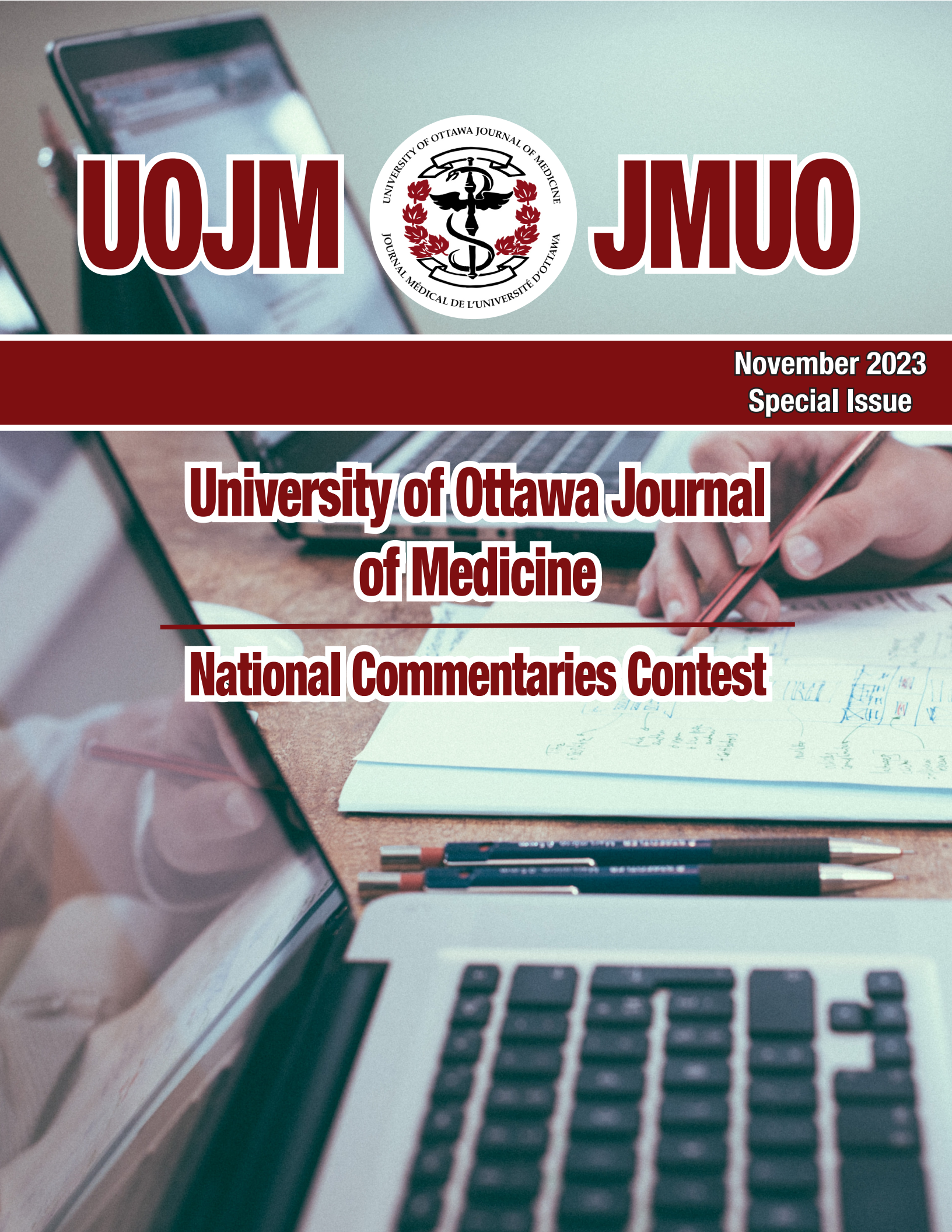

UOJM JMUO

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Special Issue

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National Commentaries Contest

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The student-run medical journal of the University of Ottawa

ABOUT US

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

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

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UOJM: PREFACE

The University of Ottawa Journal of Medicine (UOJM) is proud to share this special issue featuring the top-ranked, winning submissions in each category of the third annual UOJM National Commentaries Contest. Through academic writing, this contest seeks to give a platform for trainees across Canada to communicate and reflect on timely topics in medicine and research. The commentaries received ranged in topics from current controversies in healthcare to advances in training and social issues impacting healthcare.

This annual contest is open to any student, medical resident, and post-doctoral fellow across Canada. Trainees were invited to submit a 1000-word commentary article on any topic related to the medical field in French or English. In the spring of 2023, UOJM received well over 80 submissions which were peer-reviewed by the UOJM Editorial Team. Double-blinded submissions were initially scored by independent peer reviewers and submissions that ranked in the top quartile of each submission category were then evaluated by faculty experts at the University of Ottawa.

We were impressed by the quality and creativity of the submissions this year, and we would like to sincerely thank everyone who participated in this edition of the contest! We also thank reviewers, faculty evaluators, as well as the various UOJM sponsors for their support. A special thank you to Affaires Francophones of the University of Ottawa's Faculty of Medicine for their significant support for the francophone prizes. This contest continues to be a great success and remains in line with UOJM's vision and mission. As such, this contest will return in early 2024.

We hope that this collection of commentaries from trainees across Canada is an exciting, stimulating, and intriguing read. We again warmly thank everyone involved in this initiative and congratulate the winning authors!

Yannick Galipeau & Bryce Bogie
Co-Editors in Chief (2023-2024)

Winners of the English Stream Contest

1st Place: Raksha Shriraam, University of Ottawa
Title: Diagnosing the Urgency: Climate Change and the Imperative for Medical Education Reform

2nd Place: Michael Balas, University of Toronto
Title: Climate Change and Infectious Disease: A Looming Public Health Challenge

3rd Place: John Le, University of Ottawa
Title: The rural care challenge - Let's bridge the gap!

Medical Residents & Post-Doctoral Fellows

1st Place: Arthur Travis Pickett, University of Ottawa
Title: Laryngectomy Awareness - Are we doing enough?

2nd Place: Nicholas Fabiano, University of Ottawa
Title: Suffering in Silence - Suicide in Medical Training

JMUO: PRÉFACE

Le Journal de médecine de l'Université d'Ottawa (JMUO) est fier de partager ce numéro spécial mettant en vedette les soumissions gagnantes les mieux classées dans chaque catégorie du troisième concours national annuel de commentaires de l'JMUO. Par le biais de la rédaction académique, ce concours vise à donner une plateforme aux étudiants en formation à travers le Canada pour communiquer et réfléchir sur des sujets d'actualité en médecine et en recherche. Les commentaires reçus portaient sur des sujets allant des controverses actuelles dans le domaine des soins de santé aux avancées en matière de formation et aux questions sociales ayant un impact sur les soins de santé.

Ce concours annuel est ouvert à tous les étudiants, résidents en médecine et boursiers postdoctoraux du Canada. Les étudiants ont été invités à soumettre un article de commentaire de 1000 mots sur tout sujet lié au domaine médical, en français ou en anglais. Au printemps 2023, l'UOJM a reçu plus de 80 soumissions qui ont été évaluées par l'équipe éditoriale de l'UOJM. Les soumissions en double aveugle ont d'abord été notées par des pairs évaluateurs indépendants et les soumissions qui se sont classées dans le quartile supérieur de chaque catégorie de soumission ont ensuite été évaluées par des experts du corps professoral de l'Université d'Ottawa.

Nous avons été impressionnés par la qualité et la créativité des candidatures cette année, et nous tenons à remercier sincèrement tous ceux qui ont participé à cette édition du concours ! Nous remercions également les réviseurs, les évaluateurs de la faculté, ainsi que les divers commanditaires de l'UOJM pour leur soutien. Nous remercions tout particulièrement les Affaires francophones de la Faculté de médecine de l'Université d'Ottawa pour leur précieux appui aux prix francophones. Ce concours continue d'être un grand succès et reste en phase avec la vision et la mission de l'UOJM. Ainsi, ce concours reviendra au début de l'année 2024.

Nous espérons que cette collection de commentaires provenant des étudiants en formation à travers tout le Canada se révélera une lecture passionnante, stimulante et intrigante. Nous remercions encore une fois chaleureusement tous ceux qui ont participé à cette initiative et nous félicitons les auteurs gagnants !

Yannick Galipeau & Bryce Bogie
Co-rédacteurs en chef (2023-2024)

Gagnants du volet francophone du concours:

1ère place: Véronique Allain, Université de Sherbrooke
Titre: L'impact de la pandémie de COVID-19 sur les cancers de la sphère ORL

2ème place: Rémi Vincent, Université d'Ottawa
Titre: La cigarette électronique: un écran de fumée

3ème place: Abbas Guennoun Université de Montréal
Titre: L'intelligence artificielle: une solution aux problèmes du système de santé

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Volet Francophone

Medical Residents & Post-Doctoral Fellows

Social Media and Mental Health

Shadi Hadj-Youssef

Faculty of Medicine, McGill University

Social media has become an integral part of our daily lives, connecting people from all over the world and facilitating communication, collaboration, and creativity. With the click of a button, we can share our thoughts, feelings, and experiences with friends, family, and even strangers. However, as social media has become more ubiquitous, it has also been linked to negative effects on mental health (1). In this commentary, I argue that social media platforms must take responsibility for the negative impact they have on mental health and take action to mitigate these effects.

First and foremost, it is important to recognize the negative impact that social media can have on mental health. Numerous studies have shown that social media use is linked to increased rates of depression and anxiety (2), feelings of loneliness and isolation (3), and decreased self-esteem (4). A 2018 study published in the Journal of Social and Clinical Psychology found that limiting social media use to 30 minutes per day for three weeks led to significan improvements in well-being, including reductions in feelings of loneliness and depression (5). Another study published in the journal Sleep found that social media use was linked to decreased sleep quality and increased symptoms of anxiety and depression in college students (6).

There are several reasons why social media can have a negative impact on mental health. For one, social media platforms often prioritize engagement and profits over user well-being. This can lead to the spread of harmful or misleading content, as algorithms prioritize content that is more likely to go viral, regardless of its accuracy or potential harm (7). This can contribute to the spread of conspiracy theories, hate speech, and other harmful content that can negatively impact mental health.

In addition, social media use can contribute to feelings of social comparison and FOMO (fear of missing out), as people often present idealized versions of themselves and their lives on social media (5). This can lead to feelings of inadequacy or inferiority, as individuals compare themselves to others who appear to be happier, more successful, or more attractive. This can be particularly harmful for vulnerable populations, such as young people or individuals with pre-existing mental health conditions.

To mitigate the negative impact of social media on mental health, social media platforms must take responsibility for the impact they have on user well-being and take action to promote positive mental health outcomes. This can include implementing transparency in algorithms and content moderation, so that users can understand how their feeds are curated and can report harmful or misleading content[8]. It can also include promoting positive interactions and mental health resources within the platform, such as chatbots or crisis hotlines. In addition, social media platforms can partner with mental health organizations to promote education and awareness around mental health and to connect users with resources and support.

One example of a social media platform that has taken steps to promote positive mental health outcomes is Instagram. In 2019, Instagram began hiding likes in several countries, in an effort to reduce feelings of social comparison and to promote well-being[9]. In addition, Instagram has implemented tools that allow users to manage their time on the platform, such as the ability to set daily limits on usage and to mute notificatio s during certain times of the day (10).

While these initiatives are a step in the right direction, more needs to be done to promote positive mental health outcomes on social media. It is important for social media platforms to prioritize user well-being over profits and to work towards creating a healthier online environment. This can include partnering with mental health organizations to develop evidence-based interventions that can be implemented within the platform, such as cognitive-behavioral therapy or mindfulness training (11).

In conclusion, social media has become an integral part

of our daily lives, but it has also been linked to negative effects on mental health. The evidence is clear that social media use can contribute to increased rates of depression and anxiety, feelings of loneliness and isolation, and decreased self-esteem. Social media platforms must take responsibility for the negative impact they have on mental health and take action to mitigate these effects. This can include implementing transparency in algorithms and content moderation, promoting positive interactions and mental health resources within the platform, and partnering with mental health organizations to promote education and awareness around mental health.

As individuals, we can also take steps to protect our mental health on social media, such as limiting our time spent on these platforms, following accounts that promote positive messages, and being mindful of our own social media use and its potential impact on our mental health.

Ultimately, the negative impact of social media on mental health is a complex issue that requires a multi-faceted approach. By working together, social media platforms, mental health organizations, and individuals can create a healthier online environment that promotes positive mental health outcomes.

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Cultural Safety: Strategies to address Indigenous healthcare inequities in Canada

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Cultural safety (CS herein) is an emerging practice that requires healthcare professionals to surpass cultural sensitivity and competence knowledge (the previous gold standards in Indigenous healthcare) towards action (1,2). Rooted in patient-centred practice, CS emphasizes that healthcare workers need to practice "self-awareness, empathy, and respect" (3). Courteous and empathetic communication between practitioners where patients feel safe with their care is the hallmark of CS (4,5). Practitioners must self-reflect on how their assumptions, biases, and values affect healthcare provision [4] and recognize power imbalances embedded in their institutions (6,7).

One of the Truth and Reconciliation Commission of Canada's (TRC) calls to action is for governments to narrow gaps in health outcomes for Indigenous communities (8). Indigenous communities face a disproportionate burden of health risk factors and diseases, including inadequate housing, infant mortality, infectious diseases, chronic illnesses (e.g., diabetes) (3), and premature death (4,9). It is increasingly recognized that CS is essential to enhance Indigenous health status (10).

