

Are miscarriages more common during COVID-19?

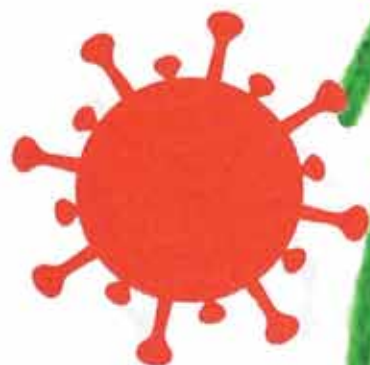
An analysis of in vitro fertilization pregnancies in BC

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In situ simulation training for in-office anaphylaxis preparedness

Innovations in early interventions for people with eating disorders

Global decline of male fertility: Fact or fiction?



Wealth guidance for physicians' unique financial needs

Build financial health
at every stage of your career



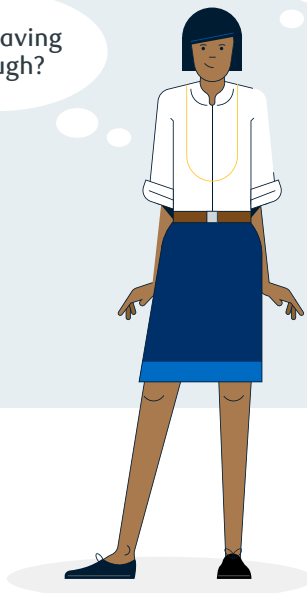
Should I incorporate
my medical practice?

Will I be able
to retire in the way
I imagine?

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a separate Will for
my corporation?

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between my Corporation,
RRSP and/or TFSA?

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Vadim Galperin, CFP, CIM
Portfolio Manager
vadim.galperin@rbc.com
604-665-9813 | vadimgalperin.com

Tom Ronneng, CFA, CFP
Portfolio Manager
tom.ronneng@rbc.com
604-665-3236 | tomronneng.com

Mikayla Michaud
Administrative Assistant
604-257-7680
mikayla.michaud@rbc.com

Toll-Free: 1-800-427-7766



Wealth Management
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Drs Bron Finkelstein (left) and Jodie Graham (right), from Chetwynd, population 3000, often use the Real-Time Virtual Support pathways for providers. Story begins on page 110.

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ON THE COVER

Clinical pregnancy rates and miscarriage rates in IVF patients do not appear to be affected by the COVID-19 pandemic.

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604 638-2815
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ARE MISCARRIAGES MORE COMMON DURING THE COVID-19 PANDEMIC?

An analysis of IVF pregnancies in British Columbia.

- We analyzed two cohorts of IVF pregnancies to assess whether miscarriages were more common during the pandemic.

- Clinical pregnancy rates were similar during the pandemic compared to prepandemic, as were the biochemical miscarriage rates per positive bHCG.

- We sought to determine whether *intangible factors** occurring during the pandemic were associated with changes in IVF pregnancy and miscarriage rates.



*stress



*changes in
disinfection protocols



*asymptomatic
COVID infections

- Women planning to conceive do not need to delay their plans as a result of the pandemic.

- Pregnancy and miscarriage rates do not appear to be changed in IVF treatment outcomes.

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Musings about the state of the world

As this editorial is being crafted, Russia has invaded Ukraine and we are into year 2 of a global pandemic. People are discouraged and tired. Public patience is being tried, as demonstrated by recent freedom convoys and the occupation of Ottawa (as an aside, it wouldn't be possible to have such demonstrations in a country that wasn't free).

Public health guidance would seem to be apolitical, but lines have been drawn between right-leaning conservatives/republicans and left-of-centre liberals/democrats. It amazes me how polarizing mask and vaccine mandates have become. Vitriol often spread by social media is divisive and inflammatory. A crisis that many would think should unite us has become a lightning rod for vehement disagreements even among family members.

The current state of the world is discouraging and brings up questions about the humanity of humankind and its future.

One month after 9/11, partly in defiance of terrorism, I went to Europe on a long-planned vacation. I distinctly remember strolling into a small Tuscan village and noticing a war memorial in the central square with fresh flowers on it. It was erected in honor of the day that

part of Italy was liberated from the Germans in World War II. It was as if this event had happened recently and was fresh in the minds of the local townspeople. I wonder how they felt about the world during the worst of that global conflict.

There are certainly other times in history when the future seemed dark and uncertain. Coming out of the Great War (World War I) and being struck by the deadly Spanish flu pandemic would have caused many to despair. Living through the bubonic plague during the 14th century, when 100 million souls perished, would have been dark days indeed. I was born in 1963, shortly before President John F. Kennedy was assassinated. My parents likely questioned their decision to bring a new life into this troubled world.

Disease, violence, and war have been a part of the human condition since time began. Charles Dickens started his novel *A Tale of Two Cities* with the line: "It was the best of times, it was the worst of times." While true that humans are capable of the despicable, they

can also be kind, caring, and generous. Focusing on people's potential for goodness can help us deal with the uncertainty and negativity found in the world today.

By the time this editorial is in print, the pandemic may have subsided and the war in Ukraine will likely have been decided. As troubling as these events have been, a great deal of goodness has also been demonstrated. There has been an outpouring of well-wishes and support for the people of Ukraine from millions of regular citizens around

the world. So many health care workers, neighbors, family, and friends have lifted those around them during this tiresome pandemic. For a local example of decency, look no further than to the people of British Columbia, who mobilized to support the farmers affected by flooding and the residents devastated by fires in the recent past.

Good and evil exist in each of us, but in the end, I have faith that our basic humanity will triumph. ■

—David R. Richardson, MD

Disease, violence, and war have been a part of the human condition since time began.

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BURNOUT AND COVID-19 Warning signs and when to act

with guests
Dr Jennifer Russel
and Dr Lawrence Yang



Quest for Superdoc, Version 2.0

In 2016 I wrote an editorial titled “Quest for Superdoc.”¹ During the past 5 years, I have been on the brink of burning out, so I decided to revisit my quest and see where it went sideways.

Even before COVID-19 reared its virulent spikes, I was feeling overwhelmed. Working as a solo family physician, I was on my EMR for 12 hours a day, managing my office, and juggling spending time with my family, three dogs, cat, chickens, and friends (in that order). I told myself and everyone around me that “it’s all good.” After all, wasn’t I *just* a family physician? I wasn’t an ER doc or an internist in the ICU. And aren’t all docs supposed to be super resilient? I just had to patch and dry-clean my cape, and all would be well.

My family practice was so busy that on many days I would have to send patients to the urgent care clinic or the ER because I couldn’t see them in a timely manner. I felt like I was failing them. My staff was working with their hair straight back. I felt like I was failing them. I wasn’t visiting my parents as much, and when I did visit, I was always rushing to get back home because I had “lots of work to finish.” I felt like I was failing them. Many of my colleagues were feeling the same way. We would chat on the phone, vent, and then carry on as before. There were no obvious solutions.

Then one day I was introduced to the idea of the community health centre (CHC) model: Community Health Centres are created by not-for-profit organizations and co-operatives that are committed to providing comprehensive, accessible, affordable, and culturally-appropriate services through a collaborative team approach. CHCs adhere to five key principles:

1. Interprofessional care: CHCs provide collaborative services through an integrated multidisciplinary team-based primary health care team.
2. Wrap-around approach: CHCs offer programs and services for healthy

living and community well-being in addition to primary care.

3. Community-governed: CHCs are governed by community members and focused on community priorities.
4. Working upstream: CHCs actively address the “social determinants of health,” like access to food, housing, education, and the supports needed to thrive.
5. Justice-based: CHCs demonstrate a commitment to fairness, and to the values of health equity and social justice.²

The Canadian Association of Community Health Centres is working on initiatives such as investing in CHCs, establishing universal Pharmacare, investing in oral health and dental health care, and investing in affordable housing and ending homelessness.³

CHCs are funded by MSP, the Ministry of Health, municipalities, community fundraising, primary care networks, and health authorities. In exchange for a percentage of my MSP earnings, my patients and I would be part of a unique team-based care concept.

The Supporting Team Excellence with Patients Society (STEPS)⁴ is a Kamloops-based not-for-profit CHC. The STEPS team consists of a volunteer board of directors, a compassionate executive director, a diligent clinic manager, caring medical office assistants, nurses, a social worker, a counselor, a pharmacist, an occupational therapist, a nurse practitioner, a diabetes nurse educator, a women’s sexual health services clinic, a transgender clinic, a respiratory therapist, a dietitian, a billing clerk, and family physicians. There is increased access to locums and “doctor of the day” physicians who are able to accommodate the urgent needs of our patients when our schedules are full.

I was apprehensive at first. Would I lose my autonomy? Would I lose the trusting relationships with my patients? Would I earn less? Was I giving up? I consulted with my family, my friends, my accountant, my lawyer, my

colleagues, and my cat (in that order), and the advice was the same: the benefits outweighed the risks. They had seen through my “it’s all good” mask. They knew I was burning out.

I joined STEPS on 1 September 2021, and it has been a seamless transition. My EMR was integrated with STEPS, allowing all of the clinicians to access and make notes in the same EMR; therefore, the continuity of care is amazing. We have monthly team meetings that include the medical office assistants and all the allied health care clinicians. Communication is key.

My patients are thrilled. They have timely and increased access to a variety of health care services. The team-based care is amazing. Everyone on the team is genuinely interested in working together to provide the best outcomes for our patients. As part of this team, I feel supported, respected, and valued. “*Just a family doctor*” is becoming a phrase of the past. With CHCs, the province is moving toward allowing physicians to choose between salaried and fee-for-service payment models. The fee-for-service model that exists today for family physicians needs to be modernized. Our governing bodies are well aware of this fact and are starting to engage in conversations that will help make these changes.

Joining the STEPS CHC has renewed my love for family medicine and is allowing me to spend quality time with my patients, family, friends, and cat.

My quest for Superdoc is finally becoming a reality; it just needed a Superteam. ■

—Jeevyn K. Chahal, MD

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Prioritizing physician health and safety

Significantly more influences our health than whether or not we are free of disease. Our holistic health—physical, mental, spiritual, and emotional—as individual physicians and the collective health of us as a profession is influenced by many internal and external factors. Now more than ever we must make our health and well-being a priority; without it, our profession has no chance of healing and promoting health in others.

We can assert control over some of the factors immediately, while others come with significant barriers or challenges that lead to issues such as burnout, an overwhelming workload, and a lack of physical and psychological safety. The pandemic has only exacerbated experiences of burnout, stress, and even violence and bullying, leading to increased mental and physical health concerns for physicians.

So, how do we heal ourselves while also healing the system in which we operate? Doctors of BC is taking a leadership role to provide physicians with the programs, systems, and supports to address concerns about physician health and safety.

Physician Health Program's expanded mandate

Our Physician Health Program, which provides confidential advocacy, support, and referral assistance for physicians, physicians in training, and their families, is expanding its programs and services to better address challenges before they become crises. Members will soon learn about new initiatives, including a program to help attach physicians to their own family doctors, a cognitive behavioral therapy skills training program to support doctors with mild to moderate mental health challenges, a physician

peer support initiative that will train doctors to deliver one-on-one emotional peer support to their colleagues, and a physician wellness network to bring together those of us who have leadership responsibilities for the health and wellness of physicians.

Addressing physical and psychological safety

An increase in concerns around violence, threats, and stressful work environments due to the pandemic has highlighted the importance of safe working environments for physicians to be able to provide patient care. At the same time, the support mechanisms to address these issues for both hospital and community-based physicians are far behind the supports available for nurses and other staff working in hospitals. Doctors of BC is taking significant action to address this through a Memorandum of Agreement on Physical/Psychological Safety in our Physician Master Agreement.

This agreement has created opportunities at the provincial level and in every health authority for Doctors of BC to discuss physician safety, influence policy and programs, and undertake projects and efforts to improve working conditions for physicians. Working with medical affairs departments and occupational health and safety departments within health authorities, for the first time Doctors of BC is able to engage on these matters and influence policy and decision making. These efforts have already delivered programs related to COVID-19 support, improvements in violence prevention, respectful workplace incidents, and blood and body fluid exposure support. This is just the beginning of this important work. You can learn more at [www.doctorsofbc](http://www.doctorsofbc.ca/your-benefits/physician-health-safety/memorandum-agreement)

[.ca/your-benefits/physician-health-safety/memorandum-agreement](http://www.doctorsofbc.ca/your-benefits/physician-health-safety/memorandum-agreement).

Addressing physician burdens

To further support physician health and wellness, we must address the challenges in the health care system that are adding to physician burdens and contributing to stress and burnout. Doctors of BC recognizes that there are more demands on doctors than ever before in today's increasingly complex health care system. The volume and pace of change is overwhelming and is negatively impacting physician health and wellness. We are advocating to the Ministry of Health, health authorities, WorkSafeBC, ICBC, the College of Physicians and Surgeons, and other health system partners to recognize and reduce burdens on physicians. For more information, check out our Physician Burdens policy statement in the Policy Database section of our website (www.doctorsofbc.ca/policy-database).

Our health and safety matters. Our patients' health depends on the health and well-being of our profession and our health care system. If we want to foster a culture that promotes health, we need to scrutinize the profession's structures and clinical environments and be aware of the potential implications to our health. It will take a multifaceted approach to confront the systemic barriers that challenge our health; however, we owe it to ourselves to recognize the problem areas and commit to finding solutions. ■

—Ramneek Dosanjh, MD
Doctors of BC President

Letters to the editor We welcome

original letters of less than 300 words; we may edit them for clarity and length. Letters may be emailed to journal@doctorsofbc.ca, submitted online at bcmj.org/submit-letter, or sent through the post and must include your mailing address, telephone number, and email address. Please disclose any competing interests.

Where have all the family doctors gone?

Try to find a family doctor in BC and you will be sadly disappointed. Patients are now asking any specialist they see to help them with general medical issues, but specialists have neither the time nor the training to help. Nurse practitioners have a completely different skill set; they are not equipped to take over the role of a family physician. Where are the family doctors we were promised in the “A GP for Me” initiative? It hasn’t happened.

The following are but a few examples of the problem.

Linda Swain from Malahat wrote to the *Times Colonist* about access to urgent and primary care centres:

“Each UPCC is geographically based. To even apply to become a patient, two pieces of ID are required to prove residency within the established boundaries of each UPCC. And if the Westshore UPCC is anything to go by, this taxpayer-funded system is a dismal failure. I needed an X-ray requisition and dutifully arrived at 7:15 a.m. and lined up with 20 other people to wait for the 8 a.m. opening, only to be told at 8 a.m. that the facility was ‘at capacity’ because only one doctor had shown up for work that day! How can a sick person get the care they need when no one seems to care?”¹

Since Swain wrote this letter, three more clinics in Victoria have closed. My own family physician, Dr G. Zabakolas, an excellent doctor, has quit.²

Consider a 93-year-old friend of mine who signed up to become a patient of the James Bay Urgent and Primary Care Centre 2 years ago. She still has no family physician. She never received an intake call.

