



Dr Kathleen Ross

**Doctors of BC president
2019–20**

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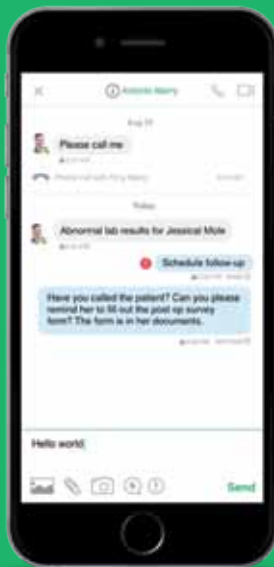
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ON THE COVER

Dr Kathleen Ross

Dr Ross, Doctors of BC's new president, has a history of stepping up to challenges. She's interviewed by *BCMJ* editor Dr David Richardson starting on page 240.

The *BCMJ* is published by Doctors of BC. The journal provides peer-reviewed clinical and review articles written primarily by BC physicians, for BC physicians, along with debate on medicine and medical politics in editorials, letters, and essays; BC medical news; career and CME listings; physician profiles; and regular columns.

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Representatives of Doctors of BC and the First Nations Health Authority recently signed a Declaration of Commitment on Cultural Safety and Humility in Health Services. See page 249.

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Classic and accessible (just like me)

Life is like that sometimes—one minute you're sitting around the Editorial Board table and the next someone is saying how it's time to make the *BCMJ* more like its editor—classic, durable, and meant to last another 10 to 15 years.

That's not how it really happened, but it *was* time to give our esteemed journal an updated, more contemporary look. This last happened in 2000, perhaps as a celebration of our computers not imploding with the feared Y2K bug. Our web redesign, completed in 2018, focused on providing a simple, clean look, and it was time to bring similar objectives to our print *BCMJ*. Therefore, starting in this July/August issue, every section, page, headline, and byline has been redesigned to reach our goal of providing a fresh look while improving readability. We know you enjoy reading and aren't intimidated by text-heavy pages, but still, we'll be introducing more photos and illustrations where the budget allows.

We know you enjoy reading and aren't intimidated by text-heavy pages, but still, we'll be introducing more photos and illustrations where the budget allows.

We hope you enjoy the three-quarter-inch increase in width, which allows the designers more space to visually open up the pages without adding length to the *BCMJ*. (For you budget hounds, be assured that this change doesn't increase mailing costs.) The layout will remain a three-column grid, which allows the designers plenty of flexibility and good line length for text. Short lines make text choppy to read and everyone finds long lines monotonous (particularly at Disneyland). After a lengthy and exhaustive consultative

process, we also decided to change the fonts. Gone is Helvetica Neue for the headers, replaced by Myriad Pro, which as many of you know has clean, open shapes while being readable and accessible (just like me). The font decision for the body text was more complicated, but once a world-renowned mystic stepped in it became clear that Adobe Caslon Pro was our baby. Times New Roman was a thing of the past, replaced by this widely used font (it can

be found in *The New Yorker*, so it must be good).

That's probably a little too much about fonts, but we hope you enjoy the changes. We want your reading experience to be a pleasant, educational, and calming. We are so proud of our little magazine, and will continue to make the changes necessary to keep the *BCMJ* the go-to source for the doctors of BC, written by the doctors of BC.

—DRR

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The changes in medicine in the last 30 years

This is my first *BCMJ* editorial, so I would like to introduce myself and offer my perspective on the enormous changes I have witnessed in the practice of medicine since being licensed in 1986.

I was born in Williams Lake in 1960. In 1969 my family moved to Victoria, a common scenario for provincial civil servants like my father. Following graduation from high school, I studied music with every intent of becoming a professional jazz musician, but after a few years I switched into pre-med, to the immense relief of my parents, as both were raised in poverty on the farm during the Great Depression and could not fathom why anyone would deliberately embark on a career path that offered no hope of financial security. They slept even better when I gained admission to UBC medical school in 1981.

In the 1980s, graduating UBC med students were encouraged to do a rotating internship and then enter general practice, or use the year to do GP locums and then return, armed with real-life experience in clinical medicine, to residency training to pursue the specialty of their choice. I matched to Montreal for my rotating internship.

When I returned to BC in 1986, influential health economists had concluded that health care expenditures were being driven up by an excess of physicians who “overserved” patients to pad their incomes. This theory was attractive to politicians, who enacted Bill 41, capping the number of physician billing numbers in the province. Locums were exempt, leading me to practise as a GP locum for 18 months. This proved more than enough time to confirm that I much preferred the hospital to the office environment. I was able to secure a full-time position as an emergency physician in the Lower Mainland in 1988, and I’ve never regretted my career choice.

I had no idea on entering practice in 1986 that seismic shifts in the delivery of medical care were about to unfold.

The role of established practices

In the 1980s, GPs competed with one another to attract and retain patients in their practices, and specialists competed for referrals from GPs. Retiring GPs in larger cities could sell their practices for a significant sum based on goodwill. It was correctly assumed that most patients would remain in the practice due to inertia, in addition to knowing that their records would continue to reside in the office of their trusted GP, ensuring continuity of care, and that the outgoing physician had carefully selected his or her replacement for compatibility of the practice philosophy. In 2019 the situation has reversed; newly minted doctors do not take over, let alone buy, established practices, and many experienced GPs are retiring, decreasing their work hours, seeking salaried alternatives to fee-for-service primary care, working as hospitalists, or moving on to restricted and specialized medical settings.

The College of Physicians and Surgeons of BC no longer publishes its list of GPs accepting new patients, and a growing body of unattached patients rely on walk-in clinics or hospital emergency departments for primary care.

Changes to continuity of care

In BC’s population centres there has been a profound drop in the continuity of care between the doctor’s office (both GP and specialist) and the hospital. In the 1980s it was the norm for GPs and specialists to identify a sick patient in the office, send the patient to hospital with orders, attend in person when the office closed, and continue to care for the patient as most responsible physician during the admission. Patients suffering from acute illness reaped the benefit of being cared for by a trusted physician who was intimately familiar with their life circumstance and medical history having provided years of longitudinal care. This care paradigm has declined coincident with the steady and ongoing redistribution of BC’s population away from smaller towns and toward urban and suburban communities in the Lower Mainland, southern Vancouver Island, and the Okanagan. Consequently, office-based physicians are spending less and less time practising in the hospital and becoming more distanced from rapidly evolving acute care protocols—the hospital that once represented familiar and safe turf gradually transforming into a strange and forbidding practice environment. Patients understand this and frequently bypass office-based doctors in favor of the hospital when they perceive a need for urgent workup of potentially serious illness.

Shifting physician-patient relationships

Physicians have largely abandoned the notion of “ownership” of patients that was prevalent in the 1980s. While the concept of patient ownership was not sound ethically, it nevertheless provided physicians with a monetary incentive—in addition to the ethical/professional imperative—to do their utmost for their patients; those who

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were dissatisfied could readily take their medical business down the street to another doctor. Physician/business owners who singlehandedly or in partnership with colleagues shoulder responsibility for a practice are now being replaced by part-time physician contractors working in clinics owned by nonphysicians and staffed by providers with a variety of health care credentials. The distinct functions of care team members are frequently unclear to patients (now called “clients”), responsibility for clinical decisions is spread among team members, and the concept of most responsible provider is increasingly unfamiliar to both patients and providers. Such care models offer welcome flexibility to physicians with complex and busy lives and are increasingly commonplace in professional and workplace settings. However, they serve to diminish physicians’ sense of personal responsibility to their patients, expose patients to the risk of conflicting clinical advice, and discourage the development of mutual trust between doctors and patients.

Physicians and patients are coming to view

Conventional wisdom has long held that the best medical care is delivered in the setting of an ongoing relationship between dedicated physicians providing longitudinal care to loyal and trusting patients. It is difficult to mount a sound argument against a paradigm that incorporates relatedness, fidelity, and interdependence.

what was historically recognized as a fiduciary relationship based on mutual trust—one where doctors devoted themselves to patients who reciprocated with loyalty to the physician—into a simple customer service agreement. Demand for physician services in BC currently outstrips supply, and doctors no longer need to compete with one another for primary care patients or referrals. Patients who historically turned to trusted GPs for advice are increasingly likely to visit varying providers, picking and choosing from recommendations from different physicians, and using techniques honed in the consumer marketplace that do not reliably allow for the selection of medical care that serves their own best interests.

How will we adapt?

Conventional wisdom has long held that the best medical care is delivered in the setting of an ongoing relationship between dedicated physicians providing longitudinal care to loyal and trusting patients. It is difficult to mount a sound argument against a paradigm that incorporates

relatedness, fidelity, and interdependence; these are human attributes that have enabled the staggering advance of civilization over a remarkably brief evolutionary time frame.

Nonetheless, such longitudinal, trust-based relationships are increasingly rare. The current era is characterized by universal patient access to formerly proprietary medical knowledge, demand for physician services that exceeds supply, and the commoditization of medical care. Such changes reflect greater societal trends that resist control by patients, physicians, health economists, and politicians; they are best viewed as inevitable consequences of an information age that casts patients in the role of health care consumers forced to choose among conflicting care options provided by detached physicians.

The challenge for newer members of our profession is clear: they must master the art of providing care to a disparate population possessing widely varying levels of medical sophistication in a marketplace characterized by patient skepticism, diffusion of medical responsibility, and fleeting clinical relationships. The ability to help patients move quickly from a position of distrust and fear—caveat emptor—into that of faith in a doctor they have just met has always been a necessary skill for consultants and hospital-based clinicians. Ironically in this era of evidence-based medical care, this critical ability is now poised to serve as the primary determinant of success in the practice of clinical medicine.

—DJE

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Health leaders of tomorrow

“The best way to predict the future is to create it yourself.” — Peter Diamandis

I had the pleasure of speaking at the Vancouver chapter’s Emerging Health Leaders speed mentoring event. This is a national volunteer peer network aimed at developing emerging health system leaders. The panel was made up of an impressive array of leaders, including Dr Victoria Lee, president and CEO of the Fraser Health Authority; Yasmin Jetha, vice president, community services, at the Vancouver Coastal Health Authority; Megan Stowe, executive director of virtual health at the Vancouver Coastal Health Authority; and me, as the sole practising physician.

We spoke about opportunities in today’s health care environment, emerging areas of innovation, and challenges for health care leaders. The audience included a variety of learners hoping to build their connections to health care management and increase their knowledge of current issues. Some were looking for inspiration, others for a deeper understanding of what it takes to be a good leader. The discussions were indeed empowering, and some of the questions that were asked gave me pause to reflect.

What are the most important skills for leaders of our generation?

I could have suggested specific leadership training on collaboration or appreciative inquiry; however, it occurred to me that the most important skill is likely adaptability. How we deliver medicine is going to change exponentially in the next decade. We will live and work in an ever-changing landscape of health care diagnostics, wearable devices, augmented intelligence, advanced decision-making algorithms or chat bots, and the elusive artificial intelligence. The future will see increasing democratization of health care, both in expansion of readily accessible evolving wearable technology and increased access for patients to their own personal health data. This is a daunting prospect for many.

Who should be leading the innovations in health care delivery?

I believe physicians should be at the front of the pack. Physicians will need to decide how to integrate advancing tech and big data into our care systems. Physicians will need to maintain

the balance between technology and the human-to-human connection that our patients desire in planning and receiving their care. Yet the audience, composed of enthusiastic future health leaders, was devoid of young physicians.

Doctors of BC has set the stage for stronger physician engagement. More opportunities exist today than ever before to become leaders at all levels of our health care system, whether with divisions of family practice, or facility engagement, or Doctors of BC committees. I believe we must find a way to energize and inspire more physicians to pick up the torch, lean in to opportunities to lead, and be part of the evolution of care.

Optimal patient outcomes begin with optimal physician engagement. Physicians are an often untapped resource, and the need for our participation has never been greater. It is time to step up and become the leaders our health care system will need in the future.

—Kathleen Ross, MD
Doctors of BC President

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

What is an appropriate title for a letter to the editor?

The title of a paper or a letter to the editor is important. It conveys a specific message from the author. The *BCMJ* follows a specific convention of titling a letter to the editor in response to a published article: “Re: the title of the original article.” That is certainly appropriate if the letter presents additional information for the paper.

Recently a news article in the *BCMJ* reported “Daily ibuprofen may prevent Alzheimer disease” (2018;60:191). It was followed by a letter raising the concern that FDA had strengthened the label warning that (non-aspirin) NSAIDs can increase the risk of heart attack, stroke, and death.¹ The letter suggests that caution should be exercised not to jump into action by taking daily ibuprofen to prevent Alzheimer disease.

The letter followed the standard format, with the title “Re: Daily ibuprofen may prevent Alzheimer disease.” But readers who skimmed the title without reading the letter itself may erroneously have thought it was a reinforcement of the message. Since the letter gives a different message—a message of caution—it may have been more appropriate to title it as “Potential serious adverse reaction of ibuprofen used in prevention of Alzheimer disease.”

In other journals, for example the *CMAJ*, the title of the letter to the editor in response to an article is provided by the author of the letter. It is also important to note the letter may only address a certain part of the paper with the title noting that. An example is a recent article that appeared in the humanities section of the *CMAJ* by a Saudi physician sharing his experience just prior to medical training in Canada (“The Saudi resident and Tillsonburg”).² It is a humorous article similar to some of the editorials by our *BCMJ* editor Dr Richardson.

A letter to the editor in response to the article addressed only one specific area of this article, with the author of the letter expressing his own interesting encounter (“A tailor made suit for interview/oral examination”).³ That letter did not address the whole article, but a parallel situation.

Another article in the *CMAJ* outlined the interwoven history of mercury poisoning in Ontario and Japan.⁴ A letter in response to this article pointed out that there is an ongoing problem with mercury poisoning in that specific Indigenous community in Ontario from an unknown source and, therefore, the history is not completed.⁵ The title of this letter brings out a specific and important message.

The Editorial Board of the *BCMJ* may want to consider using the title of a letter provided by the author if they are addressing a specific area of an article they are responding to. Of course, the Editorial Board may still reserve the right to have the format of “Re:” followed by the title of the original paper, or to provide a different shortened title.

