BC MEDICAL JOURNAL
60 YEARS OF PUBLISHING

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INFERTILITY, PART 2:

How old is "too old" to have a baby?
Prenatal screening options in British Columbia
Preconception management of diabetes
Recurrent miscarriage

ALSO IN THIS ISSUE

Unplanned hospital readmissions in British Columbia

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ON THE COVER

In Part 2 of our theme issue on infertility, we consider complications in early pregnancy and offer practical review of prenatal screening options, preconception care for women with diabetes, and management of recurrent miscarriage. Articles begin on page 246.

Clinical Articles

THEME ISSUE: INFERTILITY, PART 2

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Genetic testing

"Hey Doc, what are you going to do to help me? I'm at risk for obesity, gout, diabetes, gallstones, heart disease, and kidney disease."

"Bob, despite the fact that obesity is already more of a fact than a risk for you, what are you talking about?"

"I did one of those home DNA tests, and my printout said I'm at higher risk, so I'm worried."

"And you weren't worried when I explained last month that 300 lbs on your 5'6" frame increased your chances of heart disease and other adverse conditions?"

We live in interesting times. Patients now have access to home genetic testing, and for less than $200 these at-home kits allow individuals to research their ancestry. In addition, these companies provide genetic reports on disease predisposition and carrier states. One could argue that this is a wonderful technological advance because patients can now take control of their lives and mitigate risks. However, this information is being given without genetic counseling to people who might not be ready to hear it or understand what information they are actually getting. A genetic mutation doesn't actually mean you will get the disease; nor does it explain the other complex factors that go into disease risk.

Probably the most well-known genetic test is for mutation of the BCRA1 and BCRA2 genes, which if positive significantly increase a woman's risk for breast and ovarian cancer. But how can a patient make an informed decision about future treatments to mitigate risk without an expert guiding them through this maze of gene expression and penetrance? Also, these tests check for some mutations but not all, and if negative might convey a false sense of security and lead individuals to stop potentially lifesaving screening.

I did some online research, and it appears that not all companies have the same level of credibility. Some make unsubstantiated claims that seem a little farfetched. One company will test for 31 conditions, 53 carrier states, 12 drug-response genes, 6 wellness traits, 11 other traits, and 11 addictions. Your genetics will even be matched to dietary and exercise advice along with supplements and skin products that the company conveniently sells. Some of the listed traits did make me smile, particularly ear-wax type (who cares), digit ratio (can't you just look at them?), and newborn hair amount (didn't anyone take baby photos?). The drug-response item also caused me to pause. Apparently, your genes reveal how you will metabolize proton pump inhibitors, respond to hepatitis C treatment, and how sensitive you will be to warfarin and clopidogrel (I admit this would be valuable information to have). As for addiction testing, if the result is negative, should an individual use alcohol, cocaine, and heroin without a care in the world?

A genetic mutation doesn't actually mean you will get the disease; nor does it explain the other complex factors that go into disease risk.

Lastly, the wellness tests listed include alcohol flush, caffeine metabolism, depth of sleep, lactose intolerance, and muscle performance. If you are predisposed to being a black-coffee-swilling, red-faced alcoholic-insomniac with weak muscles, should you just give up?

As technology continues to advance, physicians will definitely face new challenges in processing the wealth of ever-expanding testing and knowledge. I believe my DNA is heavily sprinkled with the stalling-while-I-Google gene, so hopefully I will be okay. Good luck to the rest of you.

—DRR

Who am I to judge?

One of my kids has picked up a hobby for which he sometimes appears on stage, in film, and on TV. Believe me, it is not something we even knew anything about until our family was suddenly in it, and it is both an interesting and occasionally ridiculous pastime for all of us. One of his brothers is a competitive diver, who has trained thousands of hours to get to a place where he can rip dives at provincial and national competitions, and he may even be presented with scholarship opportunities at some point.

They and we are very happy to have these opportunities, and hopefully enough talent to feel part of the game, but there is also a difficult side to these activities—subjective judgment alone determines how successful they are. Not a clock or a goal or a measuring stick—a human ultimately decides who deserves what. No matter how hard you work and how well you perform, there is no guarantee that everyone will see the performance the same way. And subjectivity is prone to create biased or single-point-of-view judgments, critiques that are narrow and misdirected, and maybe even wrong sometimes!

Professionally, before we even recognize it, we can find ourselves falling onto the path of needing to be uncomfortably judgmental. For instance, when acting as part of the residency selection committee in our division for several years, having also helped choose which fellows we train, comparing and ranking submissions to academic meetings and publications to determine which ones will be accepted, winnowing out who we might hire as colleagues; we judge and judge and judge. And I'm often left thinking that these people have done amazing work, even the ones we don't end up choosing, and because the majority of them are usually way better than me on paper, I am left thinking, who the heck am I to judge?

We have become a world where unfiltered self-described judges are flourishing—all of us are capable of changing the direction of someone's life or career. And all of us are also then fully vulnerable to being judged.

And that's just at work. The world has become so critical and often unapologetically mean, it's hard to even read what is published sometimes. Anonymity means that online critique, tweets, and blogs can be simply brutal. For example, your doctor rating can be submarined by a solitary unhappy patient, and there is no burden of truth or even discussion allowed. A restaurant can be maligned with a review that never has to be proven. Children affected by gun violence are dragged over the coals publicly for daring to try to create legal change. The same film or play your kid is in can be described as both "must see" and "the worst of the year" in sequential tweets, with the more unsavory one usually appearing higher in the search engine algorithm. Your daughter may find herself being scored in the less-happy column of an uninvited, immature "hot or not" site. Blogger after blogger creates and promotes self-made critique sites, and tries to one-up their competition with edginess. And who the heck are these people to judge?

We have become a world where unfiltered self-described judges are flourishing—all of us are capable of changing the direction of someone's life or career. And all of us are also then fully vulnerable to being judged.

When we absolutely do have to make a call or criticism, we should be reminded that we should keep things real and fair and transparent. "Is it true? Is it necessary? Is it kind?" No one really knows who first said that about how we speak our mind, but it would sure be a nicer world if people took it to heart.

—CV

The one thing is

Through the clacking of keyboards and rustling of papers, I hear a sigh emerge from the confluence of doctors in the backroom.

"Did anyone else just get 100 new results to check? I was up all night going through reports and labs, and now I'm behind again. I swear half of these I've seen before, but I'm still responsible for them each time. If I could just change one thing, it would be to find out what happened to the EMR that was supposed to make my life easier."

My ears perk up.

"At least you're getting those labs. It feels like half the time patients come in, I have no idea what the 'red pills' are that someone else prescribed. Or why a TSH was ordered for the fifth time this month. What happened to EMRs talking to each other? Wasn't interoperability supposed to be a thing?"

"Well, it's better than what we get by mail. Look at all these forms overflowing on my desk. I went to medical school to help people, not push paper. Forms for consults. Forms for medications. Forms for work and school and camp. A lot of the time, the insurance companies want the patients to pay, and the patients can't pay because the insurance company is holding out. My one thing is that I just want to spend my time being a doctor and not a data clerk."

The keyboard clacking calms.

"At least those forms might help someone get through a tough time. Tell me what good all these pharmacy fax refill requests do to advance care? We have robotic surgery and gene therapy, and yet we still communicate with technology from the 1840s. If I could change one thing, it would be to have communication tools that actually help me care for my patients."

By now most chairs have swiveled from our stations to face each other.

"I know it's complicated, but if I could change one thing, it would be to use all our trained doctors, nurses, and technicians to cut down wait times. Have you seen how long it takes to get an echocardiogram these days? And don't get me started on 'non-urgent' surgeries. As they say, Canada waits."

We are preparing for negotiations and asking for feedback at every stage. And while we may not immediately create the revolution we want, we can start the momentum: The future happens slowly and then all at once.

"Maybe all this waiting explains why I'm at work so late. If I leave before dictating all my notes and returning all my calls, then I feel guilty about letting my patients down, who are waiting by the phone. If I stay late, then I feel guilty about missing my family. My one thing would be to leave here, done and on time."

I listen intently as more voices join in the conversation.

"Try balancing that with having to pick up the kids and get dinner ready. Then get all of my EMR and paperwork done."

"I would love to have a steady place to come home to. But I'm being 'renovicted.' Every time I think I'm getting closer to a down payment, the market jumps out of my reach again. My one thing would be that a doctor can afford to live in the city they want to work in."

Eyes turn to me.

"Eric, aren't you involved with Doctors of BC? What's going on to help us?"

I say that they're right.

That practising medicine should be good for our health too.

That we need to channel our frustrations.

That now is the time.

We have local innovation for consultations and advanced access and 24-7 imaging and digital health, all begging to be scaled. We have a new governance structure and a chance to build a culture of trust and inclusion and professional unity. We are preparing for negotiations and asking for feedback at every stage. And while we may not immediately create the revolution we want, we can start the momentum: The future happens slowly and then all at once.[1]

So, what is your one thing to change? I'm here and I'm listening.

—Eric Cadesky, MD
Doctors of BC President

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letters to the editor

We welcome original letters of less than 300 words; they may be edited for clarity and length. Letters may be emailed to journal@doctorsofbc.ca, submitted online at bcmj.org/content/contribute, or sent through the post and must include your mailing address, telephone number, and email address.

Nonrecognized qualifications

The *BC Medical Journal* is allowing questionable self-promotion by physicians of qualifications not recognized in Canada. In the January/February issue, the *BCMJ* printed news that "Three BC physicians earn board certification in lifestyle medicine," and in the April issue, two articles, "Clinical assessment to determine a patient's suitability for bariatric surgery," and "Prevention and management of complications after bariatric surgery," identified authors as being Diplomates of the American Board of Obesity Medicine. The *BCMJ* does not publish the names of BC physicians who have achieved their CCFP or FRCPC/FRCSC. And these are at least based on clinical patient training over many years, with rigorous criteria and examinations for certification and accreditation, as well as being accepted, approved, and accredited Canadian standards. The board referred to is not the American Board of Medical Specialties that most physicians know, but even if it were, the requirements for specialty board certification in some instances is fewer years of training than required in Canada. These paper certificates are two of a growing number of mostly foreign ways available to physicians for advertising an impressive-sounding resume, just by attending as little as a 1- to 2-week or longer course or training and/or doing some reading, possibly even absent any live patients. Or, one can simply pay to become a fellow of some society that sounds rather distinguished. This would be of little consequence if websites didn't exist. There have been many instances of physicians advertising on the Internet in a manner implying that they are specialists when they are not.

The College of Physicians and Surgeons should proactively address this issue. Advertising foreign credentials should not be allowed except where they are recognized as being equivalent to accepted Canadian professional accreditation standards. The *BCMJ* should end the practice of publishing such questionable credentials.

My concern is one of patient safety, public trust, and physician accountability.

—Evert Tuyp, MD, FRCPC
Coquitlam

Thank you for your points regarding credentials. The BCMJ *does not have a robust policy on this topic, but your letter has identified a need to develop one. Once the policy is written, we will report on it.* –Ed

The Canadian community: Altruism amid tragedy

As a father whose son once played hockey, and as a lifelong follower of the game, the tragic accident involving the Humboldt Broncos junior hockey team filled me, along with most Canadians, with a deep sense of sadness. As a gastroenterologist and liver-transplant physician at VGH, the actions of Logan Boulet's family (Logan was one of the players taken from this world much too young because of this tragedy) left me with a great sense of appreciation and awe. In their worst possible moment, when their lives were irreversibly and tragically altered, Logan's family chose to put the significant medical needs of others—anonymous to them—ahead of their own needs. Their decision to donate Logan's healthy young organs has rescued kidney disease patients from the suffering of dialysis, and saved patients with end-stage liver, heart, and lung disease from an otherwise inevitable premature death. Their noble altruism has also resulted in an increased interest among BC residents in organ donation, and that will help save lives in this province. In the darkest, most incomprehensible moments, the light of kindness and humanity refuses to be extinguished. I would like to believe that the actions of Logan's family, as well as the incredible support for the Humboldt Broncos that Canadians coast to coast have shown, somehow defines us as a nation. Humboldt Strong. Canada Strong.

—Eric M. Yoshida, OBC, MD, FRCPC
Vancouver

Dr Ross president-elect

Dr Kathleen Ross has been elected president-elect of Doctors of BC, and will serve as the association's president in 2019–20. A GP for more than 25 years, Dr Ross has spent a career building working relationships with generalist and specialist physicians, as well as with numerous other clinical and administrative health care stakeholders. Combined with her experience practising in multiple settings that include rural and urban, obstetrics, and surgical assists in cardiology, Dr Ross plans to use that experience to bring diverse groups together, to ensure that the many different opinions are counted, and to continue the hard work of defining and pursuing a common purpose. Congratulations Dr Ross.

Latent tuberculosis infection: Update on provincial treatment guidelines

Tuberculosis (TB) is an infectious disease that typically affects the lungs and is spread from person to person through the air by droplets expelled when coughing or sneezing. This disease poses a global public health threat.[1] In 2016, about 10 million people fell ill with TB, and about 1.7 million died worldwide from the disease.[2] Despite efforts to eliminate it, TB is now the leading infectious-disease killer globally and the leading killer of people living with HIV.[3]

Approximately one-quarter of the world's population has latent (or dormant) TB, which means that people have been infected with the TB bacteria but the infection has not progressed to active disease.[2] Those with latent TB infection (LTBI) do not present with illness or symptoms and are not infectious. For some individuals, the bacteria can overcome the immune system defences and begin to multiply, resulting in the progression from LTBI to active TB disease.[4] It is estimated that about 5% to 10% of those infected with TB will develop active TB at some point in their lives.[4] The likelihood of this occurrence increases considerably for those with weakened immune systems and other comorbid illnesses.