Consider a young man who injured his neck and back in a motor vehicle accident. He waited at walk-in clinics and looked on Medimap for 4 days. No access. He eventually went to emergency and waited there for hours.

To emergency they go, for minor as well as major health issues. As a result, emergency rooms are overloaded. A Kamloops woman died in the waiting room of Royal Inland Hospital’s emergency department last September.³

In the past, the health care system worked because family physicians kept patients with minor ailments out of hospital emergency rooms. Serious medical issues were attended to expeditiously. What has happened?

Look no further than physician remuneration. Why do ophthalmologists make \$1 000 000 per year and family physicians make \$163 000 per year? Most other specialists make over \$500 000 per year. Consider that overhead for a family physician’s office is 35% to 40% of gross income. Their net income is in the range of less than \$100 000.⁴

Where can a family doctor make a better living? As a hospitalist. In the past 10 years, hospitals have been hiring family physicians to take care of complicated patients in the hospital. They are paid \$240 000 to \$280 000 per year, with no overhead costs. In Victoria, 72 family doctors have recently become hospitalists. In the Fraser Health region that number is 110. The population in Victoria, especially in the western communities, continues to grow but family doctors are getting out of the business as fast as they can.

Other family physicians are leaving practice to become surgical assistants or to practise virtual medicine. Others are taking early retirement or simply quitting from stress.²

Some are moving to other provinces. The average remuneration for family doctors in Ontario is \$300 000; in Alberta it is \$250 000 to \$300 000. BC lags far behind.

The first step our government needs to take is to settle the unequal payments physicians receive, and they need to do it now.⁵⁻⁷ The inequities in the medical funding model need to be addressed.⁶ Only our provincial government can do this. The rest of Canada has tackled this problem with some success. BC needs to get on board.

—**Suzanne Montemuro, MD, CCFP**
Clinical Instructor, Faculty of Medicine, UBC

This letter endorsed by:

Darlene Hammell, MD, CCFP

Past President, College of Physicians and Surgeons of BC

Assistant Dean, Island Medical Program

Clinical Professor, Faculty of Medicine, UBC

Lorelei Johnson, MD, CCFP

Family Physician, Victoria

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The current gender-affirming care model in BC is unvalidated and outdated

As a psychiatrist, I have seen an explosion of gender-dysphoric youth and young adults in recent years. These vulnerable groups deserve compassionate, evidence-based care. I am concerned that the recent *BCMJ* content on gender dysphoria presents gender-affirming care as evidence-based¹ and as the *only* appropriate model of care. This premise forms the basis for the three articles that follow on the medicalized treatment of gender dysphoria.

The World Professional Association for Transgender Health (WPATH) Standards of Care Version 7 (SOC7) are not evidence-based. The WPATH website clearly states that SOC8 is the first version being developed using an evidence-based approach. In addition, a systematic review of its clinical practice guidelines states that SOC7 “contains no list of key recommendations or auditable quality standards.”² Furthermore, “many recommendations are flexible, disconnected from evidence and could not be used by individuals or services to benchmark practice.”²

Finland, Sweden, Norway, and the UK are re-evaluating care of gender-dysphoric youth due to concerns about medical harm and the uncertainty of benefit.³

I find it disconcerting that the validity of SOC7 and the gender-affirming model are wholeheartedly accepted and promoted by these articles. There is no balanced discourse of reported negative outcomes or alternative approaches.

Further, some high-profile members of

WPATH have gone on record stating their concerns. Dr Marci Bowers, a trans woman surgeon, publicly disclosed her concerns about puberty blockers, particularly the age at which they are started.⁴ Psychologists Drs Laura Edwards-Leeper and Erica Anderson (a trans woman), have raised questions about the significant rise of gender-dysphoric youth, particularly adolescent girls. They have advocated for thorough psychological assessment and questioned the potential harm of not providing exploratory therapy.⁵

While WPATH SOC8 may provide an opportunity for evidence-based guidelines, a review of the draft raises concerns. For example, the section on “eunuchs,” presented as a unique gender identity, was bewildering. I question the evidence for this category, and particularly the recommendation to “affirm” and refer for surgical castration lest they attempt self-castration.

For those hesitant to agree, I urge you to watch the Swedish Trans Train documentaries (part 1: <https://youtu.be/sJGAoNbHYzk>). Canadian physicians should not ignore the potential risks of the affirmation model when there is international evidence of harm to vulnerable youth. Distressed youth deserve diligent, nuanced care favoring psychological assessment and care over medical harm. Concerningly, Bill C-4 (banning conversion therapy) was recently passed by the Senate. Without a clear definition of what constitutes exploratory therapy versus conversion therapy, therapists risk being charged under this bill and may be dissuaded from treating people with gender dysphoria at all.

We are in a unique position to rethink the treatment model for gender dysphoria. I hope we can begin a dialogue, so that our youth can get the treatment they need and deserve. Gender affirmation is not a one-size-fits-all model. To allow ideology to prevail over sound medicine is negligent at best.

—Joanne Sinai, MD, MEd, FRCPC
Victoria

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Re: The value of ancillary testing in amniotic fluid infection/inflammation-related early pregnancy loss and perinatal death in British Columbia

I thank Dr Terry for his informative article [*BCMJ* 2021;63:383-387]. Of the many causes of preterm birth, finding an infectious agent gives hope that treatment might prevent recurrence. However, most bacteria identified during autopsies are commonly found in the lower female genital tract. Their culture from fetal surfaces, lung, and stomach may represent colonization during transit through the maternal vagina rather than pathogenicity. The most common bacteria cultured was Group B *Streptococcus*, a commensal found in the lower genital tract of 20% of women. The second was *E. coli*, which is ubiquitous. Although occasionally pathogenic, sometimes aggressively so, we cannot eradicate either from a woman's gut and vaginal flora for the duration of a future pregnancy. How helpful are these culture results? Do they explain the index preterm birth? Can they help prevent a future one?

Why do commensal organisms sometimes become pathogenic? The relationship between bacteria, fetal membranes, and the intra-amniotic cavity is dynamic and poorly understood, as is the maternal immune response to those organisms.¹ Amniocentesis during preterm labor frequently detects inflammatory cytokines without a positive culture, meaning invasion of the amniotic cavity is not required to cause inflammation and preterm birth. Of all the commensal organisms suspected to play an etiological role in infectious/inflammatory

preterm birth and bacterial vaginosis, *Ureaplasma* and *Mycoplasma* species are perhaps the most amenable to treatment.² Identifying them during a preterm loss may help direct care: screening and treatment for bacterial vaginosis early in a future pregnancy and eradication of *Ureaplasma* and/or *Mycoplasma* in a woman and her partner before or early in a future pregnancy.

Treatment of atypical bacteria to decrease preterm birth has not been adequately studied.³ Treatment of bacterial vaginosis with clindamycin appears to have better preventive effect than metronidazole, perhaps because clindamycin also covers *Ureaplasma* and *Mycoplasma*, whereas metronidazole does not.^{2,4} We have not typically performed fetal cultures for *Ureaplasma* and *Mycoplasma*, and they require Universal Transport Medium for identification. Can Dr Terry comment on whether *Ureaplasma* and *Mycoplasma* cultures were done in any of the included autopsies? Might he suggest a suitable fetal site if a clinician were to test for them?

—Andrew Kotaska, MD, FRCSC

Obstetrician and Gynecologist, Stanton Territorial Hospital

Assistant Professor, Department of Obstetrics and Gynecology, University of Manitoba

Adjunct Professor, School of Population and Public Health, University of BC

Adjunct Professor, Department of Obstetrics and Gynecology, University of Toronto
Yellowknife, NT

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Author replies

I appreciate Dr Kotaska's comments on the amniotic fluid infection/inflammation (AFII) autopsy quality assurance study recently published in the journal [*BCMj* 2021;63:383-387].

The practice at BC Children's and BC Women's Hospitals is to sample for bacteria from areas that are unlikely to be artifactually contaminated at or after delivery, such as the lung and stomach contents. This study was not intended to assess the sensitivity and specificity of bacterial culture in the setting of AFII and as such a non-AFII cohort was not included for comparison; anecdotally, however, bacterial cultures from non-AFII cases at BC Children's and BC Women's Hospitals are mostly negative, which demonstrates the low level of detectable delivery and tissue sampling-related contamination.

Dr Kotaska makes the excellent point that the relationship between microbes, inflammation, and delivery continues to be poorly understood. A robust relationship between intra-amniotic microbes and AFII has been established; however, the recent application of highly sensitive molecular techniques for bacterial detection has failed to demonstrate detectable microbial DNA in all AFII cases; conversely, the presence of intra-amniotic microbes (particularly *Mycoplasma* and *Ureaplasma*) without any appreciable maternal inflammatory response has been convincingly shown. Thus, bacterial culture by itself is a poor diagnostic test for AFII but can be diagnostically useful in the context of histological AFII where bacteria are not seen microscopically. Dr Kotaska also makes the important practical point that bacterial culture presently has no predictive value as there is no robust data to support treatment to decrease preterm birth, although this is also not well studied.

Testing for *Mycoplasma* and *Ureaplasma* is difficult as these obligate intracellular microorganisms are fastidious and require special handling, as Dr Kotaska points out. *Mycoplasma* and *Ureaplasma* culture is presently not performed in British Columbia and the only locally available *Mycoplasma/Ureaplasma* testing is molecular based and not validated on placental tissue, so testing for *Mycoplasma* and *Ureaplasma* in the setting of AFII, or pregnancy loss in general, is not routinely done at our centre. If I were to test a clinical sample for *Mycoplasma* or *Ureaplasma* I would submit lung and stomach contents for culture-based studies or lung and stomach contents and tissue

for molecular testing. The genomes of *Mycoplasma* and *Ureaplasma* may also be visualized fluorescently in the cytoplasm of infected cells, although this approach is more suitable to a research environment.

—Jefferson Terry, MD, PhD, FRCPC
Vancouver

Improving planetary health in BC: Taking small but important steps

It is becoming increasingly clear that our future health, as well as the health of future generations, is linked to global planetary health, including the preservation of the natural environment, appropriate use of resources, and engagement of sustainable systems.¹ The Board of the Vancouver Medical, Dental, and Allied Staff Association/Vancouver Physician Staff Association is very supportive of Vancouver Coastal Health's formal adoption of planetary health as a strategic priority via the creation of an official planetary health portfolio, with Dr

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Andrea MacNeill leading the clinical services component. Dr MacNeill has given outstanding lectures on the subject to our membership at our annual general meeting in December, and more recently to our Board. It is clear that what may be perceived as small steps locally can lead to long-lasting positive consequences.

With this in mind, we strongly recommend that the *BC Medical Journal* consider publishing only online and cease publishing in print. Given the popularity and convenience of online medical journals in general, and the fact that Doctors of BC's services and communications have long been conducted electronically, we suspect that the Doctors of BC membership will quickly adapt to accessing and reading the *BCMj* online. Reducing the carbon footprint associated with printing the journal (i.e., saving paper, ink, metal staples, and plastic wrappers, not to mention the production and distribution resources) will contribute positively to planetary health. It will also most likely result in cost savings to Doctors of BC. If the *BCMj* takes a leadership

role on this issue, we suspect that other association journals (e.g., *CMAJ*) may follow.

—Eric M. Yoshida, OBC, MD, FRCPC
Past President, VMDAS/VPISA

—Alison Harris, MBBCh, FRCPC
President, VMDAS/VPISA

—Ka Wai Cheung, MD, FRCPC
Vice President, VMDAS/VPISA

—Michael Nimmo, MD, FRCPC
Secretary, VMDAS/VPISA

—John Ridley, MD, CCFP
Treasurer, VMDAS/VPISA

—Hui-Min Yang, MD, FRCPC
Member at Large, VMDAS/VPISA

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Editor replies

Thank you for your letter. We agree with the small-steps approach and have been working to lessen our environmental impact for many years. The small steps that we have taken include:

- Supporting doctors who wish to read online-only by canceling their paper subscription and encouraging them to subscribe to *BCMj Headlines*, a notification emailed when a new issue is posted on www.bcmj.org. This action directly reduces the number of copies we print.
- Avoiding bag use, and using recyclable paper envelopes when needed.


- Working with an environmentally advanced printer, Mitchell Press, certified by www.canopy.org.
- Printing with vegetable-based inks.
- Using FSC-certified paper.
- Printing locally.

Our recently completed member survey (January 2022) again asked about members' attitudes toward print versus online. As in previous years, a strong majority of members asked that we continue with print, and this preference holds when stratified for age and other demographic factors. The number of readers who favor print has diminished somewhat since the previous survey in 2016; this trend seems likely to continue, and perhaps in the future the *BCMj* will become an online-only publication.

The *BCMj*'s mission is to provide a forum for clinical education, medical news, opinion, and resources for BC physicians, and we—along with the majority of our colleagues from around BC—believe that this mission is best accomplished with a combination of print and online formats.

To cease your subscription to the paper edition, please email your request to journal@doctorsofbc.ca. To remain informed about new BC-relevant medical content, subscribe to *BCMj Headlines*, a notification emailed when a new issue is posted on our website, by going to www.bcmj.org and clicking on the “Free e-subscription” button. You will be asked to provide only your name and email address.

—Ed




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Community-based specialists with no active hospital privileges now have free access to UpToDate, a subscription-based online clinical decision support resource that provides physicians with clear clinical guidance to complex questions with the latest evidence and best practices.

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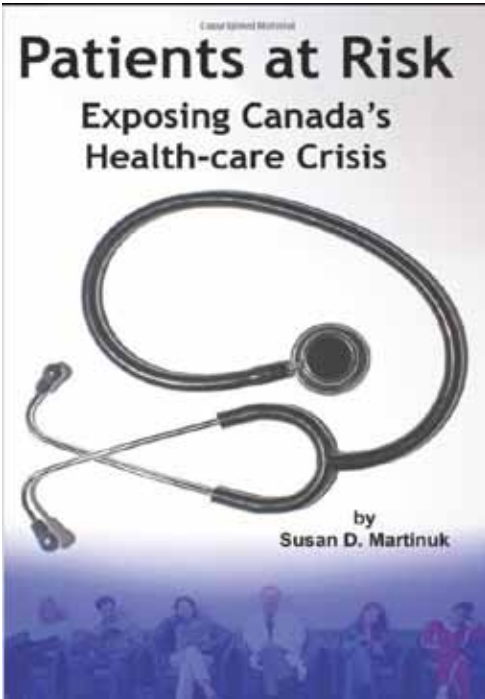
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News

We welcome news items of less than 300 words; we may edit them for clarity and length. News items should be emailed to journal@doctorsofbc.ca and must include your mailing address, telephone number, and email address. All writers should disclose any competing interests.



Book review: *Patients at risk: Exposing Canada's health-care crisis*

By Susan D. Martinuk. Winnipeg: Frontier Centre for Public Policy, 2021. ISBN: 978-1-7776577-4-1. Paperback, 264 pages.