—H.C. George Wong, MD
Vancouver

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Thank you for your thoughtful letter. The Editorial Board's role in the disposition of letters is to accept, decline, or, on occasion, request revisions

(usually for length). Once a letter is accepted, it is handed off to our editorial staff who execute all subsequent aspects of publishing. The naming formula for letters has been handed down through the generations and may date back as far as 1959, to issue 1, volume 1. The naming convention you accurately describe is intended to allow readers to trace back to the source of the conversation, and while we are reluctant to bow to the skimmers, we agree that sometimes the format could be misleading, and, in all honesty, we know everyone is a skimmer sometimes. In future you will see letters titled to better reflect their subject rather than their source. —ED

Poisonous mushrooms: Macro features matter!

The *BC Medical Journal* is always informative and appealing, including its January/February issue with the interesting article, “The world’s most poisonous mushroom, *Amanita phalloides*, is growing in BC” (2019;61:20-24).

I am writing about the cover illustration. This eye-catching drawing of the death cap beside the title “The world’s most poisonous mushroom is growing in BC” successfully attracts readers’ attention to the seriousness of this poisoning. However, it may imply that all parts of the death cap are green with dark green dots on its cap, stem, and volva, which is not correct.

As a former medical and, recently, environmental toxicologist who used to work in areas where mushroom poisoning was endemic, and having published on this subject, I have noticed that the clinical findings as well as the appearance of poisonous mushrooms are sometimes misidentified among health and medical experts. Mushroom poisoning is rare in Canada; therefore, professionals are less familiar with the issue.

A picture is worth a thousand words! People may forget the text but are more likely to remember this illustration. What if health professionals or mushroom hunters perceive the “World’s most poisonous mushroom that grows in BC” to be green with dark green dots everywhere? More importantly, can this picture give the impression that mushrooms with other appearances, let’s say white ones or those that have no dots on their stem, are safe to consume? This beautiful illustration on the cover page may

LETTERS TO THE EDITOR

have unintentional educational consequences for your readers.

The take-home message is that macro features [Figure] of the death cap are important, *may vary*, and can even resemble edible mushrooms with potential to confuse amateur mushroom hunters or health professionals.

—Reza Afshari, MD, MPH, PhD
Senior Scientist, Toxicology, BC Centre for Disease Control

Adjunct Professor, School of Population and Public Health, University of British Columbia

Professor of Medical Toxicology, Mashhad University of Medical Sciences, Iran

Editor in Chief, *Asia Pacific Journal of Medical Toxicology*

Thank you for your helpful letter. We would also direct readers' attention to the photos on pages 21 and 22 of the January/February issue. —ED

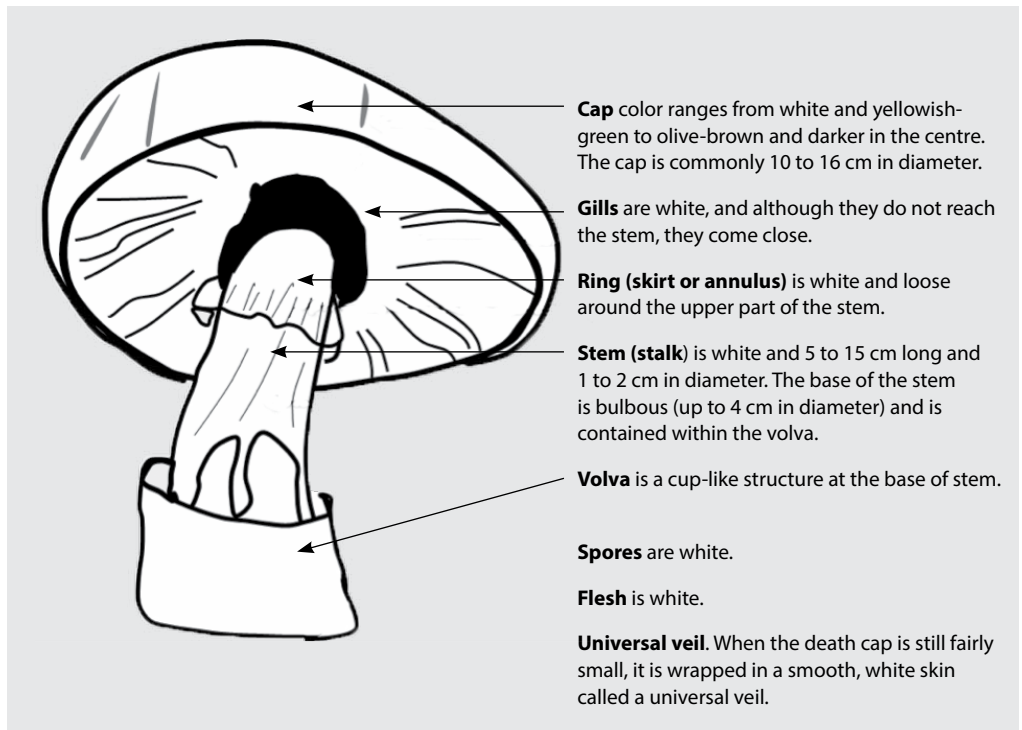


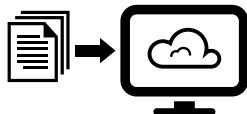
FIGURE. Macro features of death cap (*Amanita phalloides*).

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Improving end-of-life care in heart failure

Giving an outline of usual expected clinical changes early in a disease process may allow for an earlier discussion about symptom management and palliative measures as the individual declines.

In the past few decades, forms of heart failure have become increasingly common. The aging population is one of the contributing factors to this rise.¹ Understanding the natural history of a disease allows a clinician to have a good conversation with a patient or their caregivers about the expected course. Providing a prognosis is an often difficult conversation, fraught with uncertainty. In heart failure, there are generally episodes in a stepwise decline.

The trajectory of a stepwise decline in heart failure usually presents with hospitalizations for exacerbations from which the individual does not fully regain their pre-exacerbation baseline.² Retrospective studies have shown that a hospitalization for congestive heart failure (CHF) regardless of symptom severity and duration correlates with a 1-year mortality of 10% to 25%.² Each additional hospitalization compounds this percentage.

Frailty can be used to further evaluate an individual for prognostication. One common tool is the Canadian Study of Health and Aging Clinical Frailty Scale (CSHA Scale).

If clinicians place more emphasis on patient-centred outcomes such as improving function and quality of life in heart failure patients, we provide better patient outcomes.

A category 5 clinical frailty score correlates with declining function at home with the need for help with instrumental activities of daily living and predicts a 50% mortality in 5 years.²

If we add the stepwise trajectory of the normal course of heart failure with the CSHA score, we can better predict a prognosis for our patients. One can see that a frailty score of 5 added to one to two hospitalizations in a year significantly reduces life expectancy. This leads to an opportune time to discuss palliative measures.

There is increased recognition that early symptom management and high-quality end-of-life care is just as important for individuals with chronic disease as it is for cancer patients.^{2,3} This is even more important for the elderly, who often have high frailty scores in addition to one or more chronic diseases.⁴ If clinicians place more emphasis on patient-centred outcomes such as improving function and quality of life in heart failure patients,⁵ we provide better patient outcomes. Further, families may report better satisfaction with care² and clinicians may report better job satisfaction.

For a clinician, early recognition of a patient's declining function, increase in symptoms, and increase in frequency of clinic visits or hospitalizations provide the impetus to have the conversation that palliation should be initiated soon. Clinicians can explain that palliation does not mean allowing someone to die. Palliation increases symptom management and maximizes function and quality of life. This helps the individual and their caregivers understand that life

expectancy is decreased and conversations about care goals, scope of treatment, and financial and legal affairs can take place.

The progression of palliative measures as an individual declines with heart failure can provide good end-of-life outcomes and improve satisfaction for patients, caregivers, physicians, and other health care providers.

—Lauri McCoy, MD, CCFP

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This article is the opinion of the Geriatrics and Palliative Care Committee, a subcommittee of Doctors of BC's Council on Health Promotion, and is not necessarily the opinion of Doctors of BC. This article has not been peer reviewed by the BCMJ Editorial Board.

Dr Kathleen Ross: A history of stepping up

Dr Kathleen Ross, a family physician with a passion for surgery, is the new president of Doctors of BC. She tells us about her interests, her influences, her concerns, and those “hand-on-the-door” moments that she’ll never forget.

David R. Richardson, MD

Dr Kathleen Ross was bestowed the chain of office and became president of Doctors of BC on 31 May 2019. *BCMJ* editor Dr David Richardson sat down with her at her Coquitlam office earlier that month. Drs Ross and Richardson are contemporaries, both family physicians who graduated from the Faculty of Medicine at UBC.

How did you decide to become a physician?

I don’t ever remember not wanting to be a physician. When I was a kid, I was interested in anything related to anatomy, biology, physiology, and how things work. We had a family friend who was a physician, one of three in Port Coquitlam at the time, Harry Shaw. He and my dad hunted so we kids cleaned a lot of deer and moose with them, and there were always lessons.

Why did you want to become president now?

I’ve been associated with Doctors of BC peripherally for a long time—I was the first chair of our division of family practice, then I got involved with Shared Care and helped get that off the ground, and then Fraser Northwest developed Pathways and I chaired that too, and then when Doctors of BC wanted to set up medical staff associations, I said okay, I’ll do that too. I understood the lay of the land, and it was just time.

How about your track to get into medical politics?

I’m not a politician, but I do like to lead, and I have spent a lifetime stepping up into leadership positions wherever they presented themselves. So when the kids were little it was always Scouts and Girl Guides and soccer and figure skating and school councils and so on. And then the divisions of family practice started up locally just around about the time the kids were all transitioning out of that so that worked out well.

You have two kids?

Yes, Colin, who’s 26, and Shannon, who’s 25. Shannon’s a registered massage therapist and Colin is an assistant producer for Electronic Arts on the FIFA Game.

Speaking of young people, what are the challenges that medical students and residents face today?

Multiple things. Finances are a huge issue. Location is another, because if they live in a big city, trying to find a place to live that’s affordable is difficult. Medical students are forced a bit early into deciding what they want to do when they finish. It was so different for us. You could go to family practice and then go back and specialize later. That route’s a lot more difficult now, and people decide what they want to do early on, by the end of second year.

I can’t imagine that early in medicine knowing what I wanted to do.

I thought I was going to be an orthopaedic surgeon. I started medicine in an MD PhD program in medical microbiology. And then I moved over to trauma because I loved it so much; it really spoke to me. That was where I was going, but then we had our first child, and things changed. It’s probably a good thing actually because now that I have this diverse skill set—you can drop me in the middle of

the jungle in the Andes and I’m good to go. I’ve set bones there, done stitches, removed things, taught a whole crew in the Sacred Valley in Peru how to close wounds properly.

The coolest thing is that I’m at the stage in the practice where I am delivering the babies of the babies I delivered.

Who left the biggest imprint on your professional direction?

The matriarch from a family practice point of view is Dr Joan Eddy. She was the original person who set up our medical practice and set the tone for the family practice being patient-centred, where people come, they feel welcome, they feel like their needs are going to get addressed. Another person is Dr Bob Hayden. He’s probably the most decent person I know. He’s a cardiovascular surgeon and could teach anyone diplomacy.

What do you admire about those two individuals?

Patience. Their sense of calm in the face of utter chaos. The sense of positivity. You know you won’t hear either of them say anything negative.

I'm not a politician, but I do like to lead, and I have spent a lifetime stepping up into leadership positions wherever they presented themselves.



Dr Ross is a member of the Primary Care Obstetrical Group at Royal Columbian and loves working with skilled obstetrical nurses like Cheryl Britton (left) and Claudia Kraemer (right).

PHOTO: PETER HOLST

How has your medical practice in your numerous roles evolved?

I started in Fraser Lake, and that was full-time, with the extensive skill set that you need in a rural setting—everything from fractured necks to pneumonias to palliative patients. A good place to start. When we moved to Coquitlam I started with 4 days a week in the office, a full-service family practice. Then 2 or 3 years later the open heart program at Royal Columbian expanded, and I thought, wow, I'd really like to do that. It just so happened that they needed a surgical assistant 1 week per month, so I did 3 weeks in my office and then took a week to locum in hearts. Later, I joined the Primary Care Obstetrical Group at Royal Columbian, and I still do all of my independent deliveries, which was great, but the high volume obstetrical clinic meant I was only able to fit in Wednesdays as my surgical day. And then, as the politics and the meetings ramped up in the last 4 years, I haven't been as much in hearts; I've only been there twice this year so far.

So coming back after your year of being president, do you plan to get back into the same sort of role that you had?

Yes, that would be my intention. In November I become the president of the Royal Columbian Hospital medical staff as well.

Because you don't have enough to do?

That was in play before I ran for president—we do 2 years secretary, 2 years vice president, 2 years president, and that's just when my time came up. But Dr Melanie Brown, a nephrologist, and the regional head of nephrology for Fraser Health, is coming in as vice president and is very prepared. Executive lead Leslie Rodgers worked with me in the divisions, through Shared Care, and now in the medical staff association. I have lots of help.

You are busy.

Yeah, that's what my husband said.

How do you balance it?

My challenge is that I'm like a puppy: I'm excited about everything; *everything* is my favorite thing. I don't do anything I don't like. It does become a time crunch though. And then when you add into that the fact that we have four elderly parents right now, all between 83 and 86, there are lots of time demands.

Can you tell me about some experiences with patients that made a significant impact on you?

For sure. There was a fellow who was under 40, here with his kids. He didn't have an appointment and I saw his kids, and when I was literally hand-on-the-door leaving, he said, "Oh, by the way, I'm having a little irritation when I go to the washroom and I'm up a bit at night." I said, "Okay, book an appointment and we'll put some time aside to examine you." And when he came back 9 months later, because that was the first opportunity he had to come back to the office, his symptoms had gotten quite disturbing, and he had metastatic prostate cancer. *Nine* months.