Treatment of LTBI can substantially reduce the likelihood of activation[5] and subsequent transmission, and is therefore a crucial component in preventing active TB disease. In BC, while treatment for LTBI is voluntary, an emphasis is placed on treating those infected within the previous 2 years, immigrants and refugees from high TB–prevalence countries, children under 5 years of age who've come into contact with TB, and those with risk factors that substantially increase the likelihood of progression to active TB disease—those with HIV infection or AIDS, chronic kidney disease, and organ transplants, and those taking high doses of immune suppressive therapy.

In BC, standard first-line treatment for LTBI has focused on 300 mg of daily self-administered isoniazid for 9 months. Alternatively, isoniazid can be given twice weekly through direct observed preventive therapy (DOPT) for 9 months as an option for vulnerable clients requiring intensive support to complete therapy. However, poor completion rates, in part due to the length of this treatment regimen as well as drug-induced liver disease, have been an ongoing challenge for some patients. An available but less widely used alternative to the isoniazid regimen has been 600 mg

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of daily self-administered rifampin for 4 months. Rifampin treatment of LTBI would typically be considered for those with intolerance to isoniazid, those exposed to an isoniazid-resistant organism, or those with medication interactions to isoniazid. A building evidence base suggests that rifampin treatment of LTBI is a safer and less-expensive alternative with excellent treatment completion rates. Rifampin treatment for LTBI will now be used as a first-line treatment regimen in BC.

A third regimen option for LTBI is a combination of isoniazid and rifapentine. Provincial TB Services at the BC Centre for Disease Control has been able to obtain a 1-year access to rifapentine through Health Canada's Exceptional Circumstances Access Program. Clients at the provincial TB clinics may be offered this once-weekly 12-week regimen of isoniazid (900 mg) and rifapentine (900 mg) (referred to as 3HP) as the newest LTBI treatment option. Currently, this regimen is only offered as DOPT to eligible clients receiving care at the Vancouver or New Westminster provincial TB clinics. Expanded use of 3HP to the rest of the province will be considered in the future. Updated LTBI treatment guidelines can be found in the TB manual put out by the BC Centre for Disease Control (www.bccdc.ca/resource-gallery/Documents/Communicable-Disease-Manual/Chapter%204%20-%20TB/TB_Manual.pdf).

Treatment of LTBI is a crucial aspect in the global flight to eliminate TB. Clients with untreated or incompletely treated LTBI remain at risk for active TB disease. Rifampin as a first-line treatment regimen, or other LTBI treatment regimens, may help improve provincial LTBI treatment completion rates. This will aid in the fight to eliminate TB.

—Shaila Jiwa, BScN, RN, MScPPH
Senior Practice Leader, Clinical Prevention Services
BC Centre for Disease Control
—Victoria Cook, MD, FRCPC
Medical Head, Provincial TB Services
BC Centre for Disease Control

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Resource on insulin use helps Canadians with type 2 diabetes maintain healthy blood-glucose levels

An estimated 1.5 million Canadians living with diabetes can't achieve their glycemic targets. Sanofi Canada brought together a panel of Canadian experts—including GPs, nurses, nurse practitioners, endocrinologists, dietitians, pharmacists, and a psychologist—to address the common barriers people face in reaching

their target glucose levels. Their recommendations can be found in "Insulin matters: A practical approach to basal insulin management in type 2 diabetes," published in *Diabetes Therapy*.

Canadians with type 2 diabetes may need to take insulin to achieve their target glucose levels and to reduce their risk of complications such as heart disease, kidney disease, loss of vision, and amputation of the lower limbs. Since insulin introduction (initiation) and dose increase (intensification) are important factors in the management of diabetes, the panel's goal was to help break down and address barriers people may face regarding insulin—to demystify insulin and its use, and acknowledge the fear of needles and potential undesirable effects. Insulin initiation can help patients lead a healthy life along with the help of their health care team.

A health care team is a vital resource to learn about the tools available for managing diabetes. Canadians can learn about their target glucose levels, healthy eating, and exercise plans and the best treatment options, including their insulin initiation plan.

Insulin is a natural replacement hormone therapy that can be used when the pancreas can't produce enough on its own, due to the progressive nature of type 2 diabetes. A new generation of long-acting basal insulins makes it possible to lower the amount of glucose in the blood. This includes insulin glargine 300 U/mL (Gla-300, Toujeo, Sanofi), which was approved by Health Canada in 2015 and studied in a large clinical program. This insulin needs to be taken only once a day, helping Canadians maintain a healthy and active lifestyle, not limited by their medication.

"Insulin matters: A practical approach to basal insulin management in type 2 diabetes" can be found at https://link.springer.com/article/10.1007%2Fs13300-018-0375-7.

Goodbye, Bob. Hello, David

Dr Robert Vroom

As the saying goes, "time waits for no one," or something like that. I wish it had waited a little longer as, not without a little sadness, the *BCMJ* Editorial Board is saying goodbye to Dr Robert Vroom. Dr Vroom has retired and given up his seat at our esteemed table. He will be sorely missed because Dr Vroom knows something about everything and shares this wisdom with grace and humility. We wish him the very best as he enjoys his family and runs the hills of the Sunshine Coast.

Dr David Esler

We are excited to welcome Bob's replacement, Dr David Esler, to our Editorial Board. Dr Esler has practised emergency medicine in and around Vancouver since 1988. He is also a medical reviewer for the College of Physicians and Surgeons of BC. This jazz-playing animal-lover has a special interest in health law, bioethics, risk management, and patient safety. The *BCMJ* Editorial Board is sure to benefit from Dr Esler's valuable contributions in the years ahead.

—DRR

Sensitivity of early colon cancer screening tests

BC Cancer and its Laboratory Services have identified an issue with the test used to screen for colon cancer. Recent fecal immunochemical test (FIT) results show an increase in the number of positive screens—more patients are testing positive than is typical. This higher rate was detected by the improved monitoring put in place last year.

A problem with the reagent used to test the fecal samples in the labs has been identified. A new reagent has been in use since mid-December 2017, when testing resumed after a 3-month suspension due to similar issues. The new reagent was performing to expected standards until very recently.

Testing will continue; however, physicians and patients are being informed that there will be a higher-than-normal percentage of patients who are referred for a follow-up colonoscopy. The provincial colon screening program recommends all patients with abnormal FIT results have a follow-up colonoscopy.

A positive FIT result is common and does not mean that the patient has cancer. On average, 15% of patients screen positive and require further testing. It is expected that an additional 5% of patients will now screen positive, whereas previously, they would have had a borderline negative result.

BC Cancer, Laboratory Services, and the Ministry of Health are exploring all options to address this situation.

Quick facts about colon cancer and screening:

- Screening can save lives by detecting noncancerous polyps and cancer early.
- Colon cancer is easier to treat when found at an early stage. When it's detected at its earliest stage, survival rates are approximately 90%.
- FIT is a routine screening test recommended for people between the ages of 50 and 74 at average risk of colon cancer. It detects blood in the

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Best practices in treating chronic noncancer pain

Since the mid-1990s, physicians have been increasingly prescribing higher doses and stronger opioids for their patients, particularly those with chronic noncancer pain.[1,2] Opioid overprescription, improper risk assessment, and lack of monitoring opioid medication use have led to a significant health crisis in North America. Negative consequences, including opioid dependence, addiction, overdosage, intentional or unintentional death, and diversion of drugs within the community, have impacts at both individual and societal levels. The Centers for Disease Control and Prevention reports that while death rates for conditions such as heart disease and cancer have decreased substantially over the past decade, the death rate associated with opioid pain prescription has increased significantly,[3] despite the paucity of evidence to support the use of opioids to treat chronic noncancer pain.[4,5] This increase in opioid pain prescriptions has likely contributed to the opioid crisis in which we find ourselves.

WorkSafeBC's practical experience supports the research findings. We seldom see long-term improvements in pain and function with long-term use of opioids. Instead, strong evidence supports the use of nonpharmacological options as first-line treatments for patients with chronic noncancer pain,[6] which can be combined with pharmacological options or used on their own. The Centre for Effective Practice in Toronto divides nonpharmacological therapies into four categories:[7]

- Physical activity and exercise programs, including low-impact activities such as yoga, walking, and aquatic therapy.
- Physical therapies such as manual therapy.
- Psychological therapies such as cognitive behavioral therapy.

While death rates for conditions such as heart disease and cancer have decreased substantially over the past decade, the death rate associated with opioid pain prescription has increased significantly, despite the paucity of evidence to support the use of opioids to treat chronic noncancer pain.

- Self-management programs (treatment approaches that encourage individuals to be proactive in the care of their condition through lifestyle and behavioral changes and appropriate interaction with health care services).[8]

Non-opioid pharmacological treatments can also be effective, particularly when combined with some of these nonpharmacological options.

Finding the right treatment or combination of treatments requires careful trial, monitoring, and adjustment to ensure improvements in pain and function are being achieved. While time consuming, this process is valuable to the patient.

WorkSafeBC's best practices seminars

Throughout 2018, WorkSafeBC will host community seminars to equip physicians and nurse practitioners with current best practices in the appropriate evidence-informed management of chronic noncancer pain. Our goal is to reduce harm and improve functional outcomes. Our informative, interactive sessions (Not Just a Prescription Pad: A Multimodal Approach to Chronic Pain Management) will give you practical knowledge and skills to apply to your practice. This workshop aligns with the College of Physicians and Surgeons of BC's standards and guidelines for safe prescribing of opioids, and physicians who attend will receive 2.5 Mainpro+ credits.

Sessions have already been held in Richmond, Burnaby, Kelowna, and Kamloops; the next session will be in Nelson on 18 June. Tentative dates for the remaining 2018 sessions are:

- 10 September: Langley/Surrey
- 25 September: Penticton/South Okanagan
- 2 October: Abbotsford/Chilliwack/Mission
- 19 October: Victoria
- 1 November: Courtenay/Comox/Campbell River
- 20 November: Delta/White Rock/Tsawwassen

All are evening sessions. Register online at http://events.eply.com/chronicpain, or call 1 877 231-8765. Seating is limited. Sessions are tentatively planned in 2019 for Coquitlam, Cranbrook/Fernie/Kimberley, Lillooet, Nanaimo/Qualicum, Port Moody,

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This article is the opinion of WorkSafeBC and has not been peer reviewed by the BCMJ *Editorial Board.*

Does diet impact mental health?

Patients often report feeling mentally and physically unwell after eating fat-, salt-, or sugar-laden foods. Though the precise mechanisms underlying these symptoms are unclear, extensive self-reports support the notion that diet impacts mental health. While correlational evidence suggests a bidirectional relationship between diet and mental health, attributing causality is much more challenging.[1] A recent meta-analysis revealed compelling evidence of the relationship between dietary patterns and depression risk, yet concluded that more randomized controlled trials and cohort studies are needed to confirm these findings.[2]

The emerging field of nutritional psychiatry takes a more detailed look at the bidirectional impact of food and nutrition on mental health. This includes a study of gut flora or microbiota and their influence on mood. The "gut-brain axis" is an extensive channel of direct and bidirectional biochemical communications between the GI tract and the central nervous system. Ninety percent of the body's serotonin, an important neurotransmitter, is produced in the GI tract.[3]

If future research determines that probiotic changes to microbiota have significant influence on neurotransmitter levels, probiotics could become a major player in the management of mental health. Regularly recommending probiotics from dietary sources of live and active cultures or discussing how to choose probiotic supplements may become common in clinical practice.

Patients also ask about the relationship between nutrients such as omega-3 fatty acids, B vitamins, zinc, and magnesium and mental health. While there are ongoing investigations regarding the impact of these nutrients on mental health, there are no definitive conclusions regarding specific nutrient supplementation for mental health. The benefits of omega-3 fatty acids have largely been reported based on their anti-inflammatory properties. They may also provide a range of neurochemical activities that impact the reuptake of the neurotransmitters dopamine, noradrenaline, and serotonin. Recommending omega-3 fatty acids from dietary sources such as cold-water fish (salmon, tuna, sardines, mackerel), chia or flax seeds, and walnuts is aligned with overall healthy-eating messaging. If patients wish to use a supplement, advise them to use one that has a natural product number (NPN). An NPN ensures that the product has been reviewed by Health Canada.[4]

Focusing on healthy eating patterns rather than individual foods and nutrients is the best dietary advice for both mental and physical health.

Focusing on healthy eating patterns rather than individual foods and nutrients is the best dietary advice for both mental and physical health. These patterns, such as the DASH, anticancer, or Mediterranean diets, recommend whole grains; plenty of fruits, vegetables, and legumes; fish; and a sprinkling of nuts, seeds, healthy fats, and nonsalt spices.[5]

To build greater awareness over food choices and the link to emotional well-being, physicians can recommend that patients keep a simple diary of their food, mood, and lifestyle choices, and monitor whether they crave high-sugar or high-fat foods when they are tired, sad, or stressed. Some experts attribute sugar and fat cravings to the addictive nature of humans, as sugar and fat impact dopamine and serotonin levels. Identifying the when, what, and why of cravings may help with successful behavior change. With increased awareness, patients can then switch from negative to healthy behaviors. These changes can also benefit body weight, an independent risk factor for mental ailments, providing even more rationale for using a diary to build awareness around diet and lifestyle choices.

Emerging alongside nutritional psychiatry is the advent of personalized medicine—a tailored, individualized approach to optimizing patient care. This could prove revolutionary over time. Until then, we can focus on some basics that even our grandmothers would agree on—eat mainly plant-based whole foods, make time for physical activity, eat treats in moderation, and get adequate sleep. These are the current gold standards and safest ways to sustain mental and physical health and well-being.

—Kathleen Cadenhead, MD
—Mary Hinchliffe, MD
—Tanis Mihalynuk, PhD, RD

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Dr Caitlin Dunne

Infertility, Part 2: How old is "too old" to have a baby?