Susan Martinuk is a Vancouver-based journalist and research fellow in health care for the Frontier Centre for Public Policy, an independent Winnipeg-based think tank. This book, published by the Frontier Centre in 2021, begins with the stories of five patients who endured prolonged suffering and poor outcomes while waiting for specialized medical care, and lays blame squarely at the feet of a “system’ that has lost sight of its *raison d’être* and now functions more to constrain medical care than provide it.”

The author argues that the tenets of Canadian medicare enshrined in the Canada Health

Act in 1984 (public administration, comprehensiveness, universality, portability, and accessibility) represent tragic myths when viewed from the patient’s perspective. She touches on the history of publicly funded health care in Canada, then reviews two legal challenges to medicare, beginning with the successful *Chaoulli v. Quebec* decision (Supreme Court of Canada, 2005). She then proceeds to an in-depth analysis of the ongoing case of *Cambie Surgeries Corporation v. BC*, initially unsuccessful in the BC Supreme Court in 2020, currently awaiting a decision by the BC Court of Appeal, and expected by all players to be ultimately decided by the Supreme Court of Canada. Martinuk is uncompromising in her support for Cambie surgeon Dr Brian Day and condemns what she sees as the misguided role played by the government of BC, the defendant in this ongoing litigation; hence the title of Chapter 20: “The BC Government v. Common Sense.”

Available for streaming on all podcast platforms



Martinuk's two final chapters, "How to Make Health Care Better" and "Where Do We Go from Here," detail in broad strokes her prescription for reform, which involves acknowledging medicare's failings; abandoning rigid ideology; and separating politics from health, care, and planning for the long term, including the establishment of a Canadian hybrid public/private system embraced by other countries with better-ranked health care systems.

Patients at Risk is eloquently written, moves along quickly, and is carefully referenced by an experienced journalist who presents a compelling argument for a major refit in Canadian medicare. The patient anecdotes are especially poignant, and while necessarily subjective, they continually remind the reader that health care exists to serve patients, and that a system that places ideology ahead of patient care is destined for failure.

Martinuk's book is a concise and worthwhile read. It will elicit applause from readers frustrated by their experience with Canadian medicare and eager for change, and condemnation from

those who fear that any venture into hybrid public/private care will lead to the extinction of a system that represents the very cornerstone of the Canadian identity.

—David Esler, MD, CCFP(EM)

Dr Esler has practised emergency medicine in and around Vancouver for 34 years. He is also a clinical associate professor of emergency medicine at the University of British Columbia and a member of the BCMJ Editorial Board.

Real-Time Virtual Support: Much-needed rural and remote assistance during the pandemic

The COVID-19 pandemic continues to impact rural and remote regions in Northern BC at a disproportionate rate compared with the rest of the province. More than 100 patients have had to be transferred out of Northern Health since the start of the fourth wave to hospitals with more ICU capacity. The vast majority of those have been COVID-positive. And with

vaccination rates lower than in other areas of the province, a higher percentage of the population is at risk of getting critically ill from the fifth wave.

The impact on health care workers in a remote community like Chetwynd (population just over 3000) is far-reaching. The help being offered by Real-Time Virtual Support (RTVS) physicians, who are available 24/7 over Zoom, has been welcomed with open arms. And physicians are reporting that RTVS is having an impact on outcomes and helping alleviate the challenges of rural medicine during the pandemic.

RTVS virtual providers are physicians with experience in rural medicine and are dedicated to offering shoulder-to-shoulder support to physicians, residents, nurse practitioners, and nurses—any rural health care worker—over Zoom. The RTVS physicians, who are based throughout the province, can help with urgent and non-urgent cases and questions, including case consultations, second opinions, ongoing patient support, point-of-care ultrasound, and simulations.

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Drs Bron Finkelstein (left) and Jodie Graham (right), from Chetwynd, are frequent users of the Real-Time Virtual Support pathways for providers.

When a critically ill patient cannot be managed at a rural site, RTVS physicians can also step in to coordinate their transfer to a larger centre through the Patient Transfer Network run by BC Emergency Health Services. The transfer is made to a centre with available ICU capacity. In recent months, due to critically ill COVID-19 patients, patient transfer has become more common.

Dr Bron Finkelstein, a new-to-practice doctor in Chetwynd, where the hospital has just five beds, says RTVS physicians have been instrumental in making stressful situations manageable with advice, guidance when a colleague is needed, and taking on patient transfers during the depths of a difficult situation. With RTVS support, the patient can be stabilized while a transfer is being arranged.

Dr Jodie Graham, chief of staff at Chetwynd Hospital, has trained and worked in rural medicine for over a decade, including in rural

Alberta, the Northwest Territories, and Yukon, and agrees that RTVS is the best thing to happen to rural medicine.

Dr Matt Petrie is an RTVS physician who has helped coordinate patient transfers for the Chetwynd team, pointing out that it is sometimes difficult for doctors in urban centres to understand the situation on the ground in a rural centre. As a member of the RUDi (emergency) team in RTVS, he understands that part of his job is to advocate for rural providers who may not be able to advocate for themselves and their community during a stressful situation.

Call early and call often

Dr Finkelstein urges health care providers to call RTVS early—before they get too busy to call—and to call often—when they have a significant case, a challenging case, a case where a second opinion would be beneficial. He's never

encountered someone who was unwilling or unhappy to talk. Providers throughout the province are encouraged to reach out for support.

For more information on how to get started with RTVS, visit <https://rccbc.ca/rtvs/getting-started>.

Prescribing nature to improve health

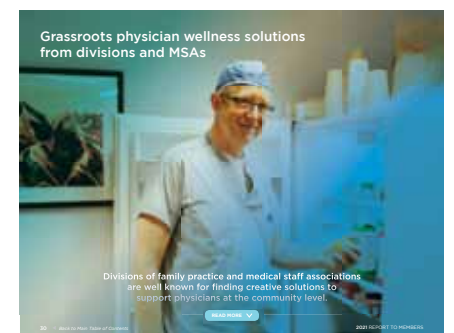
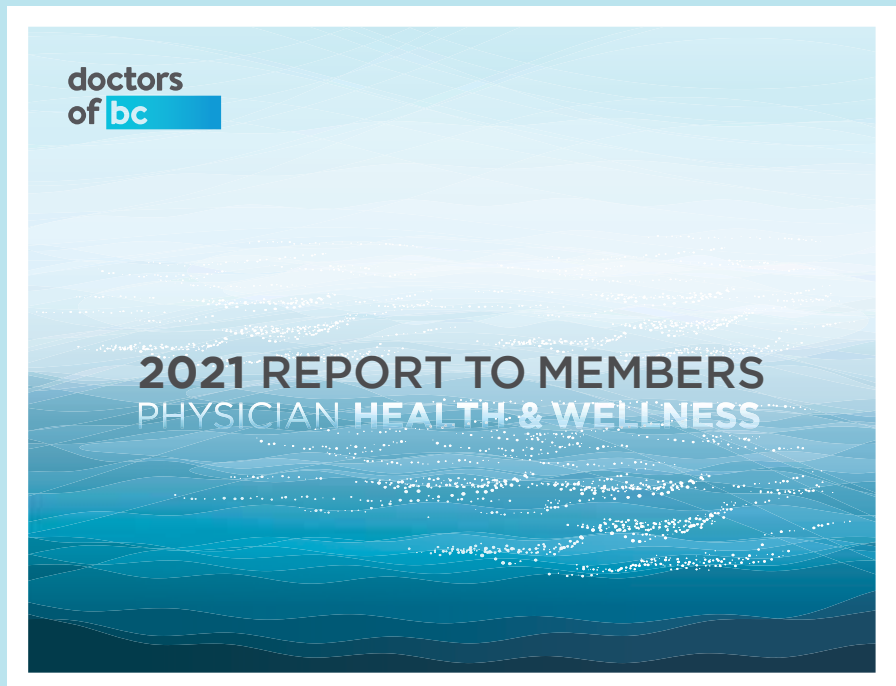
PaRx is Canada's first national, evidence-based nature prescription program, an initiative of the BC Parks Foundation driven by health care professionals. Each prescriber who registers with PaRx receives a nature prescription file customized with a unique provider code, and instructions for how to prescribe and log nature prescriptions. Doctors and other licensed health care professionals in BC can now prescribe Parks Canada Discovery Passes to patients through PaRx. For more information, visit www.parkprescriptions.ca/en/prescribers.

Physician health and wellness: Doctors of BC 2021 Report to Members

Doctors of BC has released its *2021 Report to Members*, with a focus on physician health and wellness. To illustrate some of the ways the association has been working to support physicians throughout the pandemic, the report looks at health and wellness advances made by the Physician Health Program, by the Rural Coordination Centre of BC, and through divisions of family practice, the Joint Collaborative Committees, and the Council on Health Economics and Policy. The report also contains:

- A summary of the year from 2021 President Dr Matthew Chow, Chair of the Board Dr Adam Thompson, Speaker of the Representative Assembly Dr Eric Cadesty, and Acting CEO Mr Jim Aikman.
- Reports from committees, sections, societies, councils, coordinating and working groups, and external committees and affiliated organizations.
- A full list of all the doctors who served on the association's many committees in the year.

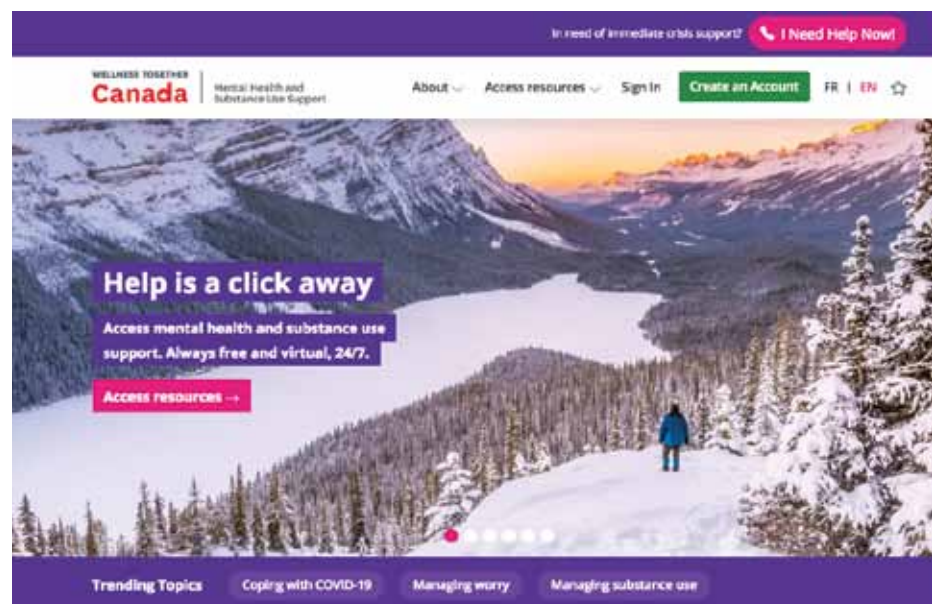
The report is available now at www.doctorsofbc.ca/about-us/report-members.



Free online mental health and substance use supports for your patients

In April 2020, Health Canada launched Wellness Together Canada in response to a rise in mental health and substance use concerns due to the COVID-19 pandemic. The free, online platform provides 24/7 access to mental health and substance use supports to all Canadians.

A free companion app (PocketWell) is now available for download to help users better track their mental health status. Additional resources include everything from self-assessment and peer support, to free and confidential sessions with social workers, psychologists, and other professionals. Find out more at www.wellnesstogether.ca. PocketWell is available from the Apple App Store and the Google Play Store.



Innovations in early intervention for people with eating disorders

The treatment of eating disorders—suboptimal even before the pandemic—can be improved with primary care involvement, community support, and increased use of technology.

Karen Trollope-Kumar, MD, PhD, CCFP

Eating disorders are complex brain-based illnesses with both psychological and physical components. They affect almost 10% of the population and have become much more prevalent since the COVID-19 pandemic began.¹ They are characterized by significant disturbances in behaviors and attitudes that surround eating, body weight, and body shape² and include anorexia nervosa, bulimia nervosa, binge-eating disorder, night-eating syndrome, and other specified feeding and eating disorders. Eating disorders can lead to life-threatening medical complications and frequently co-occur with other debilitating mental illnesses such as bipolar, depressive, and anxiety disorders.³ People with a family history of an eating disorder or any other significant mental illness are at increased risk of developing an eating disorder. Other factors affecting the onset of an eating disorder include the influence of media and diet culture, a history of trauma, and stressful life transitions and certain personality traits such as perfectionism.⁴ Eating disorders occur across the gender spectrum, and people identifying as nonbinary or transgender are particularly at

risk. Dieting for weight loss increases susceptibility to the development of these conditions. Since the COVID-19 pandemic began, the prevalence of eating disorders has increased dramatically as social isolation, job losses, financial insecurity, and uncertainty about the future have created a fertile environment where eating disorders can develop and thrive.

In Canada, wait times for treatment of eating disorders are unacceptably long—months or even years. Treatment programs are usually located in large urban centres, creating barriers for people living in remote and rural areas. Only when people become extremely ill are they eligible for inpatient treatment. People with serious eating disorders are at high risk for suicide, and difficulty in accessing services exacerbates this problem. Since the start of the pandemic, many hospital-based eating disorder treatment programs have cut back their services, deploying personnel to other areas of need. Many of these programs were slow to transition to a virtual format, leaving a critical gap in services.

What can physicians do?

Among adults with eating disorders, at least half had their first diagnosis by their primary care physician.⁵ Yet too many physicians feel unprepared to diagnose and manage these patients. Training for professionals involved in the care and treatment of eating disorders is suboptimal.^{6,7} Canadian medical students receive only 3 to 5 hours of education about eating disorders in their undergraduate years.

By increasing their knowledge about eating disorders, family physicians will be better able to recognize the presenting symptoms of an eating disorder, make a diagnosis, and monitor their patient appropriately. The well-informed physician will also know how to recognize complications and make appropriate referrals for higher levels of care. Timely diagnosis and early intervention markedly improve treatment success rates.⁸

Physicians can also educate themselves about the linkage between dieting and the development of an eating disorder. Physicians prescribe weight-loss diets for many conditions, even if a clear link between weight and the health condition in question has not been demonstrated. People in larger bodies often describe feeling humiliated by judgmental remarks by physicians about their body size.⁹ As physicians, we need to be aware of the way we speak with people about their bodies, ensuring that we respect their dignity and their autonomy to make health care decisions.

The need for community-based services

Community-based approaches that provide rapid access to resources and support are essential components in a stepped-care approach to treatment.¹⁰ For people with more severe eating disorders, community-based treatment can provide valuable support while they wait for more intensive treatment.

Australia has been a world leader in eating disorder treatment. In the last 12 months

Dr Trollope-Kumar is the chief medical officer of the Body Brave eating disorder treatment and support program and an associate clinical professor of family medicine at McMaster University in Hamilton, Ontario.

This article has been peer reviewed.