Racist and non-CS practices adversely affect Indigenous peoples' health in multiple ways (11). Mainstream Western medicine is often unfamiliar and intimidating to Indigenous peoples (4), who may prefer more familiar, holistic healing methods. Non-safe healthcare systems can lead to an increase in victim-blaming (12) and many patients' reluctance to visit healthcare facilities, even when medically necessary (2,4,9). In contrast, when Indigenous patients trust their service provider, they are more likely to utilize health services. Without appropriate policies, such as CS, patients often miss critical information regarding their diagnosis and treatment (2) and are less likely to utilize preventative care measures (e.g., immunizations and screening) (9). Cases of unreasonably long wait times are significant among Indigenous patients and have served as a barrier to life-saving treatments (7). Moreover, numerous Indigenous patients have died due to structural racism and negligence on the part of healthcare workers (7), including the recent death of Joyce Echaquan in Quebec.

Numerous CS strategies exist at individual and institutional levels (3). A starting point for CS intervention is to target the personal biases of individual healthcare students and workers. Since many healthcare inequities result from practitioners' lack of understanding of Indigenous history and culture, critical reflection at the individual level is essential (11,13). As an example, the Anishnawbe Health Toronto clinic created the Aboriginal Cultural Safety Initiative to fill curriculum gaps for future healthcare workers (14). Student improvements were recognized in the following areas: a 54% increased interest in CS and, most notably, a 75% increased interest in CS advocacy work (14). These increased personal understandings are the first step towards implementing CS. Organizations can target individual employees through a no-tolerance-for-discrimination policy (4) and mandate CS education and training (13).

These approaches spark change at the individual level while intervening in the workplace. Additionally, employees should be monitored and evaluated after completing CS training to assess how the training has impacted performance (2,6). The key to successful CS practice is to

ensure that increased knowledge translates into upgraded skills, such as practitioner improvements in communication and quality of care. CS proficiency can be monitored by tracking and handling CS breaches head-on to ensure the same mistakes do not recur (11). A robust and powerful CS strategy requires evidence of CS practices for individuals and institutions to achieve ongoing accreditation and certification (6). These tactics are a surefire way to ensure that primary care professionals put their knowledge into practice and are held accountable.

Along with intervening at the individual level, the shift towards CS requires transformation at the institutional level, "including systems, practices, policies, …, medical education, funding and jurisdiction, service delivery, and infrastructure" (3, p. 1647). As this suggests, no one-practice-fits-all approach works; instead, for CS to succeed, numerous solutions are required. Indigenous leaders and elders should be heavily involved in integrating CS into healthcare policy and practice (13,15). A call to action by the TRC is that patients have access to Indigenous healing methods and elders when requested (8). It is well-documented that people feel more comfortable receiving care from someone who shares their heritage, language, and cultural understanding. Further, cultural elements and practices should be incorporated into care, including holistic healing, traditional ceremonies, medicine wheel directions, and smudging ceremonies (15).

Another scholar suggests building relationships with patients by listening to and respecting each person's needs and cultural beliefs to integrate this understanding into their care (12). Many provinces, including Newfoundland and Labrador, offer Aboriginal patient navigators who liaise between healthcare workers and patients (9) to promote community healthcare access (2). Expanding this practice to cover more healthcare offices and hospitals nationwide can further strengthen trust and healthcare access.

The TRC recommends increasing the number of Indigenous healthcare professionals, offering CS courses in all nursing and medicine curricula, and providing CS training to all Canadian healthcare workers (8,11). The medical school at Memorial University of Newfoundland has an Indigenous Health Initiative, which helps recruit and support Indigenous students and incorporates cultural relevance into the medical programs. This initiative provides medical students an excellent foundation for CS in their future careers. Further additions to curricula include Indigenous-specific cultural competency training and other training that helps primary care workers recognize and correct their biases. Practitioners must also be encouraged and given the time to build meaningful relationships with their patients and communicate with them from a non-judgmental and empathetic place. Overall, healthcare workers should employ numerous CS strategies to ameliorate the quality of care.

Canada should incorporate more CS strategies into their current healthcare environment through updated policy, mandating student and healthcare worker education and training, and incorporating Indigenous healers and cultural methods into care. These strategies echo many of the TRC's calls to action, further strengthening their importance. CS strategies can help break down the historical healthcare inequities Indigenous peoples face to help advance their healthcare access, information understanding, health status, and longevity. CS strategies are needed to advance Indigenous healthcare equity meaningfully (2,3) and is the essential link to Indigenous healing (5).

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Words of Solace

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"The single biggest problem in communication is the illusion that it has taken place." - George Bernard Shaw "Why isn't anyone listening to me?!" shrills the pleading inquiry of an exasperated patient. My sweaty palms grip the notebook clutched to my chest…it is my Aspis Herakleous. I utter, "I'm sorry." In seconds that stretch to eons, I pray to Hermes to bestow unto me the gift of gab. A breath of the piquant ethanol-tinged air calms my nerves, allowing my heart to pluck melodious words from my vocal cords, tinged with warmth the patient pined precariously for. Physicians, who in their vast brackish sea of knowledge, comb the tides for an inkling, who explore fearlessly through the minotaur's labyrinth of medical history, fail to be healers, and become explorers in its stead. In the pursuit of truth, they engine forward as a steam locomotive leaving the patient quivering at Solitude Station. As a novice shadowing the emergency department, I witnessed patients clinging onto every word tumbling out of the weathered physician's mouth…for a morsel of hope. Silent pleas for reassurance fell on deaf ears. Watching the patient's dejected eyes track us as we vanished behind the curtain, I found myself embroiled in a flashback of when I was 9 years old receiving a pneumonia diagnosis. As I gasped for air, fretting about survival, I queried "Will I die?" The attending did not even bother to lock eyes with me and apathetically conveyed, "I don't know." It may be the constraint of the three fates Clotho, Lachesis, and Atropos toying with the spool of time that leads to this massacre of empathy, but the shattering of glass named trust is irreproachable. Anecdotes pertaining to restrained communication by patients are rampant. Truth has been withheld from physicians due to the fear of stigma, admonition, or its ripple effect on other lives… such is the potency of information. And so, it is guarded furiously; examples include professional drivers abstaining from admitting to insomnia due to fear of losing their livelihoods, wives hiding their battered bodies so as not to incriminate their husbands, and youths staying mute about substance use to avoid stigmatization. This disruption in the flow of communication can not only have health repercussions but can also irremediably unsettle the fiduciary relationship. Mohsin Hamid mused "Empathy is about finding echoes of someone else in yourself." Droves propagate the message of empathetic practice, while unassuming masses consume it without incorporating its essence. Exuding emotional healing is a holistic approach to medicine. From a meta-perspective, one can dissect, why patients seek health services. Simply to heal. Per didactic propagation, medical students are urged to establish faith and open communication with patients. In the face of this albeit valuable lesson, I have pondered, "How can I expect vulnerability from others if I do not have the courage myself?" I received the privilege of partaking in Healer's Art. This course was immersed with introspection and taught an invaluable objective concerning communication; it is a fastidious guest and requires the bidirectionality of vulnerability. Courage begets courage. To allow others to disport, we must possess the courage to put our hearts on display. By engaging in a leveled discourse-sharing raw and painful remembrances, physicians not only gain trust but also respect. It is a simple yet eye-opening revelation; I recall instances where I refrained from communicating because I feared judgment. A power imbalance is entrenched within the physician-patient relationship; sharing intimately can disempower patients. It is imperative to find the art within medicine, and at times, contemporary occurrences demonstrate healers have become so entangled in the biomedical, medicine loses sight of the person entrusting their existence to physicians' hands. While shadowing, I met a patient presenting after months of dismissal, stoically explaining the emergence of dark vaginal discharge post-hysterectomy. My astute preceptor listened unwaveringly and promptly requested an abdominal CT. The patient crumbled into tears, repeatedly thanking the physician for intently heeding. The patient stated how isolating it felt to be unacknowledged- my preceptor froze at this presentation of emotions and dissipated dutifully. After moments of uncertainty, I let instinct guide me and placed my hand on the patient's arm handing her tissues, which

she gladly accepted to wipe off months of frustration. I inquired about her sentiments, which cascaded out of her mouth as she painted a picture of her spiraling desperation. I stood by her bedside for 10 minutes of undivided devotion. This instance of communication had taken a mere morsel of my 6-hour shift but made a world of distinction for this patient. Gabor Maté accentuated "[f]rom the Latin word vulnerare, "to wound," vulnerability is our susceptibility to be wounded. This fragility is part of our nature." Whenever I falter while soothing a suffering being, I will draw upon my own experience as a terrified 9-year-old. Theodore Roosevelt discovered what I have come to realize decades ago; "No one cares how much you know until they know how much you care." This statement holds particularly true for the physician-patient relationship. Internally, empathy fuels my training, however, if I am unable to correspond to this sentiment, instead of being a partner, I will be painted as a pompous patronizer. To negate the power imbalance, I reminisce to my patient self, nervously mumbling to physicians. To empower patients, I toss aside the proverbial mask and expose their influe ce upon my being. I hold the steadfast belief that healers should demonstrate an array of passions to allow space for open dialogue, rather than a monologue. The crassness that is rampant in medicine is a defense mechanism on part of practitioners to detach themselves from the horrors of compassion burnout. I implore we remain in touch with our vulnerability to erode the tarnished clinical stone face. To ward off the callousing of my heart, I stand naked via unabating communication and pledge to indicate my solidarity with patients by being ardently susceptible. To heal all and sundry, I overcome the incessant necessity to suppress my humanity.

Diagnosing the Urgency: Climate Change and the Imperative for Medical Education Reform

Raksha Shriraam

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The imminent threat of climate change is knocking at our front door.

The United Nations (UN) Climate Change Report sounds a code red for humanity (1).

The facts are irrefutable and the alarms are deafening, yet as a global society, we are slow to answer.

UN Secretary General, Antonio Guterres, opened the 2022 UN Climate Change Conference with a dire call for action as he declared the climate crisis to be the "defining issue of our age" and the "central challenge of our century". We must pay heed to his stark admonition that "we are nearing the point of no return; of overshooting the internationally agreed limit of 1.5 degrees Celsius of global warming" (2). A recent report from the Intergovernmental Panel on Climate Change highlights the projected negative consequences of any increase in global temperature on human health, with greater impacts of heatwaves and increased risks of vector-borne diseases and undernutrition (3).

Paradoxically, while our healthcare system experiences the devastating repercussions of climate change, it is also a significant contributor to the crisis. The Canadian healthcare system generates 33 million tonnes of greenhouse gas emissions, accounting for nearly 5 % of the national total, rivaling those of major economic industries like aviation (4,5). With global temperatures rising, threatening to undermine the past 50 years of progress in global health and development, we cannot afford to continue ignoring the ongoing damage to Earth's ecological integrity (6).

Acknowledging the dismal environmental performance of the healthcare sector and the growing detrimental effects of climate change on health, I call for prioritizing the integration of planetary health and sustainable medicine into the medical education curriculum to not only prepare medical students for climate-related challenges but to foster a culture of environmental responsibility and awareness.

First and foremost, we need to prepare future healthcare professionals to adapt to the risks of accelerated global warming. Students should learn to anticipate an altered burden of disease. With climate change and ecological breakdown, there are increasing heat and air quality-related morbidities, vector-borne illnesses, and changes in infectious disease patterns (7).

Medical students must also be prepared for how the ability to deliver care will be affected. For example, in 2021, British Columbia experienced a deadly heat dome, claiming 619 lives (8). This overwhelmed emergency services and suspended elective surgeries. With a historic wildfire season followed by atmospheric river events, healthcare facilities in the province were evacuated, and critical infrastructure was demolished, thereby impeding access to care (9). These major disruptions to the health system not only jeopardize population health but also strain already overburdened healthcare professionals, provoking distress and exacerbating mental health for patients and physicians alike. It is crucial that students are informed of these challenges and that medical training encompasses elements of resilience such that students are equipped to manage difficult circumstances and continue delivering care despite increasing disruption.

Another dominant pillar of climate action is mitigation, which entails taking steps toward a low-carbon health system with the goal of achieving net zero emissions (10). Healthcare professionals are uniquely positioned to advocate for practices and policies that will reduce the healthcare climate footprint and global disease burden. Our current model of care produces emissions and hazardous pollutants that have ultimately resulted in a loss of approximately 23,000 disability-adjusted life years annually (4). To break the cycle that undermines human health and increases disease burden, we need to encourage interdisciplinary research collaboration between the Faculty of Medicine and other players such as public health and environmental engineering. Such collaborations can generate evidence-based sustainable healthcare practices, drive innovation in medical device development, and facilitate the implementation of appropriate policy solutions.

Furthermore, medical students should receive sustainable clinical practice teaching. The power of micro-level actions is demonstrated in a recent study where Dr. MacNeill and colleagues discovered that the choice of volatile anesthetic agents used in surgery was a major contributor to the operating room greenhouse gas emissions (11). They found that the preferential use of desflurane, which is nearly 2500 times more harmful than carbon dioxide from a climate perspective, made a ten-fold difference in the anesthetic footprint across hospitals (11). Following these findings, seven hospital pharmacies have shown that the clinical decision to eliminate desflurane can substantially reduce an institution's carbon footprint, thereby highlighting the importance of teaching sustainable healthcare across the medical education continuum (12).

Given the climate-related obstacles facing the planet and the medical profession, compounded by the narrowing window of opportunity to reverse course and safeguard human health from global warming, medical students are distressed (13). In a recent national survey of 1424 students at Canadian medical schools, the vast majority (79.8%) expressed a desire for more comprehensive instruction on climate change and its health impacts while a significan proportion (85.6%) agreed that it should be formally integrated into medical school curricula (14). Subjects of greatest interest included green healthcare practices, food and water insecurity, and vulnerable, displaced, or marginalized populations (14). Unfortunately, the current reality of medical education does not reflect these calls for the incorporation of fundamental climate change and health content.