By then it was everywhere. Every day there's one or two of those hand-on-the-door things that make me pause, and I say to myself, all right, it's going to put me behind but I just need to make sure it's not what I think it is. Or I march them out to the front desk and make sure that they come back the next day. So that experience was definitely important. Another patient who stands out for me was a gentleman who had grade IV astrocytoma and we knew he was at his end of days. One day he showed up with a massive flower arrangement for me, about 10 days before he died. I said, "Bill,* what are you doing here?" And he said, "Well, I really wanted to show you how much I appreciate what you've done for me and I didn't want to wait till it was too late." But the coolest thing, I think, is that I'm at the stage in the practice where I am delivering the babies of the babies I delivered. *That* is just ridiculously cool.

I love that too. What career path would you have taken if it wasn't medicine?

Polynesian dance, maybe? I could have done microbiology. I did my master's in medical microbiology and ran a research lab at VGH, but it just wasn't clinical enough for me. I always tell people I have a master's in poo because I studied *Yersinia enterocolitica* and *Giardia lamblia* with Drs Michael Noble and Judy Isaac-Renton.

So other than the Polynesian dance, what is something that people don't know about you?

I absolutely love camping and backpacking. Put me in the wilderness with my backpack for 8 to 10 days and I'm perfectly happy.

Where's your next backpacking trip?

I'd like to do the whole John Muir Trail in northern California. I've done two parts of it and I'm hoping, mid-August and September 2020, that my husband and I can do the whole trail.

Switching gears, are you concerned about the future of family medicine in the province?

Yes. The value that primary care brings has been underrecognized for decades. Physicians can't keep up with the demands, and we don't have access to enough resources. I spent an hour on the phone at lunch last week trying to find psychiatric services for a patient, and in the end I still didn't have what I needed. We can't continue to do that. The pay structure, both within our profession and comparable to other professionals, is not yet optimal. My concern is that physicians are getting disheartened.

It seems that despite expanding medical school, there are no more of us.

There are a couple features driving that. Part of it is that we live with an increased complexity of patients. I spend half my day dealing with people who have multisystem disease. You spend 20, 30 minutes with an elderly person, you haven't written a darn thing down because you're helping them on the bench, you're helping them get their shoe off, you're helping take their jacket on and off, all of those things that happen when you're caring for a person. Inquiring about test results, their memory,

**Not his real name.*



Photo: Karen Tegillas

Dr Ross with her son Colin, husband Rob, and daughter Shannon the day of her inauguration.

who's supporting them at home doing the laundry and cooking. People are taking more and more medications and living longer. So that's part of it, and the other part of it is that there's a larger demand. For example, in the past, if you were a young person with a cold, you'd stay home for week, cover up your head, and complain to your mother. But the shift now that I've been seeing is that if they're sick for 2 days they come into the office to get fixed. Everybody's living so fast and they can't afford the downtime; they can't afford any time off.

There seems to be a reluctance for newer graduates to be full-service practitioners.

That has to do with their exposure to family practice in training. There's no reason that a first-year medical student should be seeing a nephrologist, for example. We need to start early in first and second year getting folks exposed to full-scope family practice, not niche practices. I am encouraged to see medical students in the rural areas, out anywhere where family physicians do everything, but I'd like to see even more. Then you'll see more people step up and say, "Yes, I have confidence, I can do full-service family practice." When we finished at Royal Columbian, there was nothing we didn't know how to do. I moved to Fraser Lake where there were two mills, a mine, and a major highway. I knew how to set the X-ray machine, how to take an X-ray, how to start IVs; I could have put in a central line if I needed to. Not that I would ever in a million years put somebody through an internship like what we did at

Royal Columbian, that was tough, but I think that those skills can and should be developed early.

What do you think about the patient care network sort of approach?

I have such high hopes for the patient care networks. I think that, for all the reasons I just mentioned, we don't have the ability to do this ourselves anymore. We need help. The patients need help. The patients need more diverse services than what a single person can offer in an office setting. There aren't enough of us, and the primary care networks, if they're done correctly—if actual grassroots physicians' voices are heard and listened to—then we're golden.

Exactly, another provider could have spent that time on the phone finding that psychiatrist.

It's a challenge, but I do have high hopes. There will be some lessons learned, probably some mistakes, but I truly believe the only way to move forward is to learn from those mistakes.

Do you worry about physicians losing their autonomy in such a setup?

It's important that physicians provide the clinical leadership in a team as the most responsible provider. I do a lot of obstetrics, and we have the experience in our primary care obstetrical office, working with a nurse.



Photo: Peter Holst

We have clearly defined roles that work extremely well. I know what the nurse can do; I completely trust what they can do. Nurses know their skill set and they know when to pass the care up. It happens all over the hospital. With open heart surgery, nurses have their job, the assistants have their job, and the surgeons have their job, and if one part of that machine doesn't work well then the whole thing falls apart. So I think that it's a risk and roles need to be clearly outlined, but I think we as physicians need to get past the, "who's trying to eat our lunch" attitude. It's not helpful.

And it would be invaluable to have a team that could take over various things that we don't actually need to do.

I agree. You and I have lived through a number of difficult years where government was not particularly collaborative with physicians. They said we were overpaid, just wasting money. So it's hard to get the trust back after that, but thankfully we're past that. One of the key things I need to get out to my fellow physicians is this: it's time to reengage.

Why are you excited about health technology?

I firmly believe that IT is going to change the way that we practise medicine in the foreseeable future. In the next 10 years, the way that patients seek and receive care is going to change exponentially.

How do you see it unfolding?

We see it already. My last two diagnoses of atrial fibrillation were off of a Fitbit. Patients come in with their data. What's going to be really cool is the augmented intelligence that comes along with those home wearables and people who are able to come in and speak in an educated fashion about what's gone on with their health.

What do you think about telemedicine?

If telemedicine is incorporated into primary care, it's awesome. But telemedicine as a glorified electronic walk-in clinic? Just more fragmentation. And I think that the few doctors that I've spoken to who are working in that setting feel the same thing—that it's an awkward transition. There is *definitely* a place for it, though. I would absolutely love

to see telemedicine incorporated into primary care. We have a number of programs inside Fraser Health that utilize it; Breathe Well at Home is a good example. My sister lives in Fraser Lake, my niece lives in Vanderhoof and is pregnant, and without telemedicine communications, their access to care is considerably less. The other risk is that the cost will land on physicians, becoming part of our overhead. But telemedicine *is* going to change because our patients are going to demand the change, and we have to change how we're working because we cannot afford to continue to work the way we work now.

So, speaking of change and moving Doctors of BC forward, where do you see the association in 10 years?

I would like to see the association advocating for physician wellness as a priority. Another priority is that many of our members have not seen themselves reflected in the organization. I would like to see a more diverse and inclusive organization. We're in the midst of a big push to investigate the lack of diversity and find ways to improve it, so that's a first step. And finally, there are the service components that Doctors of BC offers as a member-driven organization: our insurance, parental leave, telephone services, retirement assistance, and so on—these are things that weren't available to us when we started and are extremely helpful now; they need to be maintained and even improved.

What would you like your legacy to be?

I would love to see an improvement in our culture and connectivity among the members. A year is a short time, and a lot of this work is actually already started. There are more opportunities now in Doctors of BC to engage than there have ever been. You can engage in your division, you can engage in your MSA, you can look at Shared Care, you can get involved on so many levels now that were not available 10 years ago even. We just need to encourage and support physicians to step up. And *listen* to them when they do step up.

Last question. What's the best advice anybody ever gave you?

My dance teacher, many years ago, said, "As long as you're smiling, people will think you're doing the right thing." I still use that advice. ■

Presumptive legislation for work-related mental health injuries

In July 2012, WorkSafeBC amended the Workers Compensation Act to more clearly define coverage for work-related mental illness. In April 2018, the provincial government introduced presumptive legislation for five groups of first responders in the province, and a year later, expanded the eligible occupations to include:

- Firefighters (paid and volunteer workers assigned to fire suppression duties).
- Police officers.
- Emergency medical assistants, including paramedics.
- Sheriffs.
- Corrections officers, including wardens.
- Emergency dispatchers for firefighters, police, ambulance, and 911.
- Nurses regulated by the British Columbia College of Nursing Professionals, including RNs, RPNs, LPNs, and NPs.
- Health care assistants (care aides) registered with the BC Care Aide and Community Health Worker Registry.

If anyone in these occupations experiences one or more traumatic events at work and develops a mental disorder, the disorder will be presumed to have been caused by their work. This allows for the claims decision process to move more quickly and with less investigation than in the past. WorkSafeBC's Mental Health Claims Unit (MHCU), a multidisciplinary team managing the claims, continues to grow to meet the increasing demands of accepted mental health injury claims.

Implications for family physicians

Physicians treating patients who work in the included occupations and who have been exposed

to traumatic events and present with mental health symptoms should submit the usual physician's first report (Form 8) to WorkSafeBC. The MHCU team values and relies on clinical information provided by community primary care providers in their physician reports (Form 8/11), as well as requested clinical records that are submitted. Information that is particularly helpful for the MHCU team includes:

WorkSafeBC's Occupational Trauma Response service model offers two new services, one for intervention and the other for transition.

- Work history including any known recent or remote trauma/stressor exposure.
- Mental status examination.
- Generalized Anxiety Disorder 7-item (Gad-7) and Patient Health Questionnaire (PHQ-9) scores.
- Concerns about safety such as suicidal or homicidal ideation or substance-use issues.
- Psychiatric history (this is not an exclusion for coverage since claims may be accepted for exacerbation of pre-existing mental disorders).
- Important considerations or recommendations for treatment, including referrals already made to local health services.

Various treatment options designed for trauma-related mental disorders are available for patients with an accepted mental health claim. Physicians wishing assistance for a patient with a pending or accepted claim should make this request on their Form 8/11.

Trauma-specific treatments available at WorkSafeBC

WorkSafeBC's Occupational Trauma Response (OTR) service model offers two new services, one for intervention and the other for transition. OTR intervention is an early response to exposure to trauma at work for those diagnosed with a trauma-related condition such as PTSD or acute stress disorder. The goals are for the injured worker to learn skills to manage symptoms and engage with supports, and to assist in stabilizing and preparing those workers who require further, more intensive interventions or identify those who are ready to transition back to work. The intervention service lasts a maximum of 6 weeks or up to six sessions while providers normalize the trauma reaction, assist in strengthening natural resilience, build supports, and provide skills that can help prevent worsening of mental health symptoms.

OTR transition is intended for those who have recovered or reached a plateau from the trauma-related psychological condition but require additional support during the critical periods of return-to-work or vocational rehabilitation. OTR-transition lasts a maximum of 4 months or up to 10 sessions and is designed to assist the individual to maintain and apply the skills acquired in treatment.

WorkSafeBC has contracted providers to deliver these services to injured workers as close to their home community as possible. At the moment, the services are provided in 37 locations across the province.

Further assistance

For further information or assistance with a patient who has a work-related mental health injury, please contact a medical advisor in your nearest WorkSafeBC office or call the Physician Hotline at 604 276-3049 or toll-free at 1 855 479-3049.

—Tanya Fairweather, MD, CCFP, FCFP
WorkSafeBC Medical Advisor

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

Doctors of BC election results



Matthew Chow, MD

Dr Matthew Chow was elected president-elect for the 2019–2020 year (1784 members cast their vote). Dr Chow is a psychiatrist in Vancouver and has been involved in medical leadership for a number of years. He is also co-chair of the Specialist Services Committee and serves as the Doctors of BC representative on the Medical Services Commission.

Districts 1 and 7 Representative Assembly (RA) delegate positions have also been elected. District 1 GP delegate to the RA for Lower Island is Dr Osmaan Sheikh. District 7 GP delegate to the RA for Okanagan Thompson is Dr Cheryl Hume.

Doctors of BC scholarship winners



Katherine Ryeburn

Doctors of BC has awarded its two annual scholarships of \$1000 to Ms Katherine Ryeburn of Nanaimo and Mr Ian Grabher of Nanaimo.

As usual, there was an abundance of highly impressive applicants, so the recipients are truly outstanding.

Ms Ryeburn is a top student at her high school, plays volleyball and soccer, practises tae kwon do, and is a runner, swimmer, dancer, choir member, and community volunteer. She's also a lifeguard with her standard first aid and other certifications. She plans to complete her health sciences degree at UNBC then apply to medical school.

Mr Grabher is also an accomplished individual, with awards in French, piano, basketball, and cross-country. He has extensive volunteer experience and is known as both a coach and a leader in his school community. He has been accepted to UBC and plans to study international relations.

For more than 15 years, Doctors of BC has presented two \$1000 scholarship awards to children of members in good standing who are completing high school and planning to continue studies at a recognized postsecondary institution.

Osteoarthritis resources for patients

Do your patients have questions about osteoarthritis? The OASIS (Osteoarthritis Service Integration System) program offers free, comprehensive educational classes aimed at helping people self-manage their osteoarthritis. The interactive, motivating classes are led by a team of seasoned educators (OT, PT, nurse, and dietitian) who are skilled at communicating ways of living better with a chronic condition. Classes are offered at various locations throughout the Vancouver Coastal Health (VCH) region. A referral is not needed, but registration is required. For more information about all classes, visit the OASIS website at <http://oasis.vch.ca>.

If your patient requires an individualized assessment for their osteoarthritis, a doctor's referral is required. The OASIS program referral form is available online at http://oasis.vch.ca/media/OASIS_Physician_Referral_June2018.pdf. The assessment will provide advice on whether surgery is recommended or what specific conservative measures would help manage the specified condition. Please note that this program services VCH residents and

people from other health authorities who have a VCH surgeon.

—Arlaina Waisman, RD
Dietitian, Educator, OASIS Regional Office

BC Pharmacare expands use of biosimilar medicines

The Government of British Columbia announced that patients taking originator biologic drugs will be transitioned by their clinicians to a biosimilar biologic drug. The BC Pharmacare announcement is consistent with Health Canada's recommendation that such a decision should be made by the treating physician in consultation with the patient and taking into account available clinical evidence and any policies of the relevant jurisdiction. For details on the expansion of the use of biosimilars visit <https://news.gov.bc.ca/releases/2019HLTH0080-001072>.

