BC MEDICAL JOURNAL
60 YEARS OF PUBLISHING

BCMJ
BC Medical Journal

January/February 2018; 60:1
Pages 1–72

Breast cancer, Part 1: Issues in diagnosis

Breast cancer screening: A guide to discussion with patients

Evaluation of breast health concerns & diagnosis of breast cancer

Coordination of radiological & clinical care for breast cancer diagnosis

Hereditary breast cancer: Outcomes from the High-Risk Clinic

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January/February 2018
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contents

ON THE COVER

Though many breast complaints will not be the result of a malignancy, thorough assessment is still required to rule out a malignancy. The first of our two-part theme issue on breast cancer focusses on issues in diagnosis.

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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contents

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The evidence for evidence-based medicine

Years ago, when the phrase "evidence-based medicine" was first being popularized, my friend and colleague Dr Bob Meek remarked, "What's new about that?" He was correct; there was nothing new about the idea. In my experience, doctors have always tried to manage patients based on the best available evidence.

David Sackett, credited with popularizing evidence-based medicine defined it as the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients." Who could argue with that?

One group that seeks to impose unproven top-down protocols on clinicians calls itself EvidenceNetwork.ca. They show how one can hijack a theoretically good concept and manipulate the model to create what they believe are valid guidelines pertaining to clinical treatments in which they have little or no expertise. That particular group lists nonclinical self-proclaimed experts who offer "expert guidance" in those areas.

I believe there are two kinds of experts: those who are biased and know it, and those who are biased and don't know it. Few are capable of distinguishing between their own prejudiced beliefs and factual evidence. I subscribe to the view of theoretical physicist and quantum mechanics scientist, Richard Feynman, who wrote, "Science is the belief in the ignorance of experts."

History tells us experts are often wrong but seldom in doubt. Experts at Decca Records rejected the Beatles in 1962, stating, "We don't like their sound, and guitar music is on the way out." In 1927, Warner Brothers asked, "Who the hell wants to hear actors talk?" In 1974, Margaret Thatcher pronounced, "It will be years—not in my time—before a woman will become prime minister."

Some, naively, believe that their self-generated consensus opinions represent evidence and most, if not all, have inherent biases. The world literature cannot reassure us on the value of published expert evidence, even when peer reviewed.

There are a number of research scientists that know and understand the limitations in their field. I have been involved in randomized, prospective, double-blind studies, and I support their application where applicable.[1-2] I favor properly designed trials and objective studies when feasible, and I am lucky enough to have worked with some who exhibit scientific objectivity and understand the clinical role in analyzing research.[3]

The *BCMJ* is a peer-reviewed journal. We do our best to be objective, but it is vital that we recognize the deficiencies that exist in the process. In 1998, the editor of the *British Medical Journal* sent an article containing eight deliberate mistakes in design and analysis to over 200 peer reviewers. On average, the reviewers picked up less than two of the eight errors.

If written descriptions outlining Columbus's experiences in the Americas and Darwin's theory of evolution had undergone peer review by experts, both accounts would likely have been rejected as fantasy. Scientists at Amgen, an American drug company, could replicate only 6 of 53 published studies considered landmarks in cancer science, and John Ioannidis from Stanford has declared that most published research findings are probably false.

So what is the basis for our acceptance of evidence? One widely used approach is the concept of "null hypothesis." Data are collected and calculations made to determine significance. A *P* value below 0.05 (1 in 20), implies statistical significance. This is a commonly used and abused test in experimental studies and peer review. A famous example of harm, in a case involving thousands, occurred in the early 2000s when many Vioxx users died as a result of excessive faith in the so-called 5% rule of statistical significance.

There is a strong case for decision making based on best practices and evidence-based decision making. But that evidence needs to be validated by clinical outcomes and not be dependent on self-appointed overseers who lack appropriate expertise and knowledge in terms of clinical outcomes.

—BD

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Editorials continued on page 7

president's comment

Planting, growing, and nurturing networks of care

As we begin a new year it is an opportune time for us to focus on new approaches to working together and on the options for improving delivery of medical care in BC. For the gardeners among us, it is time to plant the seeds for the upcoming planting season. And just like them, it is time for us to start cultivating opportunities for working together as a medical profession in the coming year.

The *Oxford English Dictionary* defines a network as "a group or system of interconnected people or things." A community is defined as "a group of people living in the same place or having a particular characteristic in common." Both concepts are integral to the work in BC around networks of care. Networks are developing in different ways at many levels throughout our health care system.

We strive to deliver comprehensive quality medical care to patients in BC with limited resources and capacity to accomplish this goal. However, this past year practitioners converged to tackle this challenge, and networks and communities of practice are one of the innovative solutions.

One such network is the Child and Youth Mental Health and Substance Use (CYMHSU) Collaborative, supported by the Shared Care Committee, one of the Joint Collaborative Committees, representing a partnership of Doctors of BC and the BC government. The network of over 2600 includes hundreds of physicians joined by numerous community partners including police, school districts, Indigenous groups, community agencies, and those with lived experience, all who have been working toward the common goal of improving the lives of children, youth, and families with mental health and substance use issues in BC.

To date, 64 local action teams and 11 working groups have focused on practical, sustainable solutions that address communication barriers, service-delivery gaps, and coordination of care locally and system-wide. Much of the work of the Collaborative has focused on mitigating the impact of adverse childhood experiences (ACEs) and introducing trauma informed–practice and policy, more recently in collaboration with colleagues in Alberta, who attended an ACEs Summit in Vancouver to share details of their program with 600 attendees.

The BC Patient Safety and Quality Council recently recognized the Collaborative for this outstanding work with a 2018 Quality Award in the Living with Illness category.

I have written before about the GP Oncology Network at the BC Cancer Agency, an ongoing initiative supporting the multidisciplinary network of cancer care in the province. GPs with additional training in oncology help deliver care both at BCCA facilities and at Community Oncology Network clinics. Recently nurse practitioners have been added to this model. The successes of this approach are realized by providers working to the full scope of their professional abilities, team-based care models, respect for complementary skill sets, and good communication among the team.

October saw the launch of the BC Emergency Medicine Network. This virtual network links emergency physicians across the province with each other through a member's forum that allows for discussion and practice support. A variety of online clinical practice tools are available for members. Still in its infancy, the network has a long-term goal that includes real-time clinical peer-to-peer support through a digital platform. Check out the possibilities on its website, www.bcemergencynetwork.ca, and consider joining if you practise emergency medicine in BC.

The Rural Surgical Obstetrical Network is a project supported by the Joint Standing Committee on Rural Issues. It links rural practitioners with enhanced surgical, anesthetic, and obstetrical skills with specialists in larger centres for ongoing clinical and educational support. Strengthening relationships and opportunities to work together are key factors in stabilizing low-volume surgical and obstetrical programs.

Primary care networks are now on the horizon after several years of designing a specific approach for BC. With the implementation of community of practice led and designed patient medical homes and primary care networks, we expect significant progress this year as we tackle primary care access challenges across the province. Team-based care is a key element, but it starts with physicians supporting each other as we work together to address community needs.

All networks rely on specific communities of practice to efficiently and comprehensively address complex patient needs. Our challenge in all these networks is the need for infrastructure support to enable providers to actually do the job. We need to continue to grow relationships between GPs, specialists, and other providers.

Health authorities need to include physician expertise in program design to better serve the patient and improve relationships between physicians and administration. Government ministries need to break down the walls between their portfolios to address the needs of patients and communities in a coordinated way. Above all we need to identify, support, and grow the programs that will truly make a difference. We need all partners, including patients and communities, educators, administrators, and providers working together to wrap the care around the patient. These are the ingredients we'll need to grow the networks of care that will revitalize the health care system in British Columbia.

—Trina Larsen Soles, MD
Doctors of BC President

Editorials continued from page 5

A 60-year journey

If longevity is a sign of quality, then the *BCMJ* should be proud as we enter our 60th year of publication. Our humble journal started its journey as the voice of the doctors of BC in 1959.

Looking back at 1959, John Diefenbaker was prime minister of Canada, and Dwight Eisenhower was president of the United States. This was quite a monumental year for our southern neighbors as the states of Alaska and Hawaii joined the Union. At the same time the cold war and the space race were in full swing. Also, Fidel Castro had just come to power in Cuba, and the Dalai Lama was forced to flee Tibet. Finally, the St. Lawrence Seaway joining the Great Lakes with the Atlantic Ocean was completed.

Rawhide, *Bonanza*, and *The Twilight Zone* were TV highlights in 1959, while *Ben Hur* and *Some Like It Hot* were taking the big screen by storm. Music died one day in February as Buddy Holly, Ritchie Valens, and the "The Big Bopper" perished in a plane crash. Also, for better or for worse, Mattel released Barbie in 1959, and she quickly established her longstanding doll monopoly. Not to be outdone, Mr Potato Head, Play Dough, and the Hula Hoop were still going strong. Toy-shopping parents could be seen in drainpipe jeans, pedal pushers, and white T-shirts.

The scientific community had their own breakthroughs in 1959. A litter of rabbits was grown from an ovum that underwent in vitro fertilization, and for all of you lab geeks out there (you know who the two of you are) acrylamide was first used in gel electrophoresis. In medicine, mercury was discovered as the cause of Minamata disease, and the first allograft was performed. The first bone marrow transplants were done on five Yugoslavian men with radiation damage, but unfortunately all of them were rejected (the bone marrow, not the men). Also in this year, the first known case of human HIV disease was identified in the Belgian Congo.

In 1959 a new house would have set you back about $12 400, while you earned $5010 per year. You would have shelled out $2200 for your new car, and paid 25 cents per gallon to fill it with gas. A loaf of bread cost 20 cents, and a movie ticket was a dollar.

The *BCMJ* remains a valuable educational voice written primarily by BC physicians for BC physicians.

Many things have changed since 1959, but not the *BCMJ*. It remains a valuable educational voice written primarily by BC physicians for BC physicians. The current Editorial Board is committed to producing a quality journal that honors the legacy handed down by those whose roles we now fill. To celebrate our 60th year, keep your eyes open for little reminders of the years that have passed sprinkled throughout our 10 issues of 2018.

Here's to 60 more. **—DRR**

BC MEDICAL JOURNAL
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letters to the editor

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

BC needs to prioritize health beyond health care

By late summer, 2017 had seen the death of 1013 British Columbians due to the opioid crisis.[1] Though considerable progress has been made through distribution of naloxone kits, increased treatment programs, and the opening of supervised consumption and overdose prevention sites, BC seems on track this year to nearly double the number of deaths in 2016.

High-risk substance use is often fueled by homelessness, child poverty, lack of meaningful employment, and colonial systems that disrupt Indigenous peoples' connections to land and community. These issues cannot be fixed solely through the health system; they require other ministries like Labour, Housing, and Education. In order to address the upstream determinants of health, government decision-makers need to consider how policies in other sectors can affect the public's health.

Health in all policies (HiAP) is an approach supported by organizations like the World Health Organization and Canadian Medical Association.[2,3] Under HiAP, government policies that might affect population health undergo health impact assessments, no matter what ministry develops them. For example, if the Ministry of Education closed a school, it could be required to address health impacts like families' use of active transportation (walking and biking to school), social services for at-risk families, and delivery of food security programs. Within Canada, Quebec has already adopted HiAP.[4] Farther from home, Scandinavian countries have seen success using this approach to coordinate agencies to combat health issues such as heart disease.[5]

The Ministry of Health cannot stand alone in tackling the acute and chronic health issues. While the designation of a Minister of Mental Health and Addictions signals interest in broadening health leadership beyond traditional siloes, there are still additional opportunities for collaboration. By embracing a HiAP approach, the province could reduce the burden on the health care system and improve the health of British Columbians.

—Alex Choi, MD, MHSc, CCFP
—Alexis Crabtree, MD, PhD, MPH
—Geoff McKee, MD, MPH
Vancouver

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Speaking to patients about concussions: Does our terminology impact recovery outcomes?

Perception is a subjective phenomenon and, when it comes to medical conditions, it is clear that each person has their own perception of their ailment. Notably, the perception can be positive or negative and can have an immense impact on a patient's adherence to treatment, recovery, and associated outcomes.[1-3] The association of a patient's mindset with their clinical outcomes has been demonstrated in a number of conditions, including myocardial infarction, rheumatoid arthritis, type 2 diabetes mellitus, chronic kidney disease, head and neck cancer, and mild traumatic brain injury (mTBI).[1,2]

Importantly, it has been suggested that perception may be shaped by the terminology clinicians employ to describe the illness.[3] Whereas the terms *concussion* and *mild traumatic brain injury* are often used interchangeably in the medical community, the clinical appropriateness of the nomenclature continues to be debated.[4] The terms may convey altered messages to patients, and it has been argued that only *concussion* communicates the transient nature of impaired neurological function.[4] A negative illness perception in mTBI patients results in increased risk for persistent symptoms, and the term *concussion*, in

Continued on page 10

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Continued from page 8

contrast to *mTBI*, is strongly predictive of earlier hospital discharge and earlier return to school.[2,5]

Frostholm and colleagues[6] suggest that discussions with patients about their ideas of an illness could help resolve misconceptions and reduce the risk of health problems developing into chronic conditions. Despite the lack of consensus, the potential influence of terminology on patient expectations and outcomes should not be underestimated. Reiterating these concepts to medical trainees, in the context of mTBI and the conditions listed above, could be an important intervention to counteract negative illness perceptions and thus improve outcomes.

—Sarah Fraser, BSc
MD Candidate, UBC Southern Medical Program, Class of 2019
—Alexander D. Wright, PhD
MD Candidate, UBC Southern Medical Program, Class of 2019
—Paul van Donkelaar, PhD
School of Health and Exercise Sciences, UBC Okanagan
—Jonathan D. Smirl, PhD
School of Health and Exercise Sciences, UBC Okanagan

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Re: A chill in the air

I am an old man. I sat at the heels of Sir Alexander Fleming in London and discussed cases with Sir Denis Burkitt in Uganda.

Thankfully, I have not had to experience the humiliation of Dr Chapman's colleagues under the faceless bureaucrats who intimidate the doctors and nurses working our present-day institutions.

Your readers will find this hard to believe, but I was once present at a medical staff meeting with a board of governors regarding a hospital administrator who, from evidence presented by the doctors, was relieved of his position.

I do urge Doctors of BC to support, in every way, those members who have been unfairly dismissed and to slow down the inexorable theft of our profession by bureaucracy.

—Robert Holmes, MD
Nicola Valley

Re: Two-for-one health care: A Canadian compromise

I would like to comment on the proposal for permitting private health care by a surcharge system in BC. The notion that users of a private health care channel for accessing services that are rationed in Canada should pay additional taxes deserves some comment and thought.

Canadians have been burdened by increasing taxes based on the Liberal government's propensity to overspend their revenue base and create unsustainable deficits.

The increasing tax burden is, to a considerable extent, caused by a political will to increase the number of individuals paid by government ministries as a redistribution of wealth "fairness notion." This tax burden, which we pay with little complaining, is about to get higher with little increase in government services. Citizens pay taxes so that medical services can be provided, but because the revenue generated is not sufficient to pay for "free services" we must all experience rationing. Now, Dr Andrew Kotaska [*BCMJ* 2017;59:526-527] tells us that we should pay for our services three times. Once by paying a high tax rate to cover basic medicare, the second time by making private arrangements to access nongovernmental health care facilities, and then a third time by paying a tax penalty for getting timely care that the government has decided to ration.

This might seem fair to Andrew, but it does not qualify as fair in my view. Government has been unwilling to add any user-pay features that would supplement health care funding and moderate demand to the system, so we must ration care via a universal slow delivery model.

This equation should not be fixed by application of Andrew's Band-Aid.

—Jack Pacey, MD, FRCSC
Vancouver

Development of an interdisciplinary student-run health care clinic

There has been growing support for an interdisciplinary health care model, which has demonstrated better outcomes for patients, providers, and the overall health care system. Studies have shown that interprofessional collaboration results in positive outcomes in chronic disease management, decreased length of hospital stay, reduced admissions, and harm reduction.[1,2]

To implement the interprofessional care model effectively, early exposure for future health care providers is essential. At the University of British Columbia, interprofessional educational experiences are relatively limited for health care students. To address this gap in current health care education, the development of a new

Continued on page 12

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Continued from page 10

student-run clinic began in 2014.

While other student-run clinics in Canada focus on drop-in care delivered by medical students with support from other professions, the Community Health Initiative by University Students (CHIUS) clinic places an emphasis on having an interdisciplinary team see complex patients for a comprehensive assessment with follow-up appointments.[3] The CHIUS Three Bridges Student Clinic has completed 2 successful years of operation from September 2015 to April 2017, with students from the Faculties of Medicine, Pharmacy, Social Work, Occupational Therapy, and Nursing, seeing patients as a team under the supervision of faculty and medical residents. With an emphasis placed on interdisciplinary collaboration, the teams were given time to collectively interview patients, devise care plans, and deliver interventions.

The feedback from students participating in the clinic has been overwhelmingly positive. Preliminary results from student surveys demonstrate a significant increase in understanding the scopes of practice of other health care professionals. As role clarity is an important aspect of encouraging and incorporating interprofessional teamwork into a future practitioner's practice,[4] the CHIUS clinic addresses a gap that currently exists in our health care education.

We hope that the CHIUS Three Bridges clinic will serve as a model and inspiration for future interdisciplinary-focused student-run clinics across Canada.

—Sandra Seo Young Kim, BSc, MD Candidate 2018, UBC Faculty of Medicine
—Harrison Jeffrey Lee, BSc(Pharm), MD Candidate 2018, UBC Faculty of Medicine
—Todd Sakakibara, MD

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Re: Am I overservicing my patients?

Thank you to Dr Verhulst of the Patterns of Practice Committee for alerting us to MSP's interpretation of overservicing a patient and how we might risk being found at fault in an audit [*BCMJ* 2017;59:40]. If I receive a request from my patient or a pharmacist for Special Authority from Pharmacare, would MSP deem it to be overservicing if I call my patient in to see me just for this and I bill a regular office visit? This service would include, of course, reviewing the patient's condition, looking up the Special Authority criteria, discussing with the patient the need for the drug versus alternatives and their costs, filling in the Special Authority form, sending it to Pharmacare, documenting all this, receiving the response from Pharmacare, documenting that, and recalling the patient if coverage is declined.

I note that we now have over 20 different Pharmacare Special Authority forms and 273 drugs that require them. This does not include the low-cost alternative and reference drug program medications.

A while back the Society of General Practitioners of BC asked the Medical Services Commission (MSC) to approve a fee to pay doctors for submitting Special Authority forms. The MSC refused, stating that a Special Authority form is "part of a visit." Surely this means that it is an MSC-insured service and, therefore, a legitimate reason for an office visit?

Now we are getting third-party insurance companies demanding that Pharmacare Special Authority be applied for and refused before they will cover certain drugs. Since this is a third-party request that would not otherwise be medically necessary, would we be permitted to charge the patient privately for this service?

I am sure many of my colleagues would appreciate your advice on this. Thanks very much.

—Eugene Leduc, MD
Victoria

Re: Am I overservicing my patients? Author replies

The Medical Services Commission (MSC), not the Patterns of Practice Committee, has regulatory authority over the MSC Payment Schedule. If changes to the Payment Schedule are sought (e.g., a new form fee), they must go through the Negotiations Committee. The Medicare Protection Act, Section 17, Subsection 1(b) states: "A person must not charge a beneficiary for materials, consultations, procedures, use of an office, clinic or other place or for any other matters that relate to the rendering of a benefit." The MSC rationale is twofold: one, the drug prescription is medically necessary; two, completing the Special Authority form is a matter related to the rendering of the benefit.

Also, section C. 5 of the General Preamble to the MSC Payment Schedule states:

If it is not medically necessary

for a patient to be personally reassessed prior to prescription renewal, specialty referral, release of laboratory results, etc., claims for these services must not be made to MSP regardless of whether or not a medical practitioner chooses to see his/her patients personally or speak with them via the telephone.

So, your discretion is advised. Call the patient in if it is medically necessary. The request by the insurer doesn't really change things. If the drug you prescribe is medically required and would normally be available to the patient under the Pharmacare program, you must follow the above constraints. The insurer is making sure that Pharmacare is the insurer of first resort.

—Lorne Verhulst, MD, Chair, Patterns of Practice Committee

Re: "The smells of summer"

I very much enjoyed your "ranting" in your editorial, "The smells of summer," [*BCMJ* 2017;59:344-345] and of course I agree very strongly. You may recall my Premise piece, "Toward smoke-free multi-unit dwellings" [*BCMJ* 2011;53:400-401].

Unfortunately our various levels of government have done little to move this issue forward over the last 6 years. Things are much better in the United States, with the Housing and Urban Development Department mandating that all public housing agencies nationwide have complete smoke-free policies by July 2018.[1]

On a personal level, getting the 75% strata vote needed to adopt stricter nonsmoking bylaws may not be as difficult as you think. Our condo implemented such a bylaw last winter, to my surprise getting 91% in favor of a complete indoor-outdoor ban, including balconies, with no grandfathering.

My only cautionary comment would be to make sure that the policy applies to the interiors of individual units, not just to balconies, because if one starts getting exposure into one's unit through various connections (which happened to us in 2010 in another place, ultimately forcing us to move) the situation is much harder to mitigate than a balcony source. I do realize that you were joking about encouraging smokers to increase their own exposure by smoking indoors with their doors and windows closed, but an even better idea is the completely enclosed smoker's helmet that some advocates I know would like to see smokers forced to wear!

—Stuart H. Kreisman, MD
Vancouver

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Understanding herbal medicine and liver toxicity

I am concerned about a letter published in the Personal View section of the September 2017 issue [*BCMJ* 2017;59:348]. The letter reports on two patients who suffered from acute liver failure that was "strongly felt" to be caused by commercially obtained herbal remedies. The authors assert that "Drug-induced liver injury from these products is not uncommon. In China, such injury from Chinese herbal medicine is estimated to be 25% of all reported cases (unpublished work from Dr Qi Xing-shun, General Hospital Shenyang Military District, 8 August 2017)."

That makes it sound like 25% of people who take Chinese herbs end up with liver damage. That's incorrect. Assuming the 25% noted, but not published, by some doctor in China (not Canadian numbers) is correct, we still have no idea how many people that is. The statistic is meaningless.

Continued on page 14

Continued from page 13

Next, the authors state that they "strongly feel that regulation of these products, on either the federal or provincial level, needs to be consistent with that applied to the pharmaceutical industry" and that "the public needs to be made aware of the potential dangers of these products."

Some people think that the world of natural health products is like the Wild West—anyone can sell anything with any claim. This is fully false. According to the Government of Canada website, all natural health products are required to have a natural product number (NPN), and in order to get that product licence, Health Canada needs to assess that the product is "safe, effective, and of high quality."

Where did those two liver patients get their herbal products? That's the question I would ask. Additionally, the warning is unnecessarily alarmist. If we look at the numbers, the risks are not greatest with natural remedies.

Specifically, when it comes to liver damage, Dr Michael Rieder, a pediatric clinical pharmacologist at Western University states that acetaminophen is the "most common cause of liver injury. Period. Full stop."[1] Every year there are about 4500 hospitalizations in Canada caused by acetaminophen overdose, with approximately 700 of those accidental, according to Health Canada.[2]

Unfortunately, letters like this provoke physicians to close the door to natural remedies and proper discussion. Then some patients don't tell their physicians about the supplements they are taking. My patients sometimes say that their doctors will shame them, scare them, and tell them they are wasting their money. Some patients have even told me they're afraid that their doctors won't even see them anymore.