According to the 2022-2023 planetary health report card, uOttawa received a 'C-' in planetary health curriculum and a 'B' in interdisciplinary research in health and environment (15). However, with the appointment of Dr. Moloo as Planetary Health Director, and the Faculty of Medicine's Inaugural Planetary Health Symposium in 2022, the University of Ottawa has taken steps towards placing climate change at the forefront of education of the next generation of healthcare professionals. This is a call to action for the disseminated integration of planetary and sustainable healthcare curriculum into the education of all uOttawa medical students.

While uOttawa works towards integrating climate change into the curriculum, I strongly urge all Faculty of Medicine learners to participate in the Concentration in Global Health and Social Accountability, which is an optional curriculum that offers education on planetary health. By pursuing planetary and sustainable healthcare education, we will prepare the next generation of healthcare professionals for climate-related challenges, reduce the environmental impact of the medical field, and advocate for a brighter and healthier future.

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The rural care challenge - Let's bridge the gap!

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Canadians pride ourselves on the universal healthcare systems. However, the impact of the COVID-19 pandemic has highlighted some of our long-neglected healthcare challenges. Due to the physician shortage and the increased backlog, healthcare has become inaccessible. This problem is most evident in our rural and remote communities, where there may be no provider and patients often travel hours for care. To alleviate this barrier, I propose expanding virtual care and medical travel subsidization, while investing in long-term community/physician partnerships.

Almost 20% of Canadians live in rural communities, yet only 9.7% of doctors practice there, leading to an imbalance of healthcare supply and demand (1). For this reason, most rural and remote residents travel over 30 minutes on average to access a physician, and some traveling hours (2). It is even worse in remote Indigenous communities, where health services unavailability represents 25% of unmet healthcare needs (3). This demonstrates a pernicious problem with rural healthcare accessibility, but it is also an opportunity for improvements.

Recruiting and retaining healthcare providers in rural and remote communities to meet healthcare demands can be difficult as it is costly, and providers may be more interested in the advantages of an urban setting (4, 5). For this reason, virtual care can be an alternative for remote and rural healthcare. A recent study showed a 90% and 91% physician and patient satisfaction rate with rural virtual care, demonstrating favourability (6). However, concerns remain regarding the quality of care that patients can receive. Virtual care has many limitations since some clinical examinations, and effective virtual physician-patient communication can be challenging (7). Virtual care is also a barrier for physicians and patients with limited technological literacy or access (7). Despite this, the solution remains viable due to the current physician shortage and the significant difficulties of recruiting providers in rural and remote settings. Virtual care with adequate technological infrastructure can help providers make simple clinical decisions and monitor patients while reserving in-person visits for more complex care that requires further examination (8). As this format becomes convenient, better utilized, and understood, it will immensely support residents in rural and remote communities.

Even with virtual care access, some patients still need to travel for access, which comes with associated losses in work, transportation costs, and related expenses. A British Columbia study estimated that it costs rural patients on average $856, $674, and $2276 per clinical visit for travel, accommodations, and lost wages (9). These expenses are significant stressors for patients and add to the stress of traveling and being away from home, which may delay or prevent rural patients from accessing care (9). Government agencies can target this barrier by alleviating this financial burden. Presently, in most provinces, there are subsidization programs for rural health travel, but frankly, they fall short. In Ontario, the Northern Health Travel Grant only subsidizes 41 cents/km and up to $550 for accommodation, therefore insufficient to cover traveling costs or extended medical stays (10). To sufficiently alleviate this financial barrier to healthcare access, provincial and federal governments should increase available funding for medical travel expenses. Critics of funds for medical travel are concerned that it will cost the government significantly while benefitting only a few patients. However, removing the financial barrier to healthcare access will encourage patients to seek care earlier, which decreases overall medical expenditures. Delayed care is associated with worse outcomes, requiring costlier treatment, which

is an average increase of 1.9% every two days without accounting for associated morbidity-related costs (11). 1.9% might seem minuscule, but with care for complex diseases such as cancer costing between $10000-$30000, that number means an increase of $200-$600 every two days (12). This figure over time builds up significantly higher than medical travel subsidization, representing a target for expenditure reduction while simultaneously eliminating a health barrier.

The two steps above are necessary to rapidly remove barriers for rural and remote residents without health access. However, in the long term, it is crucial to have more providers in those communities to provide direct patient care. The solution is a community-physician partnership in medical practice, where the community takes over medical administrative tasks, recruitment, and retention, which allows providers to focus on direct patient care. An example of this idea is the proposed Medical Municipal Controlled Corporation (MCC) in Cold Lake, Alberta (13). Usually, physicians operate private medical practices, which demands significant administrative time. Average physicians spend over 10 hours weekly on administration, which decreases their direct patient-care time, impairs work-life balance, and contributes to burnout (14). Through a community-physician partnership, physicians can provide care to more patients and benefit from an improved work-life balance, while the community can use the profits to expand, recruit and retain providers. Through the Cold Lake Medical MCC, the community planned to do just that while also generating profit to expand their local healthcare (13). Concerns for community-physician partnership models revolve around bureaucracy inefficiency and political interference in healthcare which can negatively impact physicians' clinical roles (15). Physicians can collaborate with the community to mitigate these concerns by setting clear expectations that mutually benefit both parties. Given the significant barriers to rural healthcare access and the current unsustainable reliance on locums and travel-in physicians, this model is best to provide healthcare services tailored to the community while supporting and incentivizing providers. The long-term recruitment and retention of providers will help provide direct and high-quality healthcare services in rural and remote communities.

The COVID-19 pandemic has revealed the long-neglected issue of rural and remote healthcare inaccessibility in Canada. For now, virtual care and medical travel subsidization are immediate solutions to remove some health barriers, but there needs to be a focus on long-term community-physician partnerships to increase recruitment and retention for better future healthcare service access. Rural healthcare access is a complex issue with no simple solution, but physicians can and need to use our expertise to act as leaders, advocates, and scholars to collaborate with policymakers and communities to bridge the gap.

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Monitoring Antibiotic Resistance Through Wastewater Surveillance: Potential and Challenges

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The emergence and spread of antibiotic-resistant bacteria pose a significant threat to public health worldwide. Today, antibiotic-resistant infections are recognized as a “Silent pandemic.” They kill 700,000 people annually; if left unchecked, this number could increase to 10 million by 2050.

For years, this issue was primarily viewed as a problem confined to hospitals. However, it is now understood that antibiotic resistance arises from complex interactions between humans, animals, and the environment and affects all spheres of the environment. The surveillance of bacterial resistance is crucial to understand the epidemiology of resistance, identifying reservoirs and sources of contamination that must be mitigated, and planning stewardship strategies.

Monitoring bacterial resistance in populations is challenging, as most studies rely on laborious sampling of human feces to identify specific human pathogens, which limits their representativeness. In this context, wastewater as a tool for surveillance of bacterial resistance emerges as a promising approach. Through wastewater surveillance, we can obtain information on the genes and bacteria circulating in the population, providing a more comprehensive understanding of the prevalence and spread of resistance. This approach has been successfully applied during the COVID-19 pandemic, highlighting the potential of wastewater surveillance for public health surveillance (1).

Numerous studies have been conducted worldwide using wastewater to monitor bacterial resistance. Bu et al. (4) demonstrated that wastewater surveillance could detect trends in antibiotic use and resistance in the population. Similarly, Lindberg et al. (5) highlighted that wastewater surveillance could identify antibiotic resistance hotspots and direct targeted interventions to mitigate its spread. In Canada, several recent studies have used wastewater surveillance to monitor bacterial resistance. Prystajecky et al. [6] conducted a study in Ontario and found that wastewater surveillance could detect trends in antibiotic resistance in the population and identified the presence of a novel carbapenemase gene, which confers resistance to last-resort antibiotics. Another study conducted by Rodriguez-Mozaz et al. (7) in Quebec identified the presence of extended-spectrum beta-lactamase-producing bacteria, which are resistant to many antibiotics commonly used in clinical practice.

While these studies demonstrate the potential of wastewater surveillance for monitoring bacterial resistance, many knowledge gaps and research needs must be addressed. More standardized methods for monitoring bacterial resistance in wastewater are needed to improve comparability across studies and regions. Additionally, it is crucial to better integrate surveillance data with clinical and epidemiological data providing a comprehensive understanding of the impact of antibiotic resistance on public health.

In summary, the potential of wastewater surveillance for monitoring bacterial resistance is clear. It provides a more comprehensive understanding of the prevalence and spread of resistance, allowing for better planning of public health interventions. However, to fully realize its potential,

more research is needed to address knowledge gaps, improve monitoring methods, and integrate surveillance data with clinical and epidemiological data. Greater collaboration between health and environmental sciences is of utmost importance to address the global threat of antibiotic resistance.

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Climate Change and Infectious Disease: A Looming Public Health Challenge

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Climate change is one of the most pressing global issues facing humanity today. Its impact on various aspects of our lives, including public health, cannot be overstated. One significant consequence of climate change is the alteration of infectious disease patterns (1). As extreme weather events become more frequent and ecosystems continue to transform, we must understand and prepare for the potential public health challenges that emerge. This commentary will discuss the various ways in which climate change affects the spread of infectious diseases and examine potential adaptation and mitigation strategies.

The relationship between climate and infectious diseases is complex, with changes in temperature, humidity, and precipitation patterns affecting the life cycles and distributions of pathogens, vectors, and hosts. This intricate interplay can influence the transmission, prevalence, and incidence of various infectious diseases, both directly and indirectly.

One of the most apparent effects of climate change on infectious diseases is the expansion of vector-borne diseases into previously unaffected areas (2). Rising global temperatures and changes in precipitation patterns can grow vector habitats, facilitating the spread of mosquitoes and ticks which carry pathogens responsible for diseases such as malaria, dengue fever, or Lyme disease. As the range of these vectors expands, more people become exposed to these diseases, potentially leading to increased infection rates and novel outbreaks. Furthermore, higher temperatures can accelerate the development of pathogens within vectors, increasing transmission rates as well (3).

Climate change can also impact the distribution, population density, and behaviour of reservoir hosts (i.e. animals that harbour pathogens). For example, warmer temperatures and changing vegetation can affect the distribution and abundance of rodent populations, influencing the transmission dynamics of zoonotic diseases like hantavirus and the plague (4). Changes in migratory patterns due to habitat loss or shifts in resource availability can also introduce novel pathogens to new regions, increasing the likelihood of disease spillover to humans (5).

Furthermore, changes in precipitation patterns can create environments conducive to the transmission of waterborne and food-borne diseases. Heavy rainfall and flooding events can contaminate water sources, facilitate the spread of pathogens like cholera and leptospirosis, and create breeding grounds for disease-carrying insects (6, 7). In contrast, drought conditions can concentrate waterborne pathogens in limited water supplies, increasing the risk of exposure and infection (8, 9). The increasing frequency and severity of extreme weather events can also lead to large-scale population displacements, putting people in overcrowded and unsanitary conditions where diseases can rapidly spread. The movement of people into new areas can introduce pathogens to previously unexposed populations, potentially leading to novel outbreaks and increasing the burden on healthcare systems (10,11).

Given the profound impact of climate change on infectious disease patterns, it is crucial to implement strategies to mitigate these effects and adapt our public health systems to the changing landscape. First, we must prioritize the mitigation of climate change itself by reducing greenhouse gas emissions, transitioning to renewable energy sources, and promoting sustainable practices. By addressing the root cause of the problem, we can lessen the impact of climate change on infectious disease dynamics.

Second, improving disease surveillance and monitoring systems is essential for early detection and response to changes in disease patterns (12). Enhanced collaboration between meteorological, environmental, and public health agencies can facilitate the integration of climate and disease data, enabling better prediction and management of infectious disease risks. Moreover, leveraging advanced technology and data analytics can significantly improve disease surveillance and prediction efforts. For example, remote sensing technology, such as satellite imagery, can be used to monitor environmental changes that may contribute to the spread of infectious diseases. Combining this information with epidemiological data can help identify potential hotspots for disease transmission and inform targeted prevention strategies (13).

Third, adapting public health strategies to account for climate change is crucial. This may include the development of targeted vector control programs (e.g. insecticide-treated bed nets), improvements in water and sanitation infrastructure, and increased investment in vaccine development and distribution for diseases with a high potential for climate-driven expansion (14). Health facilities should be built or retrofitted to withstand extreme weather events and incorporate climate considerations into health policy and planning.

Lastly, fostering public awareness and education on the links between climate change and infectious diseases is vital. A well-informed public is better equipped to understand the connection between these two global challenges and take appropriate actions to reduce their risks and contribute to mitigation efforts. Public awareness campaigns, educational initiatives, and targeted communication strategies can play a crucial role in empowering individuals and communities (15). Healthcare providers, as trusted sources of information, have a unique opportunity to educate patients about the links between climate change and infectious diseases. By incorporating these topics into routine healthcare encounters when relevant, providers can help raise awareness, answer questions, and dispel misconceptions about the issue. Linking these two global challenges can help individuals and communities reduce their risks and contribute to mitigation efforts.

As the scientific community and policymakers strive to address the broader issue of climate change, it is essential that we, as healthcare professionals, recognize our role in this process. We must be well-informed about the relationship between climate change and infectious diseases, stay up to date with the latest research, and be prepared to adapt our clinical practice and public health strategies accordingly. Furthermore, we should advocate for climate-smart policies that not only reduce greenhouse gas emissions but also address the health consequences they create.