PREMISE

alone, there has been an A\$200 million (\$184 million) investment in eating disorders. In 2018, the National Agenda for Eating Disorders was released, highlighting the critical role of community-based care for eating disorders. The report stated that the “gap in community-based care directly contributes to the escalation of both physical and psychological health problems and the risk of suicide.”¹¹ The advantages of this approach include accessibility, cost-effectiveness, and user satisfaction. Unfortunately, most eating disorder treatment programs in Canada are based in hospitals and have rigid eligibility criteria and long wait lists. Also, only certain programs have transition programs, which are essential to prevent relapse.

Community-based care in Canada is often provided by not-for-profit or charitable organizations, with few of them receiving sustainable government funding. Despite an ongoing struggle with financial stability, these community organizations have made many contributions to eating disorder treatment and support. In British Columbia, the Looking Glass Foundation has provided support for people with eating disorders for many years (www.lookingglassbc.com). Its Hand in Hand program connects people who have recovered from an eating disorder with someone who is struggling. This peer support program taps into the power of lived experience as an aid to recovery. Recently, the Looking Glass Foundation received significant government funding to expand its peer support programming.

On the opposite side of the country, Eating Disorders Nova Scotia also offers a peer support program including a chat line, peer mentoring, and workshops (www.eatingdisordersns.ca). All its services were rapidly transitioned to an online format when the pandemic began. In Saskatchewan, BridgePoint offers a unique model of stepped-care treatment for people with eating disorders, beginning with educational resources and a texting service, and leading up to a residential program (www.bridgepointcenter.ca). In Ontario, the National Initiative for Eating Disorders plays an important role in linking the many community-based organizations across the country, allowing for sharing of innovations and expertise (www.nied.ca). People searching for information about eating disorders can

find a wealth of resources on the website of the National Eating Disorder Information Centre (www.nedic.ca).

Body Brave is a charitable organization in Hamilton, Ontario, focused on providing treatment and support for people suffering from eating disorders (www.bodybrave.ca). A team of health care professionals run online groups and offer individual consultations, providing services for over 1500 people yearly.

Wait lists for hospital-based treatment programs for eating disorders in Canada have lengthened significantly since the pandemic began, extending to many months or years.

Technology’s role

Technology-enabled support for eating disorders is showing considerable promise.¹² When requests for services spiked threefold after the pandemic began, Body Brave formed a partnership with Careteam Technologies, founded by BC physician-innovator Dr Alexandra Greenhill. Using the Careteam app, patients can access a virtual suite of services that includes a self-assessment and an evidence-based self-help program. If the self-assessment suggests a significant eating disorder, patients are then guided through the complex landscape of eating disorder treatment programs. Since launching in March 2021, Body Brave has onboarded close to 800 patients onto the platform, increasing capacity by 500% while reducing wait times from 2 or more weeks to within 24 hours. By employing the Careteam app, people can get help immediately and be supported while on the wait list for more intensive services. Several hospital treatment programs and community organizations have expressed interest in employing the app to help manage wait times. Because of the scalable technology backbone,

Key messages on eating disorders.

- Eating disorders are serious brain-based illnesses with significant morbidity and mortality, and their prevalence has spiked during the COVID-19 pandemic.
- Since the pandemic began, wait lists for hospital-based treatment have grown from months to years, severely limiting access to urgently needed services.
- Primary care physicians play a key role in the diagnosis and management of patients with eating disorders.
- Community-based treatment is part of a stepped-care approach to the treatment of eating disorders and requires coordination across different organizations.
- Technology-enabled solutions can provide an accessible suite of self-care resources to support people on wait lists for more intensive care and make possible the rapid dissemination of the solution to other communities.

the Careteam app could be rolled out nationally to provide community-based support for patients with eating disorders from coast to coast to coast.

Summary

Physicians play an essential role in providing timely diagnosis and ongoing medical monitoring of people with eating disorders. Formal medical education about these complex brain-based disorders is inadequate, often consisting of just a few hours in undergraduate training. Continuing medical education is needed to equip practising physicians with the knowledge to manage their patients with eating disorders.

Wait lists for hospital-based treatment programs for eating disorders in Canada have lengthened significantly since the pandemic

began, extending to many months or years. Innovative approaches are urgently needed to respond to the dramatically increased demand for services caused by the pandemic. A stepped-care approach to the treatment of eating disorders is widely used in many countries, in which community-based organizations provide an essential first step. However, Canadian eating disorder treatment is still primarily focused on hospital-based programs. Community-based organizations have responded to the challenges posed by the pandemic in many innovative ways, strengthening a stepped-care approach to the treatment of eating disorders. ■

Competing interests

Dr Trollope-Kumar is the chief medical officer of Body Brave, a federally registered charitable organization mentioned in this article, and receives a small annual honorarium for this work.

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Rahana Harjee, MD, Jason Au, MSc, May Tian, MSc, Caitlin Dunne, MD, FRCSC

Are miscarriages more common during the COVID-19 pandemic? An analysis of in vitro fertilization pregnancies in British Columbia

Women who are planning to conceive do not need to delay their plans due to the COVID-19 pandemic because pregnancy and miscarriage rates do not appear to be affected in in vitro fertilization treatment outcomes.

ABSTRACT

Background: An assessment was conducted to determine whether the ongoing COVID-19 pandemic is associated with increased miscarriage rates in in vitro fertilization pregnancies.

Methods: A retrospective quality assurance analysis with case-matched controls was conducted at a private fertility centre in BC. In vitro fertilization/intracytoplasmic sperm injection cycles between April and December 2020 (during the pandemic) were compared with cycles from April 2018 to


Dr Harjee is a resident physician in the Department of Obstetrics and Gynaecology, University of British Columbia. Mr Au is an embryologist at the Pacific Centre for Reproductive Medicine. Ms Tian is an embryologist at the Pacific Centre for Reproductive Medicine. Dr Dunne is a clinical associate professor in the Department of Obstetrics and Gynaecology, University of British Columbia, and a reproductive endocrinology and infertility specialist at the Pacific Centre for Reproductive Medicine.

This article has been peer reviewed.


ARE MISCARRIAGES MORE COMMON DURING THE COVID-19 PANDEMIC?

An analysis of IVF pregnancies in British Columbia.


- We analyzed two cohorts of IVF pregnancies to assess whether miscarriages were more common during the pandemic.
- Clinical pregnancy rates were similar during the pandemic compared to prepandemic, as were the biochemical miscarriage rates per positive bHCG.
- We sought to determine whether **intangible factors*** occurring during the pandemic were associated with changes in IVF pregnancy and miscarriage rates.



*stress




*changes in disinfection protocols



*asymptomatic COVID infections

- Women planning to conceive do not need to delay their plans as a result of the pandemic.
- Pregnancy and miscarriage rates do not appear to be changed in IVF treatment outcomes.

Rahana Harjee, MD, Jason Au, MSc, May Tian, MSc, Caitlin Dunne, MD, FRCSC
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March 2020 (prepandemic) to assess differences in pregnancy and miscarriage rates, including fresh transfer cycles, frozen donor egg cycles, and frozen embryo transfer cycles (with and without preimplantation genetic testing). The miscarriage rate was analyzed per pregnancy.

Results: In total, 854 cycles that occurred during the pandemic were compared with 1852 cycles

that preceded the pandemic. Patients' ages were similar between the two groups. The mean number of embryos transferred was similar in the donor egg cycles and frozen embryo transfer cycles (with and without preimplantation genetic testing). Significantly fewer embryos were transferred in the fresh transfer group than in the frozen transfer group (1.36 versus 1.54 [$P < 0.0001$]), which is likely attributed to a temporal change in practice. Overall, there

were no significant differences in clinical pregnancy rates. In all treatment types, the biochemical loss per positive beta-human chorionic gonadotropin and the spontaneous miscarriage rate per clinical pregnancy were not significantly higher during the COVID-19 pandemic than prepandemic, nor was the total loss rate per positive beta-human chorionic gonadotropin.

Conclusions: The COVID-19 pandemic and associated intangible factors do not appear to affect clinical pregnancy rates or miscarriage rates in in vitro fertilization patients.

Background

Individuals have experienced increased stress due to the ongoing COVID-19 pandemic.¹ Higher stress levels can be associated with increased spontaneous miscarriage rates.² Pandemic stress may be exacerbated in patients who are undergoing fertility treatments due to numerous factors, including financial strain, anxiety, delays in care, pandemic uncertainty, and advancing age.³⁻⁵ We analyzed two cohorts of in vitro fertilization (IVF) pregnancies to assess whether miscarriages were more common during the pandemic. We sought to determine whether intangible factors such as stress, changes in disinfection protocols, and asymptomatic COVID-19 infections during the pandemic were associated with changes in IVF pregnancy and miscarriage rates.

Methods

A retrospective quality assurance study with case-matched controls was conducted at the Pacific Centre for Reproductive Medicine, a private university-affiliated fertility clinic in British Columbia. Quarterly outcomes assessments are conducted routinely to monitor centre outcomes and provide valuable information to clinicians and patients. IVF cycles between April and December 2020 (during the pandemic) were compared with cycles from April 2018 to March 2020 (prepandemic) to assess for differences in pregnancy and miscarriage rates. Both biochemical miscarriages (human chorionic gonadotropin > 10 IU/L without ultrasound evidence of a pregnancy) and clinical miscarriages (ultrasound evidence of a gestational sac/yolk sac but with no fetal heart activity) were examined.

Four IVF treatment categories were included: fresh embryo transfer cycles, frozen donor egg cycles, and frozen embryo transfer cycles (with and without preimplantation genetic testing). Asymptomatic patients were not tested for COVID-19; however, comprehensive screening was conducted during each clinic visit, in keeping with provincial standards for nonhospital medical surgical facilities. The miscarriage rate was analyzed per pregnancy. Statistics were analyzed using the Student's *t* test (continuous variables) and Fisher exact test (proportions).

Results

Nine months of IVF data from the start of the pandemic (854 cycles) were compared with the 24 months immediately preceding the

pandemic (1852 cycles). Stratifying by cycle type, patients' ages were similar between the two groups. The mean number of embryos transferred was similar in the donor egg cycles and frozen embryo transfer cycles (with and without preimplantation genetic testing). Significantly fewer embryos were transferred in the fresh transfer group than in the frozen transfer group (1.36 versus 1.54 [$P < 0.0001$]), which is likely reflective of a temporal change in practice, which encourages single embryo transfer to reduce twin pregnancies.

The clinical pregnancy rates prepandemic and during the pandemic were similar [Figure 1], as were the biochemical miscarriage rates per positive beta-human chorionic gonadotropin [Figure 2]. Across all treatment

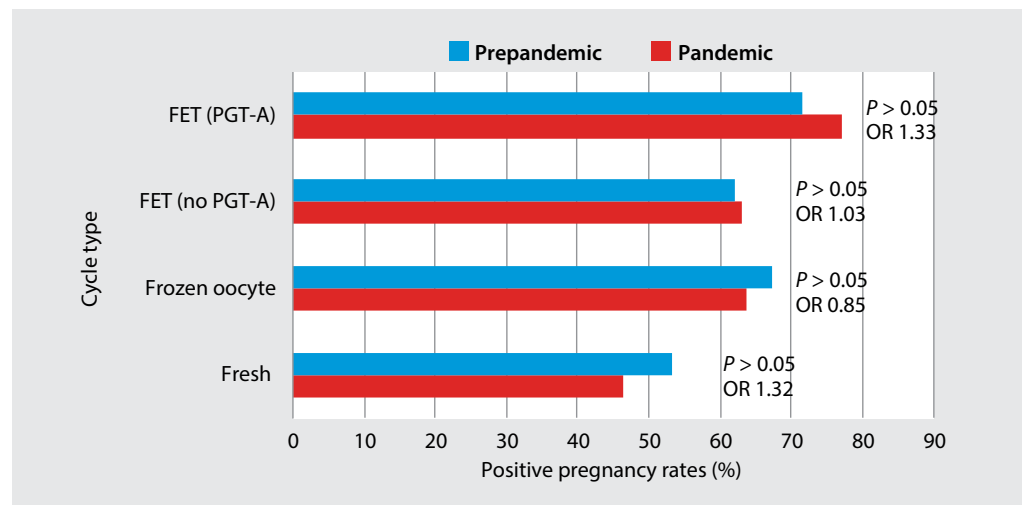


FIGURE 1. Pregnancy rates prepandemic and during the pandemic (FET = frozen embryo transfer; PGT = preimplantation genetic testing; OR = odds ratio).

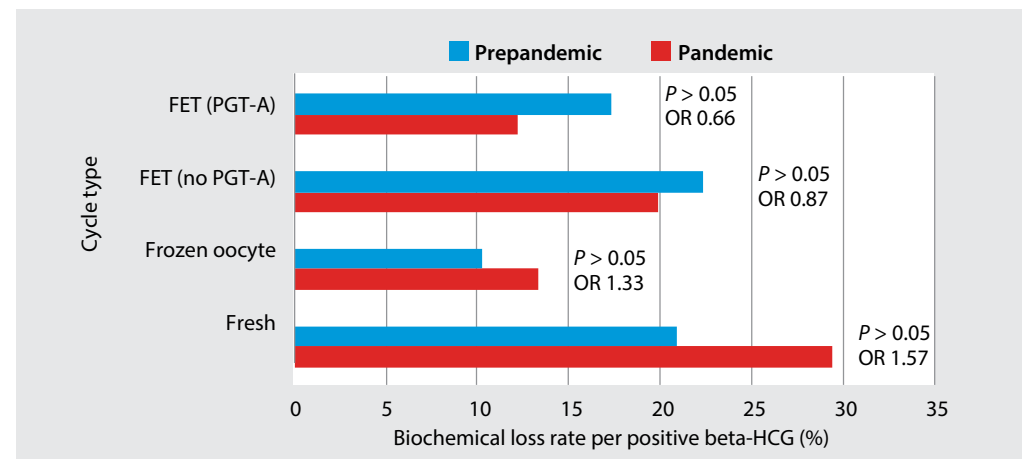


FIGURE 2. Biochemical miscarriage rates per positive beta-human chorionic gonadotropin (beta-HCG) prepandemic and during the pandemic (FET = frozen embryo transfer; PGT = preimplantation genetic testing; OR = odds ratio).