British Columbia has the highest age of first birth in the country. The average age of a first-time mother in BC is 30.8 years, according to Statistics Canada, compared with 30.5 years in Ontario and 25.4 years in Nunavut.[1] In 1991 the average age of a Canadian first-time mother was less than 28 years.[2] This means that within one generation there has been a significant move toward delayed childbearing. In 2015 the BC Vital Statistics Agency noted that the proportion of first-time mothers age 35 to 39 had risen to over 20% in the last decade.[3] The evidence is clear—our patients are at risk of waiting too long to start their families.

A woman's age when she starts her family is, arguably, one of the most adjustable factors for improving both fertility and pregnancy outcomes. A woman is born with all of her eggs, and they degenerate with age. Internal mechanisms, such as the meiotic spindle and mitochondrial functions, break down with age, and she becomes more prone to infertility, miscarriage, and aneuploidy. Once pregnant, women older than 35 are also more susceptible to adverse outcomes such as preterm birth, preeclampsia, diabetes, and cesarean section.

Advances in reproductive technology are changing the age limits of motherhood. For many women, these developments provide opportunities for motherhood that did not exist even 5 years ago. For health care providers, these technologies present novel challenges.

Egg freezing allows women to reduce some of the risks of delayed childbearing. By preserving eggs at their prime (ideally before age 34) women can create a backup plan in the event they have trouble conceiving later in life. Frozen donor eggs from the United States have been available since about 2013, and based on my clinical experience the use of donor eggs is growing in popularity. Whereas women in the past needed a friend or family member to altruistically donate eggs, now they can purchase eggs online from an increasing number of banks in the US and abroad. Autologous egg freezing and egg donation both make pregnancy possible even after menopause. In Canada, the upper age limit for treatment with frozen eggs is considered to be 50 years, while in the US it is 55 years.

The topic of older motherhood is rife with ethical and medical dilemmas. Weighing principles such as autonomy and beneficence against the risk of medical complications such as prematurity and stillbirth can lead to hours of debate. For now, we strive to consider each case on its own merits and make the best recommendation for the individual patient.

Many factors have contributed to delayed childbearing, including the pursuit of higher education, access to contraception, difficulty finding a partner, and the success of in vitro fertilization. Physicians should encourage women to plan for their future fertility by talking to them about the negative effect of advancing age on reproduction and discussing their options.

In last month's theme issue we discussed why infertility patients deserve our attention, investigations for infertility, therapy for polycystic ovary syndrome, and fertility preservation for young cancer patients. In this month's theme issue we travel further along the reproductive pathway to consider complications in early pregnancy, and we offer practical reviews of prenatal screening options, preconception care for women with diabetes, and management of recurrent miscarriage.

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This article has been peer reviewed.

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Prenatal screening options in British Columbia

Counseling is an important requirement before and after a patient undergoes prenatal screening for chromosomal and subchromosomal fetal defects and disorders such as preeclampsia.

ABSTRACT: Prenatal screening in Canada has evolved over the past 40 years along with advances in our understanding of maternal and fetal risk factors, ultrasound technology, and the human genome. Multiple prenatal screening options are now available to patients, including tests that measure biochemical markers in maternal serum, placental DNA fragments, and fetal markers revealed by ultrasound. In BC, tests covered by medical insurance include SIPS (serum integrated prenatal screen), which measures markers in two separate blood tests, IPS (integrated prenatal screen), which measures markers in both serum and on ultrasound, and the Quad screen, which measures four markers in a single second-trimester blood test. Screening tests not usually covered by provincial medical insurance include FTS (first-trimester screening) and NIPT (noninvasive prenatal testing). Knowledge of the human genomic library paired with the commercial availability of sequencing technologies can be expected to produce further advances in prenatal screening. Our greatest challenge in the next 10 years will be to train the genetic counselors needed to provide timely support to patients as they consider the array of screening options available.

This article has been peer reviewed.

The evolution of prenatal screening was slow until relatively recently. In 1866 John Langdon Down published the first reference to a cluster of fetal characteristics that were discovered to be trisomy 21 almost 100 years later,[1,2] and confirmation that each cell normally contains 46 chromosomes was not reported until 1956.[3] Following this discovery, the development of amniocentesis and chorionic villus sampling, along with improved metaphase karyotype resolution, enabled the diagnosis of many more genetic syndromes. Currently, both chromosomal (aneuploidy) and subchromosomal (deletion/duplication/translocation states) can be detected by prenatal screening.[4]

Serum and ultrasound markers

Maternal serum screening for analytes produced by the placenta to detect trisomies 21, 18, and 13 first became available in the 1980s.[4] The

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sensitivity and specificity of screening improved as markers were added. Canadian screening[5,6] tests now employ various combinations of the following biochemical markers:

- Total human chorionic gonadotropin (hCG)[7] and free beta-hCG.[8]
- Alpha fetoprotein (AFP).[9]
- Unconjugated estriol (uE3).[10]
- Pregnancy-associated plasma protein-A (PAPP-A).[11,12]
- Inhibin A.[13]

In 1997, Lo and colleagues published the first paper to describe isolating and amplifying nonmaternal DNA from maternal plasma: at the time, they referred to these fragments as "fetal" although we know now that they are placental DNA fragments.[16] This triggered important clinical applications given that placental DNA largely mirrors fetal DNA (with the exception of mosaicism, which can occur in the placenta). Today, fragments of placental DNA are being referenced against the library created by the Human Genome Project, and new sequencing tools[17] are permitting screening for subchromosomal defects such as microdeletions using commercially available tests.

Today, fragments of placental DNA are being referenced against the library created by the Human Genome Project, and new sequencing tools are permitting screening for subchromosomal defects such as microdeletions using commercially available tests.

In 1992, Nicolaides and colleagues published a seminal article demonstrating that ultrasound measurement of nuchal translucency (the fluid between the fetal skin and skull) could be used to identify the fetus at risk for Down syndrome.[14] Subsequently, new ultrasound markers were identified and these allowed prenatal screening practitioners to flag fetal anomalies beyond just the major aneuploidies of chromosomes 21, 18, and 13.[4] Then, additional ultrasound markers (e.g., uterine artery pulsatility index) expanded screening beyond chromosome errors to disorders of pregnancy such as preeclampsia.[15] This expansion of markers permitted the detection of some more rare anomalies and other syndromes in addition to the major aneuploidies.

Risk factors and tests for prenatal screening

The Society of Obstetricians and Gynaecologists of Canada (SOGC) provides excellent advice on counseling patients before and after prenatal genetic screening.[5] Their committee opinion on the topic states that some patients may have difficulty understanding the difference between a screening test and a diagnostic test, and that counseling will involve explaining that a positive screen means the patient's risk is above a predetermined cutoff set by a regional program, not that her fetus is necessarily affected.[5] The SOGC also provides suggestions for discussing the risk factors to consider and the screening tests available.

Age. Chromosomal aneuploidy increases with maternal age. A study of more than 15 000 embryos from 2701 patients demonstrated that 20.7% of embryos from women age 29 were abnormal, compared with 34.5% of embryos from women age 35, and 58.2% from women age 40. By age 43, over 83.0% of embryos were chromosomally abnormal.[18]

History. Women with a previous pregnancy affected by trisomy 21 have a higher baseline risk of recurrence (approximately 1%) and should therefore be offered prenatal screening regardless of age.

Quadruple marker (Quad) screen. The use of maternal serum markers for prenatal screening has evolved over time to produce the current Quad screen, which requires that blood be drawn between 15 and 22 weeks of gestation to measure levels of uE3, AFP, free beta-hCG, and inhibin A. These levels are analyzed along with maternal age. Described first in 1996 by Wald and colleagues, the Quad screen provides improved detection rates for trisomies 21, 18, and 13 and lower false-positive rates than double marker and triple marker screening.[19]

Nuchal translucency (NT) ultrasound. The measurement of fluid between the fetal skin and skull seen on an ultrasound performed between 11 and 14 weeks of pregnancy can reveal anomalies. As a single measurement, NT has a detection rate of 75% and a screen positive rate of 5%.[20]

Open neural tube defects (ONTDs) screen. Most open neural tube defects will be picked up either at the first-trimester nuchal translucency ultrasound scan (if the patient receives this) or the second-trimester anatomy scan at 20 weeks. However, AFP determination between 15 and 22 weeks (alone or as part of the Quad screen) is an excellent method for detecting ONTDs.

Serum integrated prenatal screen (SIPS). The addition of a first-trimester PAPP-A measurement to the Quad panel in SIPS enhances screening. Blood must be drawn in the first and second trimesters for PAPP-A measurement, and in the second trimester for uE3, AFP, free beta-hCG/total hCG, and inhibin A measurement.[5]

Integrated prenatal screening (IPS). The addition of nuchal translucency ultrasound to the serum integrated prenatal screen blood tests in IPS has been shown to increase the detection rate by 2% and reduce the false-positive rate by 2.5%.[5]

First-trimester screening (FTS). FTS combines more detailed ultrasound assessment with serum sampling for levels of free beta-hCG and PAPP-A. The Fetal Medicine Foundation recommends using the following first-trimester ultrasound markers in addition to nuchal translucency: fetal nasal bone, facial angle, and ductus venosus flow (DV). By clearly visualizing the limbs, cranial structures, heart, stomach, and bladder, ultrasound allows assessment of early fetal anatomy and major organ systems. The addition of DV assessment to FTS in 2009 led to detection rates of 96% with a screen positive rate of 3%.[21] At that time, FTS became the most sensitive and specific screening tool available, able to screen for monosomy X, trisomies 21, 18, and 13, and cardiac defects.[21,22] FTS also offers the advantage of providing results much earlier in the pregnancy (before 14 weeks) compared with the 18 to 20 weeks required for the Quad screen or IPS.

Noninvasive prenatal testing (NIPT). Commercial use of NIPT in British Columbia started in 2012 following the availability of massively parallel DNA sequencing. However, the testing was time-consuming and expensive, and therefore limited in uptake.[23,24] In 2013, targeted sequencing using specific regions of chromosomes 21, 18, and 13 was utilized to provide a faster and less-expensive alternative.[23] Also in 2013, the identification of single nucleotide polymorphism (SNP) using microarray was described. SNP array allowed for the detection of subchromosomal errors, including deletion and duplication of sequences. Most recently, whole genome sequencing has been employed to give much higher resolution of the placental genome.[25] Some limitations of NIPT are that the commercial products narrow the focus to trisomy 21 and, to a lesser extent, trisomies 18 and 13. The other limitation is that these products are being marketed directly to the patient as the "best" type of prenatal screening available, while all current clinical guidelines on prenatal screening state that NIPT should be considered an adjunct to currently available screening.

Preeclampsia screening. In 2011, Karagiannis and colleagues published a seminal paper on the use of first-trimester placental growth factor levels, uterine artery Doppler velocimetry, and mean arterial blood pressure as a screening tool for preeclampsia.[26] Despite detection rates of 95% and screen positive rates of only 10%,

Prenatal screening considerations

- Maternal serum sampling and ultrasound can be used to identify fetuses at increased risk of open neural tube defects and trisomies 21, 18, and 13.
- Serum sampling alone has problems of lower detection rates, and higher false-positive rates.
- NT combined with first- and second-trimester serum testing provides improved detection rates and lower screen positive rates, but has the drawback of second-trimester reporting.
- NT combined with nasal bone, ductus venosus flow, serum PAPP-A, and free beta-hCG provides the higher detection rates, with results available in the first trimester.
- Screening options offered will depend on maternal age and pregnancy history as well as on gestational age and other risk factors.
- Perinatal Services BC provides information on provincially insured screening practices: www.perinatalservicesbc.ca/health-professionals/professional-resources/screening/prenatal-genetic.
- Perinatal services BC does not discuss in detail the availability of first-trimester screening or NIPT.
- NIPT has excellent screening detection rates, but should not be used in isolation—NIPT is an adjunct to currently available screening.

widespread adoption of this screening tool has not occurred.

Detection rates

The detection and screen positive rates for screening tests currently used in BC are presented in **Table 1**.[27] Clinicians should be aware that the way these rates are reported for SIPS and IPS results can be confusing for patients and health care providers.

First, what is the difference between a screen positive and a false-positive? Of all women undergoing a screening test who have a positive result (i.e., they are screen positive), some will have the disorder (i.e., they are truly positive) and most will not (i.e., they are falsely positive). If the screening test is positive, it means that the patient requires further testing. For example, a patient with a screen positive SIPS would be offered NIPT, and a patient with a screen positive NIPT would be offered a diagnostic test such as amniocentesis.[27]

Second, why are screen positive and false-positive numbers so variable? This is the result of using data obtained from large prospective prenatal screening trials such as SURUSS,[28] which aimed at the standardization of *detection rates* with *variable screen positive rates*. Generally, screening tests will aim to have high detection rates with low screen positive rates. False-positive rates in serum screening, for example, increase substantially in women over 40. This is because the prevalence of aneuploidy in this population is high at baseline, which increases the pretest probability of a positive result.

Insured and uninsured tests

Currently, Perinatal Services BC focuses on the detection of open neural tube defects and trisomies 21 and 18 using the tests already described: SIPS, NT, IPS, and NIPT.[27] For patients meeting the eligibility criteria based on age and other risk factors, the tests are insured under MSP, as shown in **Table 2**.

In BC there are also some private pay options for prenatal screening. These include FTS, NIPT, and DuO (FTS plus NIPT). The detection rates, screen positive rates, and costs for these are shown in **Table 3**.