The impact of climate change on infectious disease patterns is a critical and complex issue that demands immediate attention from the medical community and policymakers alike. By understanding the various ways in which climate change affects disease transmission and working together to implement effective mitigation and adaptation strategies, we can better protect our patients and communities from the emerging public health challenges posed by a warming planet.

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They Call Her A Frequent Flier

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One of the nurses whispers she's here again
A 34-year-old woman grumbles I need my IV iron,
They call her a frequent flier in the ED
But not the flying where you use your air miles to get a first-class seat
For her being a frequent flier means chronic fatigue.

As I scroll through her chart I see,
She's been here before,
Every few months, and sometimes after a few weeks,
It's been 6 months since her last IV.
I get sent in to do a physical exam and gather thorough a history,
If she's here so often surely, it's something that we cannot treat,

On my way in,
I get warned she's a grumpy patient.
I walk in and introduce myself as the medical student on the team,
I explain that I will ask her some questions.
She rolls her eyes and says,
"I just need my IV iron,
I've done this before please leave me alone,
Just give me my iron so I can go home".

A little disheartened I persist,
I am here to help, please let me assist,
These questions will help prevent future admission
She agrees and goes on to explain her condition

She's had heavy menstrual bleeding since she was a teen,
Soaking pads in hours, lasting up to 2 weeks,
She has symptoms of fatigue, dizziness, and a rapid heartbeat
I'm constipated she complains, and it is hard for me to pee,
She's been told she has fibroids but is not sure what that means.

I palpate her abdomen with her permission
A firm mass is felt in the lower abdome
I ask her what interventions have been done up to this point,
Maybe an IUD, a pill, or a surgical decision,
Nothing yet, she exclaims, she has not had any escalation,
'My family doctor asks me to come to the ED when I have low hemoglobin'

I return to my attending and summarize the situation
We order the IV to start an infusion,
I am told to discharge her when her repeat blood work is complete,
She can go home I am told,
There is nothing else that she needs,
It doesn't sit right with me,
How? I wonder
We would never send a bleeding stab wound home with no other intervention
So why is this any different?

I advocate for my patient and say she needs help,
A prescription, a referral, something for her health,
My attending agrees,
We prescribe her TXA and a referral to the women's health center
To monitor her as an outpatient and provide her relief.

Before leaving she thanks me for taking her concerns seriously,
I am frustrated she hasn't been getting the care she needs
When gender plays a role in your medical care,
Women often face biases and neglect
It is important to take the time to reflect

In clinics and hospitals, women wait
Their pain dismissed as "normal" fate
Doctors may dismiss their complaints
Ignoring symptoms, dismissing pain,

Leaving women feeling insane.

The gender gap in medicine is real,
And it's something we need to heal,
With awareness, education, and advocacy,
We can address this healthcare disparity.

Women deserve the best care possible,
Their health is not negotiable,
Let's bridge the gap and raise the bar,
For all women, near and far,
By tackling this social determinant of health,
As a healthcare system, we can propel.

Hope For Tomorrow: Creating a Better Future for Canadians Fighting Cancer

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"Cancer" is a scary word. It has likely affected the lives of most, if not all, readers. Cancer is the leading cause of death in Canada, surpassing mortality rates of heart disease, suicide, and accidents combined. Over six hundred Canadians are diagnosed with cancer daily and, on average, over two hundred Canadians die from it each day (1). In March of 2022, my father became one of the unlucky Canadians diagnosed with cancer. Since then, my family and I have intimately experienced the successes and pitfalls of the Canadian healthcare system as it pertains to the care of cancer patients. Accessibility, in particular, continues to be an area of concern for many Canadians fighting cance .

Based on a recent report from the Frasier Institute, Waiting Your Turn, wait times for medically necessary treatments have increased to the longest ever recorded in this survey's history. Despite having the shortest wait times of any Canadian province, Ontarians are still waiting an average of 10.1 weeks for specialist consults, followed by an additional 10.2 weeks for treatment. According to this report, these delays are not benign and can lead to increased pain, worsening mental health, and the progression of potentially preventable illnesses into chronic conditions (2). From personal experience, my father waited over eight weeks for a referral to an oncologist despite his stage IV diagnosis, followed by another eleven weeks before beginning chemotherapy.

Publicly funded healthcare has many benefits but one of the pitfalls compared to the private sector is longer wait times (3). In an interview with CBC News, the Canadian Medical Association's President, Dr. Katharine Smart, reports: "The Canadian healthcare system is not functionally well. Privatization always is one of the things that people bring up in that conversation." Currently, there remains a 75-25 split between Canadians' public-private healthcare spending. Investigating a shift towards more privatization and the associated reduction in wait times may be the key to fewer emergency room visits and earlier intervention (4). Since this would only benefit those who can afford private care, we can also learn from the solutions implemented by other countries with similar universal healthcare systems. For example, Sweden has adopted a benchmark wait time of sixty days from the time of referral to a specialist appointment (5). Whether it be through privatization or benchmarks, implementing a solution to cut down patient wait times will drastically improve patient moral and lead to better health outcomes.

Once you have finally entered the healthcare system by being paired with the appropriate team of providers, the delays are far from over. In 2022, Canadians waited an average of 5.4 weeks for computed tomography (CT), 10.6 weeks for magnetic resonance imaging (MRI), and 4.9 weeks for ultrasound (2). In fact, diagnostic imaging increased by nine percent for CTs and eight percent for MRIs compared to the overall twenty percent decrease in 2021. These numbers reflect the augmented need for scans due to the delays imposed by COVID-19 restrictions. As a result, patients experienced significant interruptions in appointment follow-ups and treatment (6). For example, when my father required an MRI to assess his eligibility for surgery, he had to wait over six weeks for a specific MRI machine. When the time finally came, he was unable to receive the scan due to changes in his chemotherapy schedule, leading to further delays. Part of the problem with imaging appointments is the lack of patient education and awareness of proper imaging protocols. Many appointments, based on personal experience, are placed over the phone without informing patients of guidelines required to complete a scan. To address this issue, it would

be beneficial for primary care teams to inform patients of the subtleties involved in imaging to limit the need for re-booking.

Once the diagnostic work-up is complete, access to the patient's medical record continues to be a hassle for both the patient and their medical team. There have been attempts to improve the user experience through the development of patient portals, such as MyChart (7). Since its inception, however, user reviews have been mixed. The sign-up process continues to be a source of grievance for patients and healthcare providers given the two-factor authentication design (8). Without proper buy-in from providers, patients lack the information they need to access these tools, resulting in diminished patient engagement and technology benefits (8,9). In fact, healthcare staff reported the registration process as an additional burden which ultimately leads to increased follow-up requests by patients who are unable to comprehend their results (10).

My family experienced something similar while reviewing my father's MRI report. The findings from two different radiologists caused unnecessary alarm when one described new tumour growth whereas the other considered these changes to be negligible. To make matters worse, when the oncologist was consulted for follow-up, he did not have access to the report and was therefore unable to address our concerns. In order to streamline patient portal use, holding results until reports can simultaneously be released and addressed by the primary healthcare team would be ideal. Despite the interruption that may ensue, the benefit of mitigating patient stress is worth the wait.

In my experience, the healthcare journey for cancer patients is less than ideal. I must clarify that I am in no way ungrateful for the care my father is receiving. It is a blessing and an honour to live in a country founded on the principle of equal access to healthcare. As a future healthcare professional, however, I do believe that the patient experience can be improved. Reducing wait times for specialist consults can help improve patient health outcomes. Streamlining imaging guidelines may allow for better resource allocation and minimize delays. Adjusting the release of patient information via online portals can help prevent unnecessary user concern and limit healthcare burnout while simultaneously allowing for well-timed follow-ups. As a future physician, it is important to learn the rules of the game, but also challenge the status quo. Through collaboration, leadership, and advocacy, I believe healthcare workers hold the key to a future where the word "cancer" becomes a little less scary.

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Les femmes et les enfants d'abord... vraiment ?

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Depuis l'année 2000, il est estimé que plus d'un million de canadiens ont été tués par l'industrie du tabac (1,2). À l'origine de plus de 40 maladies pulmonaires, cardiovasculaires et d'autres systèmes, le tabagisme mène à plus de morts que le total des décès liés à l'alcool, aux opioïdes, aux suicides, aux meurtres et aux accidents de voiture (2). Bien que l'industrie du tabac soit parfaitement consciente de la mortalité liée à ses produits, elle cherche malgré tout à poursuivre leur commercialisation.

Avec la montée d'évidence contre leurs produits dans les années 1960 et 1970, l'avarice et l'indifférence des compagnies de tabac envers la santé de leurs clients est devenue claire. Afin d'assurer la vente de leur tabac, ces compagnies ont eu besoin d'adopter de nouvelles stratégies pour combattre les efforts de Santé Canada. Un document datant de 1984 écrit par un membre de l'industrie intitulé « Prognosis for the Canadian Cigarette Industry » résume leur approche en trois points (3). Selon lui, il fallait avant tout: i) modérer les perceptions du tabagisme et des fumeurs pour les rendre plus propices à une utilisation continue, ii) développer et introduire de nouveaux produits pouvant servir d'alternatives acceptables, et iii) initier des projets visant à assurer la poursuite de la consommation de tabac par les jeunes Canadiens (3).

Près de 40 ans plus tard, cet extrait devrait faire résonner des alarmes chez son lecteur. Maintenant au sein d'une épidémie de cigarettes électroniques, ces trois objectifs semblent bel et bien avoir été accomplis. Alors qu'elles sont commercialisées comme outils d'aide à la cessation, la croissance rapide du vapotage et des taux de dépendance à la nicotine chez les jeunes Canadiens menacent des décennies de progrès dans la réduction du tabagisme. Pour chaque personne qui réussit à cesser de fumer à l'aide de cigarettes électroniques, environ 80 jeunes sont introduits au vapotage (4). En 2017, environ 13.5% des jeunes Canadiens âgés de 16 à 19 ans sondés ont avoué avoir utilisé une cigarette électronique dans le passé (5). En 2019, ce pourcentage avait augmenté à 24.5% (5). Malheureusement, les jeunes qui consomment de la nicotine par cigarette électronique sont quatre fois plus susceptibles de commencer à fumer des cigarettes normales (6).

Malgré avoir moins d'effets nocifs que les cigarettes classiques, les cigarettes électroniques ne sont pas sans risques (7). Alors qu'une analyse de leurs effets à long terme n'a pas encore été effectuée, plusieurs études révèlent déjà qu'elles pourraient mener à une respiration sifflante chez les jeunes, un signe précoce de problèmes pulmonaire, ainsi qu'augmenter le risque de maladies cardiovasculaires en endommageant les cellules endothéliales tapissant l'intérieur des vaisseaux sanguins (8–10).

Considérant ces données alarmantes, nous pouvons malheureusement conclure que l'industrie du tabac a repris l'avantage dans le bras de fer avec le gouvernement canadien et ses organisations de santé. Dans les années 1990, le Canada était reconnu pour son leadership en matière de lutte contre le tabagisme (11). En effet, ses politiques de réglementation et de taxation ont servi comme modèle pour plusieurs pays et ont même été saluées et décrites comme bien pensées et novatrices par le directeur général de l'OMS en 1995 (11). Maintenant en 2023, le Canada semble avoir perdu la détermination, l'avant-gardisme et le courage qu'il avait auparavant démontré dans ces politiques luttant contre le tabac. En juin 2021, Santé Canada avait annoncé que le gouvernement canadien planifiait interdire toutes saveurs dans les liquides à vapoter afin de réduire la consommation de ces produits

par les jeunes (12). Supportées par de nombreuses études, ce type de régulation avait du potentiel (13–15). Cependant, suite à des protestations prolongées ainsi que d'un lobbying intensif de la part de l'industrie vendant ces liquides, le gouvernement canadien semble avoir été réduit au silence (16).

Il est temps pour le gouvernement canadien de se remettre sur la bonne voie. Le Canada a déjà été salué comme un leader mondial en matière de contrôle du tabac mais les conséquences de son inaction et de sa passivité au sein de cette nouvelle épidémie de cigarette électronique auront un impact néfaste sur la santé de ses citoyens. L'industrie du tabac a causé la mort de millions de canadiens afin d'en tirer un profit. En interdisant les saveurs de vapotage et en renforçant la réglementation sur les produits de vapotage, le gouvernement canadien peut envoyer un message clair: la santé de ses citoyens est une priorité absolue. Il est important de voir à travers les écrans de fumée de cette industrie. Alors qu'elle cherche à nous convaincre que la cigarette électronique est une alternative sans danger et un outil de sevrage tabagique efficace, elle introduit aussi des milliers de jeunes canadiens au tabagisme.

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L'intelligence artificielle : une solution aux problèmes du système de santé ?

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Mots clés : intelligence artificielle, problèmes système de santé, solution, Canada

Depuis plusieurs années, le système de santé canadien est confronté à des défis majeurs secondaires à l'évolution constante de la société canadienne. Ces difficultés sont accentuées par une forte pénurie de la main d'œuvre dans le secteur de santé et une population de plus en plus vieillissante. Selon Statistique Canada, le Recensement de 2021 indique que le quart de la population canadienne (24,9 %) serait représenté par la génération des baby-boomers (personnes nées entre 1946 et 1965) dont l'âge avancé exerce une pression additionnelle sur les services de soins primaires et de soins à domicile (1).