We would all be better served by opening the discussion with each other and with our patients in a less provocative manner.

—Melissa Carr, DrTCM, BSc
Registered Doctor of Traditional Chinese Medicine
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Continued on page 16

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Continued from page 14

University in Japan, which led to an article published in the *European Journal of Pharmacology*.

Understanding herbal medicine and liver toxicity. Authors reply

Prior to January 2004, nontraditional herbal medications were classified as food under the Food and Drug Act, which exempts Health Canada from providing any safety or efficacy data.[1] The Natural Health Products (NHPs) Regulations were then created to address Canadians' concerns about the safety, efficacy, and manufacturing process of natural health products in Canada—a work still in progress.[2]

The fact that nontraditional medications, including herbal and traditional Chinese medicine preparations, are little regulated compared to traditional pharmaceutical medications is not a matter of debate. Not only is efficacy undocumented by clinical evidence, potential harm is underreported. In addition, there is minimal quality assurance in terms of manufacturing of these products, resulting in variable potency and potential mislabeling of active ingredients. Dr Carr seems unaware of the difference in the extent and rigor between Health Canada's approval processes for drugs versus NHPs.

Prior to being approved for public consumption, a traditional medication is studied extensively in preclinical and clinical trials and is subject to tight surveillance post-public consumption to detail those rare side effects that might not have been apparent in the trials. In fact, many drugs have been pulled off the market at this stage. Lack of such standards is obvious when it comes to nontraditional medications.

Dr Carr also raises the point that traditional medications are hepatotoxic, citing acetaminophen as an example. We are not disputing that traditional medications are associated with hepatotoxicity, or the fact that acetaminophen is responsible for most cases of acute liver injury (ALI)—although, invariably, most acetaminophen-induced ALIs are due to acute or chronic overdoses, and, in fact, acetaminophen is one of the safest analgesic medications if used appropriately. The point is missed that the hepatotoxic adverse effects of traditional medications are known and well documented, which allows physicians and pharmacists to monitor patients closely for any early signs of harm.

Finally, Dr Carr questions, "Where did those two liver patients get their herbal products?" to which we answer, commercial traditional herbal clinics in Greater Vancouver!

Consumption of exogenous compounds, whether traditional pharmaceuticals or nontraditional medications, can induce acute liver injury. In the case of traditional medications, it is documented and monitored. In the case of nontraditional medications sold as food supplements, which are unregulated and unsupervised, it is unnoticed until it is too late.

—Trana Hussaini, PharmD
—Eric M. Yoshida, MD, MHSc, FRCPC
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Treating intra-articular distal radius fractures

Distal radius fractures are the most frequent upper-extremity fracture, with an incidence of approximately 195.2 per 100 000 patients per year,[1] most commonly in men younger than 50 and women older than 50.[2] From 1990 to 2015, WorkSafeBC saw 6025 workers with distal radius fractures. Extra-articular distal radius fractures, which are typically the result of a low-energy event, can be treated with conservative management, while intra-articular fractures may require surgery. In younger patients, intra-articular distal radius fractures are usually a result of a high-energy event, while in older patients, these injuries can result from a low-energy event such as a fall on an outstretched hand.

Initial management of distal radius fractures, whether intra-articular or not, involves neurovascular and soft-tissue assessment, reduction, and immobilization. Standard AP and lateral radiographs are sufficient in the majority of cases. Advanced imaging is used infrequently, most commonly where there is minimal intra-articular displacement and the clinician is contemplating the suitability of nonoperative management. The American Academy of Orthopaedic Surgeons advises surgical reconstruction for fractures with post-reduction radial shortening > 3 mm, dorsal tilt > 10 degrees, or intra-articular displacement or step-off > 2 mm.[3] However, intra-articular step-off ≥ 1 mm has been shown to correlate with a lower Short Form 36 score and the development of arthritis.[4,5] As such, many surgeons may accept a 2 mm gap, but prefer < 1 mm articular incongruity.[6-8]

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

Volar distal radius plating, locking or nonlocking, is the most common surgical treatment of intra-articular distal radius fractures. These range from the more conventional single volar plate to fragment-specific plating systems. In cases where the surgeon feels internal fixation is not an option, such as extreme distal comminution, external fixation with ligamentotaxis may be used to achieve reduction.[8] This tends to be more salvage than internal fixation, but in a limited number of cases, may produce the best results for difficult fractures. Dorsal plating remains an option, but is infrequently used due to concerns of extensor tendon aggravation or rupture. As such, the indications are very limited and dorsal plating is usually removed once the fracture has healed, while volar implants are usually left in situ.

In younger patients, intra-articular distal radius fractures are usually a result of a high-energy event, while in older patients, these injuries can result from a low-energy event such as a fall on an outstretched hand.

Postoperative immobilization, varying from casting to removable splints, is typically for 2 to 8 weeks. Timing depends on fracture/construct stability, bone quality, patient factors, and surgeon preference. Patients may require physiotherapy for motion and strengthening. Full weight-bearing is usually started 3 months postoperatively based on radiographic and clinical union; activity as tolerated may begin once full range of motion and fracture union have been achieved.

If you have questions regarding an injured-worker patient with an intra-articular distal radius fracture, please call a medical advisor in your nearest WorkSafeBC office.

—Derek Smith, MD, FRCSC
WorkSafeBC Orthopedic Specialist Advisor

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Breast cancer, Part 1: Issues in diagnosis

Dr Rona Cheifetz

Dr Elaine McKevitt

Despite the progress made with new treatments and reduced mortality rates, breast cancer still remains by far the most common malignancy affecting Canadian women. An estimated 25 700 new cases were identified in Canada in 2016, and 3500 of these were in British Columbia.[1] Breast cancer remains big news. Articles on breast cancer are common in the popular press, and attention is heightened every time a celebrity faces this diagnosis. Pink ribbons can be found on just about any product, with portions of purchases directed toward breast cancer–related organizations.

While this is the most common cancer in women, and certainly the one that receives that most media attention, many women either significantly overestimate or significantly underestimate their personal breast cancer risk.[2] Either can affect a woman's decision to pursue screening and seek medical attention for breast concerns and can also increase her anxiety regarding new breast symptoms. Although many breast complaints will not be the result of a malignancy, thorough assessment is still required to exclude malignancy.

Primary care providers are faced with what can be the daunting task of helping patients navigate the process of investigating imaging abnormalities. Multiple appointments for further imaging and biopsy can be required, and patients can become increasingly anxious as they await the results of these tests.

This first in a two-part theme issue dedicated to breast cancer focuses on issues in diagnosis. In the first article, Dr Colin Mar and colleagues provide an overview of the Screening Mammography Program of BC and describe current breast cancer screening policies in the province. The authors include information on the benefits, limitations, and downsides of screening, and encourage primary care providers to discuss these with women at average risk for breast cancer to facilitate informed decision making.

In the second article, Dr Amie Padilla-Thornton and colleagues review the approaches to investigating breast health concerns in symptomatic patients and imaging abnormalities identified in asymptomatic patients. The authors stress the importance of assessment and describe some of the challenges primary care providers and surgeons in different centres may face in organizing investigations.

In the third article, Dr Christine Wilson and colleagues review the Provincial Breast Health Strategy, a plan to facilitate coordinated care in the diagnostic workup for breast abnormalities. The authors discuss the current state of diagnostic services in the province and demonstrate the efficacy of a coordinated system in terms of both timely investigation and cost savings.

In the final article, Dr Katherine Blood and colleagues report on 18 years of data from the High-Risk Clinic of BC Cancer's Hereditary Cancer

This article has been peer reviewed.

Program. The authors describe the uptake rates for risk-reducing surgery and the incidence of new cancers developing in patients under surveillance, including how they were detected. The authors also report on the late age of referral for the majority of women served by the clinic and the need to identify and refer patients with hereditary risk.

In the second part of this theme issue we will focus on breast cancer treatment. Topics covered will include surgical management, radiotherapy, neoadjuvant chemotherapy, and survivorship care. With both parts of this theme issue we hope to help clinicians address some of the challenges of breast cancer care.

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Colin Mar, MD, FRCPC, Janette Sam, RTR, Christine Wilson, MD, FRCPC

Breast cancer screening in British Columbia: A guide to discussion with patients

Primary care providers have an important role to play in helping their patients consider the benefits, limitations, and downsides of screening mammography.

ABSTRACT: Breast cancer continues to affect the women of British Columbia and impose a significant health care burden. Population-based screening mammography remains the most accessible and scientifically validated test for detecting breast cancer and reducing breast cancer mortality. Screening is provided across the province by the Screening Mammography Program of BC. Downsides of screening include exposure to ionizing radiation, false-positive results, and overdiagnosis. Current screening policy in BC is based on age and other determinants of risk, including family history and genetic factors. For example, routine screening every 2 years is recommended for asymptomatic women age 50 to 74 of average risk, while routine screening every year is recommended for women age 40 to 74 with a first-degree relative with breast cancer. The Screening Mammography Program compiles data for calculating numerous outcomes, including participation and return rates, time to diagnosis measures, and sensitivity and specificity indicators. Breast density is an issue a woman and her primary care provider may need to consider, since normal dense breast tissue may impede detection of cancer. Imaging technologies undergoing investigation to address this and other challenges include digital breast tomosynthesis, ultrasound, and magnetic resonance imaging (MRI). By discussing imaging options and screening benefits, limitations, and downsides with women, primary care providers can facilitate informed decision making.

This article has been peer reviewed.

The potential impact of breast cancer on women in British Columbia means that primary care providers should be prepared to address the female patient's question, "Should I get a mammogram?" It can be helpful to begin with a brief review of some principles of screening from the classic World Health Organization report by Wilson and Jungner:

- The condition sought should be an important health problem.
- There should be an available treatment.
- There should be an acceptable test.[1]

These principles have undergone multiple revisions over the years and additional criteria have been proposed, including:

- There should be scientific evidence

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of screening program effectiveness.
- There should be quality assurance.
- The overall benefits of screening should outweigh the harm.[2]

Although breast cancer screening, treatment, and surveillance in BC have contributed to outcomes matching national and international standards,[3] the disease remains the most common cancer in women in Canada, and the second leading cause of cancer death as of 2015.[4] In 2010 the lifetime risk for developing breast cancer was 1 in 9 and the lifetime mortality risk was 1 in 30. Since 1986 there has been a steady decline in the age-standardized breast cancer mortality rate, which now stands at 16 per 100 000 in BC. The age-standardized 5-year relative survival ratio for 2006 to 2008 was 88% across the country.[4]

Population screening for breast cancer in BC began in 1988 with the Screening Mammography Program (SMP). There are SMP centres located in all five health authorities, with 36 fixed sites across the province and three mobile units providing access for remote and underserviced regions. The program is completing a transition to digital mammography, which facilitates the transfer of images between centres, and has been shown to improve cancer detection in younger women and those with dense breast tissue.[5]

Evidence for screening mammography

The evidence for breast cancer screening with mammography has engendered much discussion. Several randomized controlled trials were conducted prior to 2000 and meta-analyses of these demonstrated reductions in breast cancer mortality with screening of RR 0.80 to 0.82.[6-8] These studies may, however, underestimate the current effectiveness of screening given their age and use of intention-to-treat analysis. Mammography technology has evolved since 2000, and quality assurance programs have been developed. Observational studies have yielded more recent data. These include the work of Coldman and colleagues, who considered over 2 million women age 40 to 79 in 7 of 12 Canadian screening programs during the period 1990 to 2009,[9] and observed a 40% mortality reduction, with little variation by age. The number needed to participate in screening to prevent a single breast cancer death within 10 years decreased with age from 1247 for women first screened at age 40 to 49, to 498 for women first screened at age 70 to 79.

The Canadian Task Force on Preventive Health Care (CTFPHC) last issued guidelines for breast cancer screening in 2011.[7] These included a weak recommendation for mammography every 2 to 3 years for women age 50 to 69, and the same for women 70 to 74. Evidence of similar quality supporting a weak recommendation for mammography for women age 40 to 49 was reported, but a recommendation was not provided after the CTFPHC cited a less favorable benefit-to-harm ratio in this age group.

A working group of the International Agency for Research on Cancer (IARC) subsequently published an evidence review in 2015.[10] They concurred with the CTFPHC in that they found sufficient evidence to recommend screening for the 50 to 69 and 70 to 74 age groups. They were, however, unable to find sufficient evidence to make a recommendation for women 40 to 49, citing fewer studies for this age group.

The American Cancer Society (ACS) released a guideline update in 2015[11] that included a strong recommendation for regular screening mammography starting at age 45 and a qualified recommendation for annual screening for women 45 to 54. The ACS update also included qualified recommendations for biennial screening beginning at age 55, and continued screening at 70 to 74 to be based on life expectancy. Finally, the update included a qualified recommendation that women "should have the opportunity to begin annual screening between the ages of 40 and 44 years." Since a qualified recommendation indicates "there is clear evidence of benefit, but less certainty about either the balance of benefits and harms, or about patients' values and preferences,"[11] different patients offered this opportunity will make different decisions and discussion will be required. In these cases, the primary care provider has an important role to play in facilitating informed decision making.

None of the three organizations has found sufficient evidence to support a recommendation for routine clinical breast examination or breast self-exam. The American Cancer Society has suggested that the time required for clinical breast examination instead be used for discussion of the benefits, limitations, and downsides of mammography.

Downsides of screening mammography

As noted previously, a discussion of screening requires considering downsides. These include exposure to ionizing radiation, patient anxiety, false-positives, and overdiagnosis.

The radiation risk posed by current standards in digital mammography is low. For a woman undergoing mammography at age 40, the estimated lifetime attributable risk (LAR) of a fatal breast cancer is 1.3 cases per 100 000. Continuation with annual mammography to the age of 80 is associated with an LAR of 20 to 25 cases.[12] The IARC included a statement in its 2015

guidelines that the risk of radiation-induced malignancy is outweighed by the benefits of mammography.[10]

False-positives in screening mammography are inherent to the practice. In 2015 the positive predictive value in the SMP for first screens was 5.2% and for subsequent screens was 7.0%, values that both met national targets.[13] Anxiety caused by false-positives is related to receiving notification of an abnormal result and undergoing consequent image-guided or surgical biopsy. Such anxiety has been documented,[14] but has not been found to have a measurable health utility decrement.[15] There are also varying morbidity and risks associated with different biopsy procedures. Overdiagnosis involves the detection by mammography of a malignancy that would never have become clinically apparent before the patient's death. The issue then is one of results that precipitate overtreatment. The measurement of this is complicated, primarily by uncertainty regarding the true incidence of breast cancer, the subject of much discussion and debate. Recently published overdiagnosis rates range from 2.3% in a Danish population-based cohort study[16] to 48.3% in a later Danish study that included findings for invasive cancer and ductal carcinoma in situ (DCIS).[17] A retrospective study of provincial SMP data estimated rates of 5.4% for invasive cancer and 17.3% when DCIS was included, with the risk of overdiagnosis being highest in older women.[18] In discussing this issue with patients it remains important to recognize that the lifetime risk for overdiagnosis is low, in the order of 1.0%.[19] Moreover, it is not currently possible at the time of diagnosis to distinguish between tumors that will not progress from those that will. The decision will therefore be based on the patient's tolerance of the relative risks.

BC screening policy

Population screening recommendations for breast cancer in BC are categorized by age and other determinants of risk, including family history and genetic factors (**Table**). Women eligible for screening are asymptomatic, without a personal history of breast cancer, and without breast implants. Women age 40 to 49 are encouraged to consider the benefits relative to the downsides and limitations in discussion with their primary care provider. A limitation for women in this age group, where the incidence of cancer is lower than in older age groups, is the greater prevalence of dense breast tissue that may impede cancer detection.[20]

For women at high risk due to a genetic predisposition or a history of chest wall irradiation between the ages of 10 and 30 years, screening MRI is recommended in addition to annual mammography, although MRI is not provided through the SMP.

Regarding clinical breast examination, there is no recommendation for or against this practice in asymptomatic women. Finally, the policy recommends against breast self-examination as an alternative to mammography.

Table. Screening Mammography Program of BC guidelines for primary care providers.

Physician Protocol for Screening Mammograms

RISK	POLICY
Average risk **Ages 40-49**	Health care providers are encouraged to discuss the benefits and limitations of screening mammography with asymptomatic women in this age group. If screening mammography is chosen, it is available every **two years**. Patients will be recalled every two years.
Average risk **Ages 50-74**	Routine screening mammograms are recommended every **two years** for asymptomatic women at average risk of developing breast cancer. Patients will be recalled every two years. A health care provider's referral is not required.
Average risk **Ages 75+**	Health care providers are encouraged to discuss the benefits and limitations of screening mammography with asymptomatic women in this age group. Health care providers should discuss stopping screening when there are comorbidities associated with a limited life expectancy or physical limitations for mammography that prevent proper positioning. If screening mammography is chosen, it is available every **two to three years**. Patients will not be recalled by the Screening Mammography Program of BC.
Higher than average risk **Ages 40-74 with a first degree relative with breast cancer**	Routine screening mammograms are recommended **every year**. Patients will be recalled every year. A health care provider's referral is not required.
High risk **With a known BRCA1 or BRCA2 mutation or prior chest wall radiation or strong family history of breast cancer**	Age 40-74: please refer to recommendation for "Higher than average risk" women. Under age 40: The Screening Mammography Program accepts women at high risk of developing breast cancer **with a health care provider's referral**, provided they do not have breast implants or an indication for a diagnostic mammogram.

Source: BC Cancer

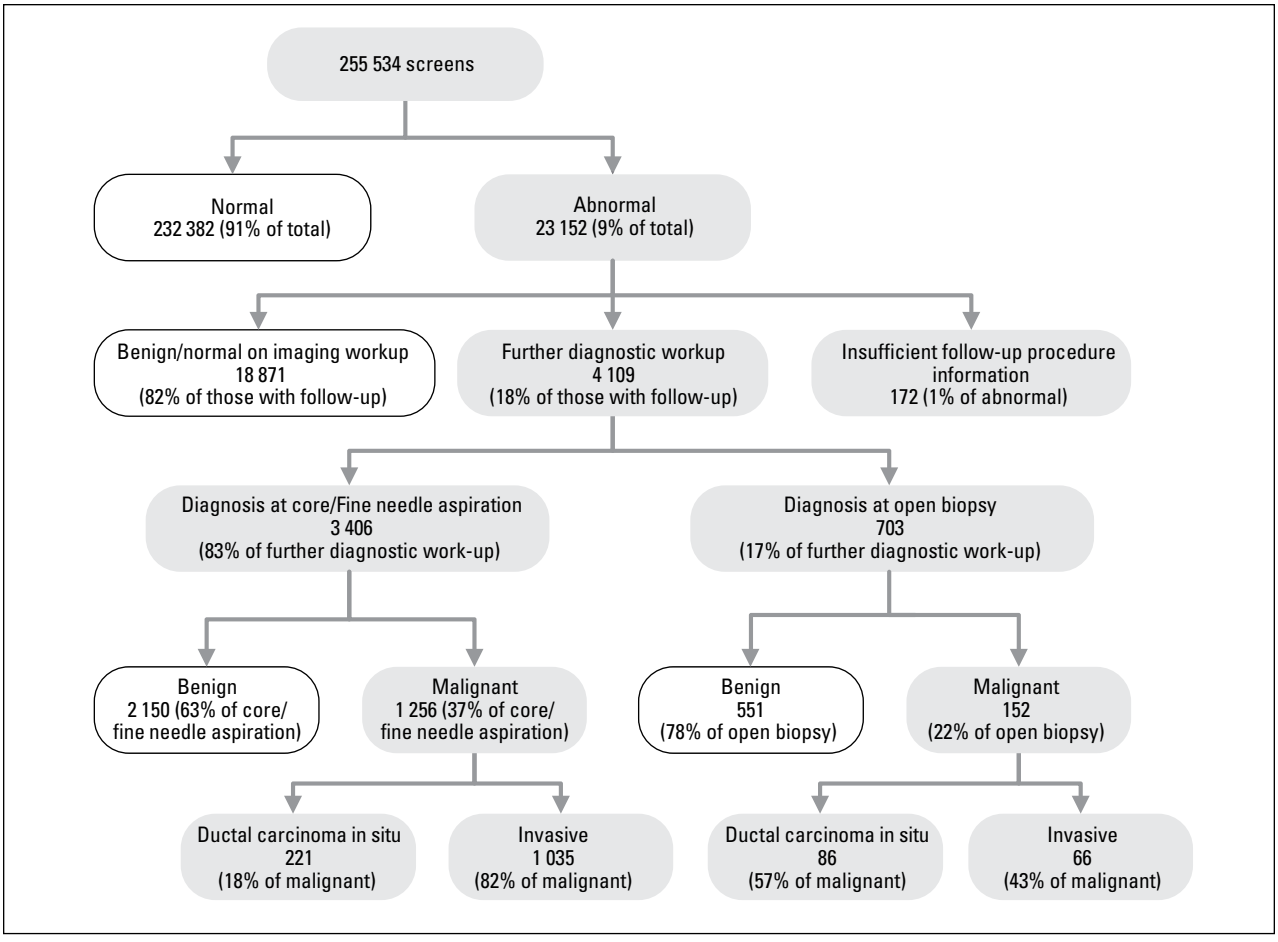

Figure 1. Breast cancer screening outcomes, 2015.[13]

Source: BC Cancer

Screening program outcomes

Objective outcome measures are integral to quality assurance in a screening program. The SMP compiles data for calculating numerous outcome measures that are then shared in a variety of ways. The program's annual report is the most comprehensive of these, and may be accessed at www.bccancer.bc.ca/screening/Documents/SMP_Report-AnnualReport2016.pdf. The report includes participation and return rates, time to diagnosis measures, and sensitivity and specificity indicators, and compares these indicators to national standards where available. The program also considers participation by region and by selected ethnic groups.

In 2015 the provincial participation rate for women age 50 to 69 was 52.4%, a rate that has remained both relatively stable and below the national target of 70.0% since 2000.[13] Participation rates by women age 50 to 69 in the Northeast health service delivery area (40.0%) and Kootenay Boundary health service delivery area (44.0%) were below the provincial average. Data were compiled for clients identified as First Nations, East/South East Asian, and South Asian. The participation of women within the same age range in all three groups rose over the previous 5 years, and lies above the provincial average. This interpretation may, however, be limited by underestimation of the ethnic group populations.[13]

More than 250 000 mammograms were performed by the SMP in 2015. Screening outcomes considered included normal and abnormal results, image-guided and surgical biopsies performed, and breast cancers detected (**Figure 1**). The percentage of women referred for further testing because of an abnormal screening mammogram (i.e., the abnormal call rate) was 9.1%. The number of women with a screen-detected cancer per 1000 women who had a screening mammogram (i.e., the cancer detec-

tion rate) was 5.5. The percentage of women with an abnormal mammogram who were diagnosed with breast cancer (i.e., the positive predictive value) was 6.1%.[13]

In addition to the outcome measures already noted, individualized data are compiled for each radiologist screener in the program and for each provincial health authority. The SMP also promotes quality assurance through a client satisfaction survey sent to selected women attending program sites across the province. Each SMP site and radiologist maintains mammography-specific accreditation from the Canadian Association of Radiologists. This requires adherence to a nationally recognized set of guidelines that ensures the quality of the examination and the competence of the screener. Finally, specific policies regulate the systematic review of randomly sampled abnormal findings and cancers diagnosed. This occurs at both the site level to facilitate direct feedback and at the program level to ensure overall effectiveness.