Counseling requirements

The last 40 years have seen tremendous growth in the array of screening options. Unfortunately, we have not seen a parallel growth in the training of genetic counselors in North America to serve the growing population needing to understand specific tests such as NIPT, which can involve many complexities that must be explained for fully informed consent. Our greatest challenge in the next 10 years will be to ensure we can provide education and knowledge translation for prenatal screening that supports patients as they consider the options available.

Summary

The evolution of prenatal screening has advanced along with our understanding of the human genome, ultra-

Table 1. Detection and false-positive rates for prenatal screening in British Columbia, 2012 to 2015.

		Serum integrated prenatal screen (SIPS)	Integrated prenatal screen (IPS)	Quadruple marker screen (Quad screen)	First-trimester screening	Noninvasive prenatal testing (NIPT)
Trisomy 21	**Screen cutoff**	**1:300**	**1:200**	**1:385**	**1:100**	
	Detection rate (by age in years)	73% (< 35) 83% (35–39) 100% (≥ 40)	86% (< 35) 96% (35–39) 100% (≥ 40)	78% (< 35) 80% (35–39) 100% (≥ 40)	96% (all ages)	> 99.0% (all ages)
	False-positive rate (by age in years)	3% (< 35) 8% (35–39) 19% (≥ 40)	4% (< 35) 7% (35–39) 18% (≥ 40)	4% (< 35) 14% (35–39) 27% (≥ 40)	3% screen positives (all ages)	< 0.1% (all ages)
Trisomy 18	**Screen cutoff**	**1:300**	**1:300**	**1:300**	**1:100**	
	Detection rate	90.0%	90.0%	90.0%	92% (all ages)	97.0%
	False-positive rate	0.4%	1.7%	0.4%	3% screen positives (all ages)	< 0.1%
Trisomy 13					> 96% (all ages)	

Adapted from Perinatal Services BC. Obstetric guideline: Prenatal screening for Down syndrome, trisomy 18 and open neural tube defects. June 2016.[27]

sound technology, and maternal and fetal risk factors. Screening methods now available can detect the likelihood of chromosomal and subchromosomal defects and disorders such as preeclampsia. Perinatal Services BC focuses on detecting open neural tube defects and trisomies 21, 18, and 13 with tests such as SIPS, NT, and IPS, which are provided under MSP for patients meeting eligibility criteria. Additional private pay options for testing include FTS and NIPT. The current clinical challenge is to ensure patients are informed about the wide array of screening options, that they receive timely genetic counseling to sort out the options, that they understand the difference between screening and diagnostic testing, and that they end up with the screening test that gives them the information they seek. BCMJ

Table 2. Eligibility criteria for MSP-insured prenatal tests in British Columbia.

Test	Eligibility criteria
Serum integrated prenatal screening (SIPS)	• Any woman
Integrated prenatal screening (IPS)*	• Age over 35 • Twin pregnancy • Previous pregnancy affected by trisomy 21, 18, or 13 • HIV-positive • IVF or ICSI conception
Noninvasive prenatal testing (NIPT)	• Screen positive with IPS, SIPS, or quadruple marker (Quad) screen • Previous pregnancy affected by trisomy 21, 18, or 13 • Risk higher than 1:300 after Quad, SIPS, or IPS

*IPS = SIPS combined with nuchal translucency ultrasound

Table 3. Uninsured prenatal tests available in British Columbia.

	Tests	Detection rate	Screen positive rate	Cost	Provider
First-trimester screening (FTS)	Ultrasound + maternal serum sampling between 11 and 14 weeks	96.0%	3.0%	$550	PCRM[a]
Noninvasive prenatal testing (NIPT)	Maternal serum sampling after 9 to 10 weeks	99.9%	0.1%	$400–$1000	LifeLabs[b] PCRM Olive[c]
DuO (FTS plus NIPT)	Ultrasound + maternal serum sampling after 9 to 10 weeks + maternal serum sampling between 11 and 14 weeks	> 99.9%	0.1%	$1000	PCRM

[a] Pacific Centre for Reproductive Medicine, www.pacificfertility.ca
[b] LifeLabs, www.lifelabsgenetics.com
[c] Olive Fertility Centre, www.olivefertility.ca

Competing interests
None declared.

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The last 40 years have seen tremendous growth in the array of screening options. Unfortunately, we have not seen a parallel growth in the training of genetic counselors in North America

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Preconception management of diabetes

The risk of adverse pregnancy outcomes in women with type 1 or type 2 diabetes can be reduced with preparation that includes improving glycemic control and discontinuing antihypertensive agents prior to conception.

ABSTRACT: Women with type 1 or type 2 pregestational diabetes have an increased risk of adverse pregnancy outcomes when compared with the general maternal population. The risks to offspring include a greater than threefold increase in congenital heart disease, a greater than fourfold increase in neural tube defects, and a nearly fourfold increase in perinatal death. These risks to offspring and the risk of maternal retinopathy and nephropathy can be attributed primarily to the negative impact of hyperglycemia. To ensure the safest possible conditions for pregnancy, women with diabetes should receive preconception care. Although some aspects of preconception care will depend on whether a patient has type 1 or type 2 diabetes, the general management principles are the same for both. Patients should be encouraged to meet glycated hemoglobin targets, should be assessed for retinopathy, and should be screened for nephropathy. They should also be advised to take folic acid supplements and discontinue the use of antihypertensive agents and statins.

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It is well known that women with type 1 or type 2 pregestational diabetes have an increased risk of adverse pregnancy outcomes. One study comparing the offspring of women in the general population and offspring of women with diabetes found a greater than threefold increase in congenital heart disease, a greater than fourfold increase in neural tube defects, and a nearly fourfold increase in perinatal death.[1] These increases in risk can be attributed primarily to the negative impact of hyperglycemia on early fetal development and point to the need for medical care prior to conception.

Preconception care should focus not only on helping patients achieve better glycemic control, but also on optimizing the pharmacological means used to achieve glycemic targets, monitoring for progression of retinopathy, screening for nephropathy, and discontinuing medications that may affect fetal development. Until optimal conditions for pregnancy are established, women should be encouraged to use contraception.

Improving glycemic control

High glycated hemoglobin (HbA1c) values are strongly correlated with adverse pregnancy outcomes,[2,3] and patients are therefore encouraged to reach an HbA1c target of 7.0% or less before pregnancy, with a target of 6.5% or less being preferable if this level can be achieved safely without undue risk of hypoglycemia.[4] Above 7.0%, adverse outcomes increase by approximately 5.5% for every 1.0% in HbA1c.[3]

Comprehensive preconception care is associated with major reductions in adverse pregnancy outcomes.[5,6] Unfortunately, a recent survey of pregnant women with diabetes in Ontario found that a disappointingly low

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proportion of women with pregestational diabetes reported a high degree of effort in planning their pregnancy (47%) and optimizing glycemic control (58%).[7] Physicians must be proactive in educating their reproductive-age patients living with diabetes about the importance of pregnancy planning, the risks of forgoing preconception care, and the need to consult with medical practitioners prior to conception. Referral to a diabetes in pregnancy clinic may be considered.

Oral hypoglycemic agents

Most patients presenting with type 2 diabetes before pregnancy will be managed on oral hypoglycemic agents (OHAs). Decisive conclusions on the safety of OHAs have yet to be reached, as individual studies have been small or of poor quality and have reported conflicting results, or have failed to account for important confounding factors.[8,9] However, despite study heterogeneity, one meta-analysis of first-trimester exposure to various OHAs, including metformin, glyburide (one study), and glipizide (two studies), reported no increase in rates of major congenital malformation.[8] Similarly, a second meta-analysis focusing on first-trimester exposure to metformin showed no increased risk of major congenital anomalies.[9] Finally, a prospective database study comparing fetal outcomes among women with type 2 diabetes treated with diet, insulin, or sulfonylureas (chlorpropamide, glyburide, glipizide) in the first trimester found no significant difference in the incidence of major or minor congenital anomalies in the three treatment groups.[10]

The safety of newer OHAs such as dipeptidyl peptidase-4 (DPP-4) inhibitors, sodium-glucose linked transporter 2 (SGLT2) inhibitors, and injectable glucagon-like peptide-1 (GLP-1) receptor agonists has not been explored adequately for pregnancy. Any data on the safety of these agents during pregnancy are from animal studies, as detailed in product monographs. Animal studies of DPP-4 inhibitors demonstrate a small increase in skeletal malformations, delayed skeletal ossification, or both, at extreme supratherapeutic doses of sitagliptin,[11] saxagliptin,[12] and linagliptin.[13] Additionally, linagliptin use in rats and rabbits was associated with reduced fetal weight and intrauterine death at extreme supratherapeutic doses. Animal studies of SGLT-2 inhibitors (dapagliflozin, canagliflozin, enpagliflozin) show potential defects in fetal renal development.[14] Regarding GLP-1 receptor agonists studied in a rat model, exposure to exenatide was associated with slowed fetal growth, skeletal defects, and perinatal mortality at extreme supratherapeutic doses,[15] while exposure to liraglutide was associated with increased incidence of miscarriage at supratherapeutic doses. In a rabbit model, the risk of major congenital anomalies was found even at subtherapeutic doses.[16]

We recommend DPP-4 inhibitors, SGLT2 inhibitors, and GLP-1 receptor agonists be stopped when pregnancy is confirmed and that every effort be made to start insulin therapy as quickly as possible. Ideally, physicians should transition patients with type 2 diabetes to insulin therapy prior to conception. However, if patients on metformin and/or sulfonylurea present with an unplanned pregnancy, they should continue on these agents until insulin can be introduced and titrated. Given the known teratogenic effect of hyperglycemia in the first trimester, it is possible that stopping these medications prematurely could cause more harm than benefit. This recommendation is also in accordance with the Canadian Diabetes Association guidelines.[4]

Insulin

Intensive insulin therapy, either by basal-bolus injection or continuous subcutaneous insulin infusion, is the recommended method of achieving the necessary preconception glycemic targets.[4] While patients with type 1 diabetes will already be managed on insulin, most patients with type 2 diabetes will need to be transitioned to insulin prior to conception.

In addition to human regular insulin (Novolin ge Toronto or Humulin R), two rapid-acting insulin analogs appear safe for use during pregnancy. A prospective observational study comparing insulin lispro (Humalog) and regular insulin,[17] and a randomized controlled trial of insulin aspart (NovoRapid) and regular insulin[18] showed no differences in major fetal outcomes such as congenital malformations, perinatal mortality, or macrosomia. In addition, the study examining lispro found no increased rate of preeclampsia,[17] while aspart was shown to result in a lower occurrence of preterm delivery (20.3% vs 30.6% with regular insulin).[18] Both insulin analogs were found to be noninferior to regular insulin in terms of maternal outcomes; women taking lispro had a lower HbA1c throughout gestation,[17] while women on aspart reported a nonsignificant reduction in hypoglycemic events.[19] No pregnancy data are currently available for insulin glulisine (Apidra).

Concerning basal insulin, a randomized controlled trial comparing insulin detemir (Levemir) and insulin NPH showed detemir was safe to use in pregnancy, with no significant difference in the rates of congenital malformations and other adverse perinatal events.[20] Detemir also demonstrated noninferiority in observed maternal outcomes such as HbA1c and hypoglycemia.[21] Pregnancy safety data regarding insulin glargine (Lantus) are

limited to findings from observational cohort studies. Some concerns have been raised regarding glargine use in pregnancy because of the product's greater affinity for the insulin-like growth factor receptor[22] and potential to affect fetal growth and development. However, in a meta-analysis of studies comparing pregnancy outcomes of insulin glargine users and insulin NPH users, no concerning trends emerged with key fetal outcomes, including congenital anomalies and macrosomia.[23] Furthermore, it was determined that glargine does not cross the placenta to a detectable degree at therapeutic doses.[24] Therefore, while a discussion regarding the limited evidence of safety for insulin glargine in pregnancy is warranted in the preconception stage, it is quite reasonable for women established on glargine to consider ongoing use in pregnancy.

Managing retinopathy

A subanalysis of the landmark Diabetes Control and Complications Trial (DCCT) examined the effect of pregnancy on the development and progression of retinopathy among women with type 1 diabetes.[25] This analysis showed that pregnancy appears to independently increase the risk of short-term progression of retinopathy from conception up to 1 year postpartum, but does not affect long-term retinopathy outcomes.[25] Retinopathy progression during pregnancy has been subsequently observed in other studies of women with type 1 diabetes[26] and those with type 2 diabetes.[27] Individuals with more advanced retinopathy and poor glycemic control at pregnancy outset appear at higher risk for retinopathy progression.[25,26] In women with poor baseline glycemic control, rapid HbA1c reductions upon the institution of strict glycemic control for pregnancy may also contribute to retinopathy progression.[25,26]

Preconception care for patients with diabetes

- Encourage patients to meet HbA1c target of ≤ 7.0%.
- Refer patients to a diabetes in pregnancy clinic for preconception care if necessary.
- If patients with type 2 diabetes are taking oral hypoglycemic agents, transition them to insulin.
- Refer patients for ophthalmologic assessment prior to conception and in the first trimester.
- Screen patients for nephropathy and counsel patients at risk.
- Recommend patients take 1.0 mg of folic acid daily starting 3 months before pregnancy.
- Advise patients to discontinue use of ACE inhibitors, ARBs, and statins.