Une étude commanditée par l'observatoire européen des systèmes et des politiques de santé en 2020 a examiné en détail le système de santé canadien et l'a comparé aux systèmes de santé des pays de l'organisation de coopération et de développement économique (OCDE) [2]. L'étude montre une inégalité à l'accès aux soins de santé, et concerne principalement certaines minorités et classes sociales, notamment les populations autochtones et les personnes ayant un bas statut économique (2). L'analyse de certains indicateurs de la qualité des soins primaires, d'urgences et des soins spécialisés comme la disponibilité des données des soins primaires, le taux d'admissions et de décès considérés comme évitables, la qualité de la prescription des ordonnances ou encore le taux de survie au cancer indique que des efforts supplémentaires sont nécessaires (2). Une étude menée par Allin et al. en 2015 montre que l'amélioration de l'efficacité du système de santé Canadien peut entrainer une réduction de 18 à 35 % des décès secondaires à des causes traitables (3). Ces résultats concordent parfaitement avec ceux de l'enquête internationale de 2016 du fonds du Commonwealth sur les politiques de santé auprès d'adultes de 11 pays. Elle considère que « 55 % des canadiens estiment qu'il faut apporter des changements fondamentaux au système de santé pour en améliorer le fonctionnement » (4). L'analyse non exhaustive des problèmes que rencontre le système de santé Canadien pointe le doigt sur l'efficacité limitée des stratégies classiques entretenues jusqu'à ce jour. L'introduction d'outils innovateurs comme l'intelligence artificielle (IA) s'avère nécessaire.

Le terme « intelligence artificielle » a été utilisé pour la première fois en 1955 par John McCarthy et al. (5). Il continue à susciter jusqu'à aujourd'hui la curiosité des chercheurs et alimente le fantasme d'une société futuriste digne des films de sciences fiction. L'intelligence artificiell connaît en 2023 son âge d'or grâce à l'avènement des mégadonnées, la conception de machines avec une capacité de calcul de plus en plus puissante et l'apprentissage automatique. L'investissement massif des superpuissances dans le développement de l'IA dans le secteur de santé démontre le rôle primordial qu'elle va jouer dans la transformation du paysage médical.

L'intelligence artificielle reflète dans l'inconscient collectif un ensemble d'algorithmes et de machines capables de mimer l'intelligence humaine, parfois même de la surpasser. En réalité, l'intelligence artificielle est un terme vague qui regroupe plusieurs sous-domaines. L'apprentissage automatique est l'axe de l'IA qui connait le plus d'intérêt. Il s'agit d'un ensemble d'algorithmes capables d'apprendre à partir des données pour ensuite appliquer les connaissances acquises sur de nouvelles situations jamais rencontrées lors de la phase d'apprentissage (6). La définition même de l'apprentissage automatique montre la place centrale qu'occupent la qualité et la quantité des données dans le développement des modèles d'IA. En

médecine, la marge d'erreur est étroite et la moindre faute peut être fatale. Il est clair que la première étape consiste d'abord à concevoir une infrastructure robuste capable de stocker, de standardiser et de gérer les données médicales. Le centre d'intégration et d'analyse des données médicales (CITADEL) du centre hospitalier de l'université de Montréal illustre l'exemple parfait d'une infrastructure capable d'organiser et d'analyser les données cliniques et administratives des patients. Cette plateforme a pour objectif la promotion de la santé des patients et l'innovation en sciences des données dans le domaine médical et regroupe plus de 3,7 millions de dossiers patients (7).

Une fois les données nettoyées et analysées, les scientifiques de données en collaboration avec les médecins peuvent développer des outils d'IA libérant le clinicien de certaines tâches chronophages et redondantes. En radiologie, un modèle d'IA peut fournir au radiologue une pré-interprétation des images radiologiques et contourner les zones d'intérêts, augmentant l'efficacité et réduisant le taux d'erreurs [8]. En médecine d'urgence, des modèles peuvent assister les professionnels de santé dans le triage et la priorisation des cas nécessitant une intervention urgente (9). En médecine de famille, les modèles d'IA couplés aux objets connectés permettraient un suivi plus efficace de certaines maladies chroniques comme le diabète (10). En oncologie, les modèles d'apprentissage automatique laissent envisager une médecine de précision en aidant à la prédiction de l'efficacité d'un traitement anti-cancéreux à partir de la signature génomique des cellules cancéreuses et la structure chimique de ces traitements (11). En psychiatrie, l'apprentissage automatique pourrait permettre de prédire le développement de certaines maladies psychiatriques chez certains jeunes individus à risque (12). Le but de ces modèles n'est pas de remplacer le médecin mais de l'accompagner dans sa prise de décision.

L'analyse des problèmes du système de santé Canadien et des applications de l'IA en médecine démontre le potentiel de ces outils comme solutions à certaines problématiques du système de santé. Néanmoins, plusieurs questions éthiques doivent être considérées afin d'assurer une utilisation responsable de cet outil. L'utilisation des données des patients peut entrainer des bris de confidentialité et les modèles sont capables de reproduire les inégalités et discriminations présentes dans nos données, ce qui est contraire aux principes directeurs de l'énoncé politique des trois conseils qui encadre l'éthique de la recherche avec des êtres humains au Canada (13, 14). De nombreux efforts ont été entrepris pour encadrer l'utilisation de l'IA au Canada comme en témoigne la « Déclaration de Montréal pour un développement responsable de l'IA » et la diversité culturelle du Canada représente une opportunité pour concevoir des modèles justes et équitables (15, 16).

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L'impact de la pandémie de COVID-19 sur les cancers de la sphère ORL

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La pandémie de COVID-19 a eu un impact marqué sur la communauté médicale. En raison du risque de propagation du virus SARS-Cov-2 et des ressources limitées, l'établissement de multiples mesures préventives additionnelles et une réorganisation des soins a dû être mise en place (1,2). Cette réorganisation, principalement caractérisée par multiples annulations de consultations, suivis et procédures, a entrainé des délais importants pour la prise en charge de patients (3,4).

Les patients atteints d'un cancer sont plus à risque d'infection à COVID-19 en raison de l'état d'immunodéficience associé au cancer (5).Ceci est particulièrement vrai pour les cancers de la sphère ORL, étant donné que le SARS-Co-2 se propage principalement par les voies respiratoires supérieures, majoritairement par l'intermédiaire des récepteurs cellulaires de l'enzyme de conversion de l'angiotensine 2 qui sont hautement prévalents au niveau des cellules épithéliales de la muqueuse orale (6). Les voies respiratoires supérieures sont l'une des endroits avec les charges virales les plus élevées pour le virus SARS-Cov-2 (3,7).

Les patients atteints de cancer de la tête et du cou en début de pandémie COVID-19 avaient des délais plus importants recevoir un diagnostic et être pris en charge que les patients en prépandémie (1,8). Selon les études, 12 à 60% des premières visites et suivis et approximativement 37% des chirurgies oncologiques ont été reportés à une date ultérieure pendant la pandémie de COVID-19 (1,4,9). Jusqu'à 80-90% des cas non-urgents ont été reportés pour se concentrer sur les cas urgents et semi-urgents (3). Le temps d'attente entre le moment du diagnostic et la chirurgie est passé d'environ 4 semaines avant la pandémie à parfois plus de 6 mois selon le type de cancer pendant la pandémie (3). De plus, il y avait des limitations significatives en termes d'examens physiques de la sphère ORL et de procédures endoscopiques, des aspects essentiels pour poser un diagnostic de cancer de la tête et du cou (4).

Un délai de diagnostic est associé à des présentations initiales avec maladies plus avancées, un risque plus marqué de rechute de maladie, une réponse au traitement sous-optimale, un besoin de chirurgie plus complexe et une augmentation de la mortalité significative (3,4). Une augmentation de mortalité de 6% a été notée au niveau des cancers de l'œsophage depuis le début de la pandémie de COVID-19 (10). Cependant, il n'y a pas eu d'augmentation significative de diagnostic de maladies avancées lors de la pandémie en comparaison avec prépandémie (4). Pour chaque délai de 30 jours entre le moment du diagnostic et de la chirurgie, la mortalité augmente de 4.6% (8). L'augmentation du taux de mortalité était plus marquée lors d'un délai de plus de 67 jours entre le moment du diagnostic et le moment de la chirurgie, correspondant à une augmentation de 18.9% du taux de mortalité (8). Ces données s'extrapolent également pour les patients traités principalement avec radiothérapie et chimiothérapie (8).

Les méthodes chirurgicales ont également été modifiées en conséquence de la pandémie de COVID-19 pour diminuer la durée et la complexité des procédures (3,9). Les dissections du cou ont été omises dans 28% des cas, comparément à 19% prépandémie, et les chirurgies à lambeau ont été effectuées dans 25% des cas, comparément à 45% des cas avant la pandémie (9). Les taux de traitement chirurgicaux comparément aux taux de traitements avec chimiothérapie et radiothérapie n'ont pas changés de façon significative pendant la pandémie comparément au temps prépandémique, indiquant essentiellement que les méthodes de traitement ont demeurées inchangées par rapport à avant la pandémie de COVID-19 (11).

Malgré les risques augmentés de propagation du virus SARS-Cov-2 lors des chirurgies au niveau de la tête et du cou, des études ont démontrées un risque faible de complications associées à ce virus chez les patients post-opération (2,9). Cela est dû aux multiples mesures préventives additionnelles mises en place, incluant le port d'un bonnet, d'une blouse, d'un respirateur à particules de type N95 et de gants, la limitation du personnel dans la salle d'opération et le dépistage les patients en préopératoire et en post-opératoire pour la COVID-19, furent mises en place dans les salles opératoires, contribuant grandement à la diminution de la propagation du virus SARS-Cov-2 (3). Le risque d'infection à COVID-19 à 30 jours post-opération est d'environ 3% (9). Cependant, chez les patients avec une infection à COVID-19 démontrée en post-opération, 44.8% ont eu une complication pulmonaire sévère et 10.3 à 20.4% sont décédés de complications liées à leur infection (2,9). Majoritairement, les patients ayant eu des complications sévères étaient atteints de cancers de stades avancés (9). Cela indique donc qu'en présence de méthodes de prévention de propagation d'infections rigoureuses, le risque infectieux demeure faible en périopératoire (2,9). Les bénéfices de la chirurgie étant supérieurs aux inconvénients pour le patient, il est donc préférable de procéder avec la chirurgie, malgré le fait que ce sont des chirurgies longues, complexes et qui ont un risque théorique d'infection à COVID-19 accru (9).

Au final, la pandémie de COVID-19 a forcé le monde des soins de la santé à s'adapter rapidement. Plusieurs stratégies ont été employées pour rendre la prise en charge des patients aussi optimale que possible. La télémédecine s'est avérée très utile pour la prise en charge de patients avec cancers ORL en temps opportun (1,7). Cependant, les patients vus par téléconférence devaient être sélectionnés avec soin, en raison de l'impossibilité d'effectuer un examen physique par cette modalité (3). Le triage efficace de patient, principalement basé sur le type de cancer et la stadification de la tumeur, permettant d'identifier les patients avec les besoins les plus pressants de traitement, s'est également avéré d'être une stratégie gagnante dans le contexte de diminution des effectifs permettant le traitement optimal des patients (2,3,5). Les mesures de précautions supplémentaires, qui ont permis de limiter au maximum la propagation de l'infection, ont également permis, de façon aussi optimale que possible, la continuation des soins en présentiel (7).

Étant donné l'assouplissement récent de plusieurs mesures préventives et le retour graduel d'activités en présentiel, le réel impact de la pandémie de COVID-19 sur les cancers de la sphère ORL se fera principalement ressentir dans les temps à venir (5).

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Le printemps de la réadaptation sensorimotrice

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En contemplant le paysage actuel de la recherche en neurosciences du mouvement, on assiste au début d'une saison de renaissance. La compréhension de notre organisme dégèle, les approches novatrices bourgeonnent et les avancées techniques fleurissent. Cet ensemble contribue à des senteurs printanières dont la pratique clinique en réadaptation pourrait bénéficier à de nombreux points de vue. Malheureusement, quelques averses pourraient perturber cette belle saison.

Arriveriez-vous à imaginer la joie de récupérer une marche fonctionnelle après une lésion incomplète de la moelle épinière ? Eh bien avec un tel printemps d'innovation, ce bonheur ne sera bientôt plus si rare, mais tout aussi exaltant. À l'heure actuelle, les interventions utilisées pour aider la récupération de la marche après une blessure médullaire incomplète se basent majoritairement sur un entrainement actif avec une assistance manuelle procurée par les cliniciens. Les bénéfices de ces stratégies sont malheureusement restreints et limitent les perspectives pour les patients les plus touchés, qui ne parviennent parfois pas à faire des mouvements par eux-mêmes. Il parait donc crucial d'explorer de nouvelles stratégies pour favoriser la récupération de la marche de ces patients. En vue de la saison de renouveau à laquelle nous assistons actuellement, les avancées pourraient pousser la pratique clinique à faire peau neuve.

Dans ce paysage bucolique, certaines fleurs rayonnent tout particulièrement : celles de la neurostimulation. Beaucoup d'espoir réside dans ce domaine en pleine floraison et dont les stratégies sont diversifiées. Ces approches peuvent viser différentes structures du système nerveux central, allant du cortex moteur, jusqu'à la moelle épinière, et ce, de manière plus ou moins invasive. Une telle effervescence est le résultat de travaux de nombreuses équipes de recherche à travers le monde, mais parmi elles, une équipe canadienne se distingue par l'utilisation de l'intelligence artificielle. Les neuroprothèses développées par ces chercheurs s'adaptent de manière autonome pour déclencher des réponses optimales (1). La capacité d'adaptation de ces neuroprothèses constitue un véritable engrais pour personnaliser le traitement en fonction de l'état du patient, et permettre que les interventions conviennent au mieux possible à ses besoins. Par ailleurs, au lieu de cibler les structures situées en dessous de la lésion médullaire, comme les thérapies actuelles, ces neuroprothèses intelligentes interviennent sur une structure supérieure : le cortex moteur. En mettant à contribution cette région responsable du contrôle volontaire du mouvement, on démultiplierait les chances récupérer une marche fonctionnelle (2).