For more information about biosimilars, visit www2.gov.bc.ca/gov/content/health/health-drug-coverage/pharmacare-for-bc-residents/what-we-cover/drug-coverage/biosimilars-initiative-patients.

Allergan recalls textured breast implants in Canada

Allergan Canada is voluntarily recalling textured breast implants from the Canadian market as a result of Health Canada's suspension of the Biocell textured implant licence. As part of this voluntary recall, any unused Biocell saline-filled and silicone-filled textured breast implants (medical device licences 3112, 72262, 72263, 87277, and 87279) will be removed from the Canadian market and no longer be sold. Natrelle smooth implants and tissue expanders are not impacted by this licence suspension and voluntary recall.

Patients are advised to discuss the risks and benefits of their implant type with their plastic surgeon should they have any concerns. There continues to be no recommendation from Health Canada for asymptomatic patients to have their textured breast implants removed or replaced prophylactically. Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) has been reported in patients with an implant history that includes Allergan's

Doctors of BC 2019 AGM and awards

Doctors of BC held its 2019 annual general meeting on Friday, 31 May, at the Robert H. Lee Alumni Centre at UBC's Vancouver campus. Doctors of BC's annual awards ceremony was held on Saturday, 1 June, at the Sheraton Vancouver Wall Centre Hotel. The evening's events began with a reception, followed by the awards ceremony, including installation of officers, and the president's dinner, with remarks given by the new president, Dr Kathleen Ross.

For more information and photos, visit www.doctorsofbc.ca/gallery/2019-doctors-bc-awards-ceremony.

Doctors of BC Excellence in Health Promotion

Dr Christine Gemeinhardt

Doctors of BC Changemaker Awards

Student Advocate

Award: Mr Alec Yu

Resident Advocate Award:

Dr Brandon Tang

Dr Cam Coady Medal of Excellence

Dr Mary-Wynne Ashford

CMA Honorary Membership Awards

Dr Kenneth Bassett

Dr William Ehman

Dr Karen Gelmon

Dr Alan Hill

Dr Simon Holland

Dr Paul Klimo

Dr Louise Martin

Dr Margaret McGregor

Dr Richard Nuttall

Dr Jack Onrot

Dr Tim Rowe

Dr Andrew Sear

Dr Barry Turchen

Dr Garth Warnick

Dr Keith White

Doctors of BC Silver Medal of Service

Dr Bakul Dalal

Dr Jean Hlady

Dr Kwadwo Asante

Dr David M. Bachop Award

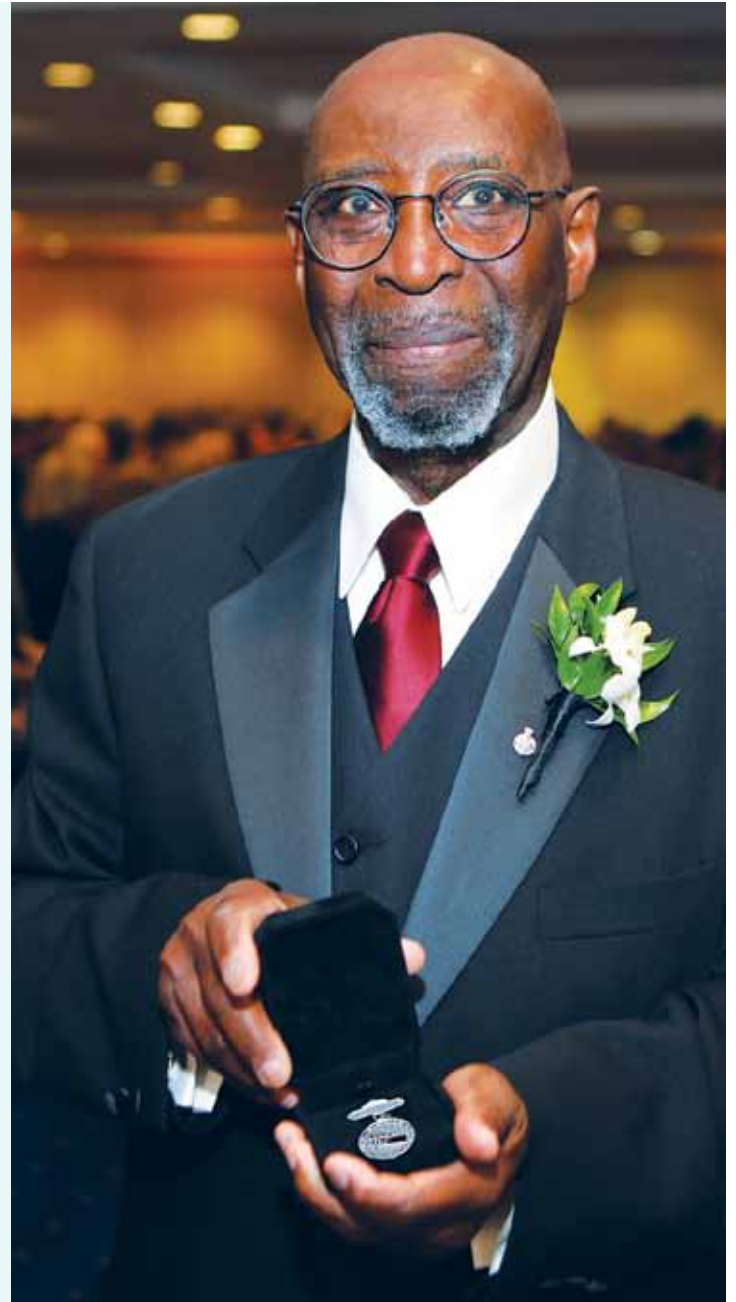
Gold Medal: Dr

Marjorie Docherty

Silver Medal: Dr Louai Musa

Dr Don Rix Award for Physician Leadership

Dr Bill Cavers



Dr Jean Hlady after being presented with the Doctors of BC Silver Medal of Service.

and other manufacturers' textured breast implants with various surface properties, styles, and shapes.

If you have questions about Biocell textured breast implants, contact the medical information team at MR-MedicalInformation@Allergan.com or 1 800 668-6424, and visit Allergan's website at www.allergan.com. For more information about Health Canada's recall and safety alert visit www.healthycanadians.gc.ca/

recall-alert-rappel-avis/hc-sc/2019/69520a-eng.php.

Call for participants: Youth with OCD

The Provincial OCD Program at BC Children's Hospital is actively recruiting Greater Vancouver youth (7 to 19 years old) who have obsessive compulsive disorder (moderate or

higher severity) to participate in a pilot trial of intensive treatment (i.e., exposure and response prevention). The goal of the study is to determine how much treatment youth need to get better and whether different ways of providing the treatment impact how well it works.

We are seeking direct referrals from family doctors, pediatricians, and child/adolescent psychiatrists practising in the Lower Mainland. If you would like more information regarding

inclusion/exclusion criteria, or study procedures, or are wondering if a patient would be suitable for referral, please contact Zainab Naqqash at 604 875-2000 (ext. 3068) or zainab.naqqash@bcchr.ca, or visit <https://bit.ly/30WSbQy>.

—Robert Selles, R. Psych.
Provincial OCD Program, BC Children's Hospital, UBC

Report to Members available now



Doctors of BC has released its latest report, the *2018-19 Report to Members*. The report is a good way to find out about the association's activities and accomplishments over the past year, and contains the audited financial statements from 2018. The *Report to Members* has reports from the CEO, president, chair of the Board, and speaker of the Representative Assembly, as well as reports from all the active committees, councils, sections, societies, external committees, and affiliated organizations. A PDF document is available at www.doctorsofbc.ca/sites/default/files/report-to-members-web.pdf.

Genomics-driven health care for children with rare diseases

Two million Canadian children are classified as having a rare disease, and over 80% of rare diseases are thought to have a genetic origin. While next-generation sequencing technologies such as whole exome and whole genome sequencing may enable more accurate disease diagnosis and treatment guidance for childhood rare diseases, these technologies are not routinely available in clinical care. There are outstanding questions about these technologies: Are they valued by patients? Are they an

A physicians' community of practice tackles ACEs in BC

Since the Shared Care Committee's Child and Youth Mental Health and Substance Use (CYMHSU) Collaborative wrapped up in December 2017, a group of physicians has continued to meet, with Shared Care's support, to advocate and strategize for improved services for child and youth mental health and substance use in the province. The CYMHSU Community of Practice now includes over 180 physicians and, over the course of three in-person gatherings, surveys, and an online communication tool called SLACK, they have established key priorities and a strategic plan for the next 3 years. Read the plan online at <http://sharedcarebc.ca/sites/default/files/CoP%20Strategic%20Plan%20Image.pdf>.

After the CYMHSU Collaborative's first Adverse Childhood Experiences (ACEs) Summit in 2017, which focused on raising awareness of ACEs and their impact on the developing brain and future health outcomes, there was a desire to follow up with a second ACEs event. The focus of the second summit was to invite physicians and other partners to share their experiences and learnings from



new approaches and trauma-informed interventions introduced in their practices and communities. On 9 May the second ACEs Summit took place in Richmond with over 500 attendees. Learn more about the day and the work taking place at www.doctorsofbc.ca/news/bc-physicians-mobilizing-action-aces.

efficient use of health care resources? At what point do they become cost-effective? Answering these questions helps inform the adoption of these tools as a standard of clinical care and potentially validates the impact that genomics has on the quality of life for patients.

Dr Dean Regier, a scientist at BC Cancer, focuses his research on improving methods to understand how genes play a role in our lives and how patients and the general public value the trade-offs of benefits versus risks when making decisions to undergo genomic testing. He gathers evidence from patients for input into economic models, which evaluate whether these technologies provide value for money. Over

the next 2 years, a \$500 000 project (funded through Genome BC's Genesolve program and Illumina Inc.) will draw on health care data from BC as well as the 100 000 Genomes Project in the UK to generate evidence for the appropriate and sustainable adoption of whole exome and whole genome sequencing to diagnose and guide treatment for children with rare diseases. The work will be undertaken by Dr Regier in collaboration with colleagues from the University of Oxford, the University of British Columbia, BC Children's Hospital, and BC Women's Hospital and Health Centre. For more information about Genome BC visit <http://genomebc.ca>.



PHOTO: ARIANA FLYNN

A commitment to cultural safety and humility

“Néca?mat, néca?mat, néca?mat,” said Musqueam Elder Shane Pointe as he opened the May 2019 Representative Assembly (RA) meeting commemorating the signing of the Declaration of Commitment on Cultural Safety and Humility in Health Services. Pronounced “nuts amaht” in English, the Coast Salish expression means “we are one.”

The signing ceremony took place after the Doctors of BC Board last year endorsed the Declaration of Commitment—a commitment between the house of Doctors of BC and the house of the First Nations Health Authority (FNHA). In First Nations language, families are recognized by the houses they belong to.

By signing this Declaration, and in partnership with our Indigenous patients, doctors agree to create an environment where cultural

safety—based on each patient’s health care experience—is developed through a process of mutual trust and respect of cultural humility. Further, that this is understood, embraced, and practised at all levels of the health care system.

Mr Pointe’s approach was one of inclusion and fairness. He stressed that while the source of the Declaration is the FNHA, safety and cultural humility apply to all cultures coming here from all parts of the world.

The ceremony called upon key representatives from both houses to be blanketed—a ritual that demonstrates FNHA respect for those who have made an important contribution to the Indigenous community. It also called for four observers chosen from the RA to witness the signing of the agreement—a historic undertaking in a traditionally oral

society. Afterward the representatives and witnesses expressed the ways in which the day was meaningful to them.

Mr Pointe ended the ceremony by saying, “Doctors, thank you, thank you for lifting up the hearts and the minds of future generations of First Nations children and their families. You, as medicine, have now made us stronger in our health, in our wellness. What more can be asked of doctors than to help us heal and to help us be well.”

By signing and participating in the ceremony, Doctors of BC joins all BC’s regulatory bodies, all health authorities, the Ministry of Health, the BC Coroners Office, and others, who have already demonstrated their commitment.

Farshad Hosseini, BSc, Sandra J. Squire, MRSc, BScPT, Alastair S.E. Younger, MBChB, ChM, FRCSC, Shannon C. Jackson, MD, FRCPC

A 13-year review of elective orthopaedic surgery outcomes in patients with hemophilia A and B

From 2004 to 2017 orthopaedic procedures for hemophilia patients in BC shifted from mainly knee surgeries to mainly ankle surgeries, and reductions were observed in both hospital length of stay and the need for coagulation factor prophylaxis.

ABSTRACT

Background: Patients with hemophilia A and B are at risk for progressive arthropathy and are known to have less satisfactory outcomes when undergoing orthopaedic surgery than patients without hemophilia. During the mid-2000s the approach to adult hemophilia care in Canada changed significantly to include preventive coagulation factor replacement therapy. Starting in 2004 adults with significant arthropathies began using coagulation factor prophylaxis. By 2012 this approach was used by over 80% of BC hemophilia patients, and by 2017 coagulation factor prophylaxis was the established approach. A study of patients in BC was proposed to compare management and surgical outcomes from 2004 to 2017 as the approach to hemophilia care changed.

Methods: Data were reviewed from the clinical charts and electronic medical records of patients with hemophilia who underwent elective orthopaedic surgery and had follow-up through the Adult Bleeding Disorders Program of BC at St. Paul's Hospital from January 2004 to February 2017. Study subjects were adult orthopaedic surgery patients with mild to severe factor VIII deficiency (hemophilia A) or factor IX deficiency (hemophilia B). The primary outcomes considered were type of hemo-

philia and severity, type of orthopaedic surgery, joints involved, coagulation factor administered, hospital length of stay, and any surgical complications. Hemophilia cases were classified as mild, moderate, or severe. Data collected for coagulation factor VIII and IX utilization (u/kg) included doses from the preoperative period to postoperative day 14. Surgical complications were defined as unexpected postoperative events such as bleeding and thrombotic events. Outcomes were compared for three eras: the "early prophylaxis" era, 2004 to 2009; the "transition to prophylaxis" era, 2010 to 2012; and the "established prophylaxis" era, 2012 to 2017.