All women with diabetes should have ophthalmologic assessments prior to conception and during the first trimester. Additional monitoring for microvascular complications during pregnancy and postpartum may be needed and is at the discretion of ophthalmology.[4]

Managing nephropathy

Women with diabetic nephropathy are a high-risk subgroup for maternal and fetal pregnancy complications, and all women with diabetes should undergo preconception screening for nephropathy. A study comparing pregnancy outcomes of women with normal urinary albumin excretion (below 30 mg/24 h) and women with microalbuminuria (30 to 300 mg/24 h) found significantly different incidence rates for preterm delivery in the two groups (35% vs 62%), mostly owing to an increased incidence of preeclampsia (6% vs 42%).[28] The risk of these complications was higher still in the subset of women with baseline proteinuria in the overt nephropathy range (above 300 mg/24 h), even with preserved renal function.[28] In a more recent study, an intensified antihypertensive strategy was found to improve obstetrical outcomes in women with microalbuminuria to such a degree that preeclampsia was averted and the incidence of preterm delivery was reduced to that observed in women with normal urinary albumin excretion.[29] Obstetrical outcomes were also improved in women with more pronounced proteinuria, but to a lesser extent.[29]

Reviewing renal outcomes, it appears that maternal serum creatinine rather than proteinuria determines maternal renal function following pregnancy. In a case-control study of renal function decline in a cohort of women with type 1 diabetes, patients with overt nephropathy but normal creatinine concentration showed no detrimental effect as a result of pregnancy.[30] In contrast, women with moderate-to-severe renal insufficiency, defined as a serum creatinine concentration of 124 μmol/L or higher prior to conception or early in pregnancy, experienced significant and permanent deterioration in renal function as a result of pregnancy.[31,32] In a cohort of 11 pregnant women with this degree of renal impairment specifically due to diabetic nephropathy, 5 experienced irreversible pregnancy-related renal damage and required dialysis within approximately 2 years of delivery.[32] In this same cohort, perinatal survival was 100%, but the

very high rate of premature delivery (79%) resulted in significant neonatal morbidity.[32]

Women with any degree of diabetic nephropathy should be counseled on their increased risk of adverse fetal outcomes, and those women with more advanced diabetic nephropathy and reduced renal function should be counseled on the possibility of permanent deterioration of renal function as a result of pregnancy.

Additional management considerations

As well as improving glycemic control and managing common complications of diabetes before pregnancy, patients should be advised about folate needs and medications that may affect fetal development.

Folate

Ensuring adequate folate intake before pregnancy is known to lower the incidence of congenital anomalies, particularly neural tube defects. Women with pregestational diabetes should add folate-rich foods to their diet (leafy greens, peas, lentils, oranges) and take a folic acid supplement (1.0 mg) daily for at least 3 months prior to conception.[33]

Antinhypertensive agents and statins

Angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) are commonly prescribed for the treatment of hypertension in women with diabetes, and deserve special consideration at the preconception stage. Conflicting evidence exists regarding the fetal risks of first-trimester exposure to these agents. A large database study found that first-trimester exposure to ACE inhibitors was associated with an increased risk of major congenital malformations, primarily in the cardiovascular and central nervous systems,[34] but women with diabetes were excluded from the analysis to reduce the risk of hyperglycemia as a confounding variable. Conversely, a meta-analysis found that infants born to women taking ACE inhibitors or ARBs in the first trimester did not have increased risk of congenital anomalies when compared with infants exposed to all other antihypertensive agents.[35] However, in this trial it was noted that maternal treatment for hypertension overall was associated with an increased risk, possibly due to the confounding factors of advanced maternal age, weight, and hyperglycemia.[35] Regardless of their safety in the first trimester, ACE inhibitors and ARBs are associated with clear negative fetal outcomes in the second and third trimesters, including fetal renal failure, anuria, and death,[36] and these medications should be stopped upon confirmation of pregnancy.

All statins are contraindicated for use during pregnancy. Statin therapy should be discontinued prior to conception because of limited evidence that fetal exposure in the first trimester increases the risk of congenital malformations.[37]

Summary

Successful pregnancies for women with type 1 or type 2 pregestational diabetes require planning and optimization of glycemic control. Patients with type 2 diabetes will, ideally, transition from oral hypoglycemic agents to insulin prior to conception, and women with type 1 or type 2 diabetes will have ophthalmologic assessment and be screened for nephropathy. In addition, women with diabetes should begin folic acid supplementation and discontinue use of antihypertensive agents and statins in preparation for conception. Primary care and specialist physicians alike should be prepared to counsel women with diabetes on preconception issues to reduce the risk of adverse outcomes. BCMJ

Competing interests

None declared.

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Recurrent miscarriage

Management of pregnancy loss includes investigating causes, addressing modifiable risk factors, and providing supportive care in the first trimester of pregnancy.

ABSTRACT: Early miscarriages are those occurring within the first 12 completed weeks of gestation. Recurrent miscarriage, defined as two or more consecutive pregnancy losses, affects 3% of couples trying to conceive and can cause considerable distress. The risk of miscarriage increases with maternal age. Genetic abnormalities, uterine anomalies, and endocrine dysfunction can all lead to miscarriage. Other causes of miscarriage are autoimmune disorders such as antiphospholipid syndrome and chronic endometritis. Unfortunately, in nearly 50% of couples no clear cause can be identified. Management includes investigating causes, addressing modifiable risk factors, and providing supportive care in the first trimester of pregnancy. For some couples, in vitro fertilization with embryo screening may be an option.

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Early miscarriage has been reported to occur in 17% to 31% of pregnancies,[1,2] and is defined as a nonviable intrauterine pregnancy with either an empty gestational sac or a gestational sac containing an embryo or fetus without fetal heart activity within the first 12 completed weeks of gestation.[3] Recurrent miscarriage occurs in 3% of couples trying to conceive. The American Society for Reproductive Medicine (ASRM) defines recurrent miscarriage as two or more failed clinical pregnancies as documented by ultrasound or histopathologic examination,[3] while the National Institute for Health and Care Excellence (NICE) notes that miscarriages can cause considerable distress.[4]

Although common, recurrent miscarriage is neither well defined nor well understood. Our understanding of recurrent miscarriage has been limited by variable definitions of miscarriage and a lack of standardization in research. Recurrent miscarriage is considered a primary or secondary process, depending on whether the woman has experienced a live birth. Nonconsecutive miscarriages have unclear significance.

Genetic causes

The risk of miscarriage increases with maternal age. At age 20 to 24 the risk is approximately 10%, with risk increasing to nearly 80% by age 45.[5] The relationship between miscarriage risk and maternal age can be explained by the increasing rate of oocyte aneuploidy that occurs as women grow older. In one study, oocytes examined during in vitro fertilization (IVF) treatment had only a 10% risk of being aneuploid in women younger than age 35, but by age 43 the risk of aneuploidy was 50%, and after age 45 nearly 100%,[6] confirming that the most frequent cause of miscarriage at all ages is aneuploidy.

Genetic factors that contribute to miscarriage include structural and numerical chromosome abnormalities that have arisen de novo in the

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embryo or fetus or have been inherited from the parents. These include trisomy, monosomy, and polyploidy. Trisomy is caused by unequal separation or disjunction of chromosome pairs during meiosis, events that increase with maternal age. Structural chromosome abnormalities include reciprocal translocations, Robertsonian translocations, and pericentric and paracentric inversions. Balanced carriers of these translocations have a complete karyotype and a normal phenotype, but during meiosis unbalanced oocytes or sperm can be produced. Such gametes then result in an embryo with an unbalanced karyotype predisposed to miscarriage. To identify parent-derived chromosome abnormalities, parental karyotyping is recommended. At the time of a miscarriage, genetic testing of the products of conception will help determine whether the miscarriage is the result of a de novo chromosome abnormality of the embryo or fetus, which is unlikely to recur, or whether underlying maternal disease has led to the loss of a chromosomally normal embryo or fetus, which might recur.

Anatomic causes

Uterine anomalies are observed in 13% of women with recurrent miscarriage, compared with 5.5% of women in the general population.[7] Congenital uterine anomalies result from the abnormal formation, fusion, or resorption of the Müllerian ducts during embryological development. Common congenital uterine anomalies are uterus didelphys, unicornuate uterus, bicornuate uterus, and septate uterus.[8] These anomalies are diagnosed using the following imaging techniques, either alone or in combination: hysterosalpingography, saline infusion sonohysterography, hysteroscopy, 2-D and 3-D ultrasonography, and magnetic resonance imaging.

Surgical correction of most uterine anomalies does not improve pregnancy outcomes. The notable exception is a uterine septum. Several studies have analyzed the reproductive outcome before and after hysteroscopic septum removal. The largest series showed a significant decrease in the early miscarriage rate from 89.6% to 12.4%, as well as an increase in term delivery rate from 1.4% to 74.4%.[9]

Uterine fibroids and endometrial adhesions may also be associated with recurrent miscarriage. Submucosal fibroids affect implantation by altering vascularization of the endometrium and reducing fluid cytokine concentrations.[10] An association between miscarriage and intramural or subserous fibroids is less clear, having been demonstrated in some, but not all, studies.[10] Recurrent miscarriage may occur in women with intrauterine adhesions as a result of implantation abnormalities in areas of denuded endometrium or insufficient vascularization. The impact varies with the severity of adhesions. Research on the impact and treatment of adhesions is limited.[11]

Endocrine causes

Endocrine disorders are observed in 10% of women with recurrent miscarriage. The health and receptivity of the endometrium is intimately related to a woman's thyroid, prolactin, androgen, and insulin regulation.[4]

Recurrent miscarriage—defined as two or more failed clinical pregnancies as documented by ultrasound or histopathologic examination—occurs in 3% of couples trying to conceive.

Thyroid dysfunction

The presence of thyroid autoantibodies is associated with an increased risk of both sporadic miscarriage and recurrent miscarriage. A meta-analysis found an increase in the miscarriage rate in the presence of thyroid autoantibodies: OR 3.90 for cohort studies (95% CI, 2.48-6.12); OR 1.80 for case-control studies (95% CI, 1.25-2.60).[12]

Several studies have suggested that levothyroxine treatment of euthyroid women who have thyroid autoantibodies decreases the risk of miscarriage. Two large randomized trials are underway to examine the role of thyroid hormone therapy in women with recurrent miscarriage.[13]

Hyperprolactinemia

Hyperprolactinemia alters the hypothalamic-pituitary-ovarian axis

leading to impaired folliculogenesis and/or a short luteal phase. One study of women with recurrent miscarriage found a significant decrease in pregnancy loss with suppression of hyperprolactinemia using the dopamine agonist bromocriptine.[14]

Polycystic ovary syndrome

Women with polycystic ovary syndrome (PCOS) have an increased risk of miscarriage, although the incidence rate is uncertain. The underlying mechanism may involve elevated levels of luteinizing hormone, insulin, and/or androgens. Further, many women with PCOS have a high BMI, which in itself is a risk factor for miscarriage.[15]

Insulin resistance

Patients with poorly controlled diabetes mellitus have an increased risk of pregnancy loss.[16] When women with a history of recurrent miscarriage and abnormal glucose tolerance test results received metformin therapy, their rate of pregnancy loss was significantly less than that of women in a placebo group (15% versus 55%), suggesting that addressing insulin resistance with metformin may protect against miscarriage.[17]

Other causes

Although early pregnancy loss most commonly has a genetic, anatomic, or endocrine cause, miscarriage may also result from an autoimmune disorder, chronic infection, or a lifestyle factor.

Autoimmune disorder

Antiphospholipid syndrome (APS) is characterized by venous or arterial thrombosis and/or an adverse pregnancy outcome in the presence of persistent laboratory evidence of antiphospholipid antibodies. Commonly identified antiphospholipid antibodies are lupus anticoagulant, anticardiolipin antibodies, and beta-2 glycoprotein. Between 8% and 42% of women with recurrent miscarriage will test positive for antiphospholipid antibodies.[18,19]

The standard treatment for documented APS consists of low-dose aspirin and heparin (74.3% live birth rate), which has proven superior to treatment with aspirin alone (42.9% live birth rate). The combination of heparin and low-dose aspirin appears to confer a significant benefit when patients have APS and otherwise unexplained recurrent miscarriage.[20]

Thrombosis

Thrombosis of the placental vasculature is associated with fetal growth restriction, fetal death after 20 weeks gestation, and preeclampsia. While there is no association between thrombophilias and recurrent early miscarriage, it may be prudent to screen women at high risk of thrombosis based on their personal or family history.[21]

Infection

Acute infection or asymptomatic colonization of the cervix or vagina with mycoplasma, chlamydia, listeria, ureaplasma, or other pathogens does not increase the risk of miscarriage, and routine screening for such pathogens in women with recurrent miscarriage is not recommended.

Unlike acute infection, however, chronic endometritis is associated with pregnancy loss. One study identified chronic endometritis in 9% of women with recurrent miscarriage, and found a per-pregnancy live birth rate of 7% before and 56% after treatment with antibiotics.[22]

While the causative organism is rarely identified in cases where endometritis is suspected, the presence of plasma cells on endometrial histopathology is diagnostic and hence endometrial biopsy is recommended.

Lifestyle factors

Cigarette smoking has been shown to increase the risk of sporadic miscarriage, as has obesity. Other lifestyle factors such as cocaine use, alcohol consumption (three to five drinks per week), and increased caffeine consumption (more than three cups of coffee per day) have been associated with risk of miscarriage.[21] Psychological stress has also been shown to affect pregnancy outcomes, with confirmation of this seen in a decreased rate of miscarriage when an intensively supportive care model is used to reduce stress.

Although early pregnancy loss most commonly has a genetic, anatomic, or endocrine cause, miscarriage may also result from an autoimmune disorder, chronic infection, or a lifestyle factor.

Unexplained

Unfortunately, no clear causative factor is identified in nearly 50% of couples who experience recurrent miscarriage. Studies are currently examining the role of sperm factors and endometrial and embryonic factors that might improve our understanding of the causes of recurrent miscarriage.

Management

The management of couples affected by recurrent miscarriage requires investigating possible causes of pregnancy loss (see **Table**), addressing modifiable risks, and providing supportive care in the first trimester of pregnancy (see **Box**).