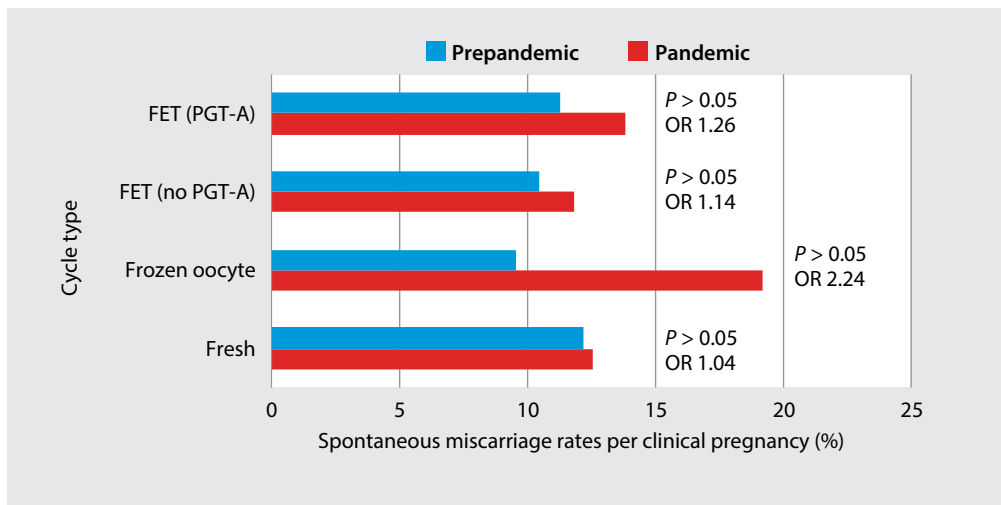


FIGURE 3. Spontaneous miscarriage rates per clinical pregnancy prepandemic and during the pandemic (FET = frozen embryo transfer; PGT = preimplantation genetic testing; OR = odds ratio).

types, the spontaneous miscarriage rate per clinical pregnancy was not statistically significantly higher during the COVID-19 pandemic compared to prepandemic. For example, in fresh embryo transfers, clinical miscarriages occurred in 12.2% of patients prepandemic and 12.6% during the pandemic ($P > 0.05$). Clinical miscarriage rates for frozen embryos (without preimplantation genetic testing) were 10.5% prepandemic and 11.8% during the pandemic ($P > 0.05$) [Figure 3].

Discussion

As the pandemic evolves, more research on pregnancy is becoming available. Retrospective studies thus far have reported reassuring findings in terms of female fertility, laboratory outcomes, and clinical outcomes in patients undergoing fertility treatment after mild or asymptomatic SARS-CoV-2 infection.^{6,7} Wang and colleagues studied 65 women with a positive SARS-CoV-2 antibody result and found similar results when assessing ovarian reserve, ovarian stimulation, and fertilization and blastocyst rates, as well as implantation, pregnancy, and early miscarriage rates compared to matched controls.⁶ Orvieto and colleagues assessed IVF outcomes in seven women who had resumed treatment after recovering from COVID-19: there were no significant differences in their cycles when compared to their IVF cycles prior to COVID-19 infection, apart from a reduced proportion of

top-quality embryos postinfection ($P = 0.03$).⁷ Rotshenker-Olshinka and colleagues examined 285 women with first-trimester pregnancies (113 during the pandemic; 172 prior to

Our analysis of pre- and mid-pandemic IVF pregnancies indicates that the less tangible effects of the COVID-19 pandemic, including changes in disinfection protocols affecting the baseline volatile organic compounds level, increased stress endured by patients, and possible asymptomatic COVID-19 infection, do not appear to affect clinical pregnancy rates or miscarriage rates in IVF patients.

the pandemic) and reported no increases in first-trimester miscarriage in asymptomatic patients during the COVID-19 study period.⁸ In September 2021, the *New England Journal*

of Medicine published correspondence regarding 2022 pregnant women who had received a COVID-19 vaccine: 14.1% experienced a miscarriage, which was within the expected range based on historical cohorts.⁹

Our quality assurance analysis of IVF pregnancies demonstrated similar pregnancy and miscarriage rates pre- and mid-pandemic. These results are reassuring to people seeking fertility treatment, many of whom might experience significant age-related oocyte quality decline should they be forced to wait years for pandemic resolution.

A limitation of our study is that none of the patients were vaccinated against COVID-19 because the vaccine was not available yet. We also cannot estimate the rate of asymptomatic infections because, as is the case across BC, patients were not routinely tested for COVID-19 before outpatient surgical procedures.

Data overwhelmingly indicate that COVID-19 infection presents a significantly higher risk to pregnant individuals due to increasing maternal morbidity, mortality, and neonatal complications; in Ontario, 7% to 15% of pregnant patients with moderate to severe infection required hospitalization.^{10,11} However, there is good evidence that mRNA vaccines can protect pregnant women from severe COVID-19 symptoms, and the vaccines are safe and recommended for women prepregnancy and during pregnancy.¹²

Conclusions

Our analysis of pre- and mid-pandemic IVF pregnancies indicates that the less tangible effects of the COVID-19 pandemic, including changes in disinfection protocols affecting the baseline volatile organic compounds level, increased stress endured by patients, and possible asymptomatic COVID-19 infection, do not appear to affect clinical pregnancy rates or miscarriage rates in IVF patients. Anyone planning to conceive can be reassured that they do not need to delay their plans as a result of the pandemic because pregnancy and miscarriage rates do not appear to be affected in IVF treatment outcomes. ■

Competing interests

Dr Dunne is a member of the *BCMJ* Editorial Board, but did not participate in decision making regarding the acceptance of this article.

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Across all treatment types, the spontaneous miscarriage rate per clinical pregnancy was not statistically significantly higher during the COVID-19 pandemic compared to pre-pandemic.

Sean Duke, MSc, MD, Victoria E. Cook, MD, FRCPC

In situ simulation training for in-office anaphylaxis preparedness

Mobile or virtual in-office anaphylaxis simulation programs can offer clinic staff practical, cost-effective opportunities to practise anaphylaxis management within their own work environment, and ultimately improve patient safety.

ABSTRACT: For medical professionals and administrative staff, the prospect of managing a medical emergency in the office can generate a great deal of unease, particularly when such events are infrequent and challenging to prepare for. Given the rapidly evolving, life-threatening nature of anaphylaxis, successful management relies on prompt recognition and treatment. To ensure swift management of anaphylaxis, medical clinic personnel, particularly those in practices that administer immunotherapy, must make a concerted effort to prepare for these events. Although international guidelines for anaphylaxis management are widely available, a considerable discrepancy exists between those recommendations and their implementation in practice, thus necessitating a revised approach to medical training for anaphylaxis. Simulation training facilitates the development of emergency management skills in a controlled setting, thereby providing opportunities to gain valuable experience prior to actual events. Given

the challenges associated with the COVID-19 pandemic, mobile or virtual simulation programs could offer logistically feasible, accessible, and cost-effective opportunities to enhance preparedness for in-office anaphylaxis at the point of care.

The prospect of encountering a medical emergency in the office is a considerable source of concern for health care providers and administrative staff, particularly when such events are infrequent and challenging to prepare for.¹ Anaphylaxis, a severe, life-threatening systemic hypersensitivity reaction,² results from the rapid systemic release of mediators from mast cells and basophils.³ Although anaphylaxis can occur in any setting where medications or biologic agents are administered,³ the most common cause of anaphylaxis in the medical office is subcutaneous immunotherapy.⁴ Systemic reactions occurred in 80%

to 85% of allergy practices in the United States between 2008 and 2016, which corresponds to 0.1% of injection visits, while fatal anaphylaxis occurred in 1 per 9.1 million injection visits.⁵

Medical clinic preparedness, prompt recognition, and rapid treatment are essential for the

successful management of in-office anaphylaxis, as even a short delay can lead to death by means of respiratory or cardiovascular collapse.^{3,6} Initial signs and symptoms, however mild, are important to recognize because patients can quickly deteriorate.³ Recognition of anaphylaxis can be difficult due to the abundance of nonspecific signs and symptoms across multiple systems, including the skin and mucosa, respiratory, cardiovascular, gastrointestinal, and central nervous systems [Table 1].⁷⁻⁹ Moreover, the presentation of anaphylaxis can vary between patients, and between anaphylactic episodes in the same patient.⁷

As soon as anaphylaxis is recognized...initial management involves rapid assessment of the patient's airway, breathing, circulation...[and] swift administration of intramuscular epinephrine.

Current guidelines developed by the World Allergy Organization emphasize the use of a printed, regularly rehearsed anaphylaxis management protocol that involves rapid patient assessment, prompt intramuscular epinephrine administration, appropriate patient positioning, and manage-

ment of respiratory distress, hypotension/shock, and cardiorespiratory arrest when indicated.^{7,10} Despite the widespread availability of global guidelines, a discrepancy exists between their recommendations and their implementation in practice, indicating the need for revised medical

Dr Duke is a pediatric resident doctor in the Faculty of Medicine, University of British Columbia. Dr Cook is a pediatric allergist and clinical immunologist in the Faculty of Medicine, Department of Pediatrics, Division of Allergy and Immunology, University of British Columbia.

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education and practical training in the management of anaphylaxis.^{11,12}

Simulation training is an effective method of medical education where participants can practise emergency management skills in a controlled setting without risking harm to patients.^{13,14} Its utility has been demonstrated in the context of anaphylaxis management across multiple settings.^{1,13,15-17} Mobile or videoconferenced in situ simulations are cost-effective alternatives to traditional lab-based simulations and provide the additional benefits of identifying office-specific technical gaps and familiarizing medical office personnel with procedures at the point of care.¹⁸ Given physical distancing measures compelled by the COVID-19 pandemic, employing a virtual platform, where external reviewers facilitate scenarios remotely, eliminates unnecessary crowding, and improves the accessibility of simulation training to underserved communities.

Preparing for anaphylaxis management

Although anaphylaxis management recommendations depend on practice resources and proximity to emergency services, key components for medical clinics include a highly visible anaphylaxis protocol, regular rehearsals, appropriately maintained supplies, and a treatment log to record events.^{3,19}

Clinic staff should be familiar with an anaphylaxis management protocol that is tailored to their office and incorporates input from staff members across multiple disciplines.²⁰ This protocol should feature flow charts for initial management of respiratory distress and hypotension/shock, and should include drug dos-

Medical clinic preparedness, prompt recognition, and rapid treatment [with intramuscular epinephrine] are essential for the successful management of in-office anaphylaxis.

ages, supplemental oxygen and intravenous fluid recommendations, and contact information for emergency medical services.⁷ The importance of a protocolized approach to anaphylaxis care cannot be overstated because the rapidly evolving nature of anaphylaxis does not afford the time to look up information or recall memorized algorithms.⁶ In one pediatric emergency department, implementing an anaphylaxis protocol enhanced anaphylaxis management by

improving the rates of epinephrine administration and appropriate observation, and by reducing the rate of corticosteroid monotherapy.²¹

Guidelines strongly recommend regular anaphylaxis rehearsals; however, they do not specify the content or frequency of those events, but rather defer this to the discretion of the attending physician.^{3,7,19} At the least, medical professionals should be able to quickly locate and assemble necessary supplies for administration, and roles for calling emergency services and treatment logging should be established.^{3,19} Readily available supplies should be maintained, and their contents and expiry dates should be regularly documented.³ Recommended anaphylaxis supplies are provided in the **Box**. Treatment logs should be readily accessible for documenting clinical events, vital signs, and medications/treatments administered.⁷

Managing anaphylaxis

According to international guidelines, as soon as anaphylaxis is recognized or strongly suspected, appropriate initial management involves rapid assessment of the patient's airway, breathing, circulation, mental status, and estimated body mass; swift administration of intramuscular epinephrine; appropriate positioning; and calling for assistance (e.g., emergency medical services) where appropriate.^{6,10} Vital signs and patient condition should be monitored frequently or

TABLE 1. Signs and symptoms of anaphylaxis.

System	Signs and symptoms
Cutaneous/mucosal	Urticaria, pruritus, angioedema, conjunctival erythema
Upper respiratory	Rhinorrhea, sneezing, throat itching and tightness, tongue swelling, stridor, obstruction
Lower respiratory	Coughing, dyspnea, tachypnea, decreased peak expiratory flow, wheezing/bronchospasm, respiratory arrest
Cardiovascular	Tachycardia, pallor, syncope, hypotension, arrhythmias, cyanosis, cardiac arrest
Gastrointestinal	Abdominal pain, nausea/vomiting, diarrhea, dysphagia
Central nervous	Headache, altered mental status, sense of impending doom
Other	Uterine cramps and bleeding, metallic taste in mouth

Adapted from "World Allergy Organization guidelines for the assessment and management of anaphylaxis"⁷ and "Position statement: Emergency treatment of anaphylaxis in infants and children."⁹

BOX. Anaphylaxis supplies checklist

Essential:

- Injectable aqueous epinephrine (1:1000 solution) with needles and syringes, or epinephrine auto-injector (preferred)

Consider:

- Personal protective equipment
- Stethoscope
- Blood pressure cuffs (pediatric and adult sizes)
- Pulse oximeter
- Oral second-generation antihistamine
- Salbutamol metered-dose inhaler with spacer
- Airway adjuncts (e.g., oral or laryngeal mask airway)
- Oxygen and equipment for administration
- One-way valve face mask with oxygen inlet port
- Intravenous fluids and equipment for administration
- Automatic electric defibrillator

Adapted from "The diagnosis and management of anaphylaxis practice parameter: 2010 update."¹⁹

continuously; the airway should be maintained; and the administration of supplemental oxygen, intravenous fluids, and second-line medications should be considered depending on the response to epinephrine and other clinical contextual factors.^{3,6} These steps are outlined in the **Figure**. Guidelines are subject to physician discretion; variations in management and transfer of care depend on clinical judgment, resource availability, and proximity to emergency assistance.^{3,19} The utility of second-line medications in the initial management of anaphylaxis is outlined in **Table 2**.²²⁻²⁵

Challenges in preparing for and managing anaphylaxis

There is significant inconsistency between the recommendations outlined in current guidelines and the preparative measures and treatments used to manage anaphylaxis in practice.⁸ Despite guidelines emphasizing the maintenance of a regularly rehearsed, highly visible anaphylaxis management protocol,⁷ an evaluation of 500 allergists' self-reported adherence to anaphylaxis practice parameters revealed that 57% of allergists had not conducted office-based anaphylaxis management rehearsals.²⁶ More fundamentally, in-office preparedness for anaphylactic events was revealed to be an area for improvement in general, with 34% of allergists not having ensured that their staff certifications (e.g., basic life support, advanced cardiovascular life support, pediatric advanced life support) were up to date, and 44% not having assigned a staff member to be responsible for calling emergency medical services.²⁶ Currently, there are no published reports that reveal the rates of office-based anaphylaxis management rehearsals for primary care practices, which comprise a substantial proportion of subcutaneous immunotherapy administration.