Breast density

Risk stratification in the current SMP screening policy is based primarily on age and family history, but another factor a woman and her primary care provider should consider is breast density. This is a measurement of the proportion of the breast composed of dense (i.e., nonfatty) tissue, and the probability of masking a cancer. Dense tissue is relatively radiopaque and thus appears white on a mammogram. Although normal, such tissue may obscure cancer and thus impede its detection.[20] A set of mammograms (**Figure 2**) illustrates the difference between dense and non-dense breasts, and how cancer may resemble dense tissue. Given this masking effect, any breast changes or symptoms should be followed up, regardless of a normal screening mammogram result.

Breast density is also a risk factor for incident cancer, particularly when the breast is extremely dense. A meta-analysis in 2006 considered over 14 000 breast cancer cases with 226 000 controls to determine a 4.64-fold risk when the proportion of dense to non-dense breast tissue was equal to or greater than 75%,[21] relative to a breast of less than 5%. Breast cancer in the setting of dense breast tissue has not, however, been associated with an increased risk of death.[22]

The reporting of breast density with mammogram results has been the focus of much recent discussion. As of early 2016, 24 American states have enacted legislation that mandate this reporting.[23] While there is no legislative requirement in Canada to report on breast density, the SMP policy on reporting of breast density is currently under review. For now, the information is available upon patient request, with the understanding that this risk factor should not be considered in isolation, but in combination with age, family history, and other risk factors.[24] At this time, there have been no guideline revisions regarding supplemental screening for women with dense breasts.

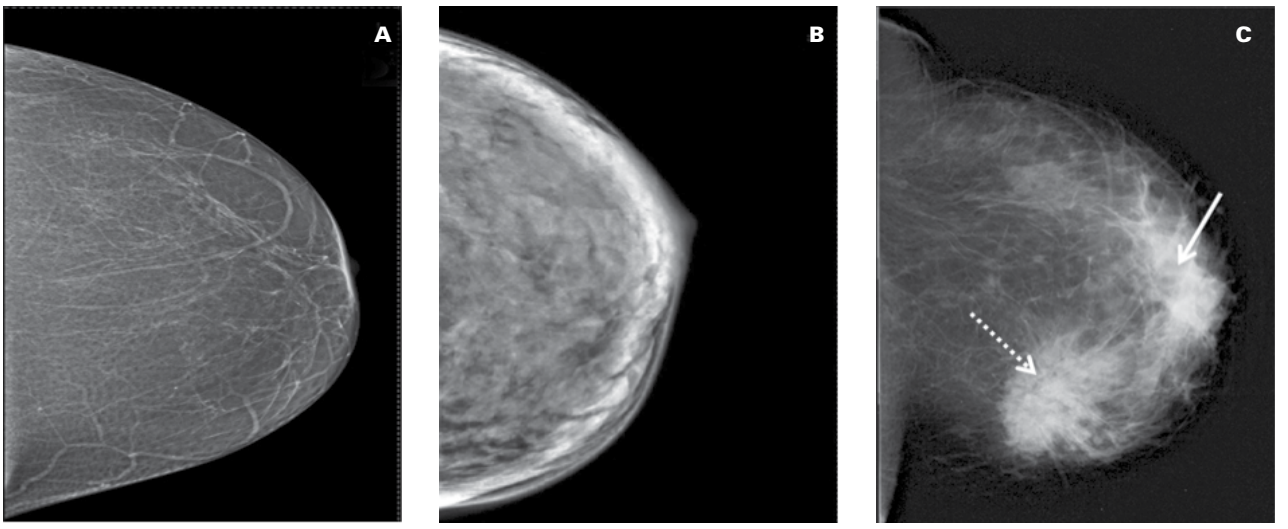

Figure 2. Mammograms illustrating the challenge breast density may pose in their interpretation. A: Low opacity seen in non-dense breast with a high proportion of fat. B: Increased opacity seen in a dense breast. C: Opacity seen in both normal dense breast tissue (solid arrow) and adjacent cancer (dashed arrow).

Emerging technologies

Mammography remains the most accessible and scientifically validated test for breast cancer screening, and the sole modality included in guidelines for women of average risk. It is, however, helpful to have a basic understanding of some of the other breast imaging modalities that are the focus of ongoing research, and may arise in discussion with patients.

Digital breast tomosynthesis (DBT) is commonly referred to as the 3-D mammogram. Indeed, this examination utilizes the technology of mammography to produce a series of two-dimensional images of a single breast. These are acquired through an arc trajectory, and ultimately viewed as a three-dimensional image set. Multiple studies have demonstrated the ability of DBT to increase cancer detection while decreasing the rate of patient recall for further evaluation.[25] A prospective trial integrating 2-D and 3-D mammography to screen over 7000 women in 2013 found an additional 2.7 cancers were detected per 1000 screens, and false-positives were reduced by an estimated 17.2%.[26] Two sites within the SMP are currently participating in a large multicentre trial to evaluate the role of DBT in screening.

Ultrasound is integral to breast imaging in the diagnostic setting, and its role in screening is evolving. It is of particular interest in the context of dense breast tissue. An earlier prospective multicentre trial followed women over three rounds of annual mammography with and without supplemental ultrasound. Inclusion criteria were a breast density of at least 50% and at least one other risk factor, such as a personal history of breast cancer. An additional 3.7 cancers per 1000 screens were detected, but with a false-positive rate of 16%.[27]

SMP screening policy indicates the use of MRI for high-risk women with genetic or familial risks or prior mantle radiation exposure. MRI has demonstrated high sensitivity for detecting breast cancer, but the use of this modality is limited by examination time and geographic availability. Recent evaluation of abbreviated imaging protocols for this modality may, however, eventually allow its use for other risk categories by increasing access through shortened time required per visit.[28]

Other imaging modalities such as thermography and nuclear medicine tests, including positron emission tomography, have not been validated for population screening.

Facilitating an informed decision

By increasing awareness of risk factors for breast cancer, the SMP hopes to help women in BC age 40 and older make an informed decision about screening mammography. When researchers analyzed provincial screening data for over 2 million women age 40 to 74 screened between 2000 and 2009, they found decreased false-positives and increased cancer detection with increasing age, and increased cancer detection with a positive family history. The main factors associated with false-positives were time since last screening and a previous false-positive.[29] These and other findings were used to develop the online Breast Cancer Screening Decision Aid of BC Cancer (http://decisionaid.screeningbc.ca), which generates a response after a user answers six questions, including "How old are you?," and "When was your last screening?" The response indicates the likelihood of three events: having a breast cancer found, having a false-positive mammogram, and having a false-positive biopsy. The user is then advised to print the response "and discuss with your doctor to determine if screening is right for you." Research within the program is now underway to consider the roles of both breast density and ethnicity within BC and Canada, and this may further individualize the assessment of risk.

Summary

Both population-based screening and treatment advances have improved breast cancer outcomes. This disease, however, continues to impose a significant burden on the health of women across Canada.[4] Mammography remains the most scientifically validated screening test to reduce breast cancer mortality. A woman's participation in a mammography screening program is best predicated on an informed decision. This requires considering risk factors and understanding the limitations and downsides of screening.

We encourage the public to use the Breast Cancer Screening Decision Aid discussed above and to access resources for general information on screening (www.screeningbc.ca). We also encourage primary care providers to take advantage of the continuing professional development resources available (http://ubccpd.ca/course/bca-screening-update).

Breast cancer screening policy in BC will continue to evolve through ongoing internal data analysis, appraisal of the medical literature and review of working group guidelines that address risk factors such as breast density, and the development of other breast imaging modalities. BCMJ

Competing interests

None declared.

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Current evaluation of breast health concerns and diagnosis of breast cancer

Physical examination, diagnostic breast imaging, and image-guided core needle biopsy are essential when evaluating breast complaints, as is the use of the Breast Imaging Reporting and Data System (BI-RADS) when describing findings.

ABSTRACT: The process leading to diagnosis of breast cancer has changed over the past 20 years with improvements in diagnostic imaging and a shift from surgical biopsy to image-guided core needle biopsy. History-taking and physical examination, diagnostic breast imaging, and biopsy are essential when evaluating breast concerns, as is the use of the Breast Imaging Reporting and Data System (BI-RADS) when describing findings. Assessment of the concordance between physical examination findings, imaging, and biopsy pathology is also essential to diagnosis, and minimizes surgical intervention. The roles of the primary care physician, radiologist, and surgeon have changed as well over the past 20 years, meaning that the optimal management of patients with breast concerns is now multidisciplinary. Referring physicians have different roles in navigating patients through the diagnostic system in different communities.

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The evaluation of breast health concerns and the diagnosis of breast cancer have changed significantly over the past 20 years due to advances in imaging technology and pathology techniques as well as increased interdisciplinary management of breast problems.

The referral pathways for diagnostic breast imaging address both the evaluation of a presenting breast complaint in the symptomatic patient and the evaluation of an abnormality identified on screening mammography in an asymptomatic patient. The diagnostic imaging workup for each requires careful risk assessment, use of the Breast Imaging Reporting and Data System (BI-RADS) lexicon, and concordance assessment of the physical examination, imaging, and pathology results. If these components of the patient's workup are not concordant, further investigation is necessary to rule out malignancy.

History and physical examination

When patients present with breast concerns, a detailed clinical history should be obtained and a physical examination performed to clarify the symptoms and physical findings and determine the need for further investigation with diagnostic breast imaging. Palpable lumps or areas of thickening, nipple discharge, and breast pain are among the most common presenting complaints.

A lump or area of thickening should be assessed for any features of concern for breast cancer, such as hard or irregular texture and apparent

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fixation to the chest wall, as well as any associated nipple discharge, overlying skin or nipple changes, and the presence of palpable axillary or supraclavicular lymphadenopathy.

Physiologic nipple discharge should be differentiated from pathologic nipple discharge. Physiologic discharge is bilateral, involves multiple ducts, is milky/yellow/green in color, and is nonspontaneous. This type of discharge does not require diagnostic medical imaging. Pathologic discharge is unilateral, involves a single duct, is clear/bloody/serosanguinous in color, and is spontaneous.

A physical examination is the first step in the evaluation of breast pain. The location and characteristics of the pain help to differentiate breast pain from chest wall pain. Chest wall pain is commonly located at the costochondral junctions and over the lateral chest wall rather than in the breast itself. Physiologic breast pain is characterized as cyclical, nonfocal, and bilateral, and is typically due to hormonal or age-related changes. Physiologic breast and chest wall pain do not require diagnostic breast imaging as pain of this nature has not been shown to correlate with the presence of breast cancer.[1] Breast pain that is persistent, noncyclical, unilateral, and, most importantly, focal, may indicate underlying breast pathology.

Diagnostic breast imaging is indicated when a palpable breast lump or thickening, suspicious skin changes, pathologic nipple discharge, or focal breast pain are confirmed on physical examination. In the absence of suspicious physical examination findings, screening mammography is recommended.

If an abnormality is identified on screening mammography, a physical examination of the breast should be performed to determine if the finding is image-detected only or associated with findings on examination. Ideally, breast examination should occur prior to a core needle biopsy (CNB) to allow for accurate clinical assessment of the abnormality in question.

Table 1. Breast Imaging Reporting and Data System (BI-RADS) final assessment categories.[4]

Category		Management	Likelihood of cancer
0	Needs additional imaging or prior exams	Recall for additional imaging or obtain prior studies	n/a
1	Negative	Routine screening	Essentially 0%
2	Benign	Routine screening	Essentially 0%
3	Probably benign	Short-interval follow-up (6 months)	> 0% to ≤ 2%
4	Suspicious	Tissue diagnosis	4A Low suspicion for malignancy (> 2% to ≤ 10%) 4B Moderate suspicion for malignancy (> 10% to ≤ 50%) 4C High suspicion for malignancy (> 50% to ≤ 95%)
5	Highly suggestive of malignancy	Tissue diagnosis	> 95%
6	Known biopsy-proven malignancy	Surgical excision when clinically appropriate	n/a

Diagnostic breast imaging

There are several reasons a patient may be referred for diagnostic breast imaging. This specialized imaging is used to evaluate a physical examination finding or to further characterize an abnormality identified on a screening mammogram in an asymptomatic patient. In addition, diagnostic breast imaging should be scheduled on a routine surveillance basis for patients with breast prostheses and previously treated breast cancers or high-risk lesions.

Bilateral diagnostic mammography and targeted ultrasound focused on the area of clinical concern are used to evaluate the majority of breast health concerns. Digital breast tomosynthesis, a form of 3-D or volumetric mammography, is becoming increasingly available for use in diagnostic breast imaging and permits better differentiation between normal and abnormal tissue.[2] Magnetic resonance imaging (MRI) may be used in limited circumstances, such as for screening patients with a known *BRCA1* or *BRCA2* mutation or a history of mantle radiation between age 10 and 30, for assessment of breast prostheses that may have ruptured, for assessment of indeterminate lesions, for assessment of pathologic nipple discharge, and for staging of breast cancers, particularly if there is multifocality or lobular histology.[3]

Categories of risk

The Breast Imaging Reporting and Data System,[4] published by the American College of Radiology (ACR) and summarized in **Table 1**, provides standardized descriptions of findings that communicate the likelihood of breast cancer based on the imaging

workup. The BI-RADS assessment of risk ultimately determines the need for an image-guided needle biopsy.

Patients with imaging studies categorized as BI-RADS 1 (negative) or BI-RADS 2 (conclusively benign) do not require further imaging workup. Lesions assessed as BI-RADS 3 have an estimated malignancy risk of less than 2% and follow-up imaging is recommended at 6, 12, and 24 months to ensure stability. Lesions assessed as BI-RADS 4 have an estimated malignancy risk of between 2% and 95% and biopsy is recommended. With this large range of risk, many radiologists subdivide BI-RADS 4 into three categories based on positive predictive values: 4A (less than 2% to less than or equal to 10% risk), 4B (greater than 10% to less than or equal to 50% risk), and 4C (greater than 50% to less than or equal to 95% risk). Lesions assessed as BI-RADS 5 have an estimated risk of malignancy greater than 95%, require core needle biopsy, and should have surgical excision even if the pathology from the biopsy does not confirm malignancy.

During the diagnostic breast imaging appointment, the radiologist will integrate elements from this detailed assessment by correlating the findings on the different imaging modalities. The radiologist will then prepare a report providing a final BI-RADS assessment score and guidance. Typically, the report will make one of five recommendations:

1. The imaging is incomplete and has not as yet permitted thorough assessment of the presenting clinical concern (BI-RADS 0). Additional imaging is required with final management options to be detailed in a subsequent report.
2. The findings are negative (BI-RADS 1) or benign (BI-RADS 2) and the patient can be discharged from undergoing further diagnostic breast imaging. If the patient is older than 40, routine screening mammography will be recommended.
3. The findings are estimated to have a greater than 98% likelihood of being benign (BI-RADS 3) and follow-up imaging in 6, 12, and 24 months is required to demonstrate stability, at which point the findings will be considered definitively benign.
4. An abnormality identified is estimated to have a greater than 2% likelihood of being malignant (BI-RADS 4 or BI-RADS 5), and an image-guided biopsy is required for definitive pathologic diagnosis.
5. Depending on the presenting compliant, referral to a breast specialist or surgeon may be recommended.

A very small subset of breast cancers will not be detected on a mammogram or breast ultrasound, and negative findings on imaging should not be cause for a delay in diagnosis of breast cancer. Any suspicious findings from a physical examination require further imaging and biopsy. In this situation, referral to a surgeon is advised.

Image-detected breast abnormalities

Nonpalpable breast lesions (masses, calcifications, asymmetries, and architectural distortion) can be identified on screening mammograms as well as incidentally on diagnostic breast imaging done for other indications. The evaluation of such abnormalities focuses on assessing the risk for malignancy. Patients should have an examination to determine whether there is an associated physical finding; however, in cases where there are no associated physical findings to guide the treating clinician, the BI-RADS reporting system and radiology-pathology concordance statements are particularly useful in determining the need for further management and follow-up.

Core needle biopsy of breast lesions is the preferred initial invasive diagnostic procedure, and image guidance is recommended to increase the accuracy of targeting.

Core needle biopsy

Core needle biopsy (CNB) of breast lesions is the preferred initial invasive diagnostic procedure,[5-9] and image guidance by ultrasound, mammography, or MRI is recommended to increase the accuracy of targeting.[8,10] CNB is able to accurately diagnose

most breast lesions and results in an improved cosmetic outcome for the patient and cost savings to the health care system. As well, CNB can decrease the number of operations that a patient requires.[7,8] CNB is safe and does not cause dissemination of cancer.[7]

Failure to resolve discordance between radiology and pathology results can lead to a delay in breast cancer diagnosis.

The guidance modality chosen depends on the conspicuity of the lesion. Most masses are seen clearly on ultrasound, and can therefore be biopsied with ultrasound guidance. For lesions seen on mammography, but not visible on ultrasound, biopsy with stereotactic or tomosynthesis guidance is used. Either way, the procedures are well tolerated under local anesthesia. CNB of breast lesions is now the standard of care and surgical biopsy should be performed only when core needle biopsy is not possible.[5-9,11] Obtaining preoperative core needle biopsy diagnoses of breast lesions in more than 90% to 95% of patients is a quality indicator in breast surgery internationally.[5,6,9] CNB pathology results are classified as benign, high-risk, or malignant.[8,12]

Concordance assessment

Concordance assessment is an integral part of core needle biopsy. For an image-guided CNB, "concordance refers to the agreement of imaging and histopathological findings such that the histopathology satisfactorily explains the imaging findings."[12,13] Discordance refers to occasions when a breast CNB demonstrates benign histology while the imaging findings indicate possible malignancy. Discordance indicates that further evaluation is required, with options including (1) repeating CNB, possibly with a larger gauge or vacuum-assisted device, (2) surgical excisional biopsy, or (3) clinical and imaging surveillance.[8,12]

Failure to resolve discordance between radiology and pathology results can lead to a delay in breast cancer diagnosis. The specifics of radiologic-pathologic correlation should be provided by the radiologist performing the biopsy,[12,13] and this is typically done by issuing a radiology-pathology addendum report that includes the histopathologic diagnosis and outlines whether further investigation, follow-up, surgical excision, or multidisciplinary review is recommended.

For symptomatic patients, there should be correlation with the physical examination findings, diagnostic breast imaging, and pathology[12] by the clinician who has ordered and reviewed the investigations. If the physical examination results remain suspicious for malignancy, but imaging and/or core needle biopsy results are benign, further investigations such as skin biopsy, surgical biopsy, repeat core needle biopsy, or further imaging are necessary to rule out malignancy.

Borderline or high-risk lesions

Concordance assessment also involves assessing the risk of undersampling, which refers to the possibility of missing a significant finding in the adjacent tissue that was not removed by the CNB. When there is a significant probability of undersampling, the lesion is regarded as a borderline or high-risk lesion. Surgical excision of the area is typically recommended for high-risk lesions found on CNB to rule out malignancy. The risk of undersampling varies by diagnosis and is affected by factors such as the number and size of CNB specimens taken, the size of the lesion, and the institution.[8,12] The high-risk lesions for which surgical excision is usually recommended are shown in **Table 2**. Institutions that have documented a

Table 2. Recommendations for lesions identified as high-risk on core needle biopsy.[8,12]

Surgical excision recommended
Atypical ductal hyperplasia
Papillary lesions with atypia
Radial scars and complex sclerosing lesions
Fibroepithelial lesions with cellular stroma
Mucocele-like lesions
Spindle cell lesions
Pleomorphic lobular carcinoma in situ
Surgical excision to be considered
Lobular neoplasia (classic lobular carcinoma in situ and atypical lobular hyperplasia)
Flat epithelial atypia (DIN 1a)
Papillary lesion without atypia
Discordance

low upgrade-to-breast-cancer rate following surgical resection for specific diagnoses may offer their patients short-term imaging follow-up rather than surgical excision.[8,12,14]

After surgical excision

Concordance assessment is recommended after surgical excision of breast lesions to ensure that the lesion of interest has been accurately targeted and adequately sampled. For image-detected abnormalities, specimen imaging of fine-wire-guided excisions is recommended and all breast surgical specimens should be oriented for the pathologist. In rare circumstances, the lesion localized for surgery with palpation or wire placement is different from the lesion biopsied under imaging guidance, and this is suggested by discordance between preoperative CNB pathology and surgical pathology. The presence of the CNB scar in the tissue excised suggests accurate targeting, but scarring can also be present in adjacent tissue. Discordance between the surgical pathology and the preoperative diagnosis indicates further investigations are required, usually further imaging, with possible repeat image-guided localization and surgical re-excision. Multidisciplinary review is recommended to guide management.

Navigating the diagnostic system

With the development of more options for diagnostic breast imaging and the introduction of image-guided breast biopsy, patients may need to attend several appointments to complete their imaging workup. It is recommended that patients have their mammograms, breast ultrasound, and image-guided core needle biopsies performed by a single radiology group to facilitate comparison, limit duplication of examinations, and decrease wait times. When more specialized biopsy or imaging techniques are required, such as stereotactic core biopsy or MRI-guided biopsy, the patient may be referred to a different facility as access to these services is not universally available. All relevant imaging and reports, as well as any pathology reports, should be forwarded when a patient is referred to a new facility.

The potential for fragmented care and extended wait times has been recognized.[15,16] The 2012 Provincial Breast Health Strategy Summary Report[16] recommended a target wait time of 21 days to diagnosis without biopsy and a wait time of 28 days to diagnosis when biopsy is required. The report also recommended facilitating necessary investigations and increasing navigation resources for patients to achieve the goal of a prompt diagnosis. The Screening Mammography Program of BC introduced fast track booking for evaluation of screen-detected lesions in 2010,[17] and many breast diagnostic teams in the province have introduced care pathways and dedicated breast health clinics in an attempt to reduce wait times.[18,19]

Currently, each community has a slightly different system for arranging breast imaging and biopsies. Additional investigations are facilitated either by radiology or by the ordering physician, depending on the centre. With so many different approaches and pathways, problems can arise, particularly if patients have mammograms outside of their usual community or health authority. Referring physicians should be aware of these differences and the role they are expected to play in arranging investigations and follow-up for their patients.

Methodical evaluation of breast health concerns is essential to ensure completion of a thorough imaging and pathology assessment in an appropriate time frame.

Summary

Methodical evaluation of breast health concerns is essential to ensure completion of a thorough imaging and pathology assessment in an appropriate time frame. This allows for malignancy to be excluded and the patient returned to the care of the referring physician, or for malignancy to be confirmed and definitive treatment arranged. The BI-RADS lexicon is needed to communicate the likelihood of malignancy in a standardized way, while concordance assessments between the clinical presentation, imaging results, and final pathology are crucial and should be employed

throughout the evaluation. Finally, because of slight variations in local practice, referring physicians should be aware of the role they play in helping patients navigate the diagnostic system. BCMJ

Referring physicians should be aware of the role they play in helping patients navigate the diagnostic system.

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Competing interests

None declared.