Assisted reproductive technology may be a treatment option for patients who are not helped by addressing modifiable risks or who have limited time to conceive because of advancing maternal age. As most miscarriages are caused by de novo structural chromosome abnormalities, IVF with embryo screening by preimplantation genetic diagnosis (PGD) or comprehensive chromosomal screening (CCS) can, theoretically, reduce the risk of miscarriage by selecting euploid embryos for transfer into the uterus.

The presumed advantages of IVF and preimplantation embryo screening over expectant management are a shorter time to pregnancy, a decreased miscarriage rate, and a higher live birth rate, although these advantages have not been demonstrated by the few studies published. There is an advantage to PGD/CSS if a euploid embryo is obtained. However, since many couples who undergo embryo screening do not obtain a euploid embryo for transfer because IVF cycles are cancelled or do not result in a viable embryo, PGD/CCS has not been shown to improve live birth rates when compared with expectant management.[23]

Management for recurrent miscarriage

- Investigate genetic, anatomic, and endocrine causes of pregnancy loss:
  - Structural and numerical chromosome abnormalities such as trisomy and polyploidy.
  - Uterine anomalies such as septate uterus.
  - Thyroid dysfunction, hyperprolactinemia, polycystic ovary syndrome, insulin resistance.
- Consider other possible causes of pregnancy loss:
  - Antiphospholipid syndrome.
  - Chronic endometritis.
  - Lifestyle factors such as cigarette smoking.
- Address modifiable risk factors.
- Provide supportive care in the first trimester of pregnancy.

Summary

Recurrent miscarriage, defined as two or more consecutive losses of an early pregnancy, occurs in 3% of couples trying to conceive. The risk of miscarriage increases as women age, with the most common cause being chromosome abnormalities that have arisen de nova in the embryo or fetus. Uterine anomalies and endocrine dysfunction can also lead to miscarriage, as can disorders such as antiphospholipid antibody syndrome and chronic endometritis. In nearly 50% of couples, however, no clear cause can be identified. Management includes investigating possible causes, addressing modifiable risk factors, and providing supportive care in the first trimester of pregnancy. For some couples, in vitro fertilization with embryo screening may be an option. BCMJ

Competing interests

None declared.

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Table. Investigating recurrent miscarriage.

Possible causes	Investigations
Genetic	Parental karyotyping
Anatomic	Imaging: hysterosalpingography, saline infusion sonohysterography, hysteroscopy, ultrasonography, MRI
Endocrine	Laboratory testing: thyroid-stimulating hormone, thyroid antibodies, prolactin, fasting glucose
Autoimmune	Laboratory testing: lupus anticoagulant, anticardiolipin antibodies, beta-2 glycoprotein
Thrombosis	Medical and family history
Infection	Endometrial biopsy

The risk of miscarriage increases as women age, with the most common cause being chromosome abnormalities that have arisen de nova in the embryo or fetus.

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Unplanned hospital readmissions in British Columbia

Reducing the rate of unplanned hospital readmissions can address associated patient discontent, increased health care costs, and increased risks for morbidity and mortality.

ABSTRACT: Rates of unplanned hospital readmissions are publicly reported in Canada and often interpreted as a marker of health care system performance. In 2016 British Columbia's 30-day risk-adjusted readmission rate of 9.7% was higher than the national average of 9.1%. This is regrettable because readmissions are associated with patient discontent, increased health care costs, and increased risks of morbidity and mortality. The fact that readmissions affect many Canadian patients and cost more than $1.8 billion per year should motivate clinicians, hospitals, and health authorities to institute programs to monitor and prevent unplanned hospital readmissions. No single intervention has been successful in reducing unplanned readmission thus far; multiple-component interventions have shown promise, but their success has proven difficult to replicate. Clinicians and administrators aiming to reduce unplanned readmissions should consider tracking local readmission rates, implementing context-appropriate interventions, and using risk-prediction models to identify and target patients at the highest risk of readmission. Given the poor outcomes and increased costs associated with hospital readmissions, a concerted effort should be made to address this issue.

In 2009 a landmark study found that nearly 20% of US Medicare beneficiaries were readmitted to hospital within 30 days, prompting hospital readmissions to become a major focus of health care quality improvement efforts.[1] Subsequent recognition of wide regional variability in readmission rates suggested that a proportion of hospital readmissions might be preventable if a focused effort was made to improve hospital and community care.[1,2] A number of organizations in Canada, the United Kingdom, and the United States now recognize a high rate of unplanned hospital readmission as a marker

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of suboptimal health care system performance.[3]

According to the Canadian Institute for Health Information (CIHI), unplanned hospital readmissions affect almost 200 000 Canadians annually.[4] Unfortunately, British Columbia's 2016 risk-adjusted 30-day readmission rate of 9.7% was significantly higher than the national average of 9.1% (**Figure 1**).[5] The readmission rates in Saskatchewan (9.7%) and Ontario (9.2%) were also higher than the national average. Manitoba (8.7%), Quebec (8.6%), Nova Scotia (8.5%), and New Brunswick (8.8%) had rates that were significantly lower than the national average. As well, in 2016 Vancouver Coastal Health had a readmission rate of 9.8%, which was the second highest among BC's five regional health authorities and exceeded both national and provincial averages (**Figure 2**). These comparisons highlight an opportunity to improve the performance of BC's health system.

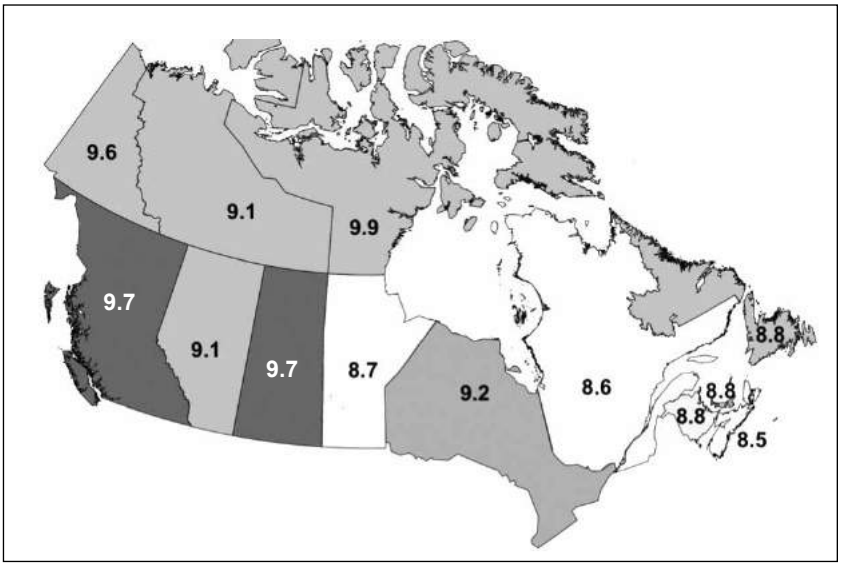

Figure 1. Risk-adjusted 30-day readmission rate (%) by province and territory. Based on data for 2015–2016 obtained from CIHI.[5]

Why do readmissions matter?

Unplanned hospital readmissions are associated with patient discontent, increased health care costs, and increased risks for morbidity and mortality. Patient dissatisfaction may arise from the perception that the readmission was preventable.[6,7] Hospital readmissions cost Canadian taxpayers over $1.8 billion per year, which represents 11% of annual inpatient costs.[4] Moreover, the average cost of a second hospitalization is often greater than the first ($10 404 versus $7287 for medical patients).[4] Hospital readmissions may be complicated by iatrogenic infection, venous thromboembolism, drug reactions, falls, and pressure ulcers.[8] Large cohort studies have found the mortality rate after a hospital readmission to be 19% at 30 days and 39% at 1 year; the latter represents a threefold increase in risk for patients who were readmitted compared with patients who remained in the community after hospital discharge.[9,10]

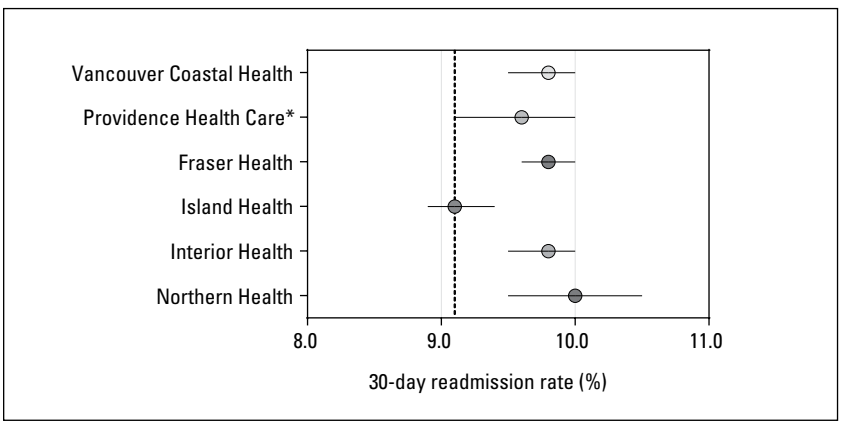

Figure 2. Risk-adjusted 30-day readmission rates for BC regional health authorities compared with national average (dashed line). Based on data for 2015–2016 obtained from CIHI.[5]

* Providence Health Care is not a health authority; however, it is a major hospital network within the Lower Mainland with many physicians and administrators to whom this statistic may be relevant.

How are readmission rates tracked?

Hospital readmission rates are calculated by determining the proportion of discharged patients who are readmitted within a designated time frame. A 30-day time frame is usually used, although there is no clear biological justification for this choice.[11-13] Eligibility criteria for the numerator and denominator often differ among institutions, making it difficult to compare hospitals' self-reported readmission

rates. For example, planned readmissions (e.g., for elective surgery) are frequently excluded from the numerator, but only some hospitals exclude psychiatric and palliative discharges from the denominator. Hospital-based tracking programs also often fail to consider the 20% of readmissions that are known to occur at a different hospital.[9] Standardized reporting by CIHI overcomes many of these challenges and facilitates equal comparisons between hospitals and regions by accounting for site-specific differences in patient age and comorbidity burden.

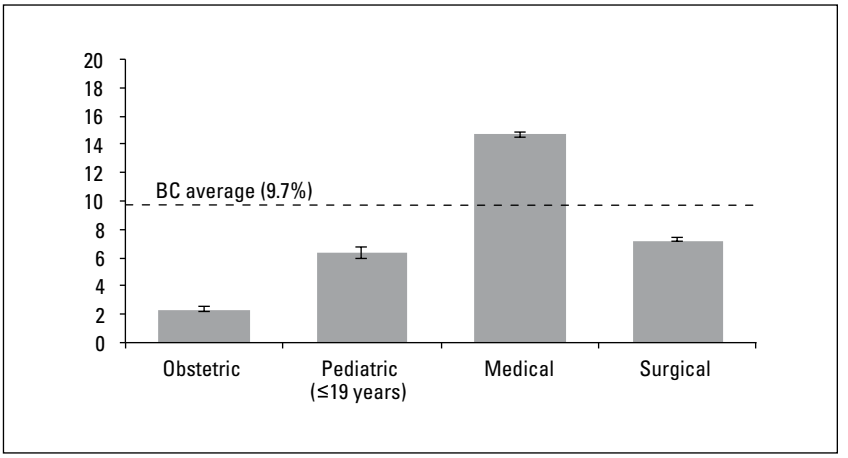

Figure 3. Program-specific 30-day readmission rates for British Columbia. Based on data for 2015–2016 obtained from CIHI.[5]

Who is at risk?

Patient risk factors for unplanned hospital readmission include male sex, advanced age, increased comorbidity burden, lower socioeconomic status, and increased hospitalizations within the last 6 months.[4] Patients with medical admissions are at highest risk for readmission (Figure 3). About 20% of patients initially admitted for chronic obstructive pulmonary disease (COPD) or heart failure are readmitted within 30 days. Among surgical patients, those undergoing colostomy or enterostomy are at highest risk for readmission. The main independent readmission risk factor in any patient is having been hospitalized twice or more in the 6 months before the index admission. Hospital-specific risk factors for readmission are small patient volume (fewer than 2000 weighted cases annually) and rural location. Hospitals with a longer average length of stay have lower risk-adjusted readmission rates. On average, discharging a patient at least 1 day earlier than the national expected length of stay increases the relative risk of readmission by around 40%.[4] The cumulative influence that these competing forces have on cost to the health care system remains controversial.[14,15] The full impact of length of stay on risk of readmission is not fully understood as other studies have found a longer length of stay to be associated with a higher risk for readmission.[16]

Are readmissions preventable?

About 25% of unplanned hospital readmissions are retrospectively determined to be preventable, but reliably effective and focused interventions to prevent them remain elusive.[11,17,18] Multiple-component interventions, specifically where at least three strategies are used to reduce readmissions, have shown promise but have been difficult to replicate.[19,20] The largest and most effective readmission reduction effort to date is the ongoing Hospital Readmissions Reduction Program (HRRP) in the US. Through the HRRP policy, hospitals with higher-than-expected condition-specific 30-day readmission rates for US Medicare patients are financially penalized. This has resulted in significant reductions in the 30-day readmission rate for both targeted conditions (from 24.1% to 22.5%) and for non-targeted conditions (from 17.8% to 17.3%).[21] However, recent analyses found that the introduction of the HRRP was associated with a 30-day mortality rate increase after an admission for heart failure (from 7.2% to 8.6%).[22] Further debate over the merits of this program is inevitable. Local researchers believe that implementation of an HRRP-like policy in BC is unlikely, in part because global hospital budgets make such disincentives less effective.[23]

How can readmissions be addressed?