Results: The study identified 42 patients with hemophilia who underwent 46 elective orthopaedic procedures from January 2004 to February 2017. Of these patients, 31 (74%) had severe hemophilia, 5 (12%) had moderate hemophilia, and 6 (14%) had mild hemophilia. The proportion of patients with severe hemophilia was the same in the early prophylaxis era and the transition era. However, in the established prophylaxis era there was a decrease of more than 30% in the proportion of patients with severe hemophilia. Knee, elbow, and ankle procedures were common in all three eras, with knee procedures predominating in the early era (48% of surgeries) and ankle procedures

predominating in the established era (60% of surgeries). Coagulation factor utilization changed from the early prophylaxis era to the established era, decreasing by 35% for knee procedures and by 44% for ankle procedures. Comparison of arthroscopic and open procedures over the three eras revealed that 27% less factor VIII on average was required for arthroscopic procedures in both the early and transition eras, and 10% less in the established era. The median hospital length of stay for knee arthroplasty patients with hemophilia ranged from 4 to 7 days over the three eras, while the median stay for hip arthroplasty patients declined over the three eras from 7 to 3 days. Postsurgical complications were associated with 10 out of 46 procedures. No thrombotic complications occurred and no coagulation factor inhibitors developed.

Conclusions: Over the study period orthopaedic procedures for hemophilia patients shifted from mainly knee surgeries to mainly ankle surgeries, and since 2012 a larger proportion of patients have had mild to moderate rather than severe hemophilia. Centralization of care has allowed for better communication and monitoring among the surgical and hematology teams in BC and resulted in a reduction in coagulation factor VIII utilization per case without untoward surgical complications.

Reductions in both coagulation factor utilization and hospital length of stay have contributed to the cost-effectiveness of treatment. Study limitations included small sample size, inconsistent data collection, and a lack of patient-reported outcomes. Future studies might focus on expanding the database to incorporate more outcome data from patients and data from other centres and provinces.

Background

Hemophilia patients, especially those with severe or moderately severe disease, are at risk of developing arthropathy related to recurrent hemarthrosis.^{1,2} The most commonly affected joints are the knees, ankles, and elbows.¹ Arthropathy can result in major morbidity, including chronic joint pain, loss of joint function, and long-term disability.² Orthopaedic surgical intervention can include joint debridement, joint replacement, and arthrodesis.³

Patients with hemophilia undergoing orthopaedic surgery have less satisfactory outcomes than patients without hemophilia undergoing similar procedures.^{1,3} As well, hemophilia patients can be at high risk for surgical complications when co-infected with HIV and/or hepatitis C.⁴ Despite this, there is little information in the literature on the proportion

of hemophilia patients experiencing surgical complications with orthopaedic foot and ankle reconstruction, and a lack of BC experience regarding complications in lower extremity arthroplasty and fusion.

During the mid-2000s the approach to adult hemophilia care in Canada changed significantly to include preventive coagulation factor replacement therapy given in the home—an approach that decreased rates of joint bleeding over the following decade. Starting in 2004 adults with significant arthropathies began using coagulation factor prophylaxis. By 2012 this approach was used by over 80% of BC patients. By 2017 coagulation factor prophylaxis was the established approach.

A study of patients in BC was proposed to compare management and surgical outcomes from 2004 to 2017 as the approach to hemophilia care changed.

Methods

Data were extracted retrospectively from the clinical charts and electronic medical records of patients with hemophilia who underwent elective orthopaedic surgery and had follow-up through the Adult Bleeding Disorders Program of BC (also known informally as the provincial hemophilia program) from January 2004 to February 2017.

Before 2004 orthopaedic surgery for adults with hemophilia was performed in a variety of BC centres. After the hemophilia program moved to St. Paul's Hospital in 2004 most cases were managed by a team of orthopaedic surgeons and other specialists in accordance with published guidelines.⁵

Study subjects were adult orthopaedic surgery patients with mild to severe factor VIII deficiency (hemophilia A) or factor IX deficiency (hemophilia B).

The primary outcomes considered were type of hemophilia and severity, type of orthopaedic surgery performed (open or arthroscopic

procedure), joints involved (knees, ankles, elbows, or others), coagulation factor utilized (VIII or IX), hospital length of stay (LOS), and any surgical complications.

Hemophilia cases were classified as mild, moderate, or severe according to the level of coagulation factor VIII or IX activity in plasma. Mild hemophilia was defined as 5% to 40% of normal activity, moderate hemophilia as 1% to 5% of normal activity, and severe hemophilia as less than 1% of normal activity.

Knees, ankles, and elbows were considered hemophilia index joints. Hips and shoulder were considered non-index joints.

Data were collected for coagulation factor VIII and IX utilization (u/kg) from the preoperative dose

to the postoperative day 14 dose.

Hospital LOS data were collected for all patients, but only LOS data from the knee and hip arthroplasty cases were compared to data from the Canadian Joint Replacement Registry (CJRR),⁶ as other joint groups are not included in the CJRR.

Surgical complications were defined as unexpected postoperative events that may have altered the course of management for the patient. These included bleeding, coagulation factor inhibitor development, infections, thrombotic events, and prolonged hospital stay. Early post-surgical bleeds were defined as those occurring 0 to 14 days after surgery, while delayed bleeds were defined as those occurring 15 days or longer after surgery.

Outcomes were compared for three eras: the “early prophylaxis” era, 2004 to 2009; the “transition to prophylaxis” era, 2010 to 2012 (use of prophylaxis increasing but not yet standard); and the “established prophylaxis” era, 2012 to 2017.

The study received ethics approval from the University of British Columbia and the Providence Health Care Research Institute.

Hemophilia patients, especially those with severe or moderately severe disease, are at risk of developing arthropathy related to recurrent hemarthrosis.

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This article has been peer reviewed.

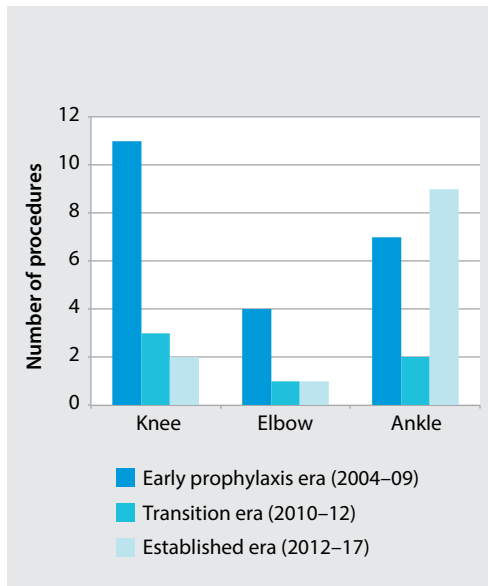


FIGURE 1. Elective orthopaedic procedures performed in three eras of study period by joint type.

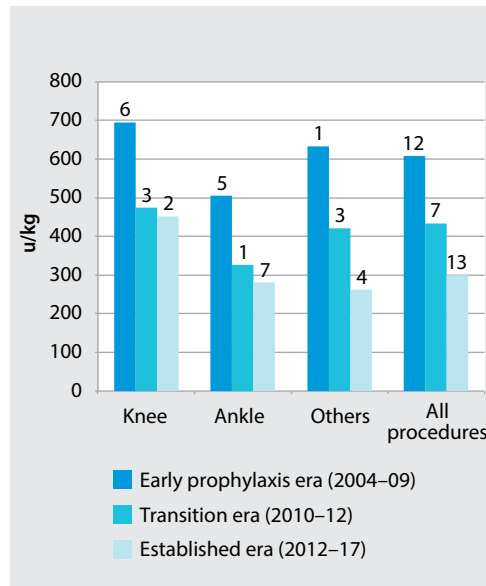


FIGURE 2. Comparison of factor VIII utilization (preoperative dose to postoperative day 7 dose) per joint procedure in three eras of study period. Number of procedures listed above each column.

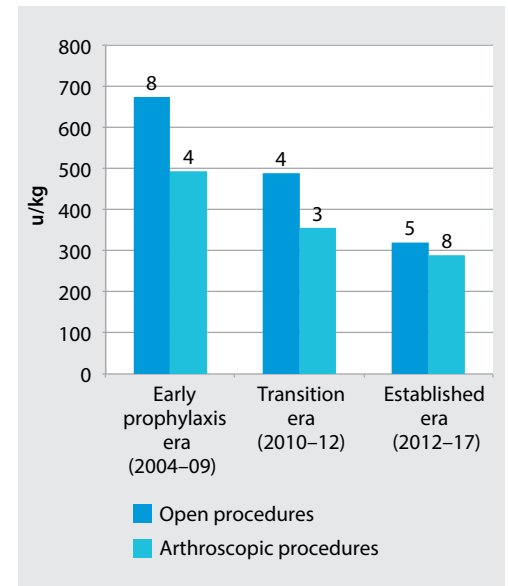


FIGURE 3. Comparison of average Factor VIII utilization (preoperative dose to postoperative day 7 dose) per joint procedure for open and arthroscopic procedures in three eras of study period. Number of procedures listed above each column.

Results

The chart and record review identified 42 patients with hemophilia who underwent 46 elective orthopaedic procedures from January 2004 to February 2017. The mean age of subjects at the time of surgery was 45 years. The number of procedures by era was 23 (2004 to 2009), 8 (2010 to 2012), and 15 (2012 to 2017), and all subjects were male.

Hemophilia severity

The review found 31 patients (74%) had severe hemophilia, 5 patients (12%) had moderate hemophilia, and 6 patients (14%) had mild hemophilia. Of the patients with severe disease, 26 had factor VIII deficiency and 5 had factor IX deficiency.

The proportion of patients with severe hemophilia was the same in the early prophylaxis era and the transition era. However, in the established era there was a decrease of more than 30% in the proportion of patients with severe hemophilia, indicating that a larger proportion of patients with mild to moderate hemophilia have been treated since 2012.

Types of procedures

Knee, elbow, and ankle procedures were

common in all three eras [Figure 1], with knee procedures predominating in the early era (48% of surgeries) and ankle procedures predominating in the established era (60% of surgeries). A total of six other procedures were performed from 2004 to 2017, including four hip, one shoulder, and one ankle joint soft-tissue surgery.

Coagulation factor utilization

While factor VIII and factor IX were both used during the study, factor IX utilization data in each era were not compared because of small sample sizes.

Factor VIII utilization was considered to include doses (u/kg) used for prophylaxis and/or bleeds from the preoperative period to postoperative day 7. Utilization changed from the early prophylaxis era to the established era, decreasing by 35% for knee procedures and by 44% for ankle procedures. Overall, knee procedures required more factor VIII than surgeries for other joints [Figure 2].

Factor VIII utilization was compared for two periods: the preoperative to postoperative day 7 period and the postoperative day 8 to 14 period. However, because postoperative day 8 to 14 data were not consistently available for

the early and transition eras, we were not able to determine how much factor VIII was administered in the two periods for these eras. We did determine that in the established era almost double the amount of factor VIII was used in the preoperative to postoperative day 7 period.

A comparison of arthroscopic and open procedures over the three eras revealed that 27% less factor VIII was used on average in arthroscopic surgeries in both the early prophylaxis and transition eras. Similarly, 10% less factor VIII was required on average for arthroscopic procedures than for open procedures in the established prophylaxis era [Figure 3].

Hospital length of stay

The median LOS for knee arthroplasty patients with hemophilia ranged from 4 to 7 days over the three eras. The median LOS for hip arthroplasty patients declined over the three eras from 7 to 3 days. These findings were similar to those in the Canadian Joint Replacement Registry (CJRR),⁶ except for the LOS of 7 days for knee arthroplasty in BC in the transition era compared with an LOS of 4 days reported by the CJRR [Table 1].

The median LOS for arthroscopic procedures was lower than for open procedures in all

three eras. The median LOS for open procedures ranged from 3 to 6 days, while the LOS for arthroscopic procedures ranged from 1 to 2 days [Table 2].

Postsurgical complications

Postsurgical complications were associated with 10 out of 46 procedures performed in the study period. These included early bleeds (2), delayed bleeds (2), infection (1), wound healing complication (1), and other minor complications such as extreme pain (1), joint non-union (1), and stiff postsurgical joint (2). No thrombotic complications occurred and no coagulation factor inhibitors developed. In addition, no surgical revisions or repeat surgeries were required for any of the 46 procedures.

One of the early bleeds occurred on postoperative day 1 of an open total elbow replacement. This was quickly identified and required additional coagulation factor VIII for management. The second case of postsurgical early bleed occurred on postoperative day 5 of an open total hip replacement and did not require

additional coagulation factor replacement but resolved spontaneously.

The first of the two delayed bleeds occurred 7 to 8 weeks after an open total knee replacement, and the second was a 10-week postoperative spontaneous ankle bleed following an arthroscopic ankle synovectomy and joint debridement procedure.

Conclusions

Orthopaedic procedures for adult hemophilia patients in BC have shifted from mainly knee surgeries to mainly ankle surgeries over the past 13 years, and patients with mild to moderate hemophilia now represent a larger proportion of cases than they did before 2012.

Study findings also suggest that centralization of care has allowed for better communication and monitoring among the surgical and hematology teams in BC and resulted in a reduction in coagulation factor VIII utilization per case without untoward surgical complications. Hospital LOS data for BC cases were found to be similar to national LOS data, with

LOS rates in general declining over time. Reductions in both coagulation factor utilization and hospital length of stay contribute to the cost-effectiveness of treatment.