A 2010 systematic review identified common gaps in anaphylaxis management across community and hospital settings.⁸ Prominent themes for primary care providers included insufficient knowledge about the signs and symptoms of anaphylaxis; lack of understanding about how to use, and thereby how to instruct a patient to use, an epinephrine autoinjector; infrequent and delayed administration of epinephrine; and first-line use of subcutaneous

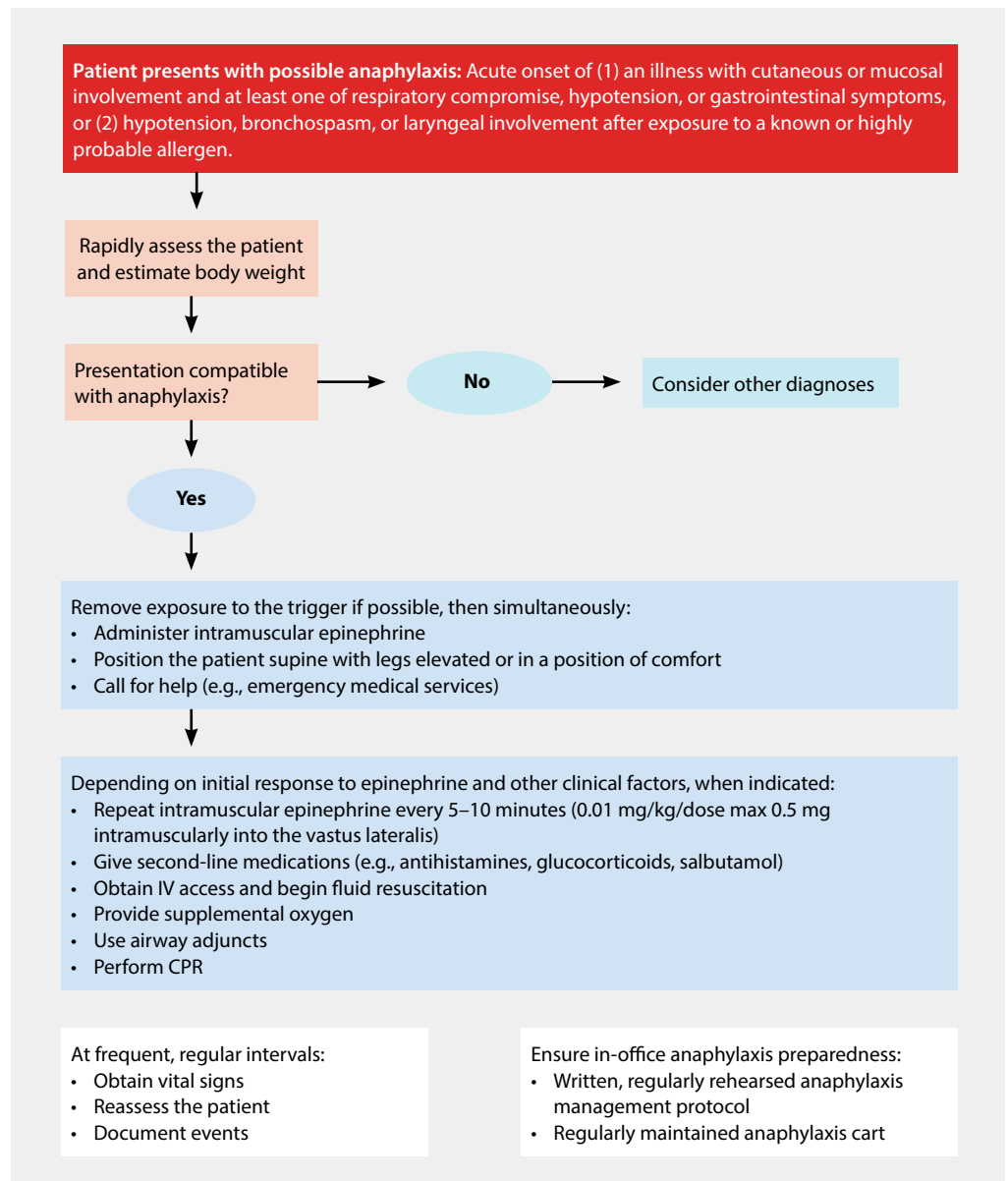


FIGURE. Steps in anaphylaxis management.

Adapted from “The diagnosis and management of anaphylaxis: An updated practice parameter”²³ and “World Allergy Organization guidelines for the assessment and management of anaphylaxis.”⁷

TABLE 2. Second-line medications in anaphylaxis management.

Medication	Comments
Antihistamines and glucocorticoids	Although routinely used in anaphylaxis management, Cochrane reviews have demonstrated an overall scarcity of data to support their use in initial anaphylaxis management. ^{22,23} Further, a recent Canadian study demonstrated an association between prehospital glucocorticoid administration and ICU/hospital ward admission after adjusting for severity, age, sex, and presence of asthma. ²⁴
Inhaled beta-2 agonists	Although occasionally used in anaphylaxis to alleviate lower airway symptoms refractory to epinephrine, ⁷ they do not address the life-threatening complications of upper airway obstruction and shock. ^{7,24}

or intravenous epinephrine rather than the recommended intramuscular route.⁸ Perhaps the most striking of these pitfalls is the underuse of epinephrine, which is corroborated in Canadian studies.^{12, 24, 25} In analyzing 3498 cases of anaphylaxis presenting to emergency departments across Canada, Gabrielli and colleagues found that only 31% of cases received prehospital epinephrine, while the same proportion received prehospital antihistamine monotherapy.²⁴ Strikingly, more than 25% of cases did not receive epinephrine in either the community or emergency department.²⁴ This is in keeping with a prospective study that revealed primary care paramedics in Quebec did not administer prehospital epinephrine in 35.6% of anaphylaxis cases.²⁷ Nguyen-Luu and colleagues found that only 21% of children with confirmed peanut allergy were treated with epinephrine when presenting to community and emergency department settings with moderate or severe anaphylaxis.¹²

Simulation training

International guidelines recommend the regular rehearsal of anaphylaxis management protocols,^{3, 7, 19} which may range from independently organized events to formal clinical simulation training with external reviewers. Clinical simulation training, which has demonstrated utility in in-office anaphylaxis preparedness,¹ provides valuable opportunities to develop team-based skills, improve procedural and intellectual knowledge, and gain confidence in the care of uncommon events without risking harm to patients.^{13, 14} This method typically involves independent external reviewers who can identify gaps in knowledge, procedures, and equipment through direct observation within a simulation suite or at the point of care.

In situ simulation training, where participants engage in clinical scenarios within their natural workplace, offers a low-cost, highly accessible alternative to traditional, academic centre-based simulation training. Additional benefits include environmental fidelity, the ability for the participants—who normally constitute the clinical team—to develop familiarity with procedures at the point of care, and the opportunity to uncover issues specific to the workplace (e.g., office procedures, availability

and proximity of supplies and equipment) that would not have arisen in a foreign space such as a simulation suite. Weinstock and colleagues developed a cost-effective simulation program that used a mobile cart to facilitate point-of-care simulations throughout five departments in a pediatric tertiary care centre.¹⁸ The program delivered experiences that were similar to those

There is significant inconsistency between the recommendations outlined in current guidelines and the preparative measures and treatments used to manage anaphylaxis in practice....The most striking...is the underuse of epinephrine.

taking place in the hospital's dedicated simulation suite—featuring high-fidelity scenarios and video-based debriefing—with the benefit of reaching a broader range of interdisciplinary teams that would not otherwise participate in simulations due to logistical reasons, such as clinical obligations for staff to remain at their respective sites.¹⁸

There is a lack of evidence to support a specific frequency at which anaphylaxis management should be rehearsed. In the author's clinic, in addition to debriefing after actual in-office emergencies, team members find that rehearsals occurring twice yearly are helpful for revisiting procedures and ensuring equipment/medications are up to date. Involving external reviewers at the point of care (e.g., mobile or virtual simulations) should be strongly considered.

Future directions

Considering the infection precaution measures related to the COVID-19 pandemic, alternative methods of simulation training are required

to improve the accessibility and feasibility of simulation programs. One low-cost alternative is the use of teleconferencing, where external reviewers are able to facilitate and observe scenarios remotely, and consequently expand the accessibility of simulation training programs beyond academic centres to rural and remote areas. This method has been used previously; ICU and emergency specialists at urban centres have remotely facilitated scenarios in rural emergency departments.²⁸ With the need for a renewed approach to in-office anaphylaxis training, in concert with the logistical challenges the COVID-19 pandemic presents, the development of an accredited in-office anaphylaxis simulation program, where external reviewers facilitate in situ scenarios via a virtual platform, is highly warranted.

The development of simulation guidelines for in-office anaphylaxis will empower physicians to independently facilitate scenarios that involve their clinical teams within their workspace. A recent example of a similar initiative is the BC Simulation Network's COVID-19 Simulation Guide, which equips clinicians with tools to facilitate simulations for COVID-19 management.²⁹

Summary

Anaphylaxis is a medical emergency that can be encountered in the medical office, particularly where immunotherapy is practised. In-office preparedness for these rapidly evolving events is critical because prompt recognition and management can be lifesaving. Despite the availability of current anaphylaxis management guidelines, the discrepancy between the recommendations and their implementation, particularly regarding the use of epinephrine, has resulted in a call for a revision in medical education and practical training among health care providers. Clinical simulation training has proven to be an effective educational method for the management of anaphylaxis. By implementing mobile or virtual in-office anaphylaxis simulation programs, clinic staff can access practical, cost-effective opportunities to practise anaphylaxis management within their own work environment and, in doing so, learn from errors, identify limitations, build confidence, and ultimately improve patient safety. ■

Resources

Examples of tools to facilitate optimal anaphylaxis management are available with the online version of this article at bcmj.org:

- 911 telephone script for in-office emergencies
- Anaphylaxis flow sheet
- Immunotherapy reaction flow sheet
- In-office emergency debrief summary
- Resuscitation equipment checklist

Competing interests

Dr Cook has received speaker honoraria from CSL Behring, ALK, and Aralez Pharmaceuticals; consultancy fees from Bausch and ALK; and fees from UBC CPD for organizing education. She is also the CPD vice chair for the Canadian Society of Allergy and Clinical Immunology.

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With the need for a renewed approach to in-office anaphylaxis training...the development of an accredited in-office anaphylaxis simulation program... is highly warranted.

Post-acute-COVID-19 Visiting Specialist Clinic

As an additional support for workers referred to post-COVID-19 recovery clinics in the community, the WorkSafeBC Visiting Specialist Clinic (VSC), in collaboration with Claims and Rehabilitation Services and Medical Services, has established a worker-centred post-acute-COVID-19 clinic to provide workers with the support they need more quickly.

The goals of the clinic are to:

- Initiate early referrals for workers with persistent symptoms to be seen within 6 to 12 weeks of the onset of illness.
- Provide a setting for injured workers with prolonged symptoms related to COVID-19 to be assessed in person (in the context of a pandemic) at the Richmond VSC, although workers can also be seen virtually.
- Provide education to help workers manage their symptoms and initiate discussion on functional and vocational recovery.
- Provide objective information for guidance and decision making for the case management team to support workers in their clinical and vocational recovery.

The clinics are staffed by general internal-medicine specialists who also provide services at community post-COVID-19 recovery clinics. The VSC ran its first post-acute-COVID-19 clinic in April 2021. In the clinic's first 10 months, 132 workers received initial consults.

The clinic visit

A visit to the clinic starts with a comprehensive history and physical exam by a general internal-medicine specialist. The specialist will identify any pre-existing comorbidities that may be contributing to delayed recovery. Following the assessment, the specialist may refer

the worker for further investigation, such as spirometry, chest CT, echocardiogram, or Holter monitoring, all of which can be expedited in the Lower Mainland using WorkSafeBC's network of contracted providers. The specialist may also refer the worker to a subspecialty, such as respiratory, cardiology, psychiatry, or neurology, or connect the worker with rehabilitation services and other programs to support their recovery.

The occupational therapist supports the worker in setting goals for return to baseline functioning and recommends community rehabilitation treatment with a focus on future gradual return-to-work planning.

After the initial assessment, a WorkSafeBC occupational therapy clinical advisor assesses the worker, reviewing job tasks, return-to-work status and barriers, activities of daily living, and daily routines. The worker is provided with education on energy conservation, sleep hygiene, brain fog, post-exertional malaise, and headache management. Workers are also introduced to the three *Ps* of managing daily activities: pace, plan, and prioritize. The occupational therapist supports the worker in setting goals for return to baseline functioning and recommends community rehabilitation treatment with a focus on future gradual return-to-work planning. Following this visit, workers are connected to other community-based programs, such as occupational therapy and interdisciplinary rehabilitation programs, which include mental health support. These programs provide supportive care

and help workers manage their symptoms and work toward their treatment goals, including return to work.

Referral process

Workers can be referred to the VSC post-acute-COVID-19 clinic in a number of ways:

- Workers are identified by case management staff and medical advisors, in consultation with community/family physicians or nurse practitioners, and are then referred to the clinic.
- Community physicians who think a referral would be beneficial for a patient can contact the claim owner, call the RACE Line (604 696-2131 or 1 877 696-2131 toll-free), or indicate on a Form 11 that they would like to speak to a medical advisor to discuss referral to the clinic. Community physicians cannot refer a patient directly.

In either case, if you request or agree to referral to the clinic, the medical advisor will write the referral on your behalf, and you will receive a copy of the referral letter and consultation reports from the clinic specialists. You can also contact Occupational Disease Services at 604 231-8842 with questions about the referral process. ■

—Michelle Tan, MD, CCFP, MBA
Medical Consultant, Health Care Programs,
WorkSafeBC

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Global decline of male fertility: Fact or fiction?

A broad summary of the published evidence on sperm-count and fertility trends.

Nora Tong, BDS, Luke Witherspoon, MSc, MD, Caitlin Dunne, MD, Ryan Flannigan, MD

ABSTRACT: For decades, researchers have been asking if sperm counts are decreasing worldwide, and if so, whether this presages a global decline in male fertility. Most recently, a large systematic review and meta-regression analysis sought to identify trends in sperm counts between 1981 and 2013 and found that sperm counts appeared to be declining rather than stabilizing. One of the complicating features of relying on sperm count as a marker of fertility is that a low sperm count does not guarantee an inability to conceive. A large variety of factors, including tobacco, alcohol, and drug use; psychological stress; obesity; insufficient sleep; and environmental factors such as air pollutants and heavy metals, have been identified as potential risk factors affecting semen quality. Initial investigations recommended for a patient

presenting with fertility concerns include a detailed history, physical examination, investigations based on the clinical context, and semen analysis for most patients. Although the evidence is conflicting, our review suggests that the potential decline in male sperm counts does not necessarily translate to a decline in male fertility.

Concerns regarding declining sperm counts have existed for over 50 years, and even predate the use of a standard means to assess semen characteristics.¹ The scientific characterization of semen samples has also changed significantly since the World Health Organization's (WHO's) first publication of its *Laboratory Manual for the Examination and Processing of Human Semen* in 1999,² with the 6th edition released in July 2021.³

Dozens of articles have been published about a global reduction in male spermatogenesis, with *varying* results reported. However, the articles that report *declining* sperm counts are the ones more often picked up by news outlets, which leads to a widespread belief of globally declining sperm counts as fact. For example, the BBC released a podcast on this topic in 2021, stating, "the fall in men's sperm counts is more alarming than first thought."⁴ This type of coverage has led to far-reaching claims of an imminent fertility disaster facing the world. However, in the field of reproduction, the contention that sperm counts are declining is not universally accepted and has been a hotly debated topic over the last several decades.^{1,5-9} Although the evidence for declining sperm counts is conflicting, our review suggests that a decline in sperm counts does not necessarily translate to a decline in male fertility.