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Coordination of radiological and clinical care for breast cancer diagnosis in BC

A hub-and-spoke model for facilities engaged in imaging and assessment for breast cancer diagnosis is needed to optimize patient experience and minimize wait times.

ABSTRACT: The diagnosis of breast cancer has grown increasingly complex and delays can occur at multiple points in the clinical process. In 2010 the Provincial Breast Health Strategy was developed to optimize the clinical pathway for breast cancer diagnosis using a hub-and-spoke model for imaging and assessment. Each full-service diagnostic facility (hub) would provide imaging, anatomical pathology, surgical, and oncology services, while the Screening Mammography Program, family physicians, community imaging clinics, and hospitals (spokes) would refer women directly to the facility as needed. Hubs in each health authority would be required to meet the standard of care: core biopsy performed by a radiologist using image guidance and Breast Imaging Reporting and Data System (BI-RADS) classification and radiologic-pathologic correlation. The criteria for hubs would require having an accredited imaging department able to provide diagnostic ultrasound, wire localization, stereotactic biopsy, and other services using digital mammography equipment and related information systems. Hubs would also be expected to provide services according to available guidelines and protocols, and to collect information required to measure performance and audit practice. Another initiative to improve breast cancer diagnosis has been the development of coordinated care programs at Mount Saint Joseph Hospital and other institutions. Although these have been found to reduce wait times and be cost-effective, the lack of substantive permanent funding to support these programs has resulted in the loss of services at some centres and increasing wait times. To optimize patient experience and minimize wait times, we recommend province-wide acceptance and implementation of the Provincial Breast Health Strategy so that women navigating the diagnostic and therapeutic process receive coordinated care and support from a team of health care providers.

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As breast cancer is the most common cancer in women, the need for more breast imaging, diagnostic, and treatment services will likely increase as the population grows and ages. There have been multiple attempts over the past 25 years to improve the diagnostic process for women in British Columbia who present with breast symptoms or have an abnormal screening mammogram and require further imaging, surgical consultation or care, and oncology services. Currently, the major initiative for improving breast cancer prevention, screening, and diagnosis in BC is the Provincial Breast Health Strategy (PBHS).[1]

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Provincial Breast Health Strategy

In 2009 the Ministry of Health asked the Provincial Health Services Authority to devise a breast health action plan. This plan was completed in May 2010 and led to implementation of the Provincial Breast Health Strategy.[1] Objectives of the PBHS include developing a provincial clinical pathway that streamlines the process for women passing through the health care system by linking various diagnostic steps and centres, and using a hub-and-spoke model to improve the delivery of breast health services in the province.

After a review of provincial breast cancer screening policy was completed in 2011, a strategy to reduce the number of surgical biopsies and increase the number of image-guided biopsies was implemented with some success.[2] A business case was made for converting from analog to digital mammography, and a plan was developed to replace aging equipment. Cost-savings were obtained by using a provincial request for proposal and a single vendor. Once the last analog units are replaced in the Northern Health region, the province-wide conversion to digital mammography will be complete.

Following other PBHS recommendations, a number of radiologists have passed through the radiology fellowship training programs in breast imaging offered jointly by BC Women's Hospital and BC Cancer, and cross-training programs for mammography and breast ultrasound technologists have resulted in the placement of a number of successful candidates around the province. In addition, partnerships with organizations such as the Canadian Breast Cancer Foundation and the Canadian Cancer Society have permitted online communication of evidence-based messages to women and physicians regarding prevention and screening.[3] Health authority reports have been developed to provide HAs with important performance indicators, such as time from abnormal screen to diagnosis, and these continue to be shared to guide the evaluation process and promote shared accountability (written communication with Janette Sam, operations director, Screening Mammography Program of BC, 19 June 2017).

Before the years 2009 to 2012, when the provincial clinical pathway and hub-and-spoke model for breast diagnostic and surgical services were operative and had the most influence, some successful models of a breast centre existed. The most successful has been the Diagnostic Breast Program at Victoria General Hospital, which began in 1995. This centre has provided women with same-day diagnostic and biopsy services for over 20 years (written communication with Tammy Clark, supervisor, Breast Imaging, Victoria General Hospital, 20 June 2017), and has meant the South Island health service delivery area has the shortest time from screening to diagnosis in the province.[4] Other examples of successful programs include the breast health clinic at the Jim Pattison Outpatient Unit in Surrey and the breast health clinic at the Abbotsford Regional Hospital and Cancer Centre.

Historically, breast imaging, diagnostic, and surgical services in the Vancouver area have been particularly fragmented.

Historically, breast imaging, diagnostic, and surgical services in the Vancouver area have been particularly fragmented. This has resulted from having a number of hospital-based facilities and community imaging clinics (CICs) play important roles in the delivery of services. Each community has a unique combination of facilities for breast diagnosis with varying degrees of integration between them. In Vancouver itself, breast imaging services are provided at BC Women's, Mount Saint Joseph Hospital (MSJ), and BC Cancer. In addition, two large CICs, Xray 505 (headed by Dr Linda Warren) and Greig Associates, also perform diagnostic breast imaging services and image-guided biopsy, and host large breast screening clinics for the Screening Mammography Program (SMP). BC Women's also has a smaller screening centre, as does MSJ. Other CICs provide diagnostic services using mammography and breast ultrasound.

MSJ, BC Women's, and BC Cancer, as well as some of the CICs, carry out preoperative imaging for women requiring wire localizations prior to surgery. Breast cancer surgery is performed at MSJ and BC Cancer, as well as at Vancouver General Hospital (VGH) and the University of British Columbia Health Sciences Centre. Women may have a localization procedure performed at one centre, such as BC Cancer, and then with the wire in situ have to transport themselves by driver or taxi to another centre, such as VGH, for their surgery. The challenges when coordinating all of this diagnostic work, as well as the surgical planning and treatment, are considerable. This fragmentation also leads to potential duplication of bookings and services, which is inefficient and costly to the system.

Northern Health has considerable challenges as well, although these are largely due to geography, small populations, and isolation. Women may have to travel long distances from home for their diagnostic tests and treatment and this often results in delays.[4]

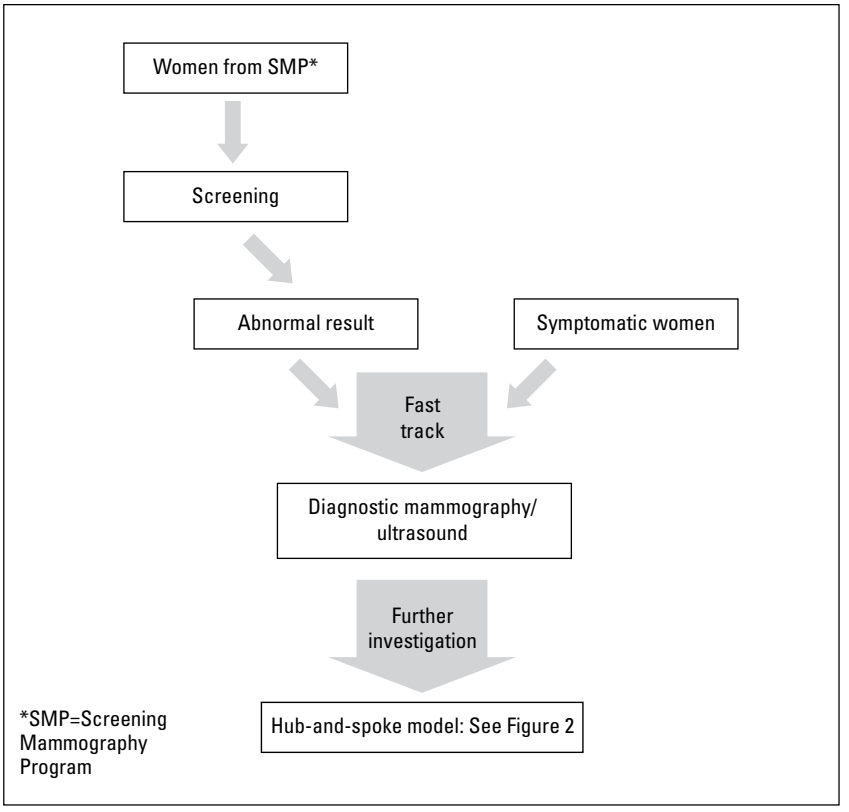

Figure 1. Provincial Breast Health Strategy recommendation: Clinical Pathway.

Provincial clinical pathway

The provincial clinical pathway was developed to streamline the imaging, diagnostic, and surgical process, to prevent duplication, and to assist women and their family physicians as they progress through the system (**Figure 1**). The pathway was developed as part of the PBHS by a team of radiologists, surgeons, pathologists, medical and radiation oncologists, mammography technologists, administrators, and representatives of the Ministry of Health, with input from family physicians and other medical and oncology specialists as needed. The pathway timelines and standards were based on international guidelines and a number of very successful programs already operating in Europe.[5]

Implementation of the clinical pathway was facilitated by the introduction of a fast track referral policy by the Screening Mammography Program in 2010. This requires facilities to perform and report on diagnostic imaging procedures within 14 days of receiving the referral. Such fast track referrals permit a timely diagnostic journey and do not require the referring physician to orchestrate the process, although the physician is kept informed of the results and progress. The proposed time from abnormal screen or presentation with symptoms to the diagnostic result was set at 21 days.[6] Women receiving a cancer diagnosis are then to be seen by a multidisciplinary team of specialists, as needed, before beginning the therapeutic journey.

The hub-and-spoke model

The clinical pathway developed by the PBHS is based on a hub-and-spoke model, with all the necessary diagnostic services grouped or accessible so that further referrals and additional communication do not cause delays (**Figure 2**). This means a full-service diagnostic facility (hub) provides anatomical pathology, surgical, and oncology services to women referred directly by the SMP, family physicians, community imaging clinics, and hospitals (spokes), that may have some, but not all, of the needed services (i.e., stereotactic core biopsies, breast MRI, and MRI-guided biopsies).

It was anticipated that each HA would have three hubs. Some of these hubs would be virtual rather than physical entities, with different partners contributing services. Inter-

connection and communication of information were identified as vital to the model. The criteria agreed upon for each hub were as follows.

- A publicly funded medical imaging department able to provide appropriate services:
  - Diagnostic mammography
  - Diagnostic ultrasound
  - Ultrasound-guided biopsy
  - Stereotactic biopsy
  - Wire localization
  - Breast MRI and MRI-guided biopsy
- Accreditation for all services under the Diagnostic Accreditation Program (DAP) and the Canadian Association of Radiologists – Mammography Accreditation Program (CAR-MAP).
- A most responsible physician for all patients, facilitated by a direct link to primary care providers who accept unattached patients.
- Digital mammography equipment and related information systems (i.e., a picture archiving and communication system, a radiology information system).

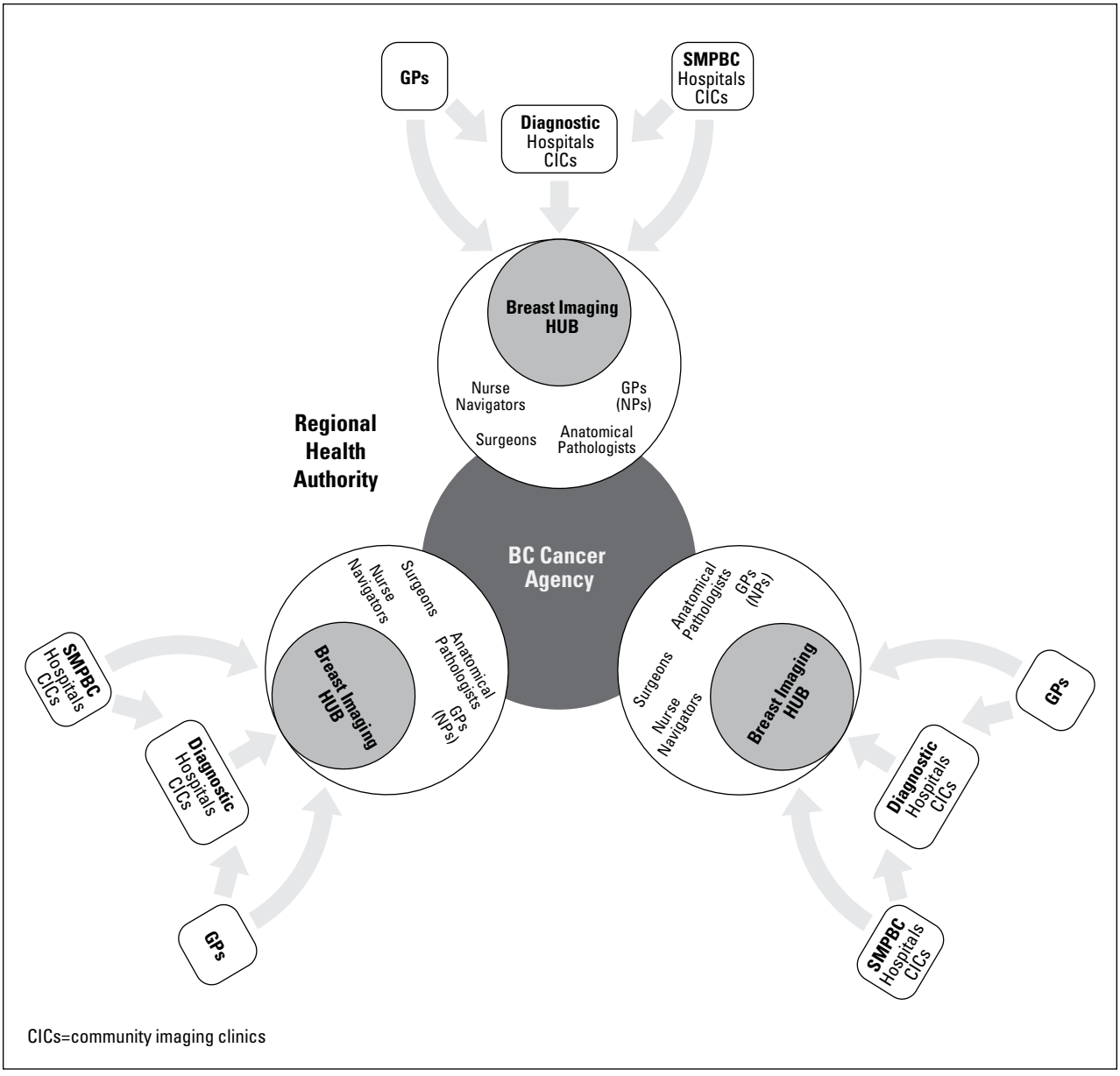

Figure 2. Hub-and-spoke model for coordinated breast cancer diagnosis in BC.

Source: Provincial Breast Health Strategy

- Synoptic reporting capability using Breast Imaging Reporting and Data System (BI-RADS) classification.

As well as satisfying these criteria and meeting the standard of care (image-guided core biopsy performed by radiologists using BI-RADS classification and with radiologic-pathologic correlation), each hub was expected to have the ability to:

- Audit biopsy practice.
- Coordinate multidisciplinary rounds (in person or by videoconference).
- Coordinate scheduling, referrals, patient flow, database, etc.
- Provide patients using the pathway with navigation materials and an information line for support.
- Communicate effectively with breast surgery, anatomical pathology, and BC Cancer or a hospital-based oncology program, and to do all this by direct link when not co-located with these services.
- Provide services according to available guidelines and protocols.
- Collect information required to measure performance and audit practice.[7]

Coordinated care benefits

In 2009 the Rapid Access Breast Clinic (RABC) was opened at Mount Saint Joseph Hospital using Lower Mainland innovation funding and a pay-for-performance model. Patients who presented with a breast abnormality or who had an abnormal screening mammogram at MSJ were referred to the clinic for diagnostic workup and surgery if appropriate. All investigations and appointments were coordinated by the clinic and no additional requisitions or referrals were necessary. Patients were examined by the clinic physician after diagnostic investigations and then seen to discuss correlation of the examination, imaging, and biopsy results, and for referral to the surgeon if appropriate. Clerical staff and nurse navigators helped to move patients along the clinical pathway under the supervision of clinic physicians and radiologists. In keeping with recommended guidelines, 80% of patients received a diagnosis within 21 calendar days of referral to the program.

Compared with patients seen at other centres, patients seen at the Rapid Access Breast Clinic waited fewer days for surgical consultation.

Reductions in wait times

The effectiveness of a rapid access model of care on wait times was reviewed by comparing patients seen at the MSJ clinic with patients in the traditional system, that is, patients who had breast investigations at other centres and were then seen in an MSJ surgeon's private office.

Patients seen at the RABC at Mount Saint Joseph waited fewer days for surgical consultation compared with patients seen at other centres (33 vs 86 days, $P < .0001$), and this applied to both malignant diagnoses (36 vs 59 days, $P = .007$) and benign diagnoses (31 vs 95 days, $P < .0001$).[8] Furthermore, 13% of patients in the traditional system referred to a surgeon with a benign or indeterminate diagnosis were diagnosed with breast cancer after a mean wait time of 84.2 days to see the surgeon. Of these patients, 49% presenting with benign or indeterminate diagnoses would not have been referred on to the surgeon in the RABC.

Of the patients seen at the RABC, 95% had their diagnostic studies at one centre (MSJ) and 5% had diagnostic studies at other centres. In contrast, only 61% of patients in the traditional system attended a single diagnostic centre, with 39% attending two to four diagnostic centers ($P < .0001$). Of the patients in the traditional system who had a diagnostic mammogram, ultrasound, and ultrasound-guided core biopsy, 31.5% attended more than one diagnostic centre.

In 2010 the Screening Mammography Program introduced fast track booking to expedite diagnostic testing following an abnormal screening mammogram. As well, many radiology facilities adopted a policy of completing diagnostic workups without requiring new requisitions for each step. Following these advances, the effectiveness of the traditional system and the coordinated care model at MSJ were assessed again in 2012 and compared. A reduction was seen in overall wait times to surgical consul-

tation in the traditional system from 2009 (86 days) to 2012 (73 days), but the time for diagnosis for patients with cancer did not change significantly (59 vs 55 days).[9] The proportion of patients diagnosed with cancer following surgical consultation in the traditional system was reduced from 13% in 2009 to 8% in 2012. The coordinated care model at MSJ was robust over time, with a mean wait time to surgical consultation of 36 days, contrasting with 73 days in the traditional system. The time from presentation to first diagnostic imaging test, from imaging to core biopsy, and from core biopsy to surgical consultation were all reduced in the coordinated care model.

MSJ is not the only centre to have evaluated the impact of a coordinated care system. Baliski and colleagues[10] reviewed wait times to breast cancer diagnosis and surgery in 2011 in the Interior of BC. Previously, wait times in this region had exceeded targets. After the implementation of a nurse navigation program, wait times from first diagnostic imaging test to surgery were reduced from 59 to 48 days. The time from first diagnostic imaging to core biopsy and from pathological diagnosis to surgery were also reduced with coordinated care.

Cost savings

Although the Rapid Access Breast Clinic was found to reduce diagnostic wait times, there were concerns about the costs of coordinated care, so these were reviewed and compared with costs in the traditional system. Constrained by a lack of privacy agreements to allow the data sharing necessary to determine actual care costs for patients in the traditional system, an approach to modeling the costs was developed.

Although the Rapid Access Breast Clinic was found to reduce diagnostic wait times, there were concerns about the costs of coordinated care, so these were reviewed and compared with costs in the traditional system.

RABC costs were calculated by looking at clinic records for 2011 and identifying presenting complaints, the investigations conducted, and the number of visits to diagnostic imaging required to evaluate each breast problem. It was assumed that a visit to the patient's family physician had been needed to either start the diagnostic workup or to refer the patient to the RABC.

For traditional system costs, it was assumed that each investigation and diagnostic imaging visit had required a return visit or call to the family physician to arrange the next step in the diagnostic workup or to obtain the results, as had been the case in 2009. The family physician costs were determined at the patient level using the age-appropriate MSP General Practice in-office visit fees.

Costs for RABC care were compared with the modeled costs for the traditional system, which were calculated at the patient level for the first 42 weeks of 2011 and annualized. Findings from 2009 RABC patients were also modeled and further cost savings were calculated for reduced surgical consultations for benign disease and reduced duplication of imaging costs (modeled using the cost of breast ultrasound, the least expensive investigation). The historical rate for open surgical biopsy in BC for patients presenting with a breast lump at the time of the study was 27%,[2] with a cost of $1140 compared with $582 for an ultrasound-guided core biopsy, data that were used to determine cost savings related to the improved core biopsy rate.

Costs for patient annualized physician visits were $49 554 for the RABC compared with $72 842 for the traditional system. RABC care per patient ranged from $29.79 to $44.67 compared with $29.79 to $238.32 for the traditional system. The annual cost savings in reduced surgical consults for these patients was $55 044, and the annual cost savings in decreased duplicate breast imaging was $42 037. The annual cost savings from increasing the rate of image-guided biopsy was $153 000 in MSP costs and $176 000 in hospital costs. The total annual cost savings from the coordinated care model for patients seen at the RABC in 2011 was $448 368, which translates to a saving of $205 per patient.

Further improvements needed

In the past 5 years we have seen some clinics using the hub criteria, but the adoption of the hub-and-spoke model has been hampered by the lack of substantive permanent funding, which has resulted in the loss of services at

some centres when temporary funding has dwindled or disappeared. For example, the pay-for-performance funding model that the MSJ breast clinic operated on was discontinued in 2013[11] and funding for nurse navigators in Kelowna was lost with budget cuts (written communication with Chris Baliski, surgical oncologist, BC Cancer Southern Interior, 4 June 2017).

Although some communication improvement has occurred between sites performing diagnostic procedures and those performing surgery, this is largely due to interest in best practice by the personnel at these sites. There has been no funding to improve data collection or communication during what has been the very slow rollout of the new Clinical and Systems Transformation (CST) information system.

While in Canada the goal has been to provide 90% of women with a definitive diagnosis based on tissue biopsy within 7 weeks,[1] this has not yet been achieved in BC. The most recent figures from the Canadian Partnership Against Cancer (CPAC) for breast diagnostic wait times are from 2013[12] and show that 66% of BC women needing a core biopsy after an abnormal screening mammogram had the procedure within 7 weeks, while an SMP annual report including data from 2015[13] shows that 58% of BC women had a tissue biopsy within 7 weeks of an abnormal screening mammogram.

Over the past 5 years many Canadian provinces have implemented care pathways and navigation programs for breast diagnostics in order to meet more ambitious target wait times of 21 to 30 days from presentation to diagnosis. If there is no further improvement in BC, particularly regarding communication and navigation, our wait times for diagnostic biopsies and surgery will continue to rise well beyond what is acceptable to patients and beyond the requirements of national and international guidelines. Coordination of radiological and clinical care is needed to optimize patient experience and minimize wait times for breast cancer diagnosis.

We recommend province-wide acceptance and implementation of the PBHS so that women receive coordinated diagnostic and therapeutic care from a team of health care providers that includes medical office assistants, nurses, mammography technologists, family physicians, radiologists, surgeons, and medical and radiation oncologists BCMJ

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Competing interests

None declared.

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Hereditary breast cancer in British Columbia: Outcomes from BC Cancer's High-Risk Clinic

Evidence-based management of women at increased risk for breast cancer has resulted in early diagnosis of tumors and preventive surgery rates comparable to those in the literature.