À ce jour, ce qui a été mis en évidence, c'est que chez des rats atteints d'une lésion incomplète de la moelle épinière, ces neuroprothèses intelligentes permettent d'atténuer les déficits locomoteurs (3). Le plus frappant, c'est que ces effets semblent perdurer sur le long terme : les rats progressent nettement dans des tâches locomotrices complexes, comme se déplacer sur une échelle horizontale. Moduler l'activité du cortex moteur serait donc un pas de géant pour la réadaptation de ces patients. D'autant plus que chez l'humain, la marche est bien plus sujette aux influences du cerveau que chez d'autres mammifères, souvent quadripèdes, pour qui la locomotion est souvent moins régulée par ces structures.

Vu sous cet angle l'avenir de la réadaptation sensorimotrice parait radieux, mais un redoux s'annonce inévitable : l'implantation de ces approches novatrices dans nos pratiques cliniques. De ce côté-ci, la météo s'annonce houleuse. Giboulées pour la réalisation d'essais cliniques

et constituer des évidences pour chacune des différentes utilisations de ces interventions, brouillard pour l'adaptation de la formation des professionnels de santé, orage pour l'acquisition des outils d'intervention par les structures de soins, et d'autres nuages sont à prévoir. Heureusement, des initiatives pancanadiennes constituent un abri fiabl contre ces intempéries. Dans le monde entier, les yeux sont tournés vers la plateforme CanStim, dont l'objectif est d'explorer l'utilisation de techniques de neurostimulation non-invasives pour améliorer la récupération à la suite d'un accident vasculaire cérébral. Ce programme national propulse les essais clinique qui étudient le potentiel de la stimulation magnétique transcrânienne répétitive (4). Cette initiative pionnière sera un réel pollinisateur pour l'incorporation de technologies prometteuses dans la prise en charge de nombreux patients.

Parallèlement, la progression foudroyante des capacités techniques et des procédures chirurgicales rend l'implantation de neuroprothèses invasives tout à fait accessible (5). Mais dans un contexte de floraiso comme celui-ci, dont le développement technologique est le fertilisant, il est primordial d'encadrer ces pratiques émergentes, notamment d'un point de vue éthique. En mettant en place des interventions qui ciblent directement des structures du système nerveux central, des aspects sont à considérer, en particulier au regard du sentiment d'identité et d'autres domaines de valeur personnelle et sociale (6). Ces risques sont difficiles à évaluer mais ils ne sont pas pour autant négligeables. Certains auteurs appellent à l'adoption d'une approche basées sur les risques, et ce, dès les stades les plus précoces du développement de ces innovations (7).

Si l'on en croit le champ des rossignols, ces approches novatrices pourraient devenir le nouveau visage de la réadaptation sensorimotrice. En assortissant les différentes fleurs de la neurostimulation, ciblant chacune diverses structures responsables de la commande motrice ou du retour sensoriel associé au mouvement, on obtiendrait un splendide bouquet. Il est toutefois essentiel de nouer ces différentes approches par le solide ruban de la participation active du patient[8].

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La cigarette électronique: un écran de fumée

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Depuis l'année 2000, il est estimé que plus d'un million de canadiens ont été tués par l'industrie du tabac (1,2). À l'origine de plus de 40 maladies pulmonaires, cardiovasculaires et d'autres systèmes, le tabagisme mène à plus de morts que le total des décès liés à l'alcool, aux opioïdes, aux suicides, aux meurtres et aux accidents de voiture (2). Bien que l'industrie du tabac soit parfaitement consciente de la mortalité liée à ses produits, elle cherche malgré tout à poursuivre leur commercialisation.

Avec la montée d'évidence contre leurs produits dans les années 1960 et 1970, l'avarice et l'indifférence des compagnies de tabac envers la santé de leurs clients est devenue claire. Afin d'assurer la vente de leur tabac, ces compagnies ont eu besoin d'adopter de nouvelles stratégies pour combattre les efforts de Santé Canada. Un document datant de 1984 écrit par un membre de l'industrie intitulé « Prognosis for the Canadian Cigarette Industry » résume leur approche en trois points (3). Selon lui, il fallait avant tout: i) modérer les perceptions du tabagisme et des fumeurs pour les rendre plus propices à une utilisation continue, ii) développer et introduire de nouveaux produits pouvant servir d'alternatives acceptables, et iii) initier des projets visant à assurer la poursuite de la consommation de tabac par les jeunes Canadiens (3).

Près de 40 ans plus tard, cet extrait devrait faire résonner des alarmes chez son lecteur. Maintenant au sein d'une épidémie de cigarettes électroniques, ces trois objectifs semblent bel et bien avoir été accomplis. Alors qu'elles sont commercialisées comme outils d'aide à la cessation, la croissance rapide du vapotage et des taux de dépendance à la nicotine chez les jeunes Canadiens menacent des décennies de progrès dans la réduction du tabagisme. Pour chaque personne qui réussit à cesser de fumer à l'aide de cigarettes électroniques, environ 80 jeunes sont introduits au vapotage (4). En 2017, environ 13.5% des jeunes Canadiens âgés de 16 à 19 ans sondés ont avoué avoir utilisé une cigarette électronique dans le passé (5). En 2019, ce pourcentage avait augmenté à 24.5% (5). Malheureusement, les jeunes qui consomment de la nicotine par cigarette électronique sont quatre fois plus susceptibles de commencer à fumer des cigarettes normales (6).

Malgré avoir moins d'effets nocifs que les cigarettes classiques, les cigarettes électroniques ne sont pas sans risques (7). Alors qu'une analyse de leurs effets à long terme n'a pas encore été effectuée, plusieurs études révèlent déjà qu'elles pourraient mener à une respiration sifflante chez les jeunes, un signe précoce de problèmes pulmonaire, ainsi qu'augmenter le risque de maladies cardiovasculaires en endommageant les cellules endothéliales tapissant l'intérieur des vaisseaux sanguins (8–10).

Considérant ces données alarmantes, nous pouvons malheureusement conclure que l'industrie du tabac a repris l'avantage dans le bras de fer avec le gouvernement canadien et ses organisations de santé. Dans les années 1990, le Canada était reconnu pour son leadership en matière de lutte contre le tabagisme (11). En effet, ses politiques de réglementation et de taxation ont servi comme modèle pour plusieurs pays et ont même été saluées et décrites comme bien pensées et novatrices par le directeur général de l'OMS en 1995 (11). Maintenant en 2023, le Canada semble avoir perdu la détermination, l'avant-gardisme et le courage qu'il avait auparavant démontré dans ces politiques luttant contre le tabac. En juin 2021, Santé Canada avait annoncé que le gouvernement canadien planifiait interdire toutes saveurs dans les liquides à vapoter afin de réduire la consommation de ces produits par les jeunes (12). Supportées par de nombreuses études, ce type de régulation avait du potentiel (13–15).

Cependant, suite à des protestations prolongées ainsi que d'un lobbying intensif de la part de l'industrie vendant ces liquides, le gouvernement canadien semble avoir été réduit au silence (16).

Il est temps pour le gouvernement canadien de se remettre sur la bonne voie. Le Canada a déjà été salué comme un leader mondial en matière de contrôle du tabac mais les conséquences de son inaction et de sa passivité au sein de cette nouvelle épidémie de cigarette électronique auront un impact néfaste sur la santé de ses citoyens. L'industrie du tabac a causé la mort de millions de canadiens afin d'en tirer un profit. En interdisant les saveurs de vapotage et en renforçant la réglementation sur les produits de vapotage, le gouvernement canadien peut envoyer un message clair: la santé de ses citoyens est une priorité absolue. Il est important de voir à travers les écrans de fumée de cette industrie. Alors qu'elle cherche à nous convaincre que la cigarette électronique est une alternative sans danger et un outil de sevrage tabagique efficace, elle introduit aussi des milliers de jeunes canadiens au tabagisme.

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Laryngectomy awareness - are we doing enough?

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The function of the human larynx, also known as the “voice box”, is something that we often take for granted. While going about our days we breathe, speak and swallow without a second thought. However, for a subset of our population these liberties can no longer be realities. To what would you say, if as a matter of survival, you required the removal of your larynx - taking away the ability to communicate with voice, breathe through your nose and mouth, and even dramatically impact your sense of smell and taste?

A laryngectomy is the complete surgical removal of the laryngeal complex, closing the upper aerodigestive tract off from the lower airway, while bringing the trachea up to the skin of the neck, leaving a permanent stoma. In essence, there is no longer a connection between the nose and mouth to the lungs - breathing occurs only through the hole in the neck. This differs from a tracheostomy, in that with a tracheostomy, the larynx remains a part of the upper aerodigestive tract - it is simply bypassed by the surgical airway. Patients with a laryngectomy most often require the surgery due to an advanced laryngeal malignancy. The treatment journey for their illness is a long and difficult one, made only more difficult by the adjustment to a new way of living that has been brought upon them (1, 2). These patients often have post-operative complications that protract their length of stay in hospital, and they have an intensive course of rehabilitation afterward for various methods of speaking techniques (esophageal speech, tracheo-esophageal puncture speech, or artificial-larynx) swallowing, and laryngectomy stoma care. Patients often report an impacted quality of life for years after surgery with unmet supportive care needs, and have an increased risk of medical comorbidities (3-7).

Given the marked life change patients with a laryngectomy go through, are we doing enough to educate the healthcare workforce so they can be adequately cared for?

Caring for surgical airways can be understandably daunting for healthcare providers without unique experience in the area (8). However, there are basic parts of laryngectomy care that are often missed. As an Otolaryngology resident, I am called about these patients in a variety of settings. As a witness to this population, anecdotal trends have emerged from my experiences in their care. For example, often, the laryngectomy is labelled as a tracheostomy in the medical record, and patients are given nasal prongs for O2 supplementation. This may on the outset seem trivial, however in an emergency scenario, such errors could have catastrophic consequences for the patient and demonstrates a fundamental misunderstanding of their anatomy. This is unfortunately supported by a study which demonstrated less than 5% of frontline emergency respondents understanding the airflow differences between a tracheostomy and a laryngectomy (9). Furthermore, a survey distributed amongst Otolaryngologists had 25.8% of respondents able to recall a patient with a laryngectomy that died following attempted oral intubation (10). With such disastrous ramification , it is important for workers in all areas of healthcare to be educated on at least what a laryngectomy is and how such patients breathe.

Some risk mitigation to this issue does take place. Typically, in hospital after a patient is recognized as having a laryngectomy, a “neck breather” sign will be placed over their bed. This is helpful, but does bear the unfortunate possibility of being confused with a tracheostomy. The National Tracheostomy Safety Project in the United Kingdom has addressed this issue by designing specific bedhead templates for patients with a tracheostomy or a laryngectomy (11,12). Additionally, in larger centres there are always trained individuals available in-house or on-call that can help answer questions or provide care, such as

Respiratory Therapists, Speech-Language Pathologists, and Otolaryngologists. But is this really enough?

Outside of tertiary care centres when resources are scarce, gaps are highlighted. One particular circumstance pertains to end-of-life care for patients with laryngectomies. Although transferring patients closer to family at the end of life should be common practice, the presence of a laryngectomy creates a complex and difficult scenario - often, only because the staff at smaller, community hospitals are not trained or equipped to care for them. This compounds the great stress that already accompanies end-of-life. In my years thus far as a resident, this has led to extremely challenging situations for patients and their families. Far too often, at a time when their comfort and wishes are what is most important.

The complex and multidimensional struggles that accompany patients with a laryngectomy raises the question, what can be done? First, further research into the discrepancies of care for these patients is required. Such research could highlight the need for further funding aimed toward advancing education in the care of patients with a laryngectomy globally. It is my firm belief that such education should be implemented in the curricula of training programs across disciplines, which is undoubtedly lacking. There is work currently demonstrating that the implementation of standardized nurse training strategies can improve knowledge in this area (13). Acknowledging that this can take years to occur, what can be done now? Local champions of awareness are required globally to highlight the needs of patients with a laryngectomy within hospital systems and health authorities. This can be implemented broadly by either patients as advocates, or healthcare workers that already have expertise in the area.

In the interim, basic principles of compassionate care will go a long way. I challenge all healthcare workers to exercise patience and active listening while communicating with these patients, as you may very well learn something new from this unique population.

Starting here, let us work together, and give a collective voice to those who have lost theirs as they knew it.

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Team-Based Primary Care: Understanding its Value and Enablers of of Success

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Introduction:

The complex, increasingly specialized nature of healthcare delivery has created a need for integrated systems that streamline communication and care processes. As a result, delivering primary care through team-based care (TBC) models has become a growing priority for Canadian health systems (1,2). Since 2011, Patient Medical Homes (PMH) have been established across Canada as a method of delivering primary TBC (3). PMHs are composed of multidisciplinary, patient-centred primary care teams that provide reliable links to various health services for patients, with the goal of delivering comprehensive, high quality care (4). With more healthcare workers practicing in integrated systems, this commentary explores the evidence and enabling strategies behind TBC delivery.