Evaluation of male fertility

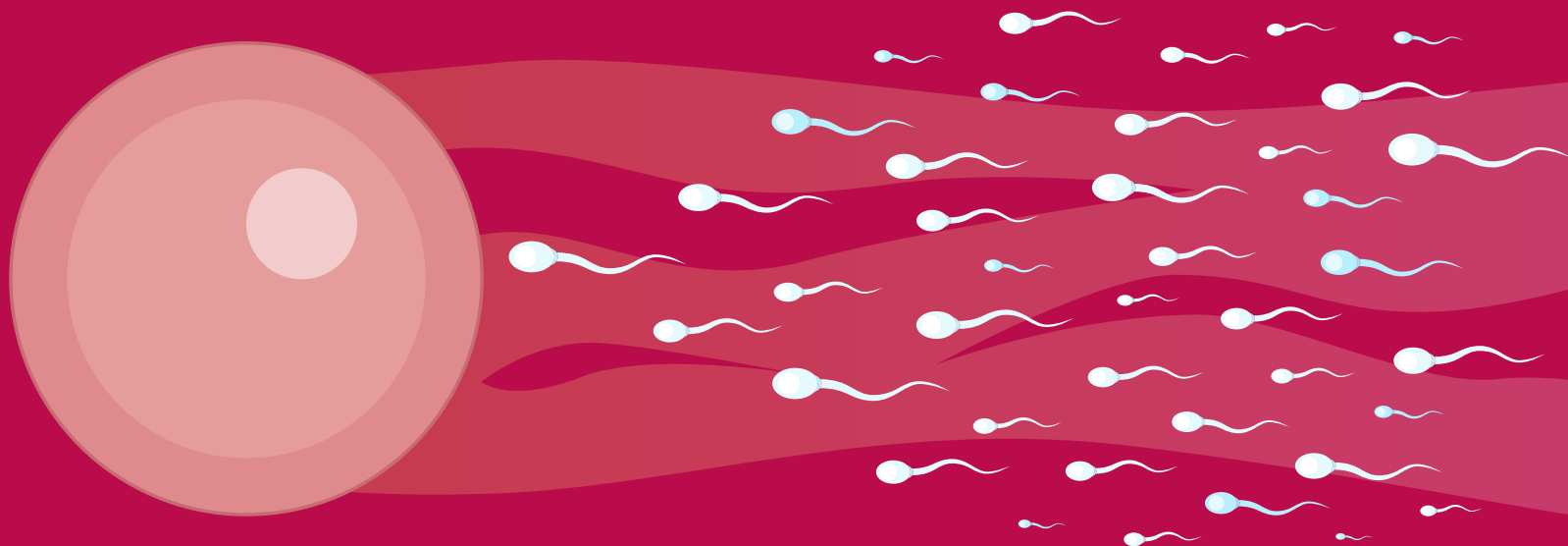
Approximately 15% of male-female couples around the world will experience infertility.¹⁰ The male is found to be the sole cause in 20% of those cases and a partial contributor in 30% to 40%.¹⁰ Male sperm production (i.e., spermatogenesis) occurs in the seminiferous tubules of the testes. The 70-day process includes proliferation of spermatogonia, meiosis, and then acquisition of a head and tail structure to become mature spermatozoa. Endocrine drivers of male sexual function include follicle-stimulation hormone, which stimulates Sertoli cells in seminiferous tubules, and luteinizing hormone, which drives testosterone production in Leydig cells. Endogenous testosterone production is the single most important endocrine driver of spermatogenesis. Men can produce tens to hundreds of millions of sperm each day.¹¹

History taking for men presenting with fertility concerns should include questions about general health, testicular symptoms, duration of infertility, sexual mechanics, difficulty with erection and/or ejaculation, coital frequency and timing, prior conceptions, medications, environmental exposures, and drug and alcohol use.¹² It is also important to ask specifically about consumption of muscle-building supplements or exogenous testosterone, as these substances can decrease or completely eliminate sperm production via negative feedback on pituitary follicle-stimulation hormone secretion.¹³ It is important to obtain a medical history of prior injury (e.g., torsion), illness (e.g., mumps), surgery affecting the scrotum or testes, and childhood and pubertal development (e.g., delayed testicular descent).¹² A family history of infertility could suggest potential chromosomal or

Ms Tong is a medical student at the University of British Columbia in the class of 2022. Dr Witherspoon is a sexual medicine and infertility fellow in the Department of Urologic Sciences at UBC and the Division of Urology at Ottawa Hospital. Dr Dunne is a co-director of the Pacific Centre for Reproductive Medicine and a clinical assistant professor in the Department of Obstetrics and Gynaecology at UBC. She also serves on the BCMJ Editorial Board. Dr Flannigan is an assistant professor in the Department of Urologic Sciences at UBC and an adjunct clinical assistant professor in the Department of Urology at Weill Cornell Medicine in New York.

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For decades, researchers have been asking if sperm counts are decreasing worldwide, and if so, whether this presages a global decline in male fertility.



genetic causes of infertility such as Kallmann syndrome, myotonic dystrophy, androgen receptor defects, gonadotropin and gonadotropin receptor defects, cystic fibrosis, or chromosomal rearrangements.¹²

Physical examination should include evaluation of body mass index, secondary sexual characteristics such as presence of facial and chest hair, and the presence of gynecomastia.¹² The genitourinary exam includes a scrotal exam, assessment of testicular size (normal length is 4.5–5.1 cm, 15–19 g, or 20 mL), consistency, and presence of nodules, epididymal abnormalities such as dilatations and cysts, abnormalities of the vas deferens, and inspection/palpation for varicoceles.^{12,14}

Investigations are selected based on the clinical context.¹² A semen analysis is a reasonable initial test to assess total sperm count (≥ 39 million per ejaculate), semen volume (≥ 1.4 mL), sperm concentration (≥ 16 million/mL), total motility ($> 42\%$), and normal morphology ($\geq 4\%$).^{3,12} For men with

oligozoospermia (concentration < 16 million/mL), a hormonal workup is indicated, including assessment of serum luteinizing hormone, follicle-stimulation hormone, prolactin, estradiol, and total testosterone.^{12,15} In cases of severe oligozoospermia (concentration < 6 million/mL) genetic testing in the form of karyotype and Y chromosome microdeletion testing is indicated.¹⁶

As most pathology in the scrotum is palpable, scrotal ultrasound is reserved for cases where the physical exam is difficult, inadequate, or ambiguous, or when a testicular mass is suspected.¹⁷ Other specialized testing such as retrograde semen analysis, transrectal ultrasound, and cystic fibrosis transmembrane regulator gene testing is typically arranged by those with subspecialty training given the specific instances in which they are indicated.¹⁶

Are sperm counts really declining?

The question of whether sperm counts are declining remains controversial. A prominent

article from Carlsen and colleagues in 1992 brought about concern about declining sperm counts between the 1930s and 1990s.⁸ Significant criticisms and limitations in the article were subsequently identified, including variability in sperm collection and measurement protocols, lack of control for abstinence durations, inability to control for seasonal variation, inability to control for lifestyle factors, failure to include studies not showing sperm count decline, failure to account for geographic variation, and inappropriate statistical considerations.¹⁸ Most notably, geographic disparities have been shown pertaining to the United States. Significantly more semen samples from New York were included than from other regions. In Carlsen's article, 80% of the included studies were derived from New York prior to 1970, but only three studies were derived from the United States after 1970. After removing the New York semen analyses, the declining trend was reversed and not statistically significant.¹⁸

More recently, Levine and colleagues conducted a large systematic review and meta-regression analysis to identify more contemporary trends in sperm counts, between 1981 and 2013.¹⁹ They found that an overall decline in sperm counts was observed from 1973 to 2011.¹⁹ Sperm concentration declined 52.4% (~1.4% per year) and total sperm counts declined 59.3% (~1.6% per year) in studies completed in North America, Europe, Australia, and New Zealand.¹⁹ Sperm counts appeared to be continuing to decline rather than stabilizing.¹⁹ The systematic review did not assess for other indicators of sperm quality, such as motility or morphology.¹⁹ The study concluded that declining sperm counts are a reason to be concerned about worldwide subfertility or infertility in the future. Some further concluded that low sperm counts may serve as a canary in a coal mine, indicating a global decline in the general health of males because low sperm counts have been associated with increased morbidity and mortality in males.¹⁹⁻²²

A critique of Levine and colleagues' meta-analysis (conducted in 2021 by Boulicault and colleagues) highlights several limitations that may provide alternative explanations for the trends they identified.²³ Levine offers what Boulicault and colleagues call the Sperm Count Decline Hypothesis.²³ In the hypothesis, sperm count is a marker of male health.²³ Causes of the decline in sperm count are attributed to endocrine disruptors, environmental pollutants, and lifestyle.²³ Boulicault offers an alternative framework called the Sperm Count Biovariability Hypothesis,²³ in which sperm count naturally varies widely and fluctuations are not always pathological and are in fact typical for the human species.²³ A central tenet of this theory is that a higher sperm count (above a certain threshold) does not equate to better health or fertility.²³ The WHO's reference intervals for semen characteristics are based on men who conceived a child within 1 year of trying.²⁴ Based on those parameters, the lower reference limit for total sperm count was 39 million/ejaculate and sperm concentration was 16 million/mL.²⁴ Levine and colleagues report total sperm counts of 212 million and sperm concentration of 66.4 million/mL in 2011.¹⁹ Although sperm concentration and total sperm count decreased from 1973 to 2011, the values

still fall above the normal lower reference limit for fertility by a significant margin.²⁴

One of the complicating features of relying on sperm count as a marker of fertility is that a low sperm count does not guarantee an inability to conceive.²⁵ Patients with low sperm counts can still conceive and patients with high sperm counts can have difficulties conceiving.²⁶ Additionally, there is not enough evidence to support the claims that subfertility has been increasing over recent decades.²⁷ Little evidence exists to show that sperm count is independently representative of male health status in isolation of other sperm parameters.²³

Do environmental and lifestyle factors affect fertility?

While it is difficult to determine if sperm counts are declining, and if so, if that will translate to an impact on fertility, it is worthwhile to understand the potential impact of environmental and lifestyle factors on sperm parameters and fertility. Tobacco, alcohol, and drug use; psychological stress; obesity; insufficient sleep; and environmental factors such as air pollutants and heavy metals have all been identified as potential risk factors that affect semen quality [Table].²⁸⁻⁴⁵

TABLE. Environmental and lifestyle factors that may affect male fertility.

Factors	Effects	References
Tobacco	Decreased sperm counts Increased DNA fragmentation Decreased sperm motility Decreased normal sperm morphology	29, 30
Alcohol use	Decreased sperm concentration Decreased sperm count Decreased normal sperm morphology	31
Illicit drug use (marijuana, cocaine, anabolic steroids)	Decreased sperm count Decreased sperm motility	32
Sedentary lifestyle	Decreased sperm concentration Decreased sperm motility Decreased normal sperm morphology	29, 33
Diet high in total fat	Decreased sperm concentration Decreased sperm count	34
Psychological stress	Decreased sperm concentration Decreased sperm motility	35
Obesity	Decreased sperm concentration Decreased sperm count	36
Poor sleep (quality and duration)	Decreased sperm concentration Decreased sperm count Increased abnormal sperm morphology	37
Air pollutants	Decreased semen concentration Decreased normal sperm morphology	38
Heavy metals	Decreased normal sperm morphology	39
Low levels of vitamin D	Decreased sperm motility	40,41
Bisphenol A	Decreased sperm concentration	42
Phthalates	Decreased sperm concentration Decreased sperm motility Increased abnormal sperm morphology Increased sperm DNA damage	43, 44
Heat	Decreased sperm concentration Decreased sperm count Decreased sperm motility	45

Drinking five alcoholic beverages per week was enough to show effects on sperm concentration, total sperm count, and proportion of sperm with normal morphology.³¹ The effects were most pronounced in individuals who drank more than 25 drinks per week.³¹ Smoking appears to decrease sperm counts, increase DNA fragmentation, and reduce motility and normal morphology.^{20,30}

A sedentary lifestyle with more than 4 hours of sitting per day was significantly associated with higher immotile sperm.^{29,33} Other lifestyle factors affecting fertility include poor sleep quality and duration, possibly contributing to abnormal sperm morphology, higher rates of oligozoospermia, and low sperm concentrations.³⁷

Low levels of vitamin D were thought to be associated with decreased sperm motility and number of motile spermatozoa;⁴⁰ however, in a randomized controlled trial assessing semen quality with vitamin D supplementation, no significant effect was observed in men who had a vitamin D deficiency.⁴¹

Environmental exposures affecting sperm quality include bisphenol A (BPA), phthalates, heavy metals, and heat.^{38,39,42-44,46} BPA is found in polycarbonate plastics, epoxy resin liners of aluminum cans, and thermal receipts, and was found to be associated with lower sperm concentrations.³⁸ Phthalates are ubiquitous and exposure occurs via ingestion, inhalation, or absorption through the skin.⁴⁶ Phthalates are used as plasticizers to increase the elasticity of material and can be found in materials such as cosmetics, paints, and lubricants.^{43,44} Chronic phthalate exposure was associated with many adverse sperm parameters including decreased sperm concentration, motility, morphology, and increased sperm DNA damage.^{44,45} Higher levels of occupational heavy metal exposure and heat have also been associated with reduced sperm quality.^{38,39,45}

Conclusion

The debate over whether sperm counts are declining will likely be a contentious topic until better study designs are implemented. Importantly, this question is separate from whether a decline in male fertility exists, because sperm counts and fertility are not synonymous. Ultimately, the evidence is conflicting, limiting our

ability to draw accurate conclusions. While it is possible that sperm counts are declining, methodologic limitations, biological variability, and technical inconsistency significantly weaken this conclusion. Furthermore, even if sperm counts are declining, this likely does not have as significant an impact on fertility as is portrayed in the media.

Although sperm concentration and total sperm count decreased from 1973 to 2011, the values still fall above the normal lower reference limit for fertility by a significant margin.

While researchers report that lifestyle and environmental factors are negatively associated with sperm parameters, it is difficult to interpret the impact seen in today's society. Certainly, a healthy lifestyle and environment are important not only for fertility, but also for general health in society and the natural world.

Researchers should caution against drawing the conclusion that male infertility is on the rise based on literature showing declining sperm counts because these studies have significant methodological limitations. While the most recent meta-analysis attempts to address several confounding variables, the data remain highly heterogeneous with immeasurable confounding biases that cannot be addressed with currently available retrospective data. Furthermore, sperm counts by themselves are not a precise marker of male fertility. Research that implements prospective, meticulously designed studies is likely required to further investigate trends of sperm production and fertility. ■

Competing interests

Dr Dunne is a member of the *BCMJ* Editorial Board, but did not participate in the decision making regarding this article. No other competing interests have been declared.

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Three best point-of-care tools available

As a type of information resource, BMJ Best Practice, DynaMed, and UpToDate have many names: point-of-care information tools, clinical decision support resources, electronic textbooks, and more. All are interactive electronic resources that provide rapid access to evidence-based, continuously updated information to address clinical problems. Independently practising physicians in British Columbia enjoy no-cost access to these three resources, which have been evaluated as equivalent and excellent in editorial quality, evidence-based methodology, and volume of content.¹

This article is the opinion of the Library of the College of Physicians and Surgeons of BC and has not been peer reviewed by the BCMJ Editorial Board.