ABSTRACT

Background: **The majority of breast cancers are thought to occur sporadically, with approximately 5% thought to be due to inherited susceptibility to cancer. The most commonly mutated genes predisposing women to breast cancer are *BRCA1* and *BRCA2.* The Hereditary High-Risk Clinic at BC Cancer organizes breast screening and provides assessment and management recommendations for women with hereditary breast cancer risk. A study was done to ascertain the effectiveness of the clinic and identify areas of need.**

Methods: **A retrospective chart review was conducted using BC Cancer data for all patients seen at the High-Risk Clinic from 1997 to 31 July 2015. Study subjects included women with confirmed gene mutations that predispose them to increased risk for breast cancer and women who were untested but had a first-degree relative with a confirmed mutation. Patient data were anonymized prior to analysis.**

Results: **The study population included 654 women first seen in the clinic at a mean age of 42 years. Of these, 151 patients had previous diagnoses for cancer, including 142 breast cancers. During management of these women at the clinic, a total of 80 new breast tumors were identified and 77 of these were found to be malignant. Diagnosis occurred at a mean age of 48 years. The majority of new cancers were identified by either MRI or mammographic screening. During the study period, 38% of patients underwent prophylactic mastectomy and over 80% of patients older than 40 completed bilateral salpingo-oophorectomy. The mean age of patients undergoing bilateral mastectomy was 45 (22 to 79) years, while the mean age of patients undergoing bilateral salpingo-oophorectomy was 47 (26 to 77) years.**

Discussion: **Women with genetic risk for breast cancer require enhanced screening that includes annual MRI and mammography. The High-Risk Clinic is providing hereditary high risk women in BC with diagnostic and prophylactic services, and achieving rates of risk-reducing surgery comparable to those in the literature. However, 53% of women attending the clinic were older than 40 at their first visit and so may have missed the full benefit of risk reduction that might be achieved with earlier referral. In future, the centralization of care in the High-Risk Clinic and ongoing data collection should provide an opportunity to evaluate new imaging modalities, long-term outcomes of risk-reducing surgery, and new risk-reducing strategies.**

This article has been peer reviewed.

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Background

Women in the general population have a 1 in 9 lifetime risk of developing breast cancer—the number one cancer diagnosed in women in BC.[1] The majority of breast cancers are thought to occur sporadically, with approximately 5% thought to be due to inherited susceptibility to cancer.[2]

The most commonly mutated genes predisposing women to breast cancer are *BRCA1* and *BRCA2*. The lifetime breast cancer risk for a *BRCA1* mutation carrier is 47% to 66% and for a *BRCA2* mutation carrier is 40% to 57%.[3] The ovarian cancer risk is also greatly increased in *BRCA* mutation carriers: 35% to 46% for *BRCA1* carriers and 13% to 23% for *BRCA2* carriers,[3] compared with a 1% to 2% lifetime risk for ovarian cancer in the general population.[1]

The Hereditary Cancer Program (HCP) at BC Cancer accepts physician or self-referrals for hereditary breast and ovarian cancer assessment. Referral criteria for the HCP are shown in the accompanying **Figure**.[4]

Through the Hereditary Cancer Program, women receive a genetic risk assessment for cancer with extended counseling and options for genetic testing. These services have been shown to improve understanding of breast cancer risk, increase knowledge of breast cancer and genetics, and help reduce patient stress.[5]

Women who have an increased risk of breast cancer due to inheritance of a mutation in a breast cancer susceptibility gene or who have a first-degree relative with a confirmed mutation are eligible for referral to the High-Risk Clinic at the BC Cancer Vancouver Centre. The clinic is run by a nurse practitioner and a medical director who arrange regular breast screening and provide consistent and up-to-date recommendations on risk-reducing measures.

- ☐ Personal history of breast* cancer diagnosed ≤ age 35.
- ☐ Personal history of breast* cancer diagnosed ≤ age 50 AND no family history known due to adoption.
- ☐ Personal history of "triple negative" (ER- PR- HER2-) breast cancer diagnosed ≤ age 60.
- ☐ Personal history of more than 1 primary breast* cancer diagnosis, at least 1 of which was diagnosed ≤ age 50.
- ☐ Personal history of ovarian† cancer at any age (pathology report required).
- ☐ Personal history of both breast* and ovarian† cancer.
- ☐ Family history that includes **1 or more of the following:**
  - ☐ A close relative with personal history as above.
  - ☐ Ashkenazi Jewish heritage and 1 or more relatives with breast* cancer and/or ovarian† cancer.
  - ☐ 1 case of ovarian† cancer and 1 case of breast* cancer in close female relatives.
  - ☐ 1 case of male breast* cancer and another family member with breast* cancer or ovarian† cancer.
  - ☐ 2 or more cases of ovarian† cancer in close relatives.
  - ☐ 2 cases of breast* cancer in close female relatives, both diagnosed ≤ age 50.
  - ☐ 3 or more cases of breast* cancer in close female relatives, with at least 1 diagnosed ≤ age 50.

***Breast cancer** *includes* ductal carcinoma in situ and *excludes* lobular carcinoma in situ.

†**Ovarian cancer** refers to invasive nonmucinous epithelial ovarian cancer and *includes* cancer of the fallopian tubes, primary peritoneal cancer, and serous tubal intraepithelial carcinoma, but *excludes* borderline/low malignant potential ovarian tumors.

Figure. Hereditary Cancer Program referral criteria for hereditary breast* and/or ovarian† cancer.

Evidence-based recommendations for this population include yearly breast magnetic resonance imaging from age 25 to 65 and yearly mammography from age 30. Risk-reduction measures include bilateral mastectomy, bilateral salpingo-oophorectomy (BSO) by age 40, and the use of risk-reducing medications.[6]

A review was done to evaluate the outcomes for women seen in consultation and followed at the High-Risk Clinic to ascertain the effectiveness of the clinic and identify areas of need.

Methods

Data were obtained from BC Cancer charts of patients first seen at the High-Risk Clinic from its opening in 1997 to 31 July 2015. The study population included patients with confirmed gene mutations that predispose them to increased risk for breast cancer and patients who were untested but had a first-degree relative with a confirmed mutation. Upon referral to the clinic these patients were not under the care of an oncologist, had not completed bilateral mastectomy, and were able to attend appointments in Vancouver. Data from incomplete charts were included in the study. Patient data were anonymized prior to analysis and the study was approved by the UBC BC Cancer Research Ethics Board.

Results

The study population consisted of 654 women who were first seen in the clinic at a mean age of 42 years (range 18 to 83 years). Almost half (47%) of the women were younger than age 40 at their first visit. Personal *BRCA* mutations or *BRCA* mutation in a first-degree relative accounted for 98% of the study population, with the remaining 2% having a personal risk or familial presence of other gene mutations (*TP53*, *ATM*, *CDH1*) that increase risk for breast cancer, as presented in **Table 1**. To date, 358 women (55%) have been discharged from the clinic. Of the women discharged, 175 (49%) were discharged due to the completion of risk-reducing surgeries, 86 (24%) due to a new cancer diagnoses and transfer to oncologic care, and 16 (4%) due to negative genetic testing results for a familial mutation. The remainder were discharged from the clinic for other reasons (e.g., patient older than 65 years, patient lost to follow-up, patient provided with prophylactic surgical plans, patient moved out of province).

Previous cancer diagnoses

The number and pathology of previous cancers in *BRCA* patients are presented in **Table 2**. Of the 627 confirmed *BRCA* mutation carriers, 156 (24%) had a previous cancer diagnosis. Of these, 129 patients had previously been diagnosed with a single cancer, 18 with two cancers (including 16 women with bilateral breast cancer), and 4 with three cancers. Previous breast cancers occurred at a mean age of 45 (27 to 71) years.

In addition to the cancers in *BRCA* patients, five previous cancers were identified in carriers of other gene mutations (*TP53*, *ATM*, and *CDH1*). These included diagnoses of gastric cancer, sarcoma, and non-Hodgkin lymphoma.

New cancer diagnoses

While the 654 patients in the study were being followed by the High-Risk Clinic, 116 new tumors were identified in 106 patients (16%). A total of 80 new breast tumors (77 of them malignant) were identified, with the majority being detected by MRI or mammography. Breast cancers accounted for 68% of new cancers and ovarian or fallopian cancers for 16%. The remaining 16% of new cancers included two peritoneal cancers (after prophylactic BSO), three pancreatic cancers, and ten other cancers. The mean age of patients diagnosed with new breast tumors was 48 (25 to 74) years. The distribution of new breast tumors by mutation type is presented in **Table 3**. A previous history of cancer was present in 30% of these patients, and of these 78% had a previous diagnosis of breast cancer.

The methods used to detect new tumors and the time since the last normal screening results (obtained by MRI, mammography, or clinical examination) are presented in **Table 4**. The method of tumor detection was defined as the means by which an abnormality was reported before further investigations led to a cancer diagnosis.

Risk-reducing surgeries

Bilateral mastectomies have been completed for 246 of 654 patients attending the High-Risk Clinic (38%). Of these, 157 bilateral mastectomies (64%) and 78 contralateral mastectomies (32%) were done for prophylactic purposes. The indications for these mastectomies are presented in **Table 5**.

The mean age of patients undergoing bilateral mastectomy was 45 (22 to 79) years.

More than 80% of patients older than 40 with *BRCA* mutations have had bilateral salpingo-oophorectomy at a mean age of 47 (26 to 77) years.

Table 1. Gene mutation status of 654 patients seen at the High-Risk Clinic of the Hereditary Cancer Program, 1997 to 2015.

Gene mutation	Personal result	Number of patients
BRCA1	Carrier	317
	Possible carrier*	31 (13 subsequently negative)
BRCA2	Carrier	270
	Possible carrier*	23 (3 subsequently negative)
BRCA1 and *BRCA2*	Carrier	2
Other *(ATM, CDH1, TP53)*	Carrier	10
	Possible carrier*	1

*Patients with a 50% risk for a gene mutation

Table 2. Pathology of 177 previous cancers diagnosed in High-Risk Clinic patients with confirmed *BRCA1* or *BRCA2* mutation.

Pathology	Number of previous cancers (%)
Breast	142 (80)
Ovarian or fallopian	20 (11)
Other (cervical, endometrial, colorectal, lymphoma, lung, squamous cell)	15 (9)

Table 3. New breast tumors diagnosed in High-Risk Clinic patients by mutation type.

Mutation	Number of patients	Mean age (range) in years	Number of tumors	Invasive cancer	Ductal carcinoma in situ	Other high-risk lesions*
BRCA1	38	47 (28–74)	41	30	9	2
BRCA2	30	49 (35–68)	34	24	9	1
Other genes	5	40 (25–64)	5	3	2	0
Totals	**73**	**48 (25–74)**	**80**	**57**	**20**	**3**

*Atypical ductal hyperplasia, lobular carcinoma in situ, intraductal papillomata

Table 4. Methods and timing of detection for new breast cancers by mutation type.

Mutation	Timing	Detection methods				
		MRI	Mammo-gram	Self-detected	Incidental finding at surgery	Other*
BRCA1	Number of tumors	14	14	5	6	2
	Mean time from normal screen in months	8.6	14.4	6.0	3.7	9
BRCA2	Number of tumors	16	10	3	4	1
	Mean time from normal screen in months	7.0	8.6	2.0	5.0	15
Other genes	Number of tumors	2	0	2	1	0
	Mean time from normal screen in months	12.0	n/a	7.0	3.0	0
Total number of tumors detected by each method (%)		**32 (40)**	**24 (33)**	**10 (13)**	**11 (14)**	**3 (4)**

*Other modalities of detection include symptoms, ultrasound, or combined MRI and mammographic detection

Table 5. Indications for 246 mastectomies.

Procedure	Number of procedures (%)
Prophylactic bilateral mastectomy	133 (54)
Delayed prophylactic bilateral mastectomy*	24 (10)
Contralateral prophylactic mastectomy concurrent with treatment mastectomy	57 (22)
Delayed contralateral prophylactic mastectomy†	21 (9)
Treatment bilateral mastectomy	11 (4)

*Breast-conserving surgery for a breast cancer diagnosis preceded bilateral mastectomy by 2 to 21 years

†Treatment mastectomy preceded contralateral prophylactic mastectomy by 5 months to 17 years

Surgery was completed for prophylactic indications in 93% of cases and for treatment purposes in 7% of patients. Of 100 patients who were younger than 40 when first seen in the High-Risk Clinic, 50 (50%) had prophylactic BSO by age 40. At the time of this review, 204 active clinic patients are younger than 40, and 31 of these (15%) have already had prophylactic BSO.

Bilateral salpingectomy alone has been completed in 13 of 643 patients (2%) with a personal or familial *BRCA1* or *BRCA2* mutation, with a plan for completion of oophorectomy at a later date. The mean age for bilateral salpingectomy is 35 (29 to 42) years.

Discussion

Women with genetic risk for breast cancer require enhanced screening that includes annual MRI and mammography. Multiple international studies have investigated the additional cancer detection yield when screening MRI and mammography are combined for women with an elevated breast cancer risk.[7-11] The sensitivity of MRI (77% to 93%) was found to be much higher than the sensitivity of mammography (33% to 50%), although with a slightly lower specificity (81% to 99% for MRI vs 93% to100% for mammography). At the High-Risk Clinic, annual MRI is available from age 25 with the addition of mammography at age 30. Compared with strategies that initiate imaging at other ages, this screening strategy has been shown by computer modeling to increase life expectancy and decrease breast cancer mortality.[12] Traditionally, the majority of women in the High-Risk Clinic were followed with alternating MRI and mammogram every 6 months because while the initial studies of breast MRI involved concurrent procedures, the

more frequent imaging assessment was thought to reassure patients. However, no scientific evidence has been found to support a diagnostic benefit for this schedule, and more recently the clinic has adopted concurrent annual imaging with MRI and mammogram, since mammograms are often required for investigation of abnormalities identified on MRI and because concurrent imaging simplifies scheduling for out-of-town patients.[9,13]

Women with genetic risk for breast cancer require enhanced screening that includes annual MRI and mammography.

Diagnoses

We cannot directly compare the performance of MRI and mammography as the screens were not performed concurrently during the entire study period. Of the tumors found during regular screening with imaging, 28% were either interval cancers or incidental findings on prophylactic mastectomy, usually within 1 year of the last normal screen. This speaks to the rapid growth of breast cancers in these high-risk patients and the need to investigate any new palpable abnormalities, regardless of normal findings on recent imaging. As well, high-risk patients need to be counseled that new cancers can develop quickly.

Considering both the 142 breast cancers diagnosed in *BRCA1* or *BRCA2* carriers prior to beginning surveillance at the High-Risk Clinic and the 80 breast tumors diagnosed in the clinic, a total of 222 breast tumors were diagnosed in 181 women followed at the clinic during the study period. The mean age of breast cancer diagnosis in women with a hereditary risk is lower than in women without such risk.

The mean age of these patients at diagnosis was 46 years and the majority (62%) were women age 30 to 49. By contrast, in the general population the majority of breast cancers (51%) occur in women age 50 to 69 and only 18% occur in women younger than 50.[1] Early referral of women at risk based on their personal or family history is essential in order to provide them with appropriate care in a timely fashion. More than half of the women at the High-Risk Clinic (53%) were older than 40 at their first visit and may have missed the full potential benefit of early risk-reducing surgery. This suggests that further research is needed to identify barriers to early identification of patients at risk.

Prophylaxis

Bilateral prophylactic mastectomy reduces the risk of breast cancer in women with a *BRCA* gene mutation by 90% to 95%.[14-16] Despite the risk reduction possible with prophylactic mastectomy, many women opt instead for radiologic surveillance.[14] Women choosing surveillance rather than prophylactic mastectomy are influenced by many psychological, medical, and demographic factors.[17] In our study, 24% of patients opted for bilateral mastectomies for purely prophylactic purposes. This is comparable to findings by Friebel and colleagues,[18] who report a 22% rate of risk-reducing mastectomy, although not as high as the findings of Chai and colleagues,[19] who report a 46% rate of risk-reducing mastectomy by age 70.

The risk of developing a contralateral breast cancer is significantly increased for mutation carriers with a history of breast cancer.[20] This information has been shown to influence a woman's surgical decision regarding breast cancer treatment, with increased rates of bilateral mastectomy at the time of initial surgical treatment.[21] Given the high risk in this patient population, such treatment is appropriate. In our study, one-third of the bilateral mastectomies involved removal of one breast for cancer treatment and the other for prophylactic purposes.

Bilateral salpingo-oophorectomy is recommended for *BRCA* mutation carriers primarily for reducing ovarian cancer risk. The reported rate of risk reduction for ovarian, fallopian, and peritoneal cancers achieved by prophylactic BSO is 80% to 96%.[22-24] The effect of prophylactic BSO on reducing breast cancer risk when the procedure is performed before natural menopause is still being investigated, but it may reduce the risk of breast cancer by up to 50%. In the literature, the reported rate of uptake for risk-reducing BSO in *BRCA* carriers is higher than that for bilateral mastectomy, with rates of approximately 45% in women younger than age 40 and up to 86% for women older than 40.[18,19] In our clinic population, 50% of patients who were seen before age 40 had prophylactic BSO by age 40, with more than 80% older than 40 having had BSO.

The fallopian tube epithelium is

believed to be the site of origin for most ovarian cancers.[25] Data from studies of patients who had undergone tubal ligations for fertility control have shown a subsequent risk reduction in ovarian cancer occurrence for both members of the general population and *BRCA* mutation carriers.[26] For these reasons, consultation with young premenopausal patients in the High-Risk Clinic includes discussion of bilateral salpingectomy and oophorectomy for ovarian cancer risk reduction, with delayed oophorectomy as an option for those not yet prepared to proceed to oophorectomy.[27] There is no evidence that this procedure impacts breast cancer risk, and the efficacy of salpingectomy alone as a risk-reduction measure for ovarian cancer is still to be defined. Bilateral salpingo-oopherectomy remains our primary risk-reduction recommendation for ovarian cancer.

Risk reduction

Our data indicate that we are achieving risk-reduction surgery rates for both prophylactic mastectomy and prophylactic BSO that are comparable to those in the literature. Given the complexity of factors influencing a woman's decision regarding prophylactic surgery, further research is needed to determine whether it is possible to increase the uptake of preventive breast surgery. As well, a more in-depth exploration of patient understanding of the risks and benefits of breast surveillance versus surgery is needed and research in this area is planned.

To our knowledge this is the third published report on a screening program for high-risk women and the second to report on a clinic designed to meet the needs of women at high risk for breast cancer. In 2012, Chiarelli and colleagues reported on the results from the first year of the Ontario high-risk breast screening program,[28] which provides annual MRI with digital mammography in 28 centres around the province. Before this, a preliminary report was published by Chart and colleagues in 1997 on outcomes from the Familial Breast Cancer Clinic at Sunnybrook Regional Cancer Centre in Toronto.[29]

Study limitations

This study is based on medical information from BC Cancer charts and only considers data for patients seen at the High-Risk Clinic. There are patients in the Hereditary Cancer Program who have chosen not to be followed by the clinic, and we do not have data on their outcomes. The location of the clinic at the BC Cancer Vancouver Centre is a limiting factor for assessment for some patients, and in the past year we have been developing an expanded model with teleconsultation options. Access to breast MRI throughout the province continues to pose a challenge for a distributed model of care.

In future, the centralization of care in the High-Risk Clinic and ongoing data collection should provide an opportunity to evaluate imaging outcomes and new imaging modalities, long-term outcomes of risk-reducing surgery, and new risk-reducing strategies.

Conclusion

The Hereditary Cancer Program and the High-Risk Clinic at BC Cancer provide important services for women with an inherited predisposition for and increased lifetime risk of breast cancer. This study shows that British Columbian women with an increased risk of breast cancer are able to receive evidence-based screening and management through the High-Risk Clinic. The clinic is achieving risk-reduction surgery rates for both prophylactic mastectomy and prophylactic bilateral salpingo-oophorectomy that are comparable to those in the literature. The clinic also provides opportunities for future research that may enhance the uptake of risk-reducing surgery and identify barriers to early identification of patients at risk. More than 50% of women are older than 40 when first seen at the clinic and may not be receiving the full risk-reducing benefit of early referral and intervention. BCMJ

This study shows that British Columbian women with an increased risk of breast cancer are able to receive evidence-based screening and management through the High-Risk Clinic.

Competing interests

None declared.

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Sport-related ocular trauma in Vancouver, British Columbia: Not the usual suspects

A remarkably high rate of badminton-induced eye injury was found in a retrospective chart review.

ABSTRACT

Background: **Vision loss due to eye injury has a significant effect on quality of life. In the US, trauma to the ocular structures is one of the most common causes of blindness, second only to cataracts, and 15% of these injuries occur during baseball, basketball, racquetball, football, and soccer activities. A study was proposed to establish the chief sporting causes of traumatic eye injury in Vancouver, BC, and to determine if individuals could be encouraged to use eye protection for high-risk sports.**

Methods: **The study was conducted using data for patients with ocular trauma referred to the Vancouver General Hospital Eye Care Centre in 2013. Sport-related cases were identified in a retrospective chart review and follow-up visits were arranged. Patient characteristics, cause of injury, visual function, and ocular diagnosis were analyzed. A subgroup of patients was surveyed to assess their attitudes toward the use of eye protection.**

Results: **Of 1301 charts reviewed, 58 were found to describe sport-related traumatic eye injuries (4.45%) sustained in 23 activities. The most common sports leading to injury were soccer and badminton. The majority of patients with badminton-induced injuries felt that eye protection would have prevented their injuries, yet only a minority agreed that the use of eye protection for the sport should be encouraged.**

Conclusions: **Soccer and badminton were the chief causes of sport-related injury seen at the Vancouver General Hospital Eye Care Centre in 2013. All badminton-induced injuries resulted in traumatic hyphema. Primary care physicians should be confident in managing minor ocular trauma but be aware of potential complications and not hesitate to contact an ophthalmologist should they have concerns. Mandating eye protection for youth, normalizing the use of protective eyewear, and educating those participating in high-risk sporting activities should be considered to reduce ocular trauma.**

This article has been peer reviewed.

Background

Vision loss resulting from traumatic eye injury has a significant effect on quality of life in the developed world.[1] Trauma to the ocular structures is one of the most common causes of blindness in the US, second only to cataracts, and 15% of these injuries occur during sporting activities.[1] The most common activities related to traumatic eye injury in the US are baseball, basketball, racquetball, football, and soccer.[1]

Our clinical experience in Vancouver, BC, suggests that US sport-related injury findings do not apply to our patient population. A Canadian study found that the three most common locations for ocular injuries were the home, the workplace, and sporting activity sites.[2] While Canada has

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a similar proportion of sport-related eye injuries (8.6% of all traumatic eye injuries), it is unclear which sports are primarily responible.[2] Reports of previous studies have not provided details about type of sporting activity, presence of eye protection, type of eye protection used, if any, and attitudes toward eye protection.[2] Further research in this area could have important implications for injury prevention in Canada. Moreover, this is of particular concern in British Columbia, a province ranking in the top three for number of eye injury incidents based on recent survey results.[2]

We hypothesized that the unique demographics of Vancouver would mean some sports not identified in US studies are the primary cause of traumatic eye injuries. Our goal was to establish the chief sport-related causes of traumatic eye injury at our hospital, and to determine which sports participants were amenable to using eye protection.

Table 1. Sporting activities resulting in traumatic eye injuries.