Increase in ankle procedures

Although few studies have described recent trends in musculoskeletal procedures in the hemophilia population, the literature does reflect the clinical observation that procedures for the knee, elbow, and ankle (index joints) are most common, while procedures for the hip, shoulder, and wrist are less common.^{7,8} Weight bearing is known to make the ankle and knee joints prone to trauma, and it is hypothesized that walking initiates hemarthrosis and leads to subsequent synovitis. The attempt of the synovium to eliminate the excess blood results in synovial inflammation and proliferation and creates a vicious cycle of hemarthrosis-synovitis-hemarthrosis, which eventually leads to chronic inflammation and joint arthropathy.⁸ This was confirmed in a study by Gamble and colleagues, which identified the ankle as the first site of bleeding in early childhood. Because of continuous trauma with participation in activities, the ankle is the most common site of hemophilic arthropathy in the second decade of life.⁹

When Jackson and colleagues studied a large cohort of adult Canadian hemophilia patients, they found that the high prevalence of ankle arthropathy was not reduced in younger adults who used coagulation factor prophylaxis compared with older adults, whereas the prevalence of elbow and knee arthropathy was significantly reduced.¹⁰ Thus it can be expected that ankle procedures will continue to predominate in future unless better methods of bleeding prevention are implemented.¹¹

Reduction in severity

This study found a decrease in the proportion of hemophilia patients with severe disease undergoing orthopaedic procedures in the established era (2012 to 2017) compared with the two earlier eras (2004 to 2009 and 2010 to 2012). This could be largely due to higher rates of prophylaxis in recent years. With sufficient prophylaxis, patients' bleeding phenotype is milder, which would reduce, although not

TABLE 1. Median length of stay (LOS) in hospital for BC knee and hip arthroplasty patients with hemophilia compared with national LOS data from Canadian Joint Replacement Registry (CJRR), 2004 to 2017.

	LOS for total knee arthroplasty		LOS for total hip arthroplasty	
	BC	CJRR	BC	CJRR
2004–2009 Early prophylaxis era	5 days	4 days	7 days	5 days
2010–2012 Transition era	7 days	4 days*	—	4 days*
2012–2017 Established era	4 days	3 days†	3 days	4 days†

*CJRR median value for 2011–2012, †CJRR median value for 2013–2014

TABLE 2. Median length of stay (LOS) in hospital for BC patients with hemophilia undergoing open and arthroscopic joint surgery, 2004 to 2017.

	LOS for open surgery	Number of open procedures	LOS for arthroscopic surgery	Number of arthroscopic procedures
2004–2009 Early prophylaxis era	5 days	14	2 days	6
2010–2012 Transition era	6 days	4	1 day	4
2012–2017 Established era	3 days	6	2 days	9

totally prevent, associated musculoskeletal complications of hemophilia.^{10,12} This may not have been the case in the first two eras of our study, when on-demand treatment in response to bleeding was more common for our patients. In the established era, eight surgical patients with severe disease were using on-demand treatment and as a result can be expected to develop arthropathy requiring intervention. Two of these patients had undergone orthopaedic procedures in previous eras of the study period.

Reduction in factor VIII utilization

The observed reduction in coagulation factor VIII utilization over the study period largely resulted from alignment with international guidelines⁵ and an understanding that higher doses provoke coagulation factor inhibitor development and postoperative thrombotic events. The high cost of the coagulation factor concentrates was also a factor in reducing utilization. This study provides reassuring outcome data to support the safety of reducing factor VIII utilization with close monitoring and follow-up from coordinated multidisciplinary teams.

Reduction in LOS

The median hospital length of stay for BC hemophilia knee arthroplasty patients ranged from 4 to 7 days over the three eras, while the LOS for hip arthroplasty patients declined over the years from 7 to 3 days. Despite these findings being similar to those reported in the CJRR,⁶ no reliable conclusions can be made based on these given the small sample size for certain groups. It is plausible that an extra day or two of admission is necessary to ensure patients receive the intended coagulation factor replacement, particularly for patients with less severe disease who are not accustomed to administering their own replacement therapy. However, the use of prophylaxis in the later eras, as well as less invasive surgical procedures and more advanced rehabilitation programs, are likely

contributing factors in the reduction of postoperative hospital LOS for hemophilia patients. This can be seen in the shorter median LOS for arthroscopic procedures that ranged from 1 to 2 days compared with the longer median LOS of 3 to 6 days for open procedures.

A study by Pakzad and colleagues in 2014 found patients with open ankle fusions had hospital stays 1.36 times longer than patients who had undergone arthroscopic ankle fusions, and identified a similar trend for total ankle replacements compared with arthroscopic ankle fusions.¹³ These differences are largely related to reduced postoperative pain after arthroscopic procedures compared with open procedures, which contributes significantly to shorter postoperative hospitalization.^{14,15} In addition, arthroscopic procedures are known to contribute to significant cost-savings over open procedures owing to this shorter hospitalization time and significantly less intraoperative blood loss.¹⁴

Thromboembolism risk

In patients without hemophilia, orthopaedic procedures such as knee arthroplasty are associated with an increased risk of venous thromboembolism when thromboprophylaxis is not used. In patients with hemophilia, the risk of bleeding means that most centres do not use thromboprophylaxis in tandem with coagulation factor replacement therapy.¹⁶ The Adult Bleeding Disorders Program of BC does not use thromboprophylaxis for hemophilia cases, and it is reassuring that in our experience over 13 years no cases of clinical thromboembolism were observed.

Study limitations

One limitation of this study was small sample size for certain groups, which is largely due to the rarity of hemophilia itself. Another limitation was inconsistent data collection for certain outcomes. The database we relied on did

not consistently and continuously track factor VIII and factor IX utilization for postoperative days 8 to 14 (after hospital discharge). As well, the study did not evaluate patient-reported outcomes.

Future studies might focus on expanding the database to incorporate more outcome data from patients and other centres and provinces. This will create a larger and more robust database that can provide readily accessible results to physicians and surgeons managing hemophilia patients.

Summary

This retrospective study demonstrates that over the past 13 years orthopaedic procedures for adult hemophilia patients in BC shifted from mainly knee surgeries to mainly ankle surgeries. Our review provides a long-term profile of these patients and shows the adequacy of previous and current management strategies. We have learned that having a dedicated, specialized hemophilia treatment centre with the surgical team in close proximity has allowed for better communication and support of patients throughout the management process, and better and more cost-effective care of BC hemophilia patients overall. ■

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Competing interests

Dr Younger is a consultant for Wright Medical Group N.V., Acumed, Zimmer Biomet, ConMed Linvatec, Bioventus, Axolotyl Biologix, and Cartiva. He receives royalties for a book published by Lippincott, and institutional support from Wright Medical Group N.V., Bioventus, Acumed, Zimmer Biomet, Arthrex, DePuy Synthes, and Cartiva. He is a partner in the Cambie Surgery Centre, the Specialist Referral Clinic, and the Footbridge Centre for Integrated Orthopaedic Care. Regarding the

Having a dedicated, specialized hemophilia treatment centre with the surgical team in close proximity has allowed for better communication and support of patients.

study described in this article, Dr Younger received no fees or institutional support from any of the companies named. The other authors of this article have no competing interests to declare.

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Noncardiogenic pulmonary edema associated with ultrapotent opioid overdoses

A study of overdose patients presenting to two emergency departments in BC found the incidence of fentanyl-related pulmonary edema was similar to that found in previous studies focusing predominantly on heroin overdoses.

ABSTRACT

Background: Noncardiogenic pulmonary edema is a rare but potentially fatal complication of opioid overdose that must be recognized and managed promptly. The typical presentation includes persistent hypoxia and radiographic findings of bilateral pulmonary infiltrates. Previous studies of pulmonary edema associated with opioids have focused on heroin and not considered drugs such as fentanyl, which make up an increasingly large proportion of the illicit drug supply in BC.

Methods: A retrospective chart review was conducted to determine the incidence of noncardiogenic pulmonary edema in patients with

symptoms of opioid overdose presenting to two Vancouver emergency departments from 1 January 2014 to 31 October 2016. Health records were reviewed for all patients who received naloxone or whose chief complaints suggested an opioid overdose. Noncardiogenic pulmonary edema was identified based on radiographic findings of acute bilateral pulmonary infiltrates not attributable to causes other than opioid use.

Results: Reviewers considered 2397 charts. After inclusion and exclusion criteria were applied, 962 charts remained. Radiographic evidence of noncardiogenic pulmonary edema was found in the charts of 11 patients (1.1%). Three of these patients (27%) required intubation. The remaining eight patients were treated with oxygen supplementation alone. Symptoms resolved within 24 hours for the majority of patients. Of the 11 patients, one died after cardiac arrest and all others were eventually discharged.

Conclusions: In cases of ultrapotent opioid overdose, the incidence of noncardiogenic pulmonary edema and the clinical course of affected patients were similar to those found in previous studies that looked predominantly at heroin overdose cases. This suggests that the risk of developing pulmonary edema from an overdose with an ultrapotent opioid is not greater than the risk posed by an overdose with a less potent opioid such as heroin.

Background

Noncardiogenic pulmonary edema (NCPE) is an uncommon but potentially fatal complication associated with opioid overdoses that must be recognized and managed promptly. The typical presentation includes persistent hypoxia despite attempts to reverse opioid-induced respiratory depression and radiographic findings of bilateral pulmonary infiltrates. The pathogenesis of this condition was first described in 1880 by William Osler and remains unclear to this day. Possible mechanisms for NCPE include lung injury from direct opioid exposure, tissue hypoxia, inspiration against a closed glottis, and catecholamine surge following naloxone administration.¹

Previous studies of pulmonary edema associated with opioids have focused on heroin and not considered drugs such as fentanyl, which make up an increasingly large proportion of the illicit drug supply in BC. In April 2016 a public health emergency was declared in the province following an alarming rise in fentanyl-related overdoses and deaths. In the course of 5 years the number of drug-related fatalities increased more than fivefold, rising from 269 deaths in 2012 to 1452 deaths in 2017, with fentanyl being detected in 76% of cases [Figure].²

Given the high percentage of fentanyl-related deaths identified in British Columbia, a study was proposed to determine the incidence and clinical characteristics of

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noncardiogenic pulmonary edema associated with ultrapotent opioids.

Methods

A retrospective chart review was conducted to determine the incidence of noncardiogenic pulmonary edema in patients with symptoms of opioid overdose presenting to emergency departments at two tertiary care hospitals in Vancouver from 1 January 2014 to 31 October 2016.

Health records were reviewed for all patients who received naloxone or whose chief complaints suggested an opioid overdose. Documents pertaining to each hospital visit were considered, including emergency health service notes, nursing notes, consultation summaries, and discharge summaries. Relevant chart information from eligible patients was collected using REDCap software (<https://projectredcap.org>). Noncardiogenic pulmonary edema was identified based on radiographic findings of acute bilateral pulmonary infiltrates not attributable to causes other than opioid use.

The chart reviews were completed by emergency medicine research assistants and trained medical students. In cases with ambiguous findings, additional reviews were completed by a panel consisting of two medical toxicologists and one emergency nurse.

Ethics approval for the study was obtained from the UBC Clinical Research Ethics Board (certificate H16-01446).

Results

Reviewers considered 2397 charts describing a possible drug overdose or naloxone administration. After applying inclusion and exclusion criteria [Table], 962 charts remained to be reviewed for evidence of NCPE, patient demographic characteristics, patient management, and patient disposition.

Radiographic evidence of NCPE was found in the charts of 11 patients (1.1%). No repeat cases of NCPE were found.

The combined mean age of all 962 patients whose charts were reviewed was 40 years (range 19 to 96). Of these, 714 patients were male (74.2%) and 248 were female (25.8%).

The mean age of the patients with NCPE was 49 years. Four patients were female with

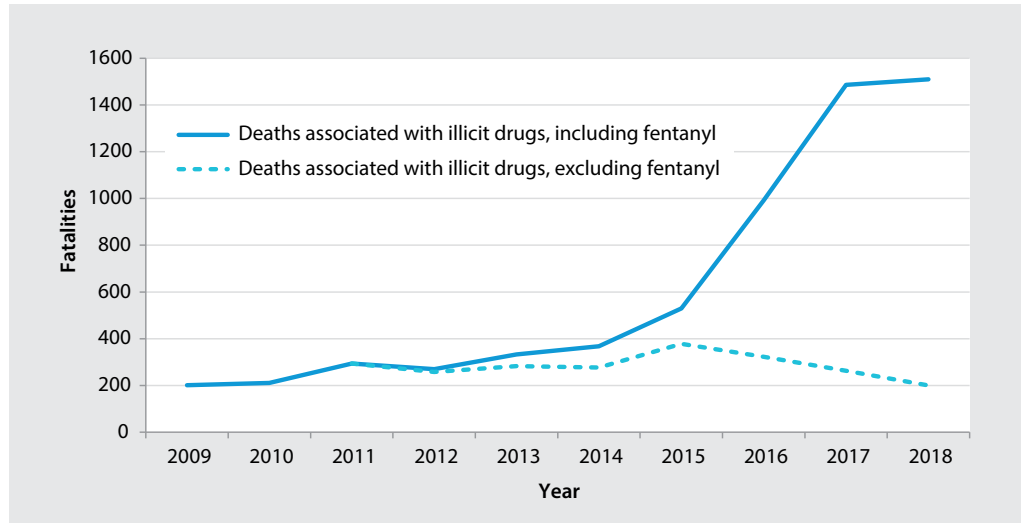


FIGURE. Comparison of illicit drug overdose deaths in BC including and excluding fentanyl, 2009 to 2018. Source: British Columbia Coroners Service.

a mean age of 40 (range 32 to 46) and seven patients were male with a mean age of 51 (range 17 to 65).

Management

Of the 11 patients who developed NCPE, 9 received naloxone from emergency health services before arriving at the hospital and 2 received naloxone in the ED. No patients underwent bystander naloxone resuscitation. One patient received 4 mg of naloxone after he was found in cardiac arrest from intranasal fentanyl use, and all others received initial naloxone doses between 0.2 mg and 1.2 mg.

Three patients (designated 1, 2, and 3) were intubated, one in the field when he was found in cardiac arrest secondary to opioid toxicity, and two in the ED due to respiratory failure.

Patient 1 was found in asystol 1 hour after overdosing on intranasal fentanyl. He was intubated and resuscitated. Subsequently he was found to have sustained severe and irreversible

hypoxic brain injury and the decision was made by the family to withdraw care.

Patient 2 was initially found in respiratory arrest. He became tachypneic and extremely agitated after naloxone resuscitation, eventually requiring sedation with midazolam. He was intubated after he continued to decompensate, with oxygen saturation of 77%, respiratory rate of 28 breaths per minute, and systolic blood pressure of 77 mm Hg. Patient 2 was intubated for 30 hours and after extubation left hospital against medical advice.

