. When you go to Japan, you see many people wearing masks in high-density public areas. It is perceived as a good hygienic practice and part of the culture to wear a mask when entering high-density environments, especially if you have sniffles.

What is very particular about this pandemic is that everything has been documented in great detail because of the widespread use of digital media If faced with the dangers of a new pandemic, future generations will have the opportunity to go back to these archives and evaluate what worked and what did not. Hopefully, they will make better decisions regarding promptly imposing the wearing of masks in public and shutting down borders and travel to avoid worldwide spread.

Call For Submissions

GENERAL CALL FOR SUBMISSIONS

The University of Ottawa Journal of Medicine (UOJM) is a peer-reviewed journal led by graduate and medical students at the Faculty of Medicine of the University of Ottawa. The UOJM considers manuscripts on any **clinical, biomedical, or health-related subjects**, and we now use a **continuous online publication** model throughout the year, supplemented by biannual themed, printed issues. We welcome high-quality submissions, in English and French, in the form of original research (also includes study protocols and meta-research), reviews and clinical practice, news and letters, commentaries, case and elective reports, and interviews.

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CALL FOR FALL ISSUE COVER ARTWORK

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We look forward to receiving your submissions!

Zacharie Saint-Georges & Omar Dewidar
Co-Editors in Chief
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Appel De Soumissions

APPEL GÉNÉRAL AUX SOUMISSIONS

Le Journal médical de l'Université d'Ottawa (JMUO) est une revue à comité de lecture dirigée par des étudiants diplômés et des étudiants en médecine de la Faculté de Médecine de l'Université d'Ottawa. Le JMUO accepte les manuscrits portant sur **tous les sujets cliniques, biomédicaux ou liés à la santé**. Nous utilisons maintenant **un modèle de publication continue en ligne tout au long de l'année**, complété par des éditions imprimées thématiques semestrielles. Nous accueillons des soumissions de haute qualité dans les deux langues officielles, soit en anglais ou en français, sous la forme de recherches originales (y compris les protocoles d'étude et les méta-recherches), de revues et de pratiques cliniques, de nouvelles et de lettres, d'articles commentaires, d'entrevues et de rapports de cas et de stage à option.

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APPEL AUX ILLUSTRATIONS POUR LA COUVERTURE DE L'ÉDITION D'AUTOMNE

Le JMUO a également le plaisir de lancer un appel aux illustrations pour la couverture de son **édition d'automne 11.2 : La justice sociale dans les soins de santé**. Nous recherchons des images photographiques de haute qualité qui représentent la justice sociale canadienne, son échec ou les minorités visibles.

Nous sommes impatients de recevoir vos soumissions !

Zacharie Saint-Georges et Omar Dewidar
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Ontario Partners in Health (OPiH) offers a stimulating career and positive environment. We have a diverse team of providers collaborating and utilizing their skills and experience to deliver high quality primary health care through integrated health solutions to our clients in Ottawa, including the ByWard Family Health Team on the campus of the University of Ottawa. If you're interested in working at a clinic in an urban or university setting, or if having a practice in the suburbs is more to your liking, we may have what you're looking for. If quality of care, innovation, inclusivity, respect and collaboration is what inspires you, come join our team of health care professionals. For additional information, including career opportunities, go to our website at opih.ca/careers.

Médicine familiale Family Medicine	Suppléance Locum	Specialiste Specialist	Clinique sans rendez vous Walk-in Clinic


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