Activity	Number of patients
Soccer	12
Badminton	9
Cycling	5
Squash	4
Ball hockey	3
Baseball	3
Rugby	3
Frisbee	2
Hockey	2
Snowboarding	2
Boxing	1
Dodgeball	1
Fishing	1
Football	1
Golf	1
Inner tubing	1
Lacrosse	1
Longboarding	1
Martial arts	1
Mountain climbing	1
Polo	1
Underwater hockey	1
Volleyball	1

Methods

Charts were reviewed for patients visiting the Vancouver General Hospital (VGH) Eye Care Centre from 1 January 2013 to 31 December 2013. All charts describing sport-related traumatic eye injury were identified and patients were contacted for follow-up.

Data collected and analyzed included patient age, sex, community of residence, ethnicity, and cause of injury (i.e., sport played). Visual function was assessed at each patient's follow-up visit to determine secondary complications related to hyphema, the accumulation of blood in the anterior chamber. Examination results for the affected eye versus the unaffected eye were compared for best corrected visual acuity (BCVA) and intraocular pressure (IOP) using paired sampled *t* tests. Significance was set at an alpha value of .05.

Six binary questions were answered by patients with badminton injuries to assess their attitude toward eye protection.

The principles of the Declaration of Helsinki were followed when designing and executing the study. Ethics approval was granted by the University of British Columbia's Clinical Research Ethics Board.

Results

Of 1301 charts reviewed, 58 described sport-related traumatic eye injuries (4.45%). The mean age of injured patients was 29.8 (SD 14.8) years. The youngest patient was 5 years old and the oldest was 64 years old. The male to female ratio was 2.1 to 1.0. The majority of injuries (35 of 58) occurred in the summer months.

Twenty-three sporting activities were identified and three or more injuries occurred in seven activities: soccer, badminton, cycling, squash, ball hockey, baseball, and rugby (**Table 1**). Soccer was the sport most commonly associated with eye trauma at the VGH Eye Care Centre in 2013, followed by badminton. Together these activities accounted for one-third of all ocular trauma seen at the centre. Traumatic hyphema was seen in all nine patients with badminton-induced injuries, and three of the nine patients had intraocular pressure rise. One had commotio retinae and vitreous hemorrhage and one had cystoid macular edema.

Of the nine patients with badminton-induced traumatic eye injury, most had evidence of angle recession on gonioscopy. Moreover, we observed a statistical impairment in both best corrected visual acuity ($P = .027$) and intraocular pressure ($P = .011$) in the affected eye compared with the unaffected eye (**Table 2**).

Table 2. Analysis of results for best corrected visual acuity (BCVA) and intraocular pressure (IOP) following badminton-induced traumatic eye injury.

Metric	Affected eye	Unaffected eye	*P*-value
BCVA (logMAR)	0.61	0.06	0.027
IOP (mm Hg)	20.6	13.1	0.011

logMAR = logarithm of the minimum angle

Five of the nine patients injured playing badminton responded to the survey questions. The majority believed eye protection could have prevented their injuries, yet only a minority agreed that the use of eye protection for the sport should be encouraged.

Conclusions

Results of this retrospective chart review suggest that the sports associated with ocular trauma in the Vancouver area differ from those reported in the US,[1] and that badminton is underrecognized as an activity associated with significant intraocular injury.

In 2013 badminton caused 15% of all sport-related traumatic eye injuries at the VGH Eye Care Centre and led to hyphema in 100% of cases. Other investigations have not identified badminton as a cause of traumatic eye injury, which may be due to the differences in sporting interests seen in Vancouver's ethnically diverse population.[1] The 2011 census found that approximately 40.1% of the population in Vancouver spoke a nonofficial language (i.e., not English or French) at home.[3] Badminton is a popular sport in Vancouver's large Asian community and three of the five survey respondents were of Asian ethnicity. Unlike squash, a similar racquet sport, badminton does not require the use of eye protection.

Understanding the risks posed by activities such as badminton and knowing more about the pathophysiology of ocular trauma and how to prevent and manage eye injuries can reduce vision loss and other complications.

Pathophysiology of ocular trauma

Trauma to the eye can range from adnexal abrasions and lacerations to blunt and penetrating orbital injury. Ocular trauma from sport is often the result of a blunt force that results in hyphema.[4] Although hyphemas are most commonly caused by trauma, they can also be caused by postoperative complications, iris neovascularization, melanoma, leukemia, and juvenile xanthogranuloma.[4]

Traumatic hyphemas occur when a blunt force indents and stretches the globe, resulting in architecture disruption and increased intraocular pressure. This intraocular pressure causes a posterior displacement of the lens-iris diaphragm and bleeding from disruption of the highly vascularized ciliary body and iris.[4] Although hyphema is usually a self-limiting condition, significant ocular trauma requires referral to an ophthalmologist for management and follow-up of secondary complications such as chronic elevation of intraocular pressure, blood deposition in the cornea, peripheral anterior synechiae, posterior synechiae, cataracts, and optic nerve damage.[5,6] Other posterior segment injuries that may occur as a result of trauma to the globe are commotio retinae, traumatic macular hole, choroidal rupture, vitreous hemorrhage, and traumatic retinal detachment or retinal dialysis.[7] These sequelae may ultimately result in reduced visual acuity or, in severe cases, blindness.

Injury prevention

Eye protection in sport is widespread and has a long history. Around 1200 BC the first use of a protective face mask for fencing was documented by the Egyptians.[8] Since then, many forms of eye protection have developed, including visors, goggles, and sunglasses. In many Olympic sports, eye protection is mandated to protect competitors from both external injuries such as corneal abrasion and internal injuries such as retinal detachment.[8] Some sporting organizations have mandated eye protection; examples include baseball catcher's masks, hockey visors, football visors, and squash goggles.[8] On 1 January 2012, US Squash, the national governing body for the sport, required protective eyewear to be worn during all events accredited by US Squash.[8,9] Squash is the first racquet sport to implement strict rules and regulations for eye protection. This was an instrumental move in the US and has reduced the number of sport-related ocular injuries.[1,2] Further, US Squash requires that eyewear meet the current

In 2013 badminton caused 15% of all sport-related traumatic eye injuries at the VGH Eye Care Centre and led to hyphema in 100% of cases.

ASTM (American Society for Testing and Materials) standards, a significant step ahead of what Canada has done regarding eye protection regulations.[9]

There is much room for improvement when it comes to eye protection for both soccer and badminton. Action needs to be taken on the international, national, and regional levels. At the international level, the Olympics can make eye protection mandatory. At the national level, governing bodies can require anyone using public facilities to wear eye protection. At the regional level, school boards and clubs can require all children competing in tournaments to wear eye protection. Moreover, individual coaches and parents can educate youth about eye protection benefits, including improved sport performance and prevention of vision loss. With children, the short-term benefits should be emphasized and the use of eye protection should be normalized to achieve higher adherence rates. Reaching athletes at the beginning of their sporting careers is likely to have the most long-term impact. Historically, prevention of injuries has been the key to reducing ocular trauma in sport and much can still be done in this regard.

Injury management

In primary care it is important to identify those patients who can be managed by general practitioners and those who should be referred to a specialist. This is particularly difficult if loss of vision is possible, as primary care physicians would rather err on the side of caution and make a referral. In cases of ocular trauma it is imperative to do a primary survey, obtain a thorough history, and complete a physical examination of the eye and surrounding ocular adnexa. History taking should focus on pertinent details regarding the mechanism of the traumatic event (blunt vs penetrating, monocular vs binocular), any vision loss (central vs peripheral), pain, visual distortion, or diplopia, and past instances of poor vision or other significant disorders (e.g., coagulopathies). The physical examination should include an assessment of visual acuity, external adnexa, ocular motility, and pupillary reaction, as well as confrontational field testing and fundoscopy. Medications such as anesthetic eye drops (e.g., tetracaine 0.5%) and cycloplegics (e.g., cyclopentolate 0.5%) for paralysis of the ciliary muscle may be needed for the physical examination, as patients with ocular trauma can be in significant pain and unable to cooperate. Fluorescein eye stain should be used to evaluate for corneal abrasions. Mydriatics (e.g., tropicamide 0.5%) can be used to facilitate fundoscopy, but should be avoided if there is a shallow anterior chamber or if the patient is under neurological observation.[10] Ocular trauma typically requires that therapy be instituted within a few hours.[10] Urgent referral (i.e., an ophthalmologist should be seen at once) is required for penetrating injuries of the globe, embedded conjunctival or corneal foreign bodies, hyphema, and traumatic optic neuropathy (usually in the context of cranial or maxillofacial trauma).[10] Semi-urgent referral (i.e., an ophthalmologist should be seen in 1 to 2 days) is indicated for orbital fractures and subconjunctival hemorrhage in the context of blunt trauma.[10] A thorough examination is required to ensure appropriate referral. Primary care physicians should be confident in managing minor ocular pathology but be aware of potential complications and not hesitate to contact an ophthalmologist should they have concerns.

Although there is limited evidence for managing uncomplicated traumatic hyphema, initial treatment should include conservative measures, rest, and eye protection.[11,12] Rest is the single most important step in the management of hyphema. Typically, patients with hyphema are prescribed bed rest for up to 10 days after ocular trauma to prevent rebleeding and its serious consequences.[11,12] Medical management with steroids and a mydriatic agent for analgesia is routinely recommended, although the evidence for this is not strong.[12] Retrospective studies suggest that 5% of patients with hyphema, on average, require surgery. Indications for surgical management are secondary hemorrhage or pre-existing blood dyscrasia.[2] Typically, patients return to their former visual acuity and function, but are at higher risk for several complications, namely glaucoma and early cataract formation.[13] In one study, at least 7% of those with anterior angle recession on examination developed chronic glaucoma after 1 year or more.[13] Thus, in cases of hyphema and other severe ocular sports injuries, yearly follow-up is imperative. The costs of these sequelae to the individual and the health care system are potentially preventable. Our data strongly support conservative management and prevention of complications to reduce long-term ocular morbidity.

Improving awareness of risk

Our data and evidence from other case reports clearly demonstrate that badminton can be a dangerous sport,[14] yet there appears to be resistance to the use of protective eyewear. Only 40% of our survey respondents expressed willingness to use such equipment. Historically, participants in various sports have shown similar resistance.[15] However, once mandated in sports such as hockey and squash, eye protection has resulted in a significant reduction in injuries.[15] It is our belief that public health and sporting organ-

izations can work to reduce the number of sport-related eye injuries and ultimately prevent the long-term sequelae of eye trauma.

Study limitations

Our retrospective chart review identified a relatively small number of subjects with ocular trauma. As well, the cases analyzed were from a subset of patients referred to the Eye Care Centre at VGH, a tertiary care facility, and thus do not represent all the traumatic eye injury cases that occurred in Vancouver during the study period and were managed by emergency physicians at community hospitals or by primary care physicians. Our study also failed to capture those patients with life- and vision-threatening injuries who required immediate surgical intervention and hospital admission for monitoring and resuscitation. As stated previously, Vancouver has a uniquely diverse population that may limit the generalizability of our findings. Moreover, the small number of eye injuries per sport limited our ability to obtain useful sport-specific survey data.

Summary

Trauma to the eye can range from adnexal abrasions and lacerations to blunt and penetrating orbital injury. Action regarding eye protection in sport needs to be taken on the international, national, and regional levels.

In cases of ocular trauma, it is imperative for primary care physicians to do an initial survey, obtain a thorough history, and complete a physical examination of the eye. Primary care physicians should be confident in managing minor ocular trauma but be aware of potential complications and not hesitate to contact an ophthalmologist should they have concerns.

The patients identified in our chart review experienced a remarkably high rate of badminton-induced traumatic eye injury, a finding that may be due to the unique demographics of Vancouver.[3] As several of these patients experienced severe complications, we recommend that protective eyewear be worn by those participating in the sport. Strict rules and regulations for the use of protective eyewear in badminton would be in keeping with other racquet sports, such as squash. However, our results suggest that education will be needed since only a minority of injured badminton players expressed any willingness to use protective eyewear.

Mandating eye protection for youth, normalizing the use of protective eyewear, and educating those participating in high-risk sports should be considered to reduce ocular trauma. BCMJ

Competing interests

None declared.

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Technology in seniors' care

Few people who consider the future of health care can argue that the aging demographic poses both serious challenges and huge opportunities. Along with predicted shortages of health care workers and fiscal constraints, meeting the quadruple aim of health care (improved population health, better patient experience, better provider experience, and reduced cost) for a growing senior population will necessarily rely increasingly on existing and emerging technologies.

Technological advances in health care are abundant, ranging from artificial intelligence, which will, for example, create patient-specific care plans based on multiple parameters, to virtual and augmented reality, which will allow trainees to learn procedures safely before having contact with patients. Tricorders for rapid bedside diagnostics and tailor-made drug regimens using gene sequencing to guide pharmacologic choices are other looming technologies.

For improving elder care, technologies can be broadly divided into four categories: managing patient data, disease self-management, monitoring patient-specific medical or risk factors, and providing care to the patient.

In the area of patient information, BC has one of the highest rates of electronic medical record (EMR) adoption in Canada,[1] and digital records are improving clinical care and workflows as well as communication between doctor and patient/caregiver and among health care providers. The future holds improved communications accessed from and stored within the EMR. EMRs may also be the repository of patients' health data as collected by various monitors.

In terms of self-care, which for elders often means the "circle of care," a growing number of apps are available for smart phones and tablets that are user-friendly and provide useful information, as would a reference book. Apps can also monitor functions like sleep and heart rate and provide reminders to take medications. These apps are relatively passive and require a certain degree of patient (or caregiver) involvement. While seniors are increasingly computer savvy,[2] those with sensory, cognitive, or functional impairment may not themselves be able to use these technologies.

Next is the realm of remote monitoring, including electronic sensors and video surveillance. The so-called Internet of Things will offer a host of home-based sensors to track such things as activities and medication compliance. Seniors' homes may have device monitoring—Is the fridge door being opened often enough? Are medications being popped out of blister packs? Already available, Smart Blisters have an electrical current that is interrupted when the foil of a blister is torn. To be effective, these sensors and video monitoring require that someone, either the patient or, more likely, an involved caregiver, is notified when activities don't meet predetermined thresholds. Since frail and demented elders are at high risk of falling and wandering, sensors in the floor and GPS trackers will be used to monitor seniors and notify caregivers of problematic events. These technologies, in combination, may enhance the health and safety of seniors, but it will be at the cost of loss of privacy and autonomy. The ability for seniors to understand and consent to the use of such monitoring systems may also be questionable.

Perhaps the most promising and, at the same time, ethically challenging technologies involve patient care. So-called care robots are technological devices integrated into care practices. They may offer indirect or direct care to patients and, in the latter, they may assist with physical care, like bathing, or be used more for psychosocial care such as companionship. It is argued that robots hold the promise of mitigating a shortage of health care workers and enhancing the autonomy of elders.[3] At the same time there are concerns that robots will diminish the moral quality and standard of care.[4] As assistive technology expands, so does the field of robo-ethics. Sharkey and Sharkey[5] highlight areas of concern in robotic elder care—reduction in human contact, loss of privacy, loss of personal liberty, loss of control, deception, and objectification. This suggests that care benefits should be thoughtfully weighed against the ethical costs.

—Jay Slater, MD
Geriatrics and
Palliative Care Committee

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.*

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Continued on page 55

GP IN ONCOLOGY TRAINING
Vancouver, 19 Feb–2 Mar (Mon–Fri) and 10 Sep–21 Sep (Mon–Fri)
The BC Cancer Agency's Family Practice Oncology Network offers an 8-week General Practitioner in Oncology training program beginning with a 2-week introductory session every spring and fall at the Vancouver Centre. This program provides an opportunity for rural family physicians, with the support of their community, to strengthen their oncology skills so that they may provide enhanced care for local cancer patients and their families. Following the introductory session, participants complete a further 30 days of customized clinic experience at the cancer centre where their patients are referred. These can be scheduled flexibly over 6 months. Participants who complete the program are eligible for credits from the College of Family Physicians of Canada. Those who are REAP-eligible receive a stipend and expense coverage through UBC's Enhanced Skills Program. For more information or to apply, visit www.fpon.ca, or contact Jennifer Wolfe at 604 219-9579.

NUTRITION IN PRIMARY CARE
Vancouver, 24 Feb (Sat)
To be held at SFU Harbour Centre, Nutrition in Primary Care: Evidence and Controversies is a program designed to enhance primary care providers' knowledge of applied nutritional biochemistry and the associated research literature pertaining to several conditions commonly encountered in clinical practice. Various levels of evidence will be presented for evaluation and discussion to facilitate improved communication with patients about health promotion, disease prevention, and treatment preferences. This Group Learning program has been certified by the College of Family Physicians of Canada for up to 5.5 Mainpro+ credits. At the conclusion of this activity, participants will be able to critique current evidence for nutritional support in several conditions commonly encountered in primary care, including generalized fatigue, sleep disturbances, and menopause; communicate more knowledgeably with patients about their preferences for treatment, including the use of specific diets and nutritional supplements; evaluate claims for potential health benefits or adverse effects resulting from popular diets and nutritional supplement use; and identify specific drug-induced nutrient depletions, which may impact medication compliance and apply nutritional support strategies for their correction. Download the program brochure at https://csom.ca/wp-content/uploads/2018/01/NPC-Vancouver.pdf for additional information. Scholarships are available to undergraduate and graduate medical students. Online registration at https://csom.ca/event/npc-vancouver. Email: info@csom.ca.

CME ON THE RUN
VGH and various videoconference locations, 16 Mar–8 Jun (Fri)
CME on the Run sessions are held at the Paetzold Lecture Hall, Vancouver General Hospital, and there are opportunities to participate via videoconference from various hospital sites. Each program runs on Friday afternoons from 1 p.m. to 5 p.m. and includes great speakers and learning materials. Topics and dates: 16 Mar (internal medicine)—Asthma 2018: An update; Atrial fibrillation: Office management; Chronic renal failure:

Continued on page 54

Continued from page 53

Errors to avoid in choosing meds and dosing adjustments; Dysphagia and motility disorders of the esophagus; Inflammatory bowel disease: Dietary and medical management; "So Many Choices = Which One to Pick? What Is the Evidence?" Updates and decision making in NIDDM treatments; Parkinson's disease management options 2018; Hypertension: An update on reaching the diagnosis and treatment targets. The next sessions are 13 Apr (prenatal, pediatrics, and adolescents); 11 May infectious disease and travel); and 8 Jun (MSK, Sports Medicine & Rheumatology). To register and for more information visit ubccpd.ca, call 604 875-5101, or email cpd.info@ubc.ca.

BC OBESITY SUMMIT
Vancouver, 7 Apr (Sat)

UBC CPD's 6th annual BC Obesity Summit is a forum connecting health care practitioners with a specific interest in caring for the obese patient. The meeting will be held at the Morris J. Wosk Centre for Dialogue. Experts and guest speakers from the obesity discipline will discuss a broad range of topics on obesity and bariatrics. Target audience: family physicians, surgeons, registered dietitians, nurses, physiotherapists, occupational therapists, residents, and others interested in caring for the obese patient. Topics covered: medical management of obesity, challenging medical and surgical case rounds, preoperative and postoperative patient care. Course format: Collaborative didactic lectures, interactive small-group workshops, panel discussions, with plenty of time for networking opportunities, practice-based exhibits, and a job fair. Join us at the end of the day for a networking reception to meet with friends and colleagues! Conference information, program details, and online registration: https://ubccpd.ca/course/6th-annual-bc-obesity-summit. Tel 604 875-5101; fax 604 875-5078, email cpd.info@ubc.ca; web : http://ubccpd.ca.

MEDICAL DISORDERS IN PREGNANCY
Vancouver, 14 Apr (Sat)

Don't miss this educational conference designed for practitioners that deal with the management of disorders in pregnant patients. This accredited event, to be held at the Sheraton Wall Centre, will provide a focused, expert review of common medical conditions in pregnancy and will provide practical strategies for their management. Target audience: all those interested in advancing their knowledge in the medicine of pregnancy and the care of complex obstetrics patients. Early bird cost: $305. Event is accredited for up to 6.25 Mainpro+ and MOC Section-1 credits. For more details and to register, visit the conference website at http://ubccpd.ca/course/MDP2018, email us at info.cpd@ubc.ca, or call 604 875-5101.

VULVOVAGINAL HEALTH UPDATE
Vancouver, 3 May (Thu)

UBC CPD is excited to announce the first BC conference addressing vulvar health! We expect a strong regional interest as vulvovaginal disorders are one of the top reasons women seek help from their family doctors. To be held at UBC Robson Square, this unique conference was planned with women's health care providers in mind and will provide education in vulvovaginal disorders. Areas that will be addressed include vulvar skin conditions, urogenital symptoms of menopause, sexual health concerns, vulvar pain conditions, and recurrent vulvovaginal infections. The focus will be on practical diagnosis and management. Target audience: family physicians, gynecologists, dermatologists, nurse practitioners, residents, and medical students. Presentation by invited speaker Lynne Margesson, MD, Geisel School of Medicine, Dartmouth, on Vulvar Ulcers Update and Office Management of Hidradenitis Suppurativa of the Vulva. Conference information, program details, and online registration: https://ubccpd.ca/course/vulvar-health-2018. Tel 604 875-5101, fax 604 875-5078, email cpd.info@ubc.ca; web https://ubccpd.ca.

PEDIATRIC EMERG MED UPDATE
Vancouver, 4–5 May (Fri–Sat)

The Division of Emergency Medicine at BC Children's Hospital and UBC Continuing Professional Development present the 15th Annual Pediatric Emergency Medicine Update for Pediatricians and Emergency Physicians at UBC Robson Square. The 2-day conference highlights the latest trends in the practice of pediatric emergency medicine in urban and rural settings. APLS (Simulator-Mediated Advanced Pediatric Life Support) course will be offered on Thursday, 3 May. Target audience: pediatricians, emergency physicians, family physicians, allied health professionals, and residents. The event is accredited for up to 12.5 MOC Section-1 credits/Mainpro+. For more details and to register, visit the conference website at https://ubccpd.ca/course/PedER2018 and email us at cpd.info@ubc.ca, or call 604 875-5101.

TROPICAL AND GEOGRAPHIC MEDICINE
Vancouver, 7–11 May (Mon–Fri)

The University of British Columbia Faculty of Medicine is pleased to once again offer this short intensive course for health care providers who seek an update on infectious tropical diseases and determinants of health in these geographic settings. This course runs 8 a.m. to 5 p.m. and is especially useful for those who intend to practise in areas endemic for these diseases. Material to be covered includes

clinical descriptions and approaches to evaluation and treatment of tropical diseases, strategies for infection control within communities, and a focus on infections whose management makes a critical difference to survival. Participants will gain practical experience through laboratory and problem-solving exercises. Nearly 250 physicians, nurses, pharmacists, and other health professionals have successfully completed this course. Spaces filled quickly in each of the past 4 years since this course was first offered in Canada. Register early. For course details and to register: http://spph.ubc.ca/continuing-education/tgm2018. Contact: spph.ce@ubc.ca. Tel: 604 822-9599.