Patient 3 was also found in respiratory arrest and was intubated for failure to maintain airway patency. Following naloxone resuscitation, he opened his eyes and became tachypneic at 30 breaths per minute but was unable to vocalize. Ventolin and epinephrine were administered with no response, three more doses of naloxone were administered, and then he was intubated for impending respiratory failure. This patient self-extubated 2 days later and received 7 days

TABLE. Criteria for study of patients with opioid-related noncardiogenic pulmonary edema.

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> • Patient presented to the emergency department with symptoms of opioid overdose, 1 January 2014 to 31 October 2016. • Patient was treated with naloxone. 	<ul style="list-style-type: none"> • Health records did not contain enough information for review. • Health record review indicated that patient did not have opioid overdose.

of treatment for an aspiration pneumonia before discharge.

Of the eight patients who were not intubated, four were persistently hypoxic with oxygen saturations ranging from 77% to 87% despite naloxone administration and adequate respiratory rate response. One of these patients developed a respiratory rate of 34 breaths per minute with oxygen saturation of 77% on 6 L of oxygen and coughed up pink frothy sputum following the reversal of opioid toxicity. She was admitted to a ward and discharged within 48 hours. Another patient was transferred to the ICU for recurrent hypoxia and re-sedation requiring a naloxone infusion. All patients were treated with oxygen supplementation by nasal prong or simple face mask to maintain oxygen saturations above 92%.

Disposition

Of the 11 patients with NCPE, one died and the rest were eventually discharged.

Looking at the eight patients who were not intubated, hypoxic symptoms resolved within 24 hours in six patients, and by 48 hours in the other two. Regarding disposition from the ED, one patient was admitted to the ICU for monitoring because of recurrent episodes of hypoxia, four were admitted to a ward, and three were discharged home.

Of the four patients admitted to a ward, one patient was admitted for treatment of rhabdomyolysis and one was admitted because he developed *Clostridium difficile* infection following antibiotic treatment in the ED for a presumed aspiration pneumonia. This patient had a WBC count of 15.3×10^9 /L but was afebrile and his sputum culture results were negative. Radiographs revealed “patchy opacities” and “findings of probable mild edema.” Aspiration pneumonia could not be definitively ruled out in this case, but is unlikely.

Conclusions

To our knowledge, this is the first study to consider noncardiogenic pulmonary edema in patients presenting to the ED with symptoms of ultrapotent opioid use. NCPE is a well-recognized but rare complication of opioid use that has been studied in cases involving heroin but not in cases involving ultrapotent opioids such as fentanyl. In British Columbia, where a public health emergency was declared following a rise in fentanyl-related overdoses and deaths, we found an NCPE incidence of 1.1%, which is similar to the previously reported incidence from heroin use.

Three retrospective studies of NCPE associated with heroin use have shown incidence rates of 0.8%,³ 2.4%,⁴ and 2.1%.⁵ This last rate found by Sporer and Dorn⁵ is notable for being from the most recent and largest case series (N= 27) of heroin-associated NCPE.

Higher incidence rates were found in two older studies. For example, a retrospective study of 149 heroin overdose patients presenting to a New York inner-city hospital between 1968 and 1970 reported 71 cases of pulmonary edema (48%).⁶ Another study of 39 patients with heroin-related symptoms presenting to Johns Hopkins Hospital between 1964 and 1969 reported eight cases of pulmonary edema (21%).⁷ The two studies, however, considered only heroin overdose patients admitted to hospital and were therefore subject to significant selection bias. One would expect a higher proportion of NCPE cases in admitted patients than in those presenting to the emergency department with heroin overdose symptoms.

Both our study and Sporer and Dorn⁵ found similar intubation rates (27% and 33%,⁵ respectively) and reported that all other patients were managed with supplemental oxygen by nasal prong or simple face mask. In all cases, respiratory failure was apparent within the first half hour following reversal of the overdose. Patients who were not intubated also followed

similar clinical courses in the two studies. In our study, symptoms resolved in 75% of patients within 24 hours and in 25% of patients by 48 hours. In Sporer and Dorn’s study, symptoms resolved in 74% of patients within 24 hours and in 26% of patients by 48 hours.⁵ These findings suggest that ultrapotent opioids are not associated with higher rates of respiratory failure requiring intubation than heroin.

Though the exact pathophysiology of NCPE remains unknown, autopsy results have shown that nearly all patients who have died after an opioid overdose have findings of pulmonary edema. This suggests that the cause of the pulmonary edema may be a primary effect of opioids rather than a response to naloxone or the associated opioid withdrawal response.^{8,9} If this is the case, then the increased efficiency of emergency medical services in providing naloxone in the field may have reduced the incidence of heroin-related NCPE over the past 50 years in the same way that prehospital care appears to have reduced heroin-related deaths.⁴ All patients in our study were given naloxone prior to imaging, so it is difficult to separate the effects of the opioid from the effects of the naloxone in the development of NCPE. Additionally, not all patients showed overt clinical signs of pulmonary edema, so it was difficult to establish the time of onset.

Limitations of study

The study was subject to the limitations expected with a retrospective chart review methodology, including those related to incomplete or missing chart information and variations in physician practice patterns. This last limitation is especially relevant regarding the decision to obtain a chest radiograph. Our results could be an underestimation of the true incidence of NCPE, as some treating physicians may not have sent mildly symptomatic patients for radiographs. In addition, ED charts do not always accurately account for comorbid conditions and we may have unwittingly included cases of pulmonary edema attributable to causes other than opioid overdose.

Finally, the use of ultrapotent opioids in the cases studied is difficult to establish definitively, as these synthetic opioids are often found as contaminants in the illicit drug supply

**In our study,
symptoms resolved
in 75% of patients
within 24 hours and
in 25% of patients by
48 hours.**

and are not detected on typical urine screening tests. There is often no clinical utility in testing specifically for ultrapotent opioids, so the presence of these opioids is not reported. However, it appears that fentanyl is pervasive in the British Columbia opioid drug supply as it has been detected in up to 76% of illicit drug-related deaths,² and up to 86% of street drugs tested.^{10,11}

Implications of study

The incidence of NCPE in patients treated for ultrapotent opioid overdoses and their clinical course, including intubation rates and time to symptom resolution, were similar to those found in previous studies that looked predominantly at heroin overdoses. This suggests that the risk of developing pulmonary edema from an ultrapotent opioid overdose is not greater than the risk posed by an overdose with a less potent opioid such as heroin. ■

Acknowledgments

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Competing interests

None declared.

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The value of data: Identifying patient and community needs to inform primary care networks

BC's health care system is undergoing changes that will connect more patients with primary care and enable physicians to help patients access additional services and support. This involves increasing team-based health care through the creation of patient medical homes (PMHs) in family practices and forming primary care networks (PCNs) in communities that support longitudinal care provided by PMHs. As of June 2019, nine divisions of family practice have announced plans to form PCNs in their communities. An additional 16 divisions are planning to undertake the PCN expression of interest process in the coming months.

Data from physician practices are key to taking a practice to the next level as a PMH and enabling participation in team-based care and PCNs. Strong EMR data help identify how many patients are in the practice, what conditions those patients have, and the kinds of in-practice and team-based supports (like allied health providers) that can help provide proactive care for these patients. This in turn helps divisions understand the needs of patient populations and the broader communities as they plan PCNs.

To contribute accurate, up-to-date data to inform the PCN planning process, physicians can adopt PMH attributes in their practice and undertake the General Practice Services Committee's Phases of Panel Management.¹ As of May 2019, more than 1300 doctors around the province were involved in this work. Updating patient data through the Phases of Panel

TABLE. Supports for family doctors to update and manage patient data.

Support	Description	More information
Panel Management Workbook	Guides doctors and their teams step by step to improve panel data and proactively manage patients' care.	www.gpsc.bc.ca/what-we-do/professional-development/psp/panel-management#workbook
Practice Facilitation – Coaching and Mentoring	Provides personalized in-practice assistance, including coaching, action planning, and EMR optimization.	www.gpsc.bc.ca/what-we-do/professional-development/psp/coaching-and-mentoring
Panel Development Incentive	Compensates eligible family doctors for their time and effort to develop and manage panels.	www.gpsc.bc.ca/what-we-do/longitudinal-care/incentive-program/panel-development-incentive
EMR Optimization	Supports doctors in making the best use of EMRs and undertaking quality improvement activities.	www.gpsc.bc.ca/what-we-do/professional-development/psp/emr-optimization
Doctors Technology Office (DTO) EMR Supports	Provides a number of EMR resources to help guide physicians in selection, migrations, and EMR escalations.	www.doctorsofbc.ca/resource-centre/physicians/doctors-technology-office-dto/health-technology-resources#tab-0-1 Email: DTOinfo@doctorsofbc.ca Call the DTO Support Desk: 604 638-5841

Management also benefits physicians and their patients in a number of ways:

- Identifying active versus inactive patients. One physician who is now proactively managing his patient panel through support from the Practice Support Program assessed his panel and discovered he had 1100 active patients (he had expected closer to 2000 as he had taken over a full-sized practice). This data prompted him to open his practice to new patients.²
- Identifying services and team members appropriately to best serve patients. Panel data enable physicians to advocate for appropriate resources to meet patients' needs, such as allied care providers.
- Using aggregated data to plan patient supports and services in the community as a whole. Physicians can choose to share their aggregated panel data with divisions to identify the broader needs of the community, inform the division's PCN expression of interest process, and help budget for the supports patients need.
- Providing proactive and preventive patient care. With clean EMR data, doctors can pull lists of patients with specific needs and organize preventive screening and proactive processes for disease management. One physician reported that panel management enabled him to streamline his immunization registry and to more than double the number of patients who had a recorded flu vaccine status within 2 months.²
- Simplifying workflows to help with patient care, such as referral callbacks, reports, and

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

Patient Medical Homes

Family doctors can prepare their practice to move toward creating patient medical homes (PMHs). Panel management is a key step, enabling them to use EMR data for proactive care and practice planning.



96% of doctors and their practice teams are managing their patient panel with in-practice support from PSP

1,400+

GPs have started to manage their patient panel through PSP's Phases of Panel Management



Primary Care Networks

In divisions of family practice, physicians are collaborating with health authorities, First Nations and community partners to create new primary care networks (PCNs).



65% of divisions and their partners are planning PCNs



"We are excited to be a part of this PCN collaboration, knowing that patients in our practices and across the entire community will be well-cared for through more seamless access to the myriad of services they need." —Family Doctor, Burnaby

gpscbc.ca

accurate resources. Based on EMR data, Practice Support Program regional support teams can provide tailored supports to help physicians improve workflow efficiencies in specific areas, enabling them to focus on patient care.

- Keeping track of patient activities to bill effectively for services provided (e.g., complex care), earning extra revenue for the practice. In some cases, this extra resource may help to increase team-based supports in a practice.
- Improving patients' experiences of care. Panel management has been shown to increase continuity of care, meaning that the patient's experience of care is more coherent, consistent, and connected. This process is associated with improved patient-provider relationships, better coordinated care, and increased preventive and proactive care.

Supports for family doctors

The GPSC supports physicians to update and manage their patient data in a number of ways. Regional support teams, panel assistants,* and remote EMR services* are available through the Practice Support Program to help physicians clean up their data, and the Panel Development Incentive compensates eligible family doctors for their time and effort to develop and manage their panels. The Doctors Technology Office (DTO) provides EMR supports as well. See the list of GPSC and DTO supports, along with links to additional information [Table].

More information on primary care networks

To learn more about primary care networks, visit the GPSC website (www.gpscbc.ca/what-we-do/system-change/primary-care-networks) and contact your local division of family practice

to find out how to contribute to PCN planning and implementation in your community.

—Alana Godin

Director, Community Practice and Quality, Community Practice, Quality and Integration Department

—Afsaneh Moradi

Director, Community Partnership and Integration

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*Panel assistants and remote EMR services are currently only available in PCN communities.

Human health implications following detection of oxycodone in mussels collected in Washington State

The Washington Department of Fish and Wildlife, in collaboration with the Center for Urban Waters (University of Washington Tacoma), reported detecting contaminants of emerging concern (CECs) in transplanted mussels collected in 2012/2013 from locations near urbanized areas around Puget Sound. In 2018 investigators reanalyzed mussel tissues collected in 2012/2013 and identified over 200 pharmaceuticals, including trace amounts of antidepressants, antibiotics, detergents (synthetic surfactants), cardiac medications, and the chemotherapy drug melphalan, among others.^{1,2} They also found traces of oxycodone in mussels taken at 3 of 18 locations (17%). The finding of an opioid in mussels received extensive media coverage.²⁻⁹

CECs in water

Pharmaceuticals enter the aquatic milieu through human consumption and subsequent excretion in urine or when people flush pills into the wastewater system.^{3,5,10} Effluent released from wastewater treatment plants into nearby aquatic environments has been shown to contain a variety of CECs.^{5,11-13} Conventional wastewater treatment partially removes pharmaceuticals, including opioids.¹⁴ Concentrations of CECs in wastewater have been used to monitor shifting patterns of opioid use in the US,¹⁵ Spain,¹⁶ Croatia,¹⁷ Norway,¹⁸ and Australia¹⁹ (in the case of oxycodone^{20,21}).

CECs in mussels

Mussels are useful sentinel species because of their wide geographic distribution and ability to

bioaccumulate contaminants from surrounding waters.^{22,23} Unlike finfish, mussels do not have the ability to filter out or metabolize pharmaceuticals, including oxycodone. A recent Ontario study compared oxycodone concentrations in water against those in mussels, leading to the calculation that mussel tissue accumulates 9.86 times (84% CI, 0-24) the concentration of oxycodone in water.²²

Environmental implications

Detection of CECs, including opioids, in water and mussels is ecologically important as they affect the growth of organisms, their hormone systems, and reproductive capacity.^{3,9,24-27} Few studies have investigated the effect of CECs on the marine environment, and nearly all have focused on marine mammals²⁸ and on risks associated with long-term exposure to compounds with bioaccumulation potential, such as endocrine disrupting compounds.²⁹

Human health implications

In spite of the ecological risk, the likelihood of adverse effects to humans from consuming shellfish contaminated with oxycodone appears negligible. First, mussels in the Washington State study were collected near urbanized areas and not from protected commercial shellfish beds.^{1,3,6} Second, the potential dose of opioids from this source would be extremely low: investigators provided us with macerated mussel oxycodone concentration results at their Seattle and Sinclair Inlet/Bremerton sites of 1.5 ng/g, 1.2 ng/g, and 0.68 ng/g of meat (oral

communication with James West, Marine Resources Division, Washington Department of Fish and Wildlife, 25 June 2018).³⁰ We calculate that for a person to ingest 10 mg of oxycodone, given the highest reported concentration of 1.5 ng/g, they would need to consume 6700 kg of mussel meat, or about 466 660 mussels. Finally,

there are no known case reports of adverse events from the consumption of shellfish contaminated with opioids. Clinicians can advise patients that they are at little risk of hazardous exposure to opioids from consumption of commercial mussels.