Clinicians and administrators may consider tracking the local readmission rate, implementing context-appropriate interventions, and refining their approach with sequential plan-do-study-act quality improvement cycles.[24] Risk prediction models such as the LACE index and the HOSPITAL score can be used to help identify patients at the highest risk of readmission.[25-27] Frameworks for developing readmission risk-reduction interventions are available from the Institute for Healthcare Improvement's STate Action on Avoidable Rehospitalizations (STAAR) program and from the Care Transitions Pro-

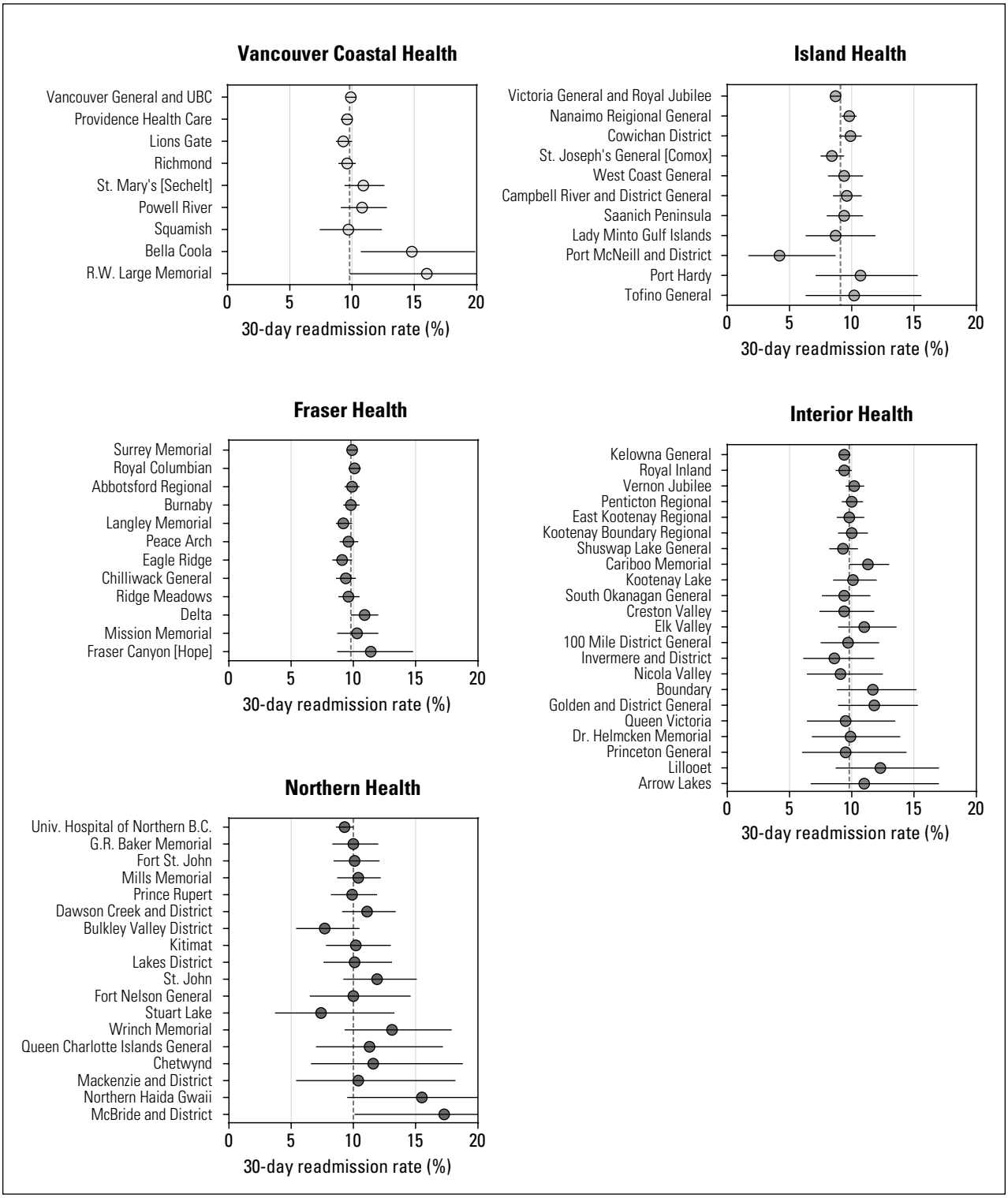

Figure 4. Risk-adjusted 30-day readmission rates for BC hospitals compared with regional health authority averages (dashed lines). Based on data for 2015–2016 obtained from CIHI.[5]

gram.[28] CIHI data can be used to continue comparing progress among provinces, health authorities, and hospitals (**Figure 4**).[5]

Unplanned hospital readmissions are a major burden on health care systems in BC and nationwide. Given the poor outcomes and high costs associated with readmissions, a concerted effort should be made to address this issue with the help of those working at all levels of the health care system, including clinicians, hospital administrators, and policymakers. BCMJ

Competing interests

None declared.

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Keeping up with cancer treatments for the busy GP

For a well-researched topic such as cancer, it's hard to keep up with the proliferation of new treatments and their effects on prognosis. For many cancers, the rate of change is such that one wants to check for the latest information whenever the topic comes up, but where can this information be found quickly?

In BC, we're lucky to have the BC Cancer Agency's Cancer Management Guidelines, where you can quickly find information on diagnosis, treatment, and follow-up/survivorship care. The guidelines are available at www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-management-guidelines.

The BC Cancer Agency also provides information written for the patient, available at www.bccancer.bc.ca/health-info/types-of-cancer. Patients and their loved ones can use this site to learn more about their specific cancer and to find resources for support and advice on coping and life after cancer. Additional high-quality resources for patients may be found at MedlinePlus (http://medlineplus.gov), a consumer health website. The patient handouts found on this site are all vetted by the (US) National Library of Medicine.

Recently, the College Library began including more articles about cancer treatments and survivorship care in *Cites & Bytes* (www.cpsbc.ca/library/cites-bytes). These articles are grouped under the Cancer & Survivors heading in the *Cites & Bytes* highlights section.

College registrants with library services may also request literature searches to locate the latest on cancer research and recommendations on our website (www.cpsbc.ca/literature-search-requests), via email (medlib@cpsbc.ca), or by phone (604 733-6671).

—Niki Baumann
Librarian
Library Services
College of Physicians and Surgeons of BC

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.*

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Prince George, Terrace, Vancouver, Vernon, and Williams Lake.

—Peter Rothfels, MD
Chief Medical Officer and Director of Clinical Services, WorkSafeBC

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stool, which can be an early sign of colon cancer.

- Screening is only recommended for people who are not experiencing symptoms of colon cancer. Symptoms can include blood in the stool, abdominal pain, change in bowel habits, or unexplained weight loss. Anyone experiencing these symptoms should talk to their doctor about diagnostic testing they may need.
- Factors that put people at greater risk include having a first-degree relative (parent, sibling, or child) diagnosed under the age of 60, two or more first-degree relatives diagnosed at any age, and a personal history of adenomas.

For more information on the colon screening program, visit BC Cancer's screening website at www.screeningbc.ca.

Opioid crisis: Challenging times for toxicology laboratories

The BC Provincial Toxicology Centre (PTC) performs extensive clinical toxicology testing, which includes screening for drugs of abuse and therapeutic drug monitoring for medications with narrow therapeutic indices. The PTC also helps with death investigations by providing forensic toxicology testing and interpretation to the BC Coroners Service.

Substance abuse is a serious problem with extensive social and economic burdens. The ongoing opioid crisis has reached epidemic proportions, with drug overdose deaths continuing to increase. The scale of the problem is stressing first responders, law enforcement, and health care resources to their limit.

Alcohol, marijuana, cocaine, methamphetamine, ecstasy, and opiates are the most commonly abused substances. With the Canadian population being so culturally diverse, substances such as hash, opium, khat, and kratom can also be present. In addition, there is a growing problem with prescription drugs being diverted for illicit purposes. The situation is further complicated by the rapid emergence of novel psychoactive substances that are cheap, easy to obtain, and deadly.

Previously, toxicology laboratories employed rather narrow test menus. Only occasionally did they have to expand their capabilities to detect new substances, with notable examples being lysergic acid diethylamide (LSD), heroin, and gamma-hydroxybutyrate (GHB).

With the rise of globalization and the explosive growth of the flow of information, the drug scene has changed dramatically, first with the appearance of synthetic cannabinoids in the early 2000s and then with the emergence of hundreds of other "designer" drugs. These synthetic cannabinoids ("spice"), cathinones ("bath salts"), benzodiazepines, and opioids often have greater potency than original analogs and are designed to circumvent regulation and detection. Fentanyl analogs such as acetylfentanyl, carfentanil, and others have no licensed medical use but have much greater potency, leading to life-threatening respiratory depression at very small doses.[1] Fentanyl and derivatives are now found in mixtures sold in underground markets as heroin, cocaine, or under other names, and can kill an unsuspecting drug user. Toxicology laboratories now confront the challenge of detecting drugs that may be present in blood at low concentrations and for short periods of time. The chemical structures of these drugs may be unknown, and labs may face a lack of knowledge about their metabolites and an absence of reference standards.

The ongoing crisis places a significant burden on the PTC. The laboratory consistently observes increased workloads due to receiving a growing number of cases with amplified complexity. In 2017, the PTC received 20% more death investigation cases than in 2016, when the laboratory saw a whopping 33% increase compared with 2015. Furthermore, investigations are complicated by the presence of novel synthetic drugs that are difficult to detect using available technology. With this influx of novel substances and ever-changing drugs of choice, toxicology laboratories such as ours are increasingly unaware of what they might find in samples and may lack the tools necessary for their detection.

As a result, the PTC is forced to use strategies to help it adapt quickly. These include participating in toxicovigilance programs to guide the development of new detection methods. Resources to support assay development must be available together with efficient workflows, which can be achieved through automation of sample preparations and liquid handling, and the use of laboratory information systems. Most critical is the availability of analyzers using advanced technology. Liquid chromatography tandem mass spectrometry is a powerful method but requires mass spectra information that is often unavailable for emerging drugs. High-resolution accurate-mass spectrometry, with more sophisticated time-of-flight and Orbitrap technologies, distinguishes molecules that are different by as low as 0.001 atomic mass units (amu), compared to 1 amu for conventional instruments, and allows for detection and identification of compounds with unknown structures.[2] This powerful system will be available in our laboratory, and when used in untargeted screening mode will enable us to detect emerging drugs using practical workflows.

—Sergei Likhodii, PhD, DCC, FCACB

This article is the opinion of the BC Centre for Disease Control and has not been peer reviewed by the BCMJ *Editorial Board.*

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GP IN ONCOLOGY TRAINING
Vancouver, 10 Sep–21 Sep and 4 Feb–15 Feb 2019 (Mon–Fri)
The BC Cancer Agency's Family Practice Oncology Network offers an 8-week General Practitioner in Oncology training program beginning with a 2-week introductory session every spring and fall at the Vancouver Centre. This program provides an opportunity for rural family physicians, with the support of their community, to strengthen their oncology skills so that they may provide enhanced care for local cancer patients and their families. Following the introductory session, participants complete a further 30 days of customized clinic experience at the cancer centre where their patients are referred. These can be scheduled flexibly over 6 months. Participants who complete the program are eligible for credits from the College of Family Physicians of Canada. Those who are REAP-eligible receive a stipend and expense coverage through UBC's Enhanced Skills Program. For more information or to apply, visit www.fpon.ca, or contact Jennifer Wolfe at 604 219-9579.

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INFECTIOUS DISEASES SYMPOSIUM
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The 4th annual Infectious Diseases Symposium will be held at Surrey Memorial Hospital, UBC Lecture Hall, Floor-B, Critical Care Tower. Symposium chair: Dr Yazdan Mirzanejad. Topics: Adult immunization and resurgences, necrotizing fasciitis, meningitis, high-risk infection during and after pregnancy, fever in returned travelers, parasitic infections in refugees and immigrants, common infections in transplanted patients, fever in children in the office and emergency room settings, and pitfalls in interpretation of infectious diseases diagnostics. Event speakers: Professor Tony Chow, Drs Monika Naus (BCCDC), Drs Alissa Wright, Laura Sauve, Mike Chapman, Miguel Imperial, Katherine Plewes, Meera Anand, Julie Schalwyk, and Yazdan Mirzanejad. Further information and registration: https://events.eply.com/infectious-diseases-day-2018-10-20.

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employment

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Physicians looking to start a practice or to relocate and enjoy the beauty of BC will be pleased to work in our state-of-art facility using OSLER EMR. Great working environment and well-trained staff. Compensation is fee-for-service with an estimated remuneration of 250K per year (70/30 overhead split). BC licence required. International graduates who need to work within the College of BC Guidelines welcome. Website: https://windermeremedicalclinic.ca.

ABBOTSFORD—LOCUMS
Full-service East Abbotsford walk-in clinic requires locum physicians for a variety of shifts, including weekends and evenings. Generous split; pleasant office staff and patient population. Please contact Cindy at 604 504-7145 if you are interested in obtaining more info.

ARMSTRONG—FT FAMILY PHYSICIAN
Haugen Medical Group, located in the heart of the North Okanagan, is in need of a full-time family physician to join a busy family practice group. Flexible hours, congenial peers, and competent nursing and MOA staff will provide exceptional support with very competitive overhead rates. Obstetrics, nursing home, and inpatient hospital care are not required but remain optional. Payment schedule: fee for service. If you are looking for a fulfilling career balanced with everything the Okanagan lifestyle has to offer, please contact Maria Varga for more information at mariaka1@telus.net.

BURNABY—FAMILY PHYSICIAN, FT/PT OR LOCUM
Family practice, located across from Metrotown Mall, two-physician clinic seeking an associate to join a very busy practice with a large Cantonese/Mandarin patient base. Possibility of taking over the practice. OSCAR EMR. Convenient parking. Negotiable split. Please email bbymedclinic@gmail.com.