MINDFULNESS IN MEDICINE
Cortes Island, 2–6 Jun (Sat–Wed)
Molokai, HI, 13–20 Oct (Sat–Sat)
The culture and practice of medicine offers unique challenges to physicians in terms of self-care and wellness. This can lead to unhealthy stress, mood disorders, relationship challenges, and burnout. The Mindfulness in Medicine series of workshops and retreats for physicians offers an opportunity to better understand the unique nature of our suffering and challenges. The workshops provide an opportunity to rediscover, as a community, the tools, skills, and resources that can allow us to nurture our own healing and resilience—for ourselves, our relationships, and our patients. Join Dr Mark Sherman and your physician colleagues for a 4- or 7-day meditation retreat amid the stunning West Coast beauty of Hollyhock on Cortes Island, or the pristine Hawaiian paradise of Hui H'oolana on Molokai. Both retreats will offer instruction in basic and more advanced meditation skills interspersed with small group discussion and sharing, as well as opportunities for self-reflection and deep rest. Please see www.livingthismoment.ca for more information, or contact mark@livingthismoment.ca to register today.

PRACTICE SURVIVAL SKILLS
Vancouver, 9 Jun (Sat)
UBC CPD's 11th annual Practice Survival Skills—What I Wish I Knew in My First Years of Practice will be held at UBC Robson Square. This course will emphasize practical, nonclinical knowledge crucial for your career, with topics such as billing, navigating through the medical organizations, accreditation, practice audits, medicolegal advice and report writing, job finding, office skills and management, physician resources, practice management, and avoiding physician burnout. Target audience: family physicians, specialty physicians, locums, IMGs, physicians new to BC, family practice and specialty residents, and physicians working in episodic care settings. Course format: collaborative didactic lectures and interactive small-group workshops; plenty of networking opportunities; practice-based exhibits. Join us at the end of the day for a job fair and networking reception to meet with colleagues and make career connections! Conference information, program details, and online registration: https://ubccpd.ca/course/practice-survival-skills-2018. Tel 604 875-5101; fax 604 875-5078; email cpd.info@ubc.ca; web https://ubccpd.ca.

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Continued from page 52

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Provincial lead appointed for BC Cancer Primary Care Program

Dr Catherine Clelland has been appointed as provincial lead of the recently established Provincial Primary Care Program at BC Cancer. Having served in the interim lead role, Dr Clelland will guide the expansion of the Family Practice Oncology Network to better support primary care providers in caring for cancer patients and to bring the voice of primary care to BC Cancer. For more information, visit www.fpon.ca. Connect with Dr Clelland at cathy.clelland@bccancer.bc.ca.

Compensation increase: Economic stability dividend

Effective 1 February 2018, physicians will receive an across-the-board increase of 0.4% to all MSP fees, as well as to service, salary, and sessional contract ranges and rates within those ranges. This is in advance of the 0.5% annual general increase that will be applied on 1 April 2018, as negotiated in the 2014–2019 Physician Master Agreement (PMA).

The Economic Stability Dividend shares the benefits of economic growth between physicians and the province contingent on growth in BC's real gross domestic product (GDP). A Letter of Agreement in the PMA triggers additional increases for physicians when BC's real GDP exceeds the prediction of an independent panel of economists that advises the Ministry of Finance. Statistics Canada reported that the BC economy grew by 3.5% in 2016, exceeding the panel's forecast of 2.7%. There is one remaining opportunity for the Economic Stability Dividend under the term of the 2014–2019 PMA.

Additional information is

Continued on page 56

Continued from page 55
available at https://news.gov.bc.ca/releases/2017FIN0030-001883.

Book review: *Your Heart Is the Size of Your Fist*

By Martina Scholtens, MD. Brindle & Glass Publishing, 2017. ISBN 978-1-927366-68-4. 224 pages.

Your Heart Is the Size of Your Fist: A Doctor Reflects on Ten Years at a Refugee Clinic is a captivating reflection of Dr Scholtens' work at a Canadian refugee clinic, interwoven with stories from her personal life. The stories reflect her journey as a doctor caring for newly arrived refugees, their struggles with navigating the Canadian health care system, and the challenges faced when trying to practise cultural humility in medicine. She also parallels her work as a physician to her personal life as she talks about maintaining this delicate balance.

Some of the highlights include following an Iraqi family as each member transitions to living in Canada, and how she plays a role in each of their medical journeys. When a young Congolese woman is diagnosed with HIV, the story provides insight into the blurring boundaries of medicine and spirituality. Several stories highlight what being a physician entails, including being a healer, advocate, and educator, and often going above and beyond for your patients.

The writing is honest and powerful, the details of each story recalled with care and understanding. Some stories make you laugh at times, while others call for reflection on what we take for granted, such as freedom, safety, and access to health care. I thoroughly enjoyed reading this book, especially from a primary-care point of view. I urge anyone interested in primary care or refugee health, along with anyone who would like an honest view about providing culturally sensitive health care, to give this book a read.

—Yvonne Sin, MD

New tools to help achieve compliance with PIPA

Creating a robust privacy management program can seem daunting, and putting such a program in place can sometimes take a back seat to providing patient care. Under current privacy legislation, physicians must maintain patient confidentiality, but must also be able to prove that they are doing so.

Doctors of BC, in collaboration with the Office of the Information and Privacy Commissioner for BC and the College of Physicians and Surgeons of BC, has updated the *BC Physician Privacy Toolkit: A guide for physicians in private practice,* originally published in 2004 and subsequently updated in 2009 and now in 2017. Along with the updated guide, comprehensive resources that physicians can rely on to meet their obligations under the Personal Information Protection Act (PIPA) are now available in the online Privacy Toolkit. The Privacy Toolkit includes:

- A PIPA fact sheet.
- A module devoted to each privacy principle and guideline.
- Numerous tips and checklists.
- Short videos (including one that guides users on navigation) that focus on privacy principles and guidelines, each 2 to 4 minutes long and accompanied by notes that include the points discussed.
- A consolidated video for employee orientation and annual refresher training.
- Searchable FAQs.
- Customizable forms and templates.
- The revised BC Physician Privacy Toolkit: A guide for physicians in private practice (concise and current).

Privacy management programs can always be improved, so whether a practice is well established or just starting, the Privacy Toolkit can help. The Toolkit is available on the Doctors of BC website at www.doctorsofbc.ca/resource-centre/physicians/managing-practice/privacy-toolkit.

If you have questions, email privacyofficer@doctorsofbc.ca.

—Heather Hannah, CAPP, CBCP, CIA, CRMA, CPA, CGA
Risk and Compliance Officer, Privacy Officer, Doctors of BC

Critical illness for spouses

Do you ever wonder what you would do if your spouse was diagnosed with cancer? Who would look after the kids? If you took time off to be with your spouse, could you manage with a lower income? How would your retirement plan hold up if you had to unexpectedly spend $200 000 to cover the costs of treatments, medications, travel, and home modifications?

Critical illness insurance is a unique product that pays a lump sum if the insured is diagnosed with one of the covered illnesses. There are often 24 or 25 conditions covered in a critical illness policy. These conditions can include cancer, heart attack, stroke, multiple sclerosis, and benign brain tumors to name a few. Unlike disability insurance, you may apply for critical illness insurance whether or not you are actively working. For this reason, these policies can be a fantastic way to protect against the risk of a critical illness diagnosis for a spouse who is not actively working outside the home. It is advisable to apply for these policies as early as possible since they can be difficult to qualify for, especially as people age.

By insuring your spouse, you could answer some of the questions raised above—you could hire a caregiver for your children, and afford to take time out of your practice to care for your spouse and take him or her to important appointments. And you would have these funds to rely on so you wouldn't need to take on debt or rely on your re-

tirement savings to cover costs. If you do not already have critical illness insurance for your spouse, consider it.

—Channelle Sawyer
Insurance Advisor, Doctors of BC

Three BC physicians earn board certification in lifestyle medicine

Drs Ian Gillespie, Erica O'Neal, and Werner Spangehl are among 204 physicians and 43 PhD/master's-level health clinicians who became the first medical professionals globally to be certified as Diplomates of the American Board of Lifestyle Medicine/American College of Lifestyle Medicine and the International Board of Lifestyle Medicine.

Lifestyle medicine is defined by the American College of Lifestyle Medicine as the use of evidence-based lifestyle therapeutic approaches, such as a predominantly whole food, plant-based diet, physical activity, adequate sleep, stress management, tobacco cessation, and other nondrug modalities, to prevent, treat, and, oftentimes, reverse chronic disease.

For more information about the American Board of Lifestyle Medicine, visit https://ablm.co. For more information about the American College of Lifestyle Medicine, visit www.LifestyleMedicine.org.

Welcome, Dr Yvonne Sin

The *BCMJ* is pleased to introduce our newest Editorial Board member, Dr Yvonne Sin. Dr Sin is a second-year UBC family practice resident who intends to practise full-service family medicine in the Lower Mainland. She has a special interest in maternity, geriatrics, and refugee care. This fun-loving foody with a zest for travel and yoga will add a valuable younger voice to the journal. We are sure Dr Sin will be a welcome addition to our Editorial Board. **—Ed.**

Reminder: Apply for benefits under the 2018–2019 Parental Leave Program

Are you a physician practising in BC? Are you or your physician spouse having or adopting a baby or planning a pregnancy during the period of 1 April 2018 to 31 March 2019? If so, then it is important to take advantage of the Parental Leave Program, one of the negotiated benefits administered by Doctors of BC. In addition to pregnancy benefits for female physicians, the program provides parental benefits for male physicians and adoptive parents. Benefits are payable for up to 17 weeks at the rate of 50% of eligible income up to a maximum of $1000/week. For more information or an application package, please contact Lorie Lynch, PLP administrator, at 1 800 665-2262 (ext. 2882), 604 638-2882, or llynch@doctorsofbc.ca.

New resource for locums and physicians seeking locums: Locumunity

One of the top reasons for physician burnout is the inability to find locum coverage. There is massive demand for locums, and although the percentage of physicians who do locums has increased slightly, inefficient placement mechanisms make it difficult for physicians to connect with a broad base of locums.

Dr Haneen Abu-Remaileh, a BC locum physician, created www.Locumunity.com to simplify the task of finding a locum position in Canada and eliminate the need to sift through multiple job-posting boards.

Locumunity is a web-based platform that matches and connects clinics with locums using a unique matching algorithm to help streamline the recruitment process, dissolve provincial barriers, and help efficiently redistribute locum coverage. It is the first centralized Canada-wide and specialty-wide search tool for locums and clinics.

Continued on page 58

Reminder: Submit GPSC Portal Fees

GPs are reminded to submit the GPSC Portal (G14070) or GPSC Locum Portal (G14071) fees at the start of 2018. Effective 1 January 2018, GPs will need to bill G14070/71 in the following way to avoid billing refusal. Changes for 2018 are highlighted in **bold**.

PHN#: 9753035697
Patient Surname: **Portal**
First Name: **GPSC**
Date of Birth: January 1, 2013
ICD9 Code: 780

Submitting G14070/71 enables GPs to bill the following fee codes:

- G14075 GP Frailty Complex Care Planning and Management Fee
- G14076 GP Patient Telephone Management Fee
- G14077 GP Allied Care Provider Conferencing Fee
- G14078 GP Email/Text/Telephone Medical Advice Relay Fee
- G14029 GP Allied Care Provider Practice Code

For more details about G14070/71 in the GPSC Billing Guide–Portal, visit: www.gpscbc.ca.

Continued from page 57

Launched in April 2017, Locumunity has close to 1000 physician users across Canada, 70% of whom are locums. The Locumunity team has also been accepted into an accelerator program where they hope to grow Locumunity and expand on the artificial intelligence component of their algorithm.

Seeking ophthalmologists for outreach work in Papua New Guinea

Youth With A Mission (YWAM) is seeking ophthalmologists skilled in extracapsular cataract extraction (ECCE) cataract surgery interested in volunteering for medical marine outreach in Papua New Guinea. Ophthalmologists are needed to volunteer on the M/V *Pacific Link*. Phaco machines are not used due to the density of the cataracts encountered.

YWAM works in partnership with the National Health Authority of Papua New Guinea and with ophthalmologists from Papua New Guinea who perform this surgery on the ship. Currently, the organization is short of skilled professionals for its next five outreach campaign in 2018 due to a shortage of specialists in the country.

Interested individuals should contact the main YWAM ship's base in Kona, Hawaii, via email: join-us@ywamships.net, or call a recruiter at 1 808 757-9150. For more information about YWAM, visit www.ywam.org.

Colon screening test for average-risk patients resumes in BC

Fecal immunochemical testing (FIT), part of the early screening process for colon cancer, resumed on 15 December 2017 following a temporary suspension. Eligible patients can pick up FIT kits from any public or private lab across the province with a referral from their health care provider.

Testing was suspended in October 2017 after a manufacturer problem was identified with the reagent used to test the FIT samples. New batches of reagent have been approved for use following extensive testing and quality assurance process.

The Colon Screening Program, along with laboratory providers and health authority partners, has a coordinated plan to notify patients about the resumption of testing, first addressing those patients for whom testing was delayed.

Health care providers are advised that:

- Asymptomatic patients aged 50 to 74 can be referred for FIT using the Standard Outpatient Lab Requisition every 2 years.
- Patients with existing FIT requisitions from their health care provider may bring their requisition to the laboratory to receive their FIT kit.
- Patients who could not pick up a FIT kit or those who completed FIT but did not receive a result due to the FIT suspension may be contacted by their laboratory provider. Each laboratory will determine the most appropriate approach for contacting their patients. Most laboratories are considering giving notice with instructions to patients by mail or telephone. Every effort will be made to contact patients.

FIT is a routine screening test recommended for men and women between the ages of 50 and 74. FIT is designed for people who do not have symptoms and are considered at average risk of colon cancer. It detects blood in the stool, which can be an early sign of colon cancer. Those with abnormal test results are referred for a follow-up colonoscopy.

Patients with a strong family history of colon cancer or a personal history of adenomas were not affected by the test suspension and continued to be referred directly to the Colon Screening Program for colonoscopy. Patients with symptoms that may indicate cancer were not affected by this test suspension.

For more information regarding the Colon Screening Program, visit www.screeningbc.ca/colon.

Universal, no-cost coverage for mifegymiso in BC

Universal, no-cost coverage for the drug mifegymiso (also known as RU-486) commenced on 15 January 2018. Mifegymiso, an alternative to surgical abortion, is a combination of mifepristone and misoprostol. It can be used to terminate pregnancies at an early stage—up to 9 weeks from the start of the last menstrual period.

Since 11 July 2017, Pharmacare has covered mifegymiso subject to the rules of a person's Pharmacare plan. Patients under the Fair Pharmacare plan may face an out-of-pocket expense. Currently, the out-of-pocket cost for mifegymiso for individuals without Pharmacare coverage is approximately $300. The Common Drug

Review recommended mifegymiso for public coverage in April 2017.

Pharmacists may dispense mifegymiso to patients with a valid prescription. To obtain a prescription, patients must visit a physician or nurse practitioner for an ultrasound to confirm that they do not have an ectopic pregnancy. Health care professionals who will be prescribing or dispensing mifegymiso are encouraged to complete an education program.

Mifegymiso will be available at all participating pharmacies throughout

Continued on page 60

Recently published BC guidelines

Frailty in Older Adults – Early Identification and Management (2017)

This updated BC guideline addresses the early identification and management of older adults with frailty or vulnerable to frailty. The guideline facilitates individualized assessment and provides a framework and tools to promote patient-centred strategies to manage frailty and prevent further functional decline. The primary focus of the guideline is the community-based primary care setting, although the tools and strategies included may be useful in other care contexts.

Key recommendations

- Early identification and management of patients with frailty or who are vulnerable to frailty provides an opportunity to suggest appropriate preventive and rehabilitative actions (e.g., an exercise program, review of diet and nutrition, medication review) to be taken to slow, prevent, or even reverse decline associated with frailty.
- Use of a diligent case-finding approach to identify patients with frailty, particularly among older adults who regularly or increasingly require health and social services, is recommended. However, routine frailty screening of the general population of older adults is not recommended.
- Many patients with frailty can be assessed and managed in the primary care setting through a network of support, which may include family, caregivers, and community care providers. Coordinate care with other care providers and ensure patients and caregivers are referred to or connected with local health care and social services.
- Polypharmacy is common in patients with frailty. Consider the benefits and harms of medications by conducting a medication review in all patients with frailty.
- Initiate advance care planning discussions for patients with frailty or vulnerable to frailty.

Key resources that accompany this guideline

- Appendix A: Frailty Assessment and Management Pathway
- Appendix B: Sample Care Plan Template
- Appendix C: Medication Review
- Resource Guide for Older Adults and Caregivers
- Advance Care Planning Resource Guide

Chronic Obstructive Pulmonary Disease (COPD): Diagnosis and Management (2017)

This updated BC guideline provides recommendations for the diagnosis and management of COPD in adults who are 19 years and older. The guideline includes a COPD Flare-up Action Plan, a Patient Care Flow Sheet, and a Resource Guide for Patients.

New and amended key recommendations

- Use spirometry to confirm airflow obstruction in all patients suspected of having COPD. [Amended, 2017]
- Implement pharmacologic therapy in a stepwise approach and use the lowest step that achieves optimal control based on the patient's severity of COPD. [New, 2017]
- Develop an exacerbation action plan with the patient for pharmacologic therapies including short-acting bronchodilators, oral corticosteroids, and antibiotics. [Amended, 2017]
- Use routine follow-ups to evaluate the patient's inhaler technique and adherence regularly. Evaluating inhaler technique is particularly important in patients who are older, frail, or cognitively impaired. [New, 2017]

Hormone Testing: Indications and Appropriate Use

See the recent guideline Hormone Testing: Indications and Appropriate Use (formerly known as Special Endocrine Testing) for recommendations on the appropriate indications for testing selected endocrine hormones in patients who are 19 years and older, mainly in a primary health care setting.

New BC Guidelines Mobile App

To download the new BC Guideline Mobile App for both Android and Apple devices, visit www.BCGuidelines App.ca.

To stay up to date with BC guidelines, visit the What's New section on www.BCGuidelines.ca.

Continued from page 59

BC. All pharmacies will be able to order the drug as needed, which could take up to 2 business days to receive. Stock of mifegymiso will be available at pharmacies that are rural or remote, or that have previously dispensed high volumes of the medication.

Resources to prevent medical errors during transfer of care

Medical errors can be costly for both patient and hospital. As defined by the Joint Commission (www.jointcommission.org/assets/1/18/Hot_Topics_Transitions_of_Care.pdf), in order to keep patients safe, clinicians should focus on the three key points along the patient's continuum of care. To help, free resources are available.

Upon admission

Patient admission is a critical time for risk assessment. Clinicians should employ screening tools to identify high-risk patients before procedures. For patients potentially receiving opioids, this can include the Risk Index for Serious Prescription Opioid-Induced Respiratory Depression or Overdose (RIOSORD).

Patient recovery

As patients recover from procedures, it is common for patient-controlled analgesia (PCA) pumps to be employed to manage pain. The Physician-Patient Alliance for Health & Safety (PPAHS) PCA Safety Checklist is a free downloadable resource developed by a panel of experts to reduce the risk of opioid-related adverse events (www.ppahs.org/pca-safety-checklist-download).

Patient discharge

Clinicians should take steps to actively engage patients and their families as partners in their health. Patients are encouraged to ask the following five questions about their medications:

1. Have any medications been added, stopped, or changed, and why?
2. What medications do I need to keep taking, and why?
3. How do I take my medication, and for how long?
4. How will I know if my medication is working, and what side effects do I watch for?
5. Do I need any tests and when do I book my next visit?

We encourage clinicians to download a PDF version of these five questions and share it with their patients (www.ismp-canada.org/medrec/5questions.htm).

For more resources dedicated to patient safety, visit the Canadian Patient Safety Institute (CPSI) and PPAHS websites (www.cpsi.com, www.ppahs.org).

—Stephen Routledge, MPH
Patient Safety Improvement Lead
Canadian Patient Safety Institute
—Michael Wong, JD
Founder and Executive Director
Physician-Patient Alliance for Health and Safety

World Medical Association adopts statement on bullying and harassment within the profession

The World Medical Association (WMA) Statement on Bullying and Harassment within the Profession[1] was adopted at the WMA's 68th General Assembly.

Medical student mistreatment ranges from verbal harassment and public humiliation to threats of limiting future career opportunities. In a national survey conducted by the Association of Faculties of Medicine of Canada in 2017, 59.6% of medical students in their final year reported being personally mistreated.[2] In 2016 the rate was 53%; in 2015 it was 50.6%.[3] Of students reporting mistreatment, 89.6% report mistreatment by faculty and 34.1% by residents.[3]

As evidenced in the WMA's statement, mistreatment within the profession is also an issue internationally. Among US medical students, 42% reported having experienced harassment and 84% experienced belittlement during medical school.[4] These students were significantly more likely to be stressed, depressed, and suicidal; to drink alcohol or binge drink; and were significantly less likely to be glad they trained to become a doctor.[4]

Most Canadian medical students do not file a report when they experience instances of mistreatment. More than 80% of students who experienced mistreatment stated they had not reported it to their medical school or a designated faculty member.[3] Only 35.9% of students were satisfied with the outcome of having reported instances of mistreatment.[3]

Reasons cited by students for not reporting mistreatment included that "the incident did not seem important enough to report" (64.7%), "I did not think anything would be done about it" (47.1%), and "fear of reprisal" (35.3%).[3]

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Audit and billing CME sessions take off

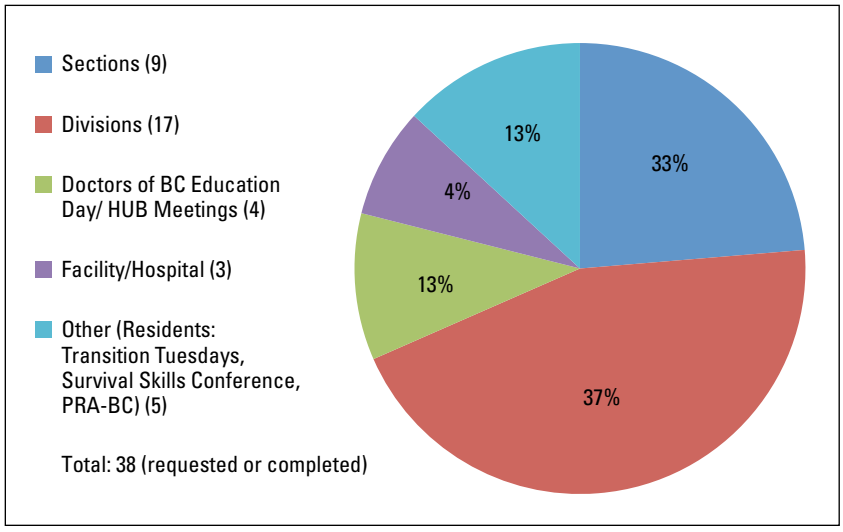
In March 2017, the Patterns of Practice Committee (POPC) embarked on a new journey by providing educational opportunities to physicians relating to audit and billing. Communications were sent to all sections heads and divisions, offering physician groups the opportunity to invite one of our speakers to present at one of their regularly scheduled meetings, annual general meetings, or education days.

The following three CME-accredited audit and billing sessions are currently being offered:

- Why an Audit: The Audit Process in BC Explained
- Avoiding Audit Pitfalls
- Introduction to Understanding Your Mini Profile

These three sessions are for physicians and are eligible for up to two Mainpro+ credits from the College of Family Physicians of Canada and up to two Maintenance of Certification (MOC) Section-1 credits from the Royal College of Physicians and Surgeons of Canada.