The Evidence for TBC:

The "quadruple aim" is a well-known framework for the delivery of high value, high quality care. The framework is defined by the Institute for Healthcare Improvement (IHI) as care that optimizes the four pillars of: patient experiences, provider experiences, population outcomes, and financial cost (5,6). Studies illustrate that TBC models are more successful in achieving the quadruple aim compared to traditional modes of care delivery for numerous reasons (7).

Firstly, TBC can improve patient experiences. Comparative studies illustrate that effective TBC models improve patients' perceptions of 1. their knowledge of their health status, 2. access to care, 3. feelings of trust and safety, 4. ability to communicate with providers, engage in self-care, and maintain independence, 5. coordination of care, 6. patient-centredness of care, 7. self-rated health, and 8. personal overall health (6,8-12). Patient surveys also demonstrate increased overall satisfaction with care and likelihood that patients will recommend TBC clinics compared to traditionally operated clinics (13).

Provider experiences can also benefit from TBC systems. Healthcare workers engaged in TBC report enhanced professional fulfillment and skills utilization compared to traditional models of care (13). Furthermore, TBC models demonstrate reduced burden of work for physicians and improved job satisfaction and staff retention, while reducing feelings of stress and burnout (7,13-17). As clinician burnout is associated with the delivery of less safe care, this ultimately improves patient safety (18).

TBC has also been shown to improve patient and population outcomes by enhancing patient monitoring for cancers and chronic illnesses, such as depression and diabetes (19-21). Furthermore, quantitative health outcomes, including sustained diabetes, hypertension, and dyslipidemia control, also improve with successful TBC delivery (22-24).

Finally, effective TBC reduces health care costs and improves resource utilization. Certain models of TBC increase not only the number of patient visits per work day, but also the capacity of providers during each visit (13). Additionally, patients receiving team-based primary care experience fewer emergency department visits, hospital admissions, and days spent in hospital (12,19,25-28). This is particularly true for medically complex patients who engage in TBC – a population disproportionately incurring healthcare costs (29-34). Patients engaged in TBC also

experience reduced 30-day ED visits and mortality following hospital discharge, improving both patient outcomes and resource utilization (35).

TBC has the capacity to improve care delivery in all aspects of the quadruple aim. However, transitioning to TBC can compromise quality of care if not orchestrated appropriately (14,36-38). The following are evidence-based strategies, or "enablers", proven to increase the likelihood of successful TBC delivery.

TBC Enablers:

Core Values and Principles – Successful TBC delivery requires establishing shared values and principles that guide members towards accomplishing the team's patient-centred goals (14,37,39,40). Furthermore, reluctance by leadership to engage in change has been cited as the most critical barrier to effective TBC processes, with team members being more likely to support change when they are guided by a shared purpose (14,40).

Team Structure – TBC groups should include all professional staff, patients, and caregivers. This includes readily engaging patients and caregivers in multidisciplinary discussions and decision-making processes, when appropriate (14).

Team members must also be part of a structured approach to care. One historically successful model of TBC includes larger teams that are sub-divided into "teamlets", each responsible for a patient panel (15). When studied, this model showed that team members are most effective when consistently interacting within the same teamlet. Teamlet models often include one clinician (e.g. physician, nurse practitioner) and one to two support staff (e.g. medical assistants, nurses) per teamlet. Various other professionals (e.g. specialized RNs, psychologist, OT/PT) are employed to provide services to all the teamlets (15). Studies show that employing three to four non-clinical staff members for every one clinician significantly reduces the risk of clinician burnout, and that a variety of available skillsets better enables care delivery (15,18,40).

Leadership – Diplomatic, non-hierarchical leadership is consistently identified as an enabler of TBC (8,34,48,49). Most models adopt clinical leadership, whereby the primary care provider facilitates the administration of patient care. Tasks should be discussed and distributed based on the aptitudes of each team member to create a culture of "shared power" (40).

Roles and Responsibilities – Designated roles and responsibilities should seek to maximize each team member's potential without compromising their professional identity. Common qualities amongst high-functioning members of TBC groups include: 1. exercising a concerted effort towards the team's goals; 2. depending on other professionals' skills (interdependence); and 3. making decisions as a team (14,37,40). Employing these strategies when establishing roles and responsibilities improves care efficiency and maximizes each member's potential, consequently improving job satisfaction (14,37,40).

Effective Communication – Effective communication has been identified as a key enabler of TBC delivery across a variety of integrated centres (14,15,36,39,40). This approach begins by establishing high standards for consistent, clear, and professional communication, often through formal training. Basic strategies include discussing verifiable observations rather than opinions, sharing ideas equally, listening actively, and continually reflecting upon and re-evaluating team processes (14).

Other Enablers – Additional enablers of TBC include 1. co-location of teams (14,15,36,40); 2. a shared, digital information technology platform that can be modified, viewed, and understood by all members (14,39); 3. training that develops the members' capacity to function interdependently (14,15,36); and 4. continuous measurement of patient processes, outcomes, and team functionality to drive evidence-based improvement.[41]

Conclusion:

Health systems across Canada are increasingly prioritizing the advancement of primary TBC through multidisciplinary engagement in PMHs. While TBC has been shown to improve the value and quality of care delivery, properly understanding and applying enablers of TBC is crucial to successful implementation of these care models.

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Radiology and Global Health; What can it look like? An introduction for the next generation

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Access to radiology is limited globally by the lack of necessary hardware, insuffici nt education in the multiplicity of required services, and a disproportionately low number of local radiologists (1-7). The World Health Organization (WHO) estimates that two-thirds of the global population do not have adequate access to medical imaging (2, 8, 9). Sadly, about 500 million to 1 billion are children (1). As radiology has become an integral partner to the other medical and surgical disciplines, its absence only widens the gap in essential healthcare delivery. The WHO lists medical imaging as one of the six essential building blocks for health systems to operate, and improving access is critical to meeting various Sustainable Development Goals detailed by the United Nations (10, 11).

The definition of global health has been extensively contemplated, with roots stemming from the terms “public health” and “international health”. Koplan et al. provided a unified description; “Global health is an area for study, research, and practice that places a priority on improving health and achieving equity in health for all people worldwide. Global health emphasizes transnational health issues, determinants, and solutions; involves many disciplines within and beyond the health sciences and promotes inter-disciplinary collaboration; and is a synthesis of population-based prevention with individual-level clinical care” (12).

Medical students, radiology residents, and radiologists are keen to learn about and ultimately lend their hand to radiology global health efforts. However, they need to be made aware of avenues to do so, and additional support must be provided to foster their enthusiasm (5, 13-16). For this purpose, radiology global health initiatives are introduced under three umbrellas: infrastructure, education, and clinical care.

Infrastructure:

Deficiencies in radiologic infrastructure are found in the chain of equipment procurement and maintenance, data and electrical supply requirements, and IT support (1, 3, 8, 17, 18). The “RAD-AID Radiology-Readiness Assessment” is an openly available online data analysis tool endorsed by the WHO (2, 19). It is used to identify pre-existing supportive resources and significant barriers to imaging development. The in-depth evaluation is then used to make an impactful, individualized plan with measurable deliverables. For example, it would be impractical to install a CT scanner at a site with an unstable electrical grid or a Picture Archiving and Communications System (PACS) without sufficient data management capabilities. Therefore, due to their relatively low complexity, cost, and portability, a focus on supplementing ultrasound and X-ray programs is evident in resource-limited locations (1, 2, 18, 19).

Solutions are multifaceted and cannot be improved in a paternalistic manner. Previously, used or refurbished imaging technology was commonly donated to developing countries. Today, most do not accept donated equipment due to poor installation support, missing parts and user manuals, and no contract for the product warranty or regular servicing (3, 17). Radiology development is thus multidisciplinary, including business administrators, medical physicists, engineers, nurses, politicians, and so on (2, 20). Volunteerism therefore must extend beyond the clinician.

Education:

Teaching is a cornerstone of global health. Fostering bidirectional relationships is imperative as educators can learn from local stakeholders to better their cultural understanding and gain exposure to unique barriers to care. Conversely, a cycle of dependency must be avoided so local leaders may be empowered to promote sustainable, long-lasting change (13, 21).

International education has been described in 4 forms: onsite lectures, onsite hands-on demonstrations, online learning management systems, and virtual collaborative case reviews (8). These are complementary as onsite training provides hands-on feedback for procedural skills and nurtures the relationships between global partners, while online learning delivers key background information and subject fundamentals. As widespread Internet access continues to improve, and travel was limited by the COVID-19 pandemic, academic centres have become more involved in the virtual side of international education (4, 17). With this in mind, there is a growing opportunity to engage in educational efforts that can be done without the time and financial commitment of an on-site mission

Clinical Care:

There is a disparity of radiologists within developing regions. To paint the picture, Malawi is a country of 16 million with just two local radiologists (7). In comparison, Canada has about seven per 100 000 people (22).

While radiology in resource-limited regions is known to aid in the diagnosis and management of acute and communicable diseases, there is a trend toward increasing its use in the realm of non-communicable conditions (1, 13). Examples include upstream prevention with cancer screening, prenatal assessment via ultrasound, and chronic care with cardiovascular angiography and echocardiography (1, 5, 13, 18). On-site clinical duties can involve aiding with imaging acquisition, reporting exams, and conducting interventional procedures (1). By communicating with local providers, the deliverance of care would be in concordance with what is seen as the most valuable use of their efforts while boots are on the ground.

Alternatively, as Internet and digital equipment use spreads, teleradiology has become invaluable in improving access to diagnostic imaging (8, 20, 23). Humanitarian teleradiology has since been divided into two major types; "tele-diagnosis" projects often enacted by clinicians who lack access to a radiologist for any interpretation of imaging studies, and "tele-expertise" initiated by radiologists seeking subspecialty consultation to assist in patient care and their personal education (20). While teleradiology has its benefits, avoiding the total outsourcing of radiologists is of great importance. Whenever possible, there needs to be a focus on capacity building with opportunities for local radiologists and the eventual move towards a tele-expertise format of assistance (8, 20, 23, 24).

Moving Forward:

Due to its technical nature, radiology global health initiatives have lagged behind other medical specialties (2, 5, 16). Radiologists and trainees appear eager to cultivate this further. To do this, many agree that a structured global health curriculum should be introduced into residency, and a template has already been developed by RAD-AID (5, 13-15, 17, 19, 21, 25).

You can learn more by exploring organizations such as RAD-AID, Radiology Without Borders, Radiology Across Borders, and the Canadian Association of Radiologists Global Outreach module on their RAD Academy learning platform.

Improving access to radiology requires a multidisciplinary, non-paternalistic, and bidirectional approach. This can only be achieved by educating future generations of global health volunteers to come.

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Perinatal Loss: Unrecognized Trauma

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Perinatal loss is not an uncommon health concern. It involves miscarriage (loss of pregnancy before 20-28 weeks), stillbirth (loss of pregnancy after 20-28 weeks), neonatal death (loss of a baby in the first 28 days of life), termination of pregnancy for fetal anomaly, and recurrent perinatal loss which is having two or more miscarriages (1). When a woman gives birth; usually, people around her tend to support her emotionally and physically. However, the same amount of support might not be seen if she lost the baby during or after pregnancy. People assume that time will heal her shortly, especially if she can physically get pregnant. When time passed, the intensity of some emotional responses might decrease, however, time is not the only factor that helps in healing the loss (2). And physical health is not the only factor that makes people prepared to get pregnant again.

Given that one in four pregnancies ends in loss (3), sometimes people, including healthcare professionals, tend to normalize the loss in a way that doesn't allow the parents to grieve normally, and it might be hard for them to understand how someone misses a baby who was never born or hardly known. Perinatal loss has been seen as a medical problem rather than a significant loss, and little empathy for the loss might be shown (4). Previous studies showed that psychiatric symptoms are linked to late perinatal loss as the attachment between the mother and the baby becomes more robust with time (5,6). Late perinatal loss can be worsened by physiological changes in the body, like milk secretion, and by various preparations for the baby's arrival, like empty crip. These are painful reminders of the tragic loss (7). Moreover, some women will have to go through a vaginal delivery without having a baby which makes her focus on the pain and the loss.

The psychological consequences of perinatal loss (during pregnancy up to 28 days after delivery) are not well-appreciated compared to the physical consequences. This trauma can affect women's well-being and might cause psychiatric disorders (8). Parents might suffer from a spectrum of mental health issues, including complicated grief, depression, anxiety, panic, fears, post-traumatic stress disorder (PTSD), and suicide (2,6). The psychological reactions after the loss might lead the parents to avoid any attempt to have a child as they found it a frightening idea. Some women feel ashamed and prefer to be socially isolated and silent about it. Other women blame themselves, feel lonely and guilty with a sense of failure and low self-worth, and question their motherhood. Many women apologize to their babies, saying, "Sorry for being unable to protect you. I'm not a good mother!" (9). Perinatal loss may create some stress in the couple's relationship (10). Furthermore, the grief for the loss might impact other family members like older children who were expecting a sibling, or couple's parents who were expecting to become grandparents (11).

Maladaptive coping style is a significant predictor of adjustment difficulties in perinatal loss including anxiety, depression, and posttraumatic stress. This emphasizes the need for coping-focused intervention, e.g. cognitive behavioral therapy (2). Moreover, the lack of social support is a significan predictor of psychiatric symptoms. Social support is a robust protective factor against symptoms of PTSD and grief. Sufficient support from family, friends, and colleagues following a perinatal loss can be helpful (2). Another useful source is support groups that involve people with similar experiences which might reduce the stigma and isolation, and facilitate the processing of the loss with social connection (2,11,12). Couples or family therapy might be also indicated for some individuals (2).