As noted in the *BCMJ*,² UpToDate is available without cost to specialists irrespective of health authority affiliation courtesy of the Specialist Services Committee. This complements the ongoing access to UpToDate for family practitioners who are members of divisions of family practice and for health authority-affiliated specialists.

DynaMed has recently been determined to provide answers to clinical questions with an accuracy equivalent to UpToDate.³ BC physicians can access DynaMed online and as an app through the College of Physicians and Surgeons of BC Library (www.cpsbc.ca/library).

BMJ Best Practice is also available to BC physicians through the CPSBC Library. Like the other two tools, Best Practice is integrated with a drug information resource, in this case Martindale: the complete drug reference, an

evidence-based pharmacopeia unaligned with the pharmaceutical industry.

These high-quality information tools offer BC physicians a choice of preferred platform and the ability to broaden their information sources. ■

—Karen MacDonell
Director, Library Services

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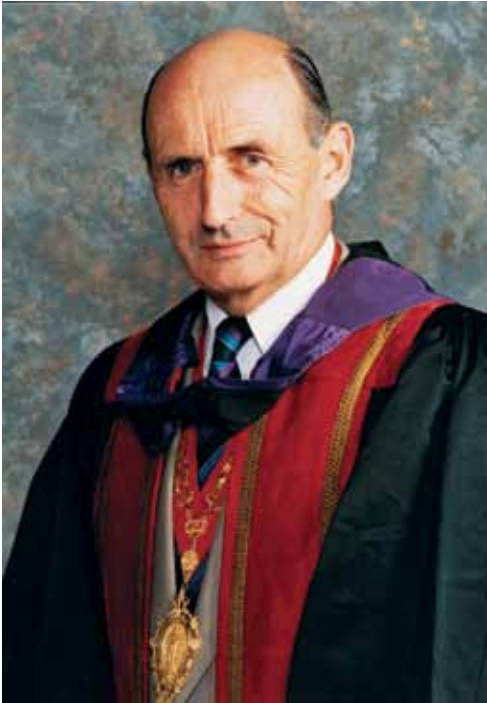
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Obituaries

We welcome original tributes of less than 300 words; we may edit them for clarity and length. Obituaries may be emailed to journal@doctorsofbc.ca. Include birth and death dates, full name and name deceased was best known by, key hospital and professional affiliations, relevant biographical data, and a high resolution head-and-shoulders photo.



Dr John O'Brien-Bell
1929–2022

Dr John O'Brien-Bell's first exposure to medicine was as a young child making house calls with his family physician father, whose practice was based in a working-class area of Birmingham, England. John grew up during the turmoil of the Great Depression and was just 10 years old when World War II broke out. At a young age, he observed patients suffering from illnesses such as polio and tuberculosis and saw the serious impact of poverty on patients in need of care. His father died prematurely of tuberculosis, leaving his mother as a young widow. A positive result of such difficult childhood experiences led to his interest in medicine, which he chose as a career. He graduated

from London's prestigious Westminster Medical School in 1956.

After 10 years working under the British NHS, John immigrated to Canada in 1966. He grew to love his adopted province and country, and settled in Surrey, BC. After his arrival in Canada, he began working as an assistant physician in New Westminster. He later accepted an invitation to formally join and practise with Dr Geoff Parker-Sutton in 1967.

It is not surprising, considering world events at the time, that his earlier years in England led him to develop an interest in politics. After settling in BC, he served as an alderman in Surrey, was a campaign manager for an MP, and even ran for a seat in the BC provincial legislature. He later shifted those interests to the equally (some believe more) challenging field of medical politics.

In the 1970s, John was also the editor of a doctors' provincial newspaper, the *BCMA News*, and later the *Western Medical News*. He helped rekindle the then BC Medical Association when, as a key member of the so-called "reform group," it took on and challenged what it called "the establishment." Fortunately for our profession, the two groups eventually reconciled, and the result was that our profession became stronger and more united. John went on to serve as president of the then BCMA from 1986 to 1987, and president of the Canadian Medical Association from 1988 to 1989. His goals for his patients and the medical profession were emphasized during both terms and echoed those of Canada's 1964 Hall Commission: "the highest possible health-care, freedom of choice, and a free and self-governing profession."

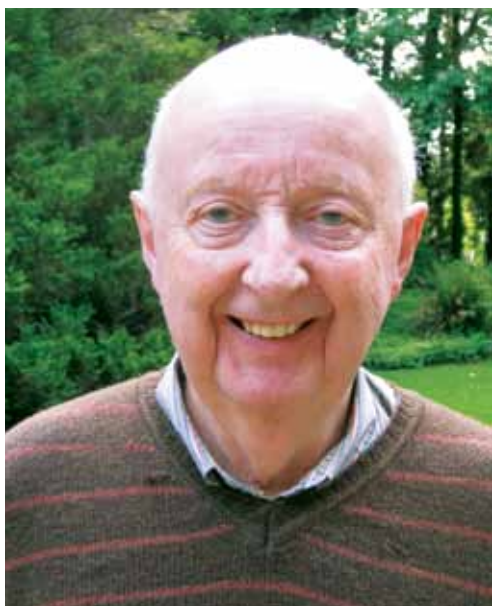
By the time John began his term as CMA president, his practice had grown to include Drs Tom Wong, Glenn Bowsby, and Janet Bowsby. Their support helped him balance his CMA duties with his practice. However, John continued to serve his own patients at every opportunity and continued to do 8-hour emergency shifts at Surrey Memorial on a weekly basis. When asked about his availability for interviews as president, he told reporters and journalists that he was busy with his patients once he left home. He gave out his home telephone number, telling them, "The best time to call is around 7 a.m., before I've left the house."

John was my friend. We corresponded and spoke often. We often went for lunch to chat about medicine, politics, and the world. He was a very active man, and an active runner into his 80s. He also continued to see patients (as a locum tenens) into his mid-80s. Like many others I am a better person for having known and learned from him. Leaders like him are a rarity in this modern era.

John leaves a daughter, Catharine, a college lecturer in photography, and five grandchildren. His son, Andrew, sadly died prematurely in 2017. His wife, Louie, also predeceased him. He retained devoted friends and family back in England, whom he continued to visit annually.

On 21 May 2022 there will be a celebration of John's life held at Victory Memorial Park in South Surrey. His family requests that those wishing to remember his legacy consider a donation to Surrey Hospitals Foundation.

—Brian Day, MB
Vancouver



Dr Peter Michael Rees
1942–2022

With great sadness, we share the news of Dr Peter Michael Rees’s recent death. Peter had accepted his devastating diagnosis with courage and was determined to continue to enjoy as much of life as he could. His loving family and friends, his love of music, his sense of humor, watching the Canucks (even when they weren’t winning), cricket, rugby (providing that Wales was playing), and his memories of family holidays to Hawaii and Ucluelet all led Peter to frequently say, “That was a nice day,” as he was helped to bed at night. Thankfully, we were able to look after Peter at home until his last few days.

After receiving his doctorate in physiology from Cardiff University, Peter completed his medical undergraduate training at Oxford. He chose to do his internship “somewhere nice” as he was planning to return to continue his academic career in Oxford. Peter chose Vancouver and was accepted at VGH. His experience of Canadian clinical medicine, which was so different from what he had seen at Oxford, caused Peter to make a complete change in career plans and become the caring, conscientious clinical neurologist who was so valued both in Burnaby and at the outreach clinics in Fort St. John, Dawson Creek, and Powell River.

Being in Vancouver allowed Peter to fulfill

his passions for river fishing and singing (in the Welsh Men’s Choir and the Bach Choir). He used his time away during curative chemotherapy for lymphoma in 2002 to write a highly respected and often-quoted meta-analysis on mild traumatic brain injury, which had become Peter’s focus of practice.

Peter is survived by his wife, Rosemary; his children, Rachel, Bryn (Monique), Joanne (Harvey), and Stephanie; seven grandchildren; and three great-grandchildren. We miss him dearly.

—Rosemary Basson (Rees), MD
West Vancouver



Dr Barrie Humphrey
1940–2020

Dr Barrie Humphrey was best known locally as a stalwart of the Gabriola Historical and Museum Society (board member 1994–2004 and a frequent contributor to the *Shale*).

Barrie was characteristically modest about his distinguished medical career: Arthur Crease Award in his final year at UBC Medical School (1967), a coveted psychiatry residency at McGill, postgraduate training at Stanford University, a member of the teaching staff at McMaster University, and a psychiatrist for the Hamilton Psychiatric Hospital community outreach unit. After moving to Gabriola in 1990, he brought his expertise to Nanaimo and joined the mobile

outreach to seniors team and practised with them until he retired in 2000.

His curiosity was boundless; from Gabriola’s history to the mechanics of his wheelchair, he was a man who loved to learn. He knew more about historical epidemics than most people want to know, had a passion for statistics, and would have reveled in the flood of data occasioned by the pandemic, undoubtedly producing much-needed useful analysis.

Barrie was an empathetic and compassionate listener, a helpful quality in a psychiatrist and a friend. His daughter, Stacey, probably summed him up best: “He was generous and kind, ethical, and he loved to talk about pretty much any topic.”

He is survived by Cathy Humphrey, his wife of 57 years; Jonathan, his beloved son; Stacey, his adoring daughter; and his brothers, Blair and John.

—Roy Innes, MD
Gabriola Island

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Online (every 2nd and 4th Wednesday)

In response to physician feedback, the Physician Health Program's drop-in online peer-support sessions, established in April 2020, are permanently scheduled for every second and fourth Wednesday at noon. The weekly sessions are cofacilitated by psychiatrist Dr Jennifer Russel and manager of clinical services Roxanne Joyce, and are drop-in with no commitment required. The focus is peer support, not psychiatric care.

All participants have the option to join anonymously. To learn more about the sessions and the program, visit www.physicianhealth.com/how-we-can-help/peer-support. Email peer.support@physicianhealth.com for the link to join by phone or video.

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The Endocrine Research Society is pleased to present the 21st BC Endocrine Day, an annual CFPC- and RCPSC-accredited case-based review of common endocrine problems encountered in clinical office practice. Join us virtually from home or work over Zoom for a full-day presentation series presented by expert physicians. This course will review a variety of endocrine health topics such as adrenal, thyroid, pituitary, gonadal, and pediatric disorders, as well as hypertension, diabetes, and some interesting endocrinology cases. Target audience: open to general practitioners, internists, specialists, trainees, and allied health professionals. Register now as space is limited. Online registration at www.endocrineresearchsociety.com/events/21st-bc-endocrine-day. Please contact Calvin Chang at the Endocrine Research Society for more information or with registration questions. Email endocrine.research.society@gmail.com, or call 604 689-1055.


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We welcome letters, blog posts, articles, and scientific manuscripts from physicians in British Columbia and elsewhere. Manuscripts should not have been submitted to any other publication. Articles are subject to copyediting and editorial revisions, but authors remain responsible for statements in the work, including editorial changes; for accuracy of references; and for obtaining permissions. The corresponding author of scientific articles will be asked to check page proofs for accuracy.

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- Avoid unnecessary formatting, as we strip all formatting from manuscripts.
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2. Mollison PL. *Blood Transfusion in Clinical Medicine*. Oxford, UK: Blackwell Scientific Publications; 2020. p. 78-80.
3. O'Reilly RA. Vitamin K antagonists. In: Colman RW, Hirsh J, Marder VJ, et al. (eds). *Hemostasis and Thrombosis*. Philadelphia, PA: JB Lippincott Co; 2015. p. 1367-1372.
4. Health Canada. *Canadian STD Guidelines, 2017*. Accessed 15 July 2021. www.hc-sc.gc.ca/hpb/lcdc/publicat/std98/index.html.

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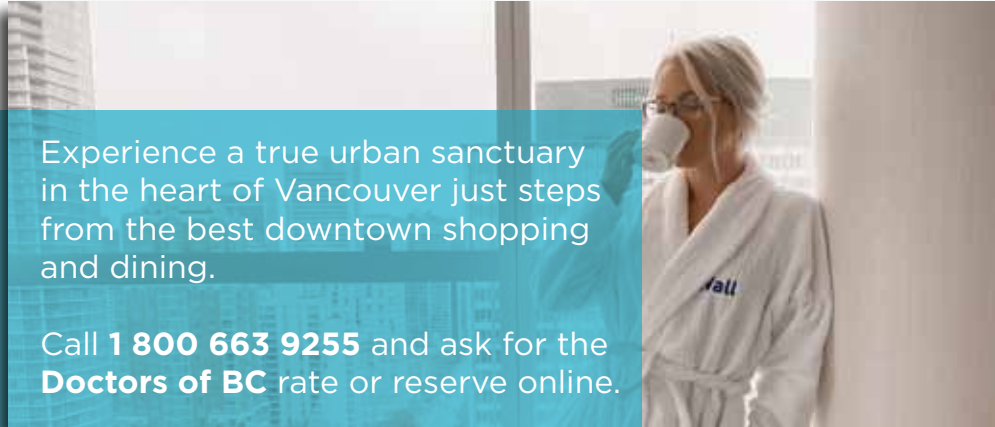
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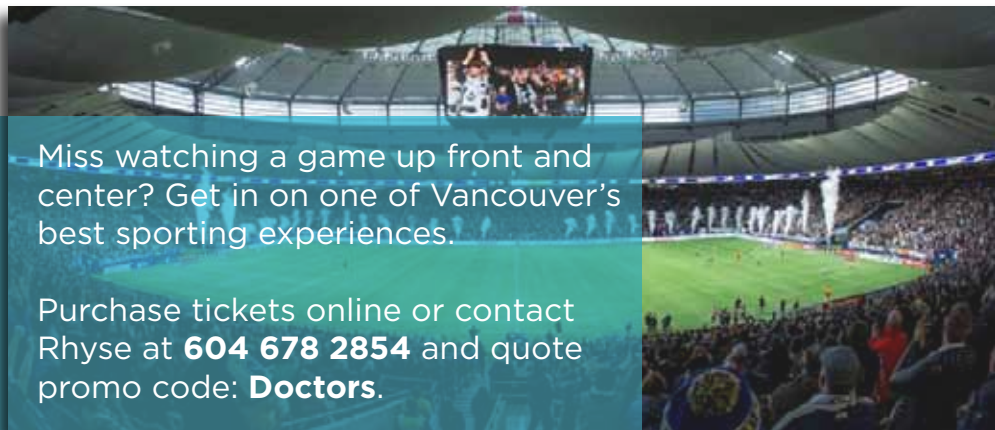
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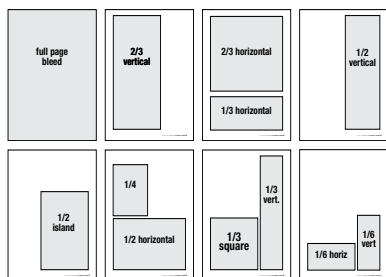
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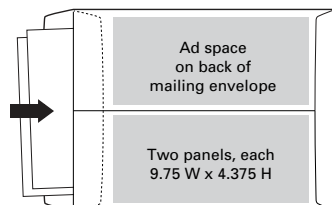


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