In 2017 there were 38 physician groups that expressed interest or scheduled one of our sessions (**Figure**). To date, we have spoken to 24 physician groups and approximately 553 physicians. There has been a tremendous amount of interest from physicians in hearing about the audit process and the common audit pitfalls revealed in audits. This unique opportunity allows physicians to be proactive and to make changes to their billing patterns if required.



Figure, Breakdown, by physician group, of the number of audit and billing sessions requested or provided in 2017.

I would like to take this opportunity to thank all Doctors of BC staff, the Patterns of Practice Committee members, and the Billing Integrity Program for their support to make these sessions such a success. The POPC looks forward to continuing to offer these accredited sessions in 2018 and beyond, and hopes to reach even more physician groups.

—Lorne Verhulst, MD
Chair, Patterns of Practice Committee

This article is the opinion of the Patterns of Practice Committee and has not been peer reviewed by the BCMJ *Editorial Board. For further information contact Juanita Grant, manager, audit and billing, Physician and External Affairs, at 604 638-2829 or jgrant@doctorsofbc.ca.*

Some comments from the CME sessions held in 2017:

- Audit and billing, best talk of the decade.
- I will be incorporating these tips to avoid audit pitfalls.
- Audit and billing information was extremely eye opening.
- Start off billing correctly as I enter practice.
- Very useful session for those new to practice.
- I will review the Preamble and improve record keeping.
- I will use more precise ICD-9 codes when billing.
- Very informative session, will review billing rules and GPAC guidelines.
- I will review my mini profile and the Preamble.
- I will ensure my documentation supports my billings.

Calls to BC Poison Control on 4/20: A case-only analysis

Every 20 April, thousands of Canadians celebrate or advocate cannabis use by attending public events or consuming cannabis in private. Cannabis-themed celebrations on this date, known as 4/20, have been held since the 1970s when the phenomenon emerged from California's cannabis subculture.[1]

Vancouver hosts a large 4/20 event, most recently held at Sunset Beach on English Bay. Crowds have grown from around 10 000 people in 2012 to 40 000 in 2017.[2,3]

After noticing a high volume of cannabis-related calls on 4/20 to the BC Drug and Poison Information Centre (DPIC), we sought to describe 4/20 cannabis-exposure callers and assess how they differ from callers on other days of the year. We hypothesized that 4/20, as a mainstream event, would attract first-time or occasional cannabis users. To explore this we conducted a case-only analysis of poison centre call data from 2013–2016, a method that quantifies the degree to which individual and situational factors modify the risk of a particular outcome.

We examined the characteristics of cannabis-exposure callers that might make them more likely to call on 4/20 compared with other days. If a characteristic increases this risk, we would expect a larger portion of 4/20 cannabis callers to have the condition. Characteristics considered included age, sex, cannabis formulation, caller location, and cannabis-use history. Data were extracted from mandatory coded fields and case histories in DPIC's call database.

We defined event cases as callers to the poison centre on 4/20 or the day after reporting cannabis exposure. Comparison cases were ones reporting cannabis exposures on all other days of the year, excluding days when cannabis call volume exceeded the daily average 99th percentile. Cases reporting the use of illicit substances other than cannabis use were excluded.

The 4/20 callers were more likely to have consumed edible cannabis products than other formulations, and more often called from the Vancouver Coastal Health Authority region than elsewhere in BC.

We identified 19 event and 721 comparison cases from 2013–2016. Univariate regression produced interaction odds ratios for the odds of being a cannabis-exposure call on 4/20 among those with certain characteristics compared to those without (**Table**). The 4/20 callers were more likely to have consumed edible cannabis products than other formulations, and more often called from the Vancouver Coastal Health Authority region than elsewhere in BC (**Figure**). Controlling for location, the odds of being a 4/20 cannabis caller were 3.7 times higher among consumers of edible marijuana products (95% CI, 1.39–11.82).

It was not surprising that 4/20 cannabis users primarily call from Vancouver and consume edibles, considering the large event in Vancouver at which edible products are promoted and sold. Ingesting cannabis produces delayed symptoms, often more severe than those experienced from inhalation. Delayed effects and lack of dosage regulations contribute to a phenomenon observed in poison centre calls in which novice users consume successive servings of edible cannabis product while waiting for the drug's psychoactive effects to begin.

It was surprising that 4/20 calls from first-time users or from certain age groups were not more frequent. It is not mandatory for poison centre staff to ask callers about cannabis-use history, which may explain why first-time user status did not stand out.

Table. Interaction odds ratios for characteristics potentially modifying the likelihood of 4/20 cannabis calls.

Characteristic	Comparison group	Interaction odds ratio (95% CI)
Edible cannabis	Other formulations	4.33 (1.63, 13.52)
Female	Male	2.63 (1.03, 7.56)
First-time user	Previous cannabis use	1.24 (0.39, 4.29)
Age, y (binary)		
≥ 13	≤ 12	1.37 (0.27, 25.01)
≥ 19	≤ 18	1.66 (0.69, 5.85)
≥ 50	≤ 49	1.84 (0.49, 5.63)
Call from Vancouver Coastal Health Authority	Other health authorities	12.20 (4.01, 52.86)

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

Results highlight concerns for edible cannabis products; 4/20 event messaging, product packaging, and health providers should warn users about the particular effects of edibles. While edibles are not included in Canada's 2018 cannabis legislation, they are of concern for population health.

—Emma Cumming, MSc
Field Epidemiologist,
Public Health Agency of Canada
—Tom Kosatsky, MD
BCCDC

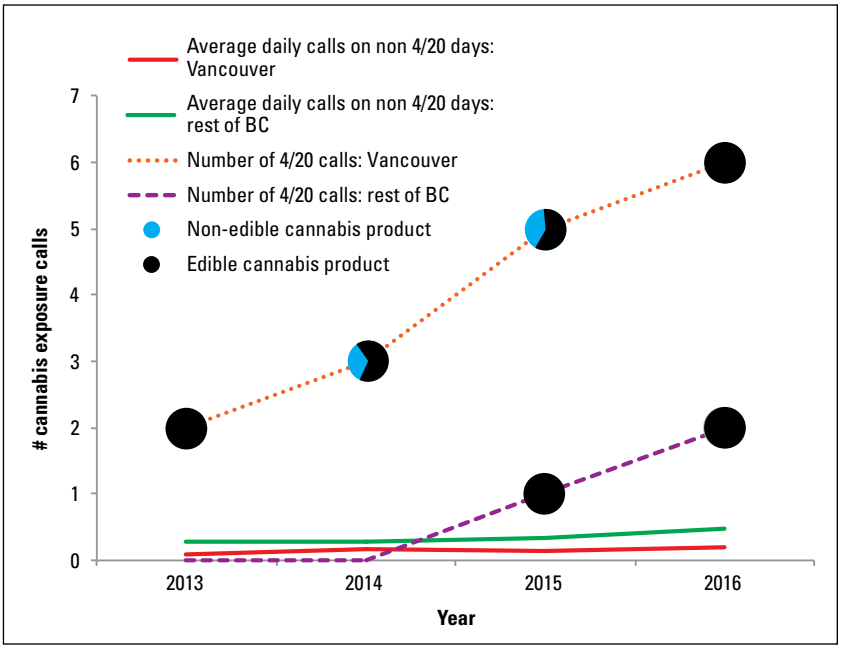


Figure. Location of callers about cannabis exposure to the BC Drug and Poison Information Centre on 4/20 and average daily volume of cannabis exposure calls throughout the rest of the year, 2013-2016.

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—Robert Melrose
Librarian

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Parallel worlds: Reflections from Centro de Salud Santa Clotilde, Peru

Daily experiences in the Peruvian Amazon during a rural family-medicine elective.

Justin Burton, MSc, UBC MD Candidate 2018

Things are not always what they seem. This summarizes my daily experiences in the Peruvian Amazon for a rural family-medicine elective. Although on first sight the situations and approaches used seemed drastically different from what would be the norm in Canada, I quickly realized that they were just alternative paths to the same endpoint in most cases, and there were more similarities in play than differences.

The Centro de Salud Santa Clotilde (CSSC) is located adjacent to the Rio Napo, 5 hours upriver by boat from Iquitos in northeastern Peru. The CSSC provides health care and support services to approximately 15 000 predominantly Indigenous people spread throughout roughly 100 villages. The Missionary Sisters of Our Lady of the Angels from Quebec took on the tasks of education and health care in the region between 1951 and 1991 as nurse-nuns. Beginning in the mid-1980s the physician-priests, Padres Jack McCarthy, MD, and Maurice Schroeder, MD, began to provide medical services and transformed the facility into its current state. The centre now boasts a 30-bed inpatient ward, simple OR, birthing room, emergency-procedures room, laboratory, and pharmacy. Inpatient, outpatient, emergency, obstetrical, pediatric, psychological, and dentistry services are offered. Although the infrastructure is basic, the hospital staff and the services they provide are certainly not. During my time at the CSSC I came to appreciate the breadth of knowledge and amount of advocacy that permeated the daily work at the hospital.[1]

Mr Burton is a fourth-year medical student at the University of British Columbia in the Vancouver-Fraser medical program. Mr Burton's interests include primary care and emergency medicine.

Interdisciplinary teamwork

Each day began at 6:00 a.m. with the town's public-radio tower crackling to life with the Peruvian national anthem, followed by town news. Hospital rounds started promptly at 7:00 a.m. and took the form of a group meeting where announcements were made and everyone had a chance to speak. Everyone, including at times our resident dogs and chickens, then

In addition to the simple operating room shown here, the facility has a 30-bed inpatient ward, a birthing room, a lab, and a pharmacy.

rounded on the inpatients, thus ensuring all team members were involved in each individual's care and informed of disposition plans. I found it to be an inclusive environment with time to learn and discuss all aspects of care as well as interact with all teams, something which is often lost in large centres in the first world due to high patient volumes. This casual communication continued throughout the day with various team members often dropping by to ask for clarification or to share important details.

The casual, open environment continued in the outpatient clinic, which is where the majority of working hours were spent. Whenever there was confusion about a case, an interesting teaching point to be made, or a second opinion was required, it was a simple exercise to walk to a nearby office and make inquiries. The physicians provided abundant information on diseases I had never encountered in the flesh, such as malaria, leishmaniasis, leptospirosis, and ascariasis. They were also an incredible resource on critiquing physical examination skills, refining questions on history, and expanding my knowledge of common ailments such as arthritis, respiratory infections, and traumas.

Although resources were scarce, there was access to current evidence-based medicine, and I consistently saw the Peruvian doctors using evidence-based applications or quickly researching diagnostics or treatments via our intermittent satellite Internet connection. However, due to the demands of a low-resource hospital attempting to adequately service so many, there was little time for scholarly endeavors. The demands led to a number of stressful moments, but also added to the camaraderie that came as a result.

During my first few dizzying days in this new environment I tried to get a handle on hospital protocols and village culture. It was comforting to see my old friend the SOAP note when I flipped open my first handwritten foolscap chart, but then I realized that I didn't know what a *gota gruesa* or a *heces fecales* was (later determined to be a malaria smear and fecal smear), nor did I understand the various shorthand notes and synonyms for Spanish descriptions. These would soon become second nature and comparable to vital signs to me. Although I had spent numerous years studying and practising Spanish in Canada and abroad, I found learning the Spanish medical terminology a steep transition. To add to the confusion, during the first few afternoons I found myself standing alone in the previously bustling clinic without electricity. This was later explained by the town's afternoon siesta and the public generator, which was only operational for select hours in the morning and evening (exceptions to this rule, however, included village celebrations, where one was serenaded until the early hours of the morning with the latest Latin rhythms). As I adapted to the differences in protocol, paperwork, diagnostics, diseases, and lifestyle, I realized that the basic foundation of care and clinical reasoning remained the same, and I fell into a rhythm.

Patient expectations

Communication between doctors and patients was another learning curve. The relationship was more formal than in Canada. Although physicians would have likely happily included patients in the decision-making process—something we strive for in Canada—patients seemed more comfortable simply taking direction. This may have had some roots in the poverty and lack of education that many patients struggled with, which became apparent to me when I learned that the government-assisted health insurance that the majority of patients accessed was reserved for the poorest in the nation. This scenario wasn't always the case, however, as some patients requested scarce medications and physicians had to navigate difficult conversations, just as they do in Canada.

Scarce resources

Although the physicians possessed a wealth of knowledge and gave extraordinary care given the resources available, there were shortcomings with technology, medications, general supplies, and access to specialists. Almost daily, the pharmacists would announce that the hospital had run out of paracetamol or ampicillin and that we would not be getting a shipment for a month or two. It was also a privilege to have electricity at times when it was most needed, such as during

Continued on page 66

View of the hospital courtyard with inpatient ward to the right and outpatient services to the left.

Continued from page 65

procedures and deliveries, so you could turn your headlamp off for a moment. As well, because we were not equipped to perform any type of imaging other than simple ultrasounds, everyone played it safe with patients and had a low threshold to admit-and-watch or transfer if they worsened. To complicate matters further, disposition was a unique challenge given the location and environment. Determining where and when patients could safely go home became as important as their diagnosis.

Transferring a patient to a specialist had its challenges as well. The Peruvian doctors told me that Iquitos had its limitations and some physicians there were reluctant to accept certain transfers. Though this appeared to be specialist-dependent, it was disheartening when encountering patients adversely affected by cataracts or pterygium, and showed that the people in the Napo region had to contend with more than poverty and a lack of resources. In addition, some patients were unable to afford the journey and thus were powerless to receive further treatment.

Similarities rather than differences

Canada and rural Peru contrast significantly in areas such as disease type, access to care and medicines, technology, and specialist services. However, I also spent time in Inuvik and Tuktoyaktuk, NWT, along with areas of rural BC, and noticed the same lack of opportunity, poverty, and diseases such as tuberculosis present. This is illustrated by Canada having one of the worst infant mortality rates according to the Organisation for Economic Co-operation and Development.[2] During my time in Peru many of the tenets of the Canada Health Act came to mind, along with why they exist—universality, accessibility, and comprehensiveness.[3] The provisions of the Act ensure that all Canadians have access to timely advanced care, which is not the case in rural Peru, and may be a reason why Peruvians struggle with diseases that are routinely managed in Canada, such as diabetes, hypertension, and their sequelae.

A child follows a wayward chicken through the inpatient ward.

And the comparisons are not limited to rural populations; the people in the Napo region struggle with the same issues of alcohol and drug misuse, domestic violence, and mental illness that plague our urban cores in Canada—which I saw during my clerkship training at St. Paul's Hospital in Vancouver. I'm thankful for my time spent in both places. It has made me realize that poverty has the same face no matter what the climate or ethnicity.

Patient education

It would be naive to think that I could make recommendations on how to better deliver care to rural Peruvians having spent 1 month in a single location. However, given that many of the causes of inadequate care appear to find roots in poverty—a theme that translates across many countries, and one I'm struggling to fully understand—some simple reflections can be made.

Although funds are limited in any country, a greater portion dedicated to health care is always helpful. Also, alleviating the stressors on the determinants of health, such as poverty and a lack of formal education and employment opportunities in underserved regions, would be of benefit.

One area that doesn't carry a large price tag but has a potentially large impact is patient education. Although the physicians attempted to educate patients and their families on disease processes and medications daily, it often seemed to fall on deaf ears. I encountered daily conversations about the implications of sporadic use of antimalarials and antibiotics, reluctance to use the vaccinations that were available, and the importance of not sharing medications. It's possible that certain misconceptions are rooted in the lack of formalized education as well; however, educating patients on appropriate medication use, such as when presented with patients taking both ranitidine and omeprazole for osteoarthritis, seems correctable regardless of educational level. Again, these experiences echo similar conversations occurring in clinics and hospitals throughout Canada.

A privilege to learn

I'm deeply grateful for the privilege to have worked with and been mentored by the great physicians and staff at the CSSC. I encountered diseases that I wouldn't have seen in Canada, which is of great importance given our large immigrant population and Can-

adians' frequency of travel. I will be a better physician having learned to manage various exotic diseases and refined certain basic skills in a low-resource area. There were drawbacks—dealing with frequent power outages, eating a daily diet of eggs, and being covered in ants and kept up at night by neighborhood dogs (that rested all day). But the experience had benefits that I couldn't recreate, and there are many moments that will be hard to forget—interviewing and assessing patients by headlamp with donated equipment during rainstorms, or watching cockroaches scurry out of my underwear while I searched my shelf for the reprieve of clean laundry.

It was humbling to be immersed in a different culture, language, and health care system, and I leave Santa Clotilde with much empathy for the immigrants and travelers who are attempting to navigate the Canadian health care system. And I will most definitely take time to listen and understand patients and their families, even when communication is challenging and it's easy to give up, because if you stay a moment longer you'll realize that most people are searching for the same things.

Acknowledgments

I would like to extend my sincere gratitude to the entire staff at the CSSC for allowing me the privilege to take part in such a noble and enriching effort.

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Dr Thomas Lachlan Calder 1927–2017

Dr Thomas Lachlan Calder passed away on 15 September 2017 at home after complications from a stroke that he suffered in May. Dr Calder was born and raised in New Westminster, and graduated from Duke of Connaught High School, where his father, Thomas Hanning Calder, was principal. He went on to study at UBC (BSc 1949) and McGill (MD CM 1953), where he met and wed a fellow medical student, Norma ("Tommy") England—the love of his life for 45 years of marriage. After medical school the Calders moved to West Vancouver where they raised six children. Tom practised medicine for 47 years and Norma eventually enjoyed her own medical career and advocacy work. Tom's busy practice was old-fashioned, full-service medicine with house calls, deliveries, surgery, hospital rounds, and care of all ages, including a tender focus on the elderly. Tom loved and lived medicine and was a respected member of the medical staff at Lions Gate Hospital until his retirement in 2000.

His other passion was music. Because his children played in a community band and he recognized other adults in his community had the same interest, he co-founded the West Vancouver Adult Band in 1969. He played his euphonium (and other instruments on demand) with several other groups—more so after his retirement from medicine—and he never walked anywhere without humming or whistling like a one-man marching band. His Doctors' Band, composed of retired physicians, played at nursing homes throughout the year. Some band members were older than the audience.

Tom was a member of the Kinsmen Club back when polio was the battle, as well as a mental health advocate for schizophrenia and mental health services. Tom and Norma were strong partners in facing their challenges. In 1980 Norma had a hand in taking a support group of eight people to over 30 Friends of Schizophrenics groups throughout the province, which would later become the BC Schizophrenia Society. Norma was recognized for this incredible volunteerism in 1988 with a Governor General's Silver Medal. Tom's contribution to the evolution of schizophrenia services was at the grassroots level—supporting his sons, watching treatments, and advocating for best care. He was also the man behind the scenes for Norma's activities, and while he kept a low profile, he guided and funded multiple initiatives. He also combined his musical talent into the advocacy work, and organized entertainment and music for annual parties and fundraising balls. His Pops Band played at the start of the annual Walk for Schizophrenia as they launched from Lawson Park. Tom also played a major fundraising role to establish a Psychiatry Research Chair at the University of British Columbia, in Norma's name.

As he rests in peace, his headstone reads, "With music in your heart."

—Jill Calder, MD, FRCPC
Kamloops

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Fantastic opportunity for an anesthetist with an interest in chronic pain to join us at Penticton Regional Hospital! If you are looking to practise in a welcoming and collegial setting where the lifestyle opportunities are endless, this is the opportunity for you. Enjoy a full practice and still have time to enjoy the adventures calling from your back door. The PRH Department of Anesthesiology is seeking a full-time anesthetist who functions well in a team setting to join our group of seven dedicated anesthesiologists. We are excited to add enthusiastic and hardworking anesthesiologists to our team at PRH. Email to apply: PhysicianRecruitment@InteriorHealth.ca.

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—FP & LOCUMS
Opportunities for physicians looking to do walk-in shifts, build a practice, or relocate in our busy modern clinic. EMR OSCAR. Great location next to a 24-hr Shoppers Drug Mart. No hospital work, no call, 70/30 split—walk-in shifts at $100 per hour minimum—and bonus available. Contact us at healthvuemedical@gmail.com, 604 270-9833/604 285-9888.

RICHMOND—FP/WALK-IN
Family practice/walk-in clinic, conveniently located inside Richmond Walmart, which includes a pharmacy and plenty of free parking. Efficient OSCAR EMR. Large Mandarin-speaking patient base. We welcome all physicians, either full-time or locum. Please email megafumedical@gmail.com or call 541 361-9561 for details.

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

S SURREY—OPPORTUNITY FOR DERMA
Busy medical clinic has an opportunity for a dermatologist. Clinic includes 10 full-time family-practice doctors, as well as specialists in gynecology, orthopedics, and women's health. In addition, it is associated with a full-service medi spa with innovative laser treatments as well as aesthetics and skin care. Please email Sandra@serenowellness.com for further information.

SOUTHERN INTERIOR, BC—OPPORTUNITIES FOR RESIDENT GRADUATES
Interior Health (IH) has great opportunities to launch your career whether you have chosen to practise as a family practitioner or hospitalist, or specialize in areas such as anesthesiology, cardiology, gastroenterology, infectious disease, internal medicine, neurology, pathology, pediatrics, physiatry, psychiatry, radiology, and more! Our location offers either an active urban lifestyle or a rural setting, where you can enjoy the amenities of a big city without the congestion. If you are completing your residency program and looking to make an impactful difference in health care, IH is the place for you. Email CV to PhysicianRecruitment@interiorhealth.ca.

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

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Option 1: join walk-in or family practice at attractive splits of 90/10, initially. Work 1–5 days of your choice. Option 2: relocate your existing practice to our location. Full EMR and online scheduling with OSCAR. Long-term staff and a mixed base of patients. Everything is done; just practise! On-site pharmacy for patients as well. Potential to own or lease the clinic or join as full partner in future. Existing three physicians are congenial and easy to work with. Call Priti at 604 788 3649 or email priti@bclaser.ca

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

Continued on page 70

Continued from page 69

EMR. Well-organized clinics. Please contact Winnie at medicalclinicbc@gmail.com.

VANCOUVER—FP
Mainland Medical Clinic is seeking a family doctor for our modern, multidisciplinary street-level clinic in Yaletown, downtown Vancouver. We have been operating for over 13 years in a comfortable setting shared with a chiropractor, massage therapists, and a nutritionist to complement our three family doctors. Ideally seeking someone with an existing practice—perhaps relocating or cutting back. We serve a broad spectrum of patients, both walk-ins and appointments. Excellent revenue split. The clinic offers a pleasant work environment in an upbeat, fun neighborhood. Contact Dr Brian Montgomery at brian@mainlandclinic.com or 604 240-1462, or just drop by.

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.

VICTORIA—PERMANENT/PT FP
Experienced family physician wishing to expand medical team at Mattick's Farm in beautiful Cordova Bay. Fully equipped office, OSCAR EMR, congenial staff, close to schools. Contact phoughton@shawcable.com, phone 250 658-5228.

medical office space

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

VANCOUVER (YALETOWN)—FP/GP, PT
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KSO Accounting Group, with offices in Prince George and Cloverdale, offers accounting services and additional business solutions for health professionals (corporate, personal, and not-for-profit). We would like to welcome Thomas Hirt, CPA, CGA, to our team. Thomas's preferred area of practice is physicians and specialists