A multidisciplinary approach is critical in a perinatal loss by listening with sensitive communication, providing empathy with emotional validation, and identifying the patients' needs including psychological, medical, and logistical support. Options with pain and lactation management should be discussed with patients (2,7,11). Screening for

psychiatric symptoms and assessing social support might be crucial for early intervention (2).

Lastly, it is essential to promote the importance of mental health of perinatal loss in the community and academia to improve research, patient healthcare, and policy development (8). It is also essential to consider cultural differences as an influential factor in responding to the loss by assessing the understanding of the cultural meaning of the loss as well as the cultural practices or rituals (11).

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The biased doctor will see you now

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The intensive care unit (ICU) is an organized chaos of humanity, medicine, and luck, where often, time to intervention following circulatory failure can mean the difference between life or death. Now, imagine for a moment if you could predict which critically ill patients will have circulatory failure, and when. Science fiction, right? This, and other 'impossible' questions are what artificial intelligence (AI) is poised to answer, and is doing so already (1). Moving outside the ICU, and into the domain of ophthalmology, AI has shown promise in tackling previously intractable problems, like which patients with macular degeneration will progress to the blinding exudative form, and at which rate; and, even, which patients with diabetic retinopathy require referral to a retina specialist, and when (2,3). Even outside of medicine, AI is beginning to take over the mainstream, with tools like ChatGPT bringing the power of large language models (LLMs) like OpenAI's generative pre-trained transformer 3 (GPT-3) to the general public (4). AI models possess the capacity to analyze vast amounts of data and can identify patterns impossible for human assessors to elucidate, however, as their development and use accelerates, significant concerns have begun to emerge. Present models suffer from a lack of performance in real-world clinical environments due to siloed training data, but most importantly, carry significan bias, which brings potential for harm not only to patients but to the broader health care system and society (5). Such 'algorithmic bias' is a key challenge for AI developers in all disciplines, but poses an especially critical challenge for health care applications, where clinicians must strive to ensure that delivery of care is equitable, irrespective of age, gender, race, socioeconomic status, or other social factors (6).

Algorithmic bias refers to inherent prejudices encoded into machine learning (ML) algorithms from the dataset(s) used to train them and the processing methods implemented to output requested results. Such biases can manifest in a variety of ways, including output of responses which disproportionately affect specific populations, reinforcement of stereotypes, underrepresentation of vulnerable groups, or omission of results or data. In the mainstream, for instance, OpenAI's GPT-3-powered ChatGPT has been noted to voice opinions that 'Americans are entitled' or that 'the best scientists are white and male' while simultaneously also being accused by other users of having a 'woke' bias (7,8). Both biases reflect the training dataset used to develop GPT-3, comprised of Common Crawl, WebText, Books1, Books2, and all of English-language Wikipedia, which together are considered to be a snapshot of the entire internet (9,10). Worryingly, in the health care domain, such biases have already manifested in substandard care. In a pilot-test of GPT-3 on a dataset of pain patients, Logé and colleagues at Stanford University observed that while the AI algorithm advocated for pain management for all patients, it was 3.6% more likely to refuse pain treatment to black patients in comparison to white patients, and, equally likely to refuse pain treatment to female patients when compared to males (11). Reporting of datasets specific to health care applications of AI in specialty medicine has also demonstrated that there is a significant lack of representation of patients from low and middle income countries, thereby reducing the generalizability of ML models developed from these data (12). Alarmingly, despite reporting of such stark biases in the literature, some clinicians and stakeholders continue to remain resistant to their very existence, further cementing them as expected byproducts of the ML development process and thereby allowing for the potential for patient harm (13).

Addressing algorithmic bias thus requires a multidisciplinary approach, involving application developers, hospital and health system administrators, patients, and end-user clinicians. To ensure that the potential for bias is reduced from the earliest stages of algorithm development, it is imperative that datasets be representative of the entire expected patient population for a specific disease or

discipline. To achieve this, clinicians and researchers should work to initiate international collaborations with a specific focus on nations which lack digital health data and the infrastructure to create datasets. Such collaborations should be centred on digitizing health data in under-represented countries through re-allocation of scientific funding and resources and sharing of existing digital health infrastructure and cloud computing power. Once equitable, representative datasets become available, algorithm developers should seek to incorporate these into their training and validation processes to create applications which are trained without bias and which improve upon existing limitations to model explainability. Where current AI models work as unexplainable 'black boxes', limiting our understanding of how biases arise, newer generation ML applications should be accompanied by clear data on how the model considers its training and input data, and the decision making processes utilized in the clinical setting. Finally, once such applications are ready for deployment, regulatory agencies should institute post-deployment real-world monitoring for algorithmic bias. Such monitoring, with the help of end-user clinicians, should centre on ensuring that algorithms are performing without marginalizing a specific patient population, while continuing to provide high-quality, contemporary medical care.

With the continued evolution and integration of AI models, health care is set to experience another once-in-a-century revolution. To ensure that society's most vulnerable and marginalized groups are not once more left behind, we must work together to recognize algorithmic bias, develop equitable datasets, and institute rigorous monitoring processes. Health care's AI golden age should not be one in which we continue to worry what biases our healers will bring with them into our care.

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Expanding MAiD - Treating Systemic Problems with Suicide

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Everyone has the right to die.

Encoded in the Canadian Charter of Rights and Freedoms is the provision that everyone has the right to life (1), but even more universal is the inevitability of death. As physicians, we spend each day of our lives attempting to stave off the inevitable by curing illness, alleviating pain, and bearing witness to the beauty of each individual life. All of our treatments are in service of delaying the inevitable until we reach the end of a person's life.

Every able-bodied person has the ability to complete suicide. As a society, we acknowledge that prolonging life can be prolonging suffering, such as when a body is ravaged by illness or when death is inevitable. When Bill C-14 was passed by the Canadian parliament, a person's right to physician-assisted suicide was codified in law. This allowed people who were too ill or frail to access their right to suicide. The passing of this law was a celebration of autonomy—those previously unable to access a thing as fundamental as death were finally given the ability to choose. In the service of alleviating suffering, a physician can thus offer medical assistance in dying (MAiD).

At first, one of the key stipulations of MAiD was that death would have to be reasonably foreseeable when one had a grievous and irremediable medical condition (2). With the passing of former Bill C-7, the eligibility criteria were widened. While the spirit of the law was in the service of further alleviating suffering, the criteria were extended to include persons suffering solely from mental illness. With increasing rates of unmet mental health care needs in the Canadian populace (3), it is likely that there will be people requesting MAiD for mental health who have conditions that are not irremediable. Due to the limitations of healthcare resources, this person may have not yet been treated adequately for their mental illness. Should physicians become complicit in euthanizing a person who is treatment-refractory because of inadequate access?

Expanding access to MAiD is no longer helping to equalize each person's access to suicide; by expanding the criteria to mental illness, physicians are now at risk of prematurely ending the lives of people with treatable illnesses. At a time when access to life-saving treatments such as electroconvulsive therapy (ECT) remains inequitable (4), how can using MAiD to address mental illness be justifiable? Previous to MAiD, suicide was a possible outcome of mental illness. If physicians become complicit in ensuring a mentally ill person's outcome becomes suicide, is that not doing harm?

Addressing suicidality is a key component of a psychiatrist's work. Decreasing rates of suicidal behaviour and suicidality is a core aspect of certain therapies, such as dialectical behavioural therapy (5); expanding access to these types of treatments could improve a mentally ill person's outcome. With recent developments in the treatment of mental illness, such as research into the use of ketamine or psychedelics, options for alleviating suffering are increasing (6). Given the number of treatments and therapies available for mental illness, it is almost impossible that a person with mental illness has exhausted their options. Rather, it is when they have exhausted their access to healthcare that they feel their condition is irremediable. If access to psychiatric care is not expanded to meet the demands of the population, it is impossible to justify the use of MAiD for mental illness. In doing so, we guarantee an outcome of suicide.

While it is inevitable that some people will complete suicide, it is also true that decreasing access to the means of completing suicide may prevent someone from completing it (7). This is why the presence of firearms increases the likelihood of a completed suicide; the more immediate the

means, the less time there is for a person to reconsider. Safety plans are often implemented in order to increase the time between the urge for suicide and the ability to attempt it. Mental health acts, such as section 15 of the Mental Health Act of Ontario, have provisions for involuntary hospitalisation in people demonstrating suicidality (8). As a society, we have decided that people who are mentally ill may not be competent to make their own decisions; it is also acknowledged that a person may regain their competency with the resolution of their episode of illness. The intensity of suicidal ideation often abates as an episode of illness improves (7). By allowing for people whose sole illness is mental illness to have assisted suicide, we are handing people the means for ending their lives rather than delaying access to the means until their suicidal thinking abates.

Access to MAiD is an important component of equitable healthcare—the choice of how and when one dies gives dignity to those at the end of their lives. For some people, death can be the ultimate way of addressing their suffering. A physician's purpose is to relieve suffering and cure illness; it is thus justifiable for physicians to provide medical assistance in dying for those with intractable suffering. Yet, allowing people with only mental illness to access physician-assisted death is guaranteeing that they succumb to their illness—an illness that may not be irremediable with the right resources. Providing physician-assisted suicide for mental illness is putting the burden of a broken healthcare system on the shoulders of our most vulnerable—and allowing them to die.

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Suffering in Silence - Suicide in Medical Training

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Work, sleep, repeat. The seemingly endless cycle of residency which is believed to be fundamental to produce the highest quality physicians and simultaneously responsible for burnout, deterioration of mental health, and suicide. Time after time, we hear the tragic story of a resident who succumbs to these unsustainable circumstances by taking their own life. This is usually followed by nationwide grievances and a demand for change. Despite this, nothing ever changes. We remain stagnant knowing that residents are suffering, with suicide as an inevitable outcome.

There are over 800,000 deaths due to suicide each year, and among physicians suicide rates are over double that of the general population (1,2). It is known that the toxic environment of medical training leads to burnout early along the medical training trajectory. In a survey of medical students, half met criteria for burnout with 11% reporting suicidal ideation within the past year (3). Additionally, while nearly one third of medical students experience depressive symptoms during their training, only a very small minority seek any form of treatment (4). Due to the pipeline effect, it is not surprising to see that over 70% of residents meet criteria for burnout with a sharp increase in depression correlating with the onset of residency (4,5). This translates into over one third of residents experiencing suicidal ideation during their training, and a portion of these which attempt or succeed to take their own lives (6). Clearly, there are deep-rooted issues within the medical training process which are leading to these adverse mental health outcomes which must be addressed.

Training should never come at the expense of wellness. How can we be expected to help others without taking care of ourselves? In residency, it is not uncommon to work upwards of 80 hours per week. It is important to consider that this figure does not include other scholarly or academic commitments which are often a requirement. It is commonplace for residents to routinely work over 24-hours consecutively, often several times per week. These gruesomely long shifts have been associated with numerous adverse outcomes (7). These shifts have also been associated with increased medical errors and significant decrease in helping desire compared to being well-rested, which have direct negative implications to quality of patient care (8,9). Previous research demonstrated that limiting the maximum shift length to under 24-hours had numerous mental and physical health benefits (10). This restriction has also been shown to reduce medical errors, injuries on the job, and motor vehicle crashes when driving home (11). Despite the clear adverse outcomes on residents and patients alike, numerous programs and institutions around the world continue to implement these extensive shifts. These working conditions are clearly not humane nor sustainable and it is no wonder that there is such a high prevalence of distress and mental health comorbidities among residents. However, the culture of medicine fosters such a competitive environment which forces its inhabitants to learn to ignore the signs of burnout, depression or suicidal ideation (12). The pervasive delayed gratification in medicine has conditioned us to tolerate the intolerable. Those who choose to acknowledge or share these signs or seek help are often viewed as weak. Further, although physicians are trained medical professionals they are often poor at recognizing the signs of depression within themselves or colleagues (13). In those that are able to recognize the signs of deteriorating mental health, the stigma and confidentiality concerns often serve as a significant barrier to seeking treatment, causing the majority of physicians to not seek care at all (14,15).

Barring the necessary institutional changes, what can we do in the interim to maximize wellness and minimize suicidality? After all, institutions commonly make wellness and mental health an individual problem thus removing

responsibility from the organization itself. Firstly, medical students and physicians alike must receive proper education in order to recognize the signs of burnout, depression and suicidality. This will allow for timely interventions and to be connected with systemic supports as early as possible (16). When mental health concerns are identified, we must minimize any barriers to usage present such as stigma, confidentiality or lack of time (14). The stigma associated with mental health resource usage can be minimized through the use of regular well-being assessments. This in turn allows residents to be in direct contact with mental health professionals to receive the support they require. In turn, by "breaking the ice" residents have been shown to be more likely to use these services voluntarily in the future and had a more positive view of usage of mental health resources in general (17). Moreover, the importance of healthy lifestyle habits such as healthy eating, regular sleep schedules and exercise must be emphasized as all have demonstrated reductions in suicidal ideation (18–20). In the treatment of depression, exercise has even been shown to be as effective as pharmacotherapy and cognitive behaviour therapy with additional multisystem benefits such as weight and blood pressure control (21,22). A recent systematic review of randomized controlled trials even found that exercise reduced suicide attempts in those with mental or physical illness (23). Further, numerous organization-level and physician-directed interventions such as mindfulness sessions, stress management training and online psychoeducation have proven successful at reducing the symptoms of common mental health disorders and suicidal ideation among physicians (24). Evidently, there are numerous ways to lessen the burden of the medical training process in order to ensure the wellbeing of its learners. Many members of the medical community have already stepped forward to publicly verbalize their concerns (25–27). Therefore, it is imperative that we break the endless cycle of suffering in silence during the medical training process and demand change.

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