CECs in the environment

Although there is minimal risk to humans from mussels contaminated with trace amounts of opioids, the Washington study illustrates the larger issue of CECs in the environment and their potential adverse human health impacts. CECs of greatest concern include those which may not pose an immediate effect through acute exposure, as most of these contaminants are found in relatively small concentrations, but rather through long-term exposure, particularly for compounds with a high bioaccumulation potential.³¹ Key questions include the long-term safety profile of pharmaceuticals that bioaccumulate in marine environments, as well as the potential synergistic effect of exposures to mixtures of pharmaceuticals.^{10,32} Clinicians can help limit the entry of pharmaceuticals into the environment, and ultimately into the human food chain, by advising patients to return expired/unused medications to their local pharmacy.

Pharmaceuticals enter the aquatic milieu through human consumption and subsequent excretion in urine or when people flush pills into the wastewater system.

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Continued on page 267

GP IN ONCOLOGY TRAINING**Vancouver, 9–20 Sep and 3–14 Feb 2020
(Mon–Fri)**

The BC Cancer'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

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**ST. PAUL'S EMERGENCY MEDICINE UPDATE
Whistler, 26–29 Sep (Thu–Sun)**

Join us for the 17th Annual St. Paul's Conference. Four exciting days of learning, networking, and of course, recreation! We had over 300 attendees last year. Don't miss out! Pre-conference workshops: CASTED, HOUSE EM, CAEP AIME. Target audience: Any physician providing emergency care, emergency nurses, paramedics. Keynotes: Best literature of the past year (Dr Grant Innes, Dept of Emergency Medicine, University of Calgary); Sub-arachnoid hemorrhage—What the ED doc of 2019 needs to know (Dr Jeff Perry, Dept of Emergency Medicine The Ottawa Hospital); Gender and medicine in 2019—Where are we? Where can we go? How can we get there? (Dr Carolyn Snider, St. Michael's Hospital, Toronto); Managing stress in a high-risk environment (Mr Will Gadd, gold medalist, X Games). Conference details and registration: <https://ubccpd.ca/course/sphemerg-2019>. Phone: 604 675-3777; fax: 604 675-3778; email: cpd.info@ubc.ca. Accommodation: <http://bit.ly/sph2019reservations>.

**INFECTIOUS DISEASES DAY SYMPOSIUM
Surrey, 19 Oct (Sat)**

The 5th Annual Infectious Diseases Day Symposium will be held at UBC Lecture Hall, Floor B@ Critical Care Tower, Surrey Memorial Hospital. Topics for the morning sessions, 8 a.m. to 12 noon include didactic lectures on approach to hospital acquired infection; approach with empiric antibiotic therapy in patients with positive blood culture; approach to management of STI (resistance trend and

current treatment); approach in management of TB in the era of MDR and XRD tuberculosis; approach in management of common infectious syndromes in an outpatient settings; approach in management of infectious complications of biologics in reactivations of viral, mycobacterial, and fungal infections; approach in management of common fungal infections (aspergillosis, candida, and cryptococcus); approach in management of cognitively impaired patients with infection (delirium and dementia); human microbiome in state of health and illness. Afternoon workshop/breakout sessions (1 p.m. to 4 p.m.) will focus on most of the above topics and will be made available on a first-come first-served basis. Each participant can choose a maximum of three sessions based on seat availability. Maximum capacity for each session is 30. Each session has two relevant cases to discuss in approach and management by professors. Early registration is encouraged. Information and registration: <https://events.epl.com/Infectious-Diseases-Day-Symposium2019>.

**LIVE WELL WITH DIABETES
Richmond, 8–10 Nov (Fri–Sun)**

This conference returns to the Radisson Hotel Vancouver Airport for another comprehensive update in diabetes care. The 2019 agenda features evidence and research-based presentations designed for family physicians, allied health care workers, diabetes educators, podiatrists, and other health care professionals who have an interest in recent advances in diabetes. Featured themes: Working with(in) the system to coordinate multidisciplinary diabetes care; Controversies and current updates in diabetes care and research; From bench to bedside: Diabetes research and its application to patient management; How family physicians manage diabetes care in their patients; Confronting your fears: Managing diabetes alongside another chronic disease; Using nonpharmacological approaches in the management of diabetes; Pharmacological treatment of diabetes—What's new? What Works? What Doesn't? Program details and registration: <https://ubccpd.ca/course/lwd2019>. Phone 604 675-3777; fax 604 675-3778; email cpd.info@ubc.ca. Accommodation: reservations@radissonvancouver.com.

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Practice available from January 2020. Start time flexible over several months. All equipment including computer and furniture included for price of strata title or rent (820 sq. ft. office). This is a full general practice, can add obstetrics if wanted. Office is one block from Royal Jubilee Hospital in a medical rental professional building with recent renovations. If interested, please reply by email to ejmathes@hotmail.com or call 250 598-9230 weekdays.

VICTORIA—PRACTICE AVAILABLE

Well-established solo family practice available May 2020 at no cost for patient list. Patient demographics across all ages with an emphasis on seniors care. No obstetrics or hospital

work; however, residential care work available. Collegial call group of 20. Office space includes three exam rooms and one reserved parking stall in downtown area. Further details at 250 388-7123 or paulndeb@shaw.ca.

EMPLOYMENT

DELTA—GENERAL PRACTITIONER

Very busy, established family practice located on Scott Road. The practice consists mainly of Punjabi-speaking patients. Two spacious exam rooms available for the physician. Underground parking. No set-up fees or equipment required. Everything is included in the billing split (80/20). Potential to earn \$400 000 per year. Physician may decide their own schedule. Each exam room is fully equipped with everything required. EMR: Med Access. For more information contact Dr Jagtar Rai at raimedicalclinic@gmail.com.

EDMONTON, AB (HAMPTONS)—PHYSICIANS WANTED

A new medical centre is seeking to recruit full-time, part-time, or walk-in GPs, specialists who are looking to start a new practice to serve in a high-demand population with modern facilities and guaranteed income of \$400 000. We have an attractive split, flexible work hours, admin

support on site. Enquiries: 780 289-8752 or kniffyodets@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 Lisa Wall at 250 390-5228 or email lisa.wall@caledonianclinic.ca. Visit our website at www.caledonianclinic.ca.

NEW WEST—ROYAL CITY MEDICAL CLINIC: LOCUM, WALK-IN, FT FAMILY PRACTICE

This 12-exam-room, 3-physician clinic located in the mall is currently seeking a fourth associate to join as a full-time family physician. Relocation incentives, insurance benefits available for the right candidate. Locums and walk-in shifts also available at a competitive overhead. Please contact Richard at rw@bcdrug.com or visit www.elicare.ca.

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.

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CLASSIFIEDS

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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.

RICHMOND—LANSDOWNE MEDICAL CLINIC RECRUITING FT/PT FP, SPECIALISTS

Join our multiphysician team in Richmond at this beautiful, accessible first-floor walk-in clinic/family practice/specialist clinic. Managed by Elicare Medical Group, relocation incentives, competitive overhead, insurance benefits, and efficient practice management available. Please contact Richard at rw@bcdrug.com or visit www.elicare.ca.

RICHMOND—LOCUM TENANTS WANTED

Seeking locum clinical cardiologist FRCP(C), BC licensed, to cover consulting cardiology (call: 1 week out of 4). Possibility of permanent recruitment for Richmond Hospital. MOCAP payments, ECHO, EST, ECGs, Holters. Please reply to richmond.cardiology@gmail.com.

SOUTH 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.

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.

VANCOUVER/RICHMOND—FP/ SPECIALIST

The South Vancouver Medical Clinic seeks family physicians and specialists. Split is up to 80/20. Closing your practice? Want to work part-time? Join us to see only booked patients or add walk-ins for variety. Oscar EMR. Positions in Richmond also available. Contact Dr Balint Budai at tgr604@gmail.com.

VICTORIA—GP/WALK-IN

Shifts available at three beautiful, busy clinics: Burnside (www.burnsideclinic.ca), Tillicum (www.tillicummedicalclinic.ca), and Uptown (www.uptownmedicalclinic.ca). Regular and occasional walk-in shifts available. FT/PT GP post also available. Contact drianbridger@gmail.com.

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NANAIMO AND VICTORIA—DERMATOLOGY ROOMS AVAILABLE

Dermatology clinics/rooms available on Vancouver Island (Nanaimo and Victoria). Purpose built, well staffed and equipped. Suit new dermatologists, GP with dermatology interests, semi-retiring derm/GP. Contact Dr Julian Hancock at skinlaserdrh@gmail.com.

PORT COQUITLAM—SPACE IN ELICARE HYAMS MEDICAL CLINIC

Practise with Dr Ian Hyams in a 2100 sq. ft., eight exam room, shared physician office in a newly built family practice clinic in Port Coquitlam. For full-time physicians, this clinic features competitive overhead, relocation incentives, free patient parking, and extended insurance benefits. PLEXIA EMR. Contact Richard at rw@bcdrug.com or visit www.elicare.ca.

SICAMOUS—SPACE AVAILABLE PRIVATE MEDICAL CLINIC/ PHARMACY

Private medical clinic/pharmacy in a family-orientated community.

Community seeking general physicians. Currently available: 1500 sq. ft. in a shopping plaza next to Interior Health Community Services. Recently used as a dental practice, would make an ideal family medical practice. Check our website for current updates: www.parklandsicamous.com.

VERNON—GP OPPORTUNITY IN OKANAGAN VALLEY

We require a general physician for independent practice in a collegial setting (sharing reception room space with another GP in a professional building). Space is ready to be occupied immediately, or could receive minor renovations to suit incoming tenant. Ample patient supply would allow a start-up practitioner to quickly build a practice to any desired level of business. Vernon Jubilee Hospital is a modern 200-bed facility with extensive specialist support and optional privileges. Come enjoy the beautiful climate, setting, lifestyle, and everything else the Okanagan has to offer. Please reply to Dr Mark Wasyluk for more information: 250 550-7401, mwasyluk@shaw.ca.

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BCCDC

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While adverse health impacts have not been associated with the consumption of drinking water or seafood contaminated with pharmaceuticals,^{29,32} further research should include specific populations at increased exposure risk due to dietary practices, including Indigenous populations.³³ While there has also been concern about drinking water contaminated with CECs, there is minimal evidence of adverse effects.²⁹ Concentrations of pharmaceutical compounds in contaminated water are typically orders of magnitude below levels considered acceptable.³²

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References

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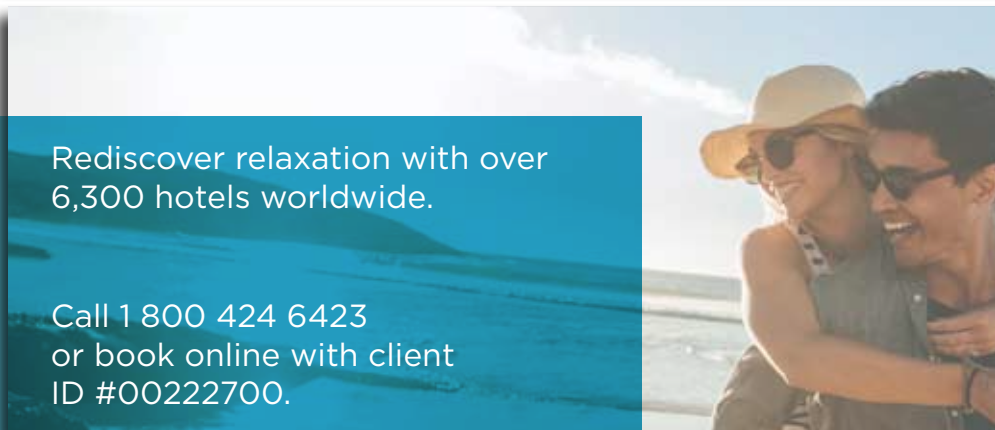
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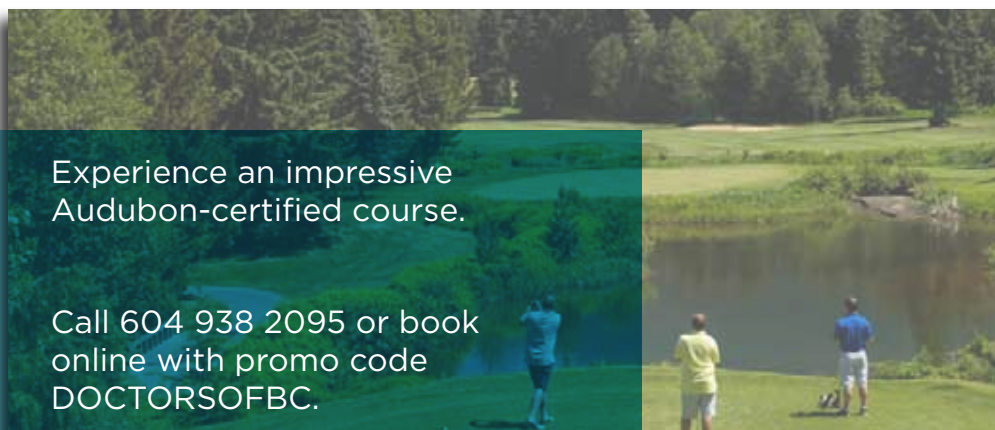
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