NANAIMO—GP
General practitioner required for locum or permanent positions. The Caledonian Clinic is located in Nanaimo on beautiful Vancouver Island. Well-established, very busy clinic with 26 general practitioners and 2 specialists. Two locations in Nanaimo; after-hours walk-in clinic in the evening and on weekends. Computerized medical records, lab, and pharmacy on site. Contact Ammy Pitt at 250 390-5228 or email ammy.pitt@caledonianclinic.ca. Visit our website at www.caledonianclinic.ca.

NORTH DELTA—TWO FPS, LOCUM/FT
Looking for two family physicians for our clinic at the Scottsdale Medical Centre to start ASAP as locums, full-time, or as associates, with the intention of being partners in the long run. Clinic is located in North Delta (open since 1983). Fully equipped with EMR and paper charts. We have a full-time family practice and a walk-in clinic. Billing-split negotiable. Contact medicalclinic07@gmail.com or call 604 597-1606 as soon as possible.

NORTH VAN—FP LOCUM
Physician required for the busiest clinic/family practice on the North Shore! Our MOAs are known to be the best, helping your day run smoothly. Lucrative 6-hour shifts and no headaches! For more information, or to book shifts online, please contact Kim Graffi at kimgraffi@hotmail.com or by phone at 604 987-0918.

PITT MEADOWS—FAMILY PHYSICIANS
We are seeking three full-time family physicians to join our team at the New Pitt Meadows Medical Clinic. We encourage physicians to have a full family practice with regular shifts in our very busy walk-in clinic. The NPMMC is a purpose built, well established, and highly reputed practice in Pitt Meadows with beautiful views. It is ideally situated between Coquitlam and Maple Ridge in a high-visibility, high-traffic location. We have excellent staff. Low overheads for full-time physicians. At present, the clinic is open 6 days per week. For further details visit www.newpittmeadowsmedicalclinic.ca or contact Dr L. Challa at 604 465-0720.

POWELL RIVER—EMERGENCY MED
Part- or full-time ER locum or permanent position. Flexible shifts in single-coverage ER with good specialist back up. 50+ patient visits per day, good imaging and lab coverage (including limited CT scan coverage). Length: 2-week to 3-month locums, or permanent position. Powell River is a family-oriented community and an outdoor playground with multiple lakes, trails, and ocean activities. Contact Robert Head at prerscheduling@gmail.com or 604 344-0636.

POWELL RIVER—LOCUM
The Medical Clinic Associates is looking for short- and long-term locums. The medical community offers excellent specialist backup and has a well-equipped 33-bed hospital. This beautiful community offers outstanding outdoor recreation. For more information contact Laurie Fuller: 604 485-3927, email: clinic@tmca-pr.ca, website: powellrivermedicalclinic.ca.

S SURREY/WHITE ROCK—FP
Busy family/walk-in practice in South Surrey requires GP to build family practice. The community is growing rapidly and there is great need for family physicians. Close to beaches and recreational areas of Metro Vancouver. OSCAR EMR, nurses/MOAs on all shifts. CDM support available. Competitive split. Please contact Carol at Peninsulamedical@live.com or 604 916-2050.

SOUTHERN INTERIOR, BC—OPPORTUNITIES FOR ANESTHESIOLOGISTS
Interior Health (IH) is recruiting anesthesiologists in both locum and permanent capacities in several communities, including Cranbrook and Kamloops. In addition to improving anesthesia and pain management through our collaboration with UBC's Southern Medical Program, you will have the opportunity to make an impact in education and research. At IH anesthesiologists provide services for a wide range of surgical and diagnostic procedures, including general surgery, orthopedic surgery, neurosurgery, vascular surgery, OBG, ENT, plastic surgery, urology, and multiple trauma. Come enjoy a rewarding career in one of our many caring communities. See job postings: www.betterhere.ca.

SURREY/DELTA/ABBOTSFORD—GPS/SPECIALISTS
Considering a change of practice style or location? Or selling your practice? Group of seven locations has opportunities for family, walk-in, or specialists. Full-time, part-time, or locum doctors guaranteed to be busy. We provide administrative support. Paul Foster, 604 572-4558 or pfoster@denninghealth.ca.

TERRACE—FAMILY PHYSICIAN, NEW CLINIC
Join our new primary care office opening in Terrace, BC. Only 80 minutes north of Vancouver. Opening in August 2018, the HG Health Centre offers complete provision of medical office infrastructure to operate your own professional family practice. Outstanding specialist support: gen surg, int med, peds, OBGYN, psych, ENT, urology, ophthalmology, and oncology. Obstetrics and ER available, not mandatory. ER: uniquely APP funded, and point-of-care diagnostics. DI dept includes MRI and on-site radiology. Expand your scope and vision in your own family practice, and sculpt your personal work-life-balance in this unique opportunity. Please contact hermangreeff@gmail.com.

VANCOUVER/RICHMOND—FP/SPECIALIST
We welcome all physicians, from new graduates to semiretired, either part-time or full-time. Walk-in or full-service family medicine and all specialties. Excellent split at the busy South Vancouver and Richmond Superstore medical clinics. Efficient and customizable OSCAR EMR. Well-organized clinics. Please contact Winnie at medicalclinicbc@gmail.com.

VANCOUVER—FT/PT FAMILY PHYSICIANS & PSYCHIATRISTS
New medical office in the Fairmont Medical Building is looking for family physicians who want to move or start a practice. Office features four fully furnished exams rooms; able to accommodate both paper and EMR (Accuro) practices. Office hours are flexible and available 7 days a week (7 a.m.–7 p.m.). MOA and support staff provided. Clinic has many unattached patients looking for a family doctor, and is accompanied with available VDofP supports to help build a practice. Offering 70/30 split. Email raz@elitemedicalassociates.com.

VICTORIA—GP/WALK-IN
Shifts available at three beautiful, busy clinics: Burnside (www.burnsideclinic.ca), Tillicum (www.tillicummedicalclinic.ca), and Uptown

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(www.uptownmedicalclinic.ca). Regular and occasional walk-in shifts available. FT/PT GP post also available. Contact drianbridger@gmail.com.

VICTORIA—PERMANENT/P-T FP
Experienced family physician wishing to expand medical team at Mattick's Farm in beautiful Cordova Bay. Fully equipped office, OSCAR EMR, congenial staff, close to schools. Contact phoughton@shawcable.com, phone 250 658-5228.

medical office space

NEW WEST—GP FOR EST. HEALTH CLINIC
Polo Health+Longevity Centre on Columbia street in New Westminster is looking for a general practitioner to join our dynamic health team and integrated clinic. There is an available treatment room with a designated area at the front desk for your own personal MOA. We have our own on-site pharmacy as well. We have street parking and skytrain access. You would be joining a team of other health care providers, psychologists, medical aesthetics, and more. Please send resumes to drallanapolo@gmail.com. Visit www.polohealth.com for more information on our health centre.

SIDNEY, BC—BRIGHT CLINIC SPACE
Bright, two-op clinic space available in the heart of Sidney, BC. Fully furnished; waiting room, front desk area with Internet, landline, fax, two operatories, sterilization room, and restroom. Days available are flexible. To view please call 250 920-5043.

VANCOUVER (KERRISDALE)—OFFICE SPACE
Airy, spacious, quiet office available for a psychiatrist or psychologist on Fri and/or weekends. Located in Kerrisdale Prof. Bldg., an exceptionally convenient location for access by public transit or car, with a large amount of free residential parking available. Close to pharmacies, labs, a walk-in clinic, coffee shops, and restaurants--all within walking distance. The office is accessible by stairs and elevator. Consists of a waiting area that seats two people; a large reception desk; file storage room; and large, bright, comfortable interview room/office. If interested please contact Dr Lewis Pullmer at dr.pullmer@gmail.com, or contact the office directly at 604 872-3422.

VANCOUVER (MAIN STREET)—2 MED OFFICE SPACES FOR LEASE
Two separate second-floor office spaces for lease: 650 and 600 sq. ft. Both set up as general medical. Established pharmacy on main floor. Unit 1: $1500/month, waiting room, three exam or office rooms. Unit 2: $1400/month, waiting room, two exam rooms, one small office. No elevator access. Utilities and unit cleaning included, property tax $5800/year. Contact Matthew at mhuangvan@gmail.com.

VANCOUVER (W BROADWAY)—FURNISHED SPACE
Fully furnished space for one or multiple doctors. Space can be used part-time or full-time with short- or long-term arrangement possible. Use some or all of the large space. MOA provided if needed. Extraordinary views. Concrete professional building with elevators, underground parking, and three restaurants. Available immediately. Please call Neil at 604 644-5775.

VANCOUVER—LARGE SPACE
Very large (approx. 2400 sq. ft.), well-maintained space in a recently renovated single-level building in South Vancouver. Ideal for a walk-in clinic. Located near Champlain Mall and steps from a community centre, school, park, and other businesses. Chiropractor, dentist, and pharmacy already in the building. Street-level parking with over 20 spaces. Entrance to the building and the clinic is very accessible to patients (no stairs or elevators). Densely populated residential neighborhood. Email southvanclinic@outlook.com.

VANCOUVER—TWO RENOVATED OFFICES CLOSE TO VGH
Two fully renovated office spaces available close to VGH with city views. Close to the Broadway–City Hall Canada Line station on Cambie for your patients' convenience. The offices are suitable for psychiatrists, psychologists, or counselors. New furniture, including in the waiting area. Customize your office and bring in your phone, fax machine, etc. Offices are available immediately on a 1-year lease basis; however, will consider other options. Negotiable and reasonable rent. Call or text 604 970-6600 or email wahan.wanis@ubc.ca.

vacation properties

PROVENCE, FRANCE—YOUR VILLA
Les Geraniums, a luxury 3-bedroom, 2½ bath villa, is your home in the heart of Provence. Expansive terrace with pool and panoramic views. New kitchen and bathrooms. Walk to lovely market town. One hour to Aix and Nice. Come and enjoy the sun of southern France! 604 522-5196. villavar@telus.net.

SHUSWAP LAKE—COTTAGE, WATER ACCESS ONLY
Rent by the week or buy the lease to this idyllic summer retreat. View photos on OKhome seller.com, #26805. Call or text Mike Stanger 1 250 361-6115.

miscellaneous

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MILL BAY (BRENTWOOD COLLEGE WATERFRONT)—HOME & COTTAGE FOR SALE
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PATIENT RECORD STORAGE—FREE
Retiring, moving, or closing your family or general practice, physician's estate? DOCUdavit Medical Solutions provides free storage for your active paper or electronic patient records with no hidden costs, including a patient mailing and doctor's web page. Contact Sid Soil at DOCUdavit Solutions today at 1 888 781-9083, ext. 105, or email ssoil@docudavit.com. We also provide great rates for closing specialists.

VANCOUVER—TAX & ACCOUNTING SVCS
Rod McNeil, CPA, CGA: Tax, accounting, and business solutions for medical and health professionals (corporate and personal). Specializing in health professionals for the past 11 years, and the tax and financial issues facing them at various career and professional stages. The tax area is complex, and practitioners are often not aware of solutions available to them and which avenues to take. My goal is to help you navigate and keep more of what you earn by minimizing overall tax burdens where possible, while at the same time providing you with personalized service. Website: www.rwmcga.com, email: rodney@rwmcga.com, phone: 778 552-0229.

Proust questionnaire: Dr Eric Cadesky

What profession might you have pursued, if not medicine?
Children's book author.

Which talent would you most like to have?
Musical talent would be nice. Or to have actually been as good at sports as I remember I was.

What do you consider your greatest achievement?
My daughter, whose laughter and boundless wonder imbue me with perspective and gratitude.

Who are your heroes?
The women in my life. Refugees. Single parents.

What is your favorite activity?
Anything outdoors and active. Or indoors and quiet. Basically, anything where I'm awake, although sleeping is nice too.

Dr Cadesky is Doctors of BC's new president. He lives in Vancouver.

What is your idea of perfect happiness?
Being in the moment with loved ones.

What is your greatest fear?
Knowing I could have helped more and didn't.

What is the trait you most deplore in yourself?
Reflexive cowardice before giving bad news.

What characteristic do your favorite patients share?
Humor, humility, candor, and appreciation.

Which living physician do you most admire?
My colleagues working hard to care for people in communities and facilities despite increasing acuity and decreasing resources.

On what occasion do you lie?
When I think that I'm protecting others and haven't yet realized that I'm the needy one.

Which words or phrases do you most overuse?
Let's start with this, and we'll go from there.

Where would you most like to practise?
In a place with adequate resources, rewards for valuable care, and support for work-life integration.

What technological medical advance do you most anticipate?
The adoption of technologies we have—secure messaging, videoconferencing, patient health records—and the death of technologies we use like fax machines and printers.

What is your most marked characteristic?
An aqualine nose and a staunch belief in people's good.

What do you most value in your colleagues?
Sincerity.

Who are your favorite writers?
Haruki Murakami, Christopher Hitchens, Joni Mitchell, Monty Don, J.K. Rowling, anyone with a cooking blog.

What is your greatest regret?
Allowing teenage insecurity to distract me with jealousy of others instead of finding ways to improve myself.

How would you like to die?
Not knowing that I did, but knowing that my affairs were in order and not a burden to others.

What is your motto?
Work hard and be kind.

Submit a Proust Questionnaire – your colleagues will appreciate it.
Online: www.bcmj.org/content/contribute. Click on the Proust tab, then complete and submit online.
Email: journal@doctorsofbc.ca. Email and we'll send you a Word document to complete and email back to us.
Print: www.bcmj.org/content/contribute. Click on the Proust tab, click on "Print a PDF copy," then complete and submit by fax or mail.
Mail: 604 638-2858. Call and we'll send you a blank questionnaire to complete and return to us by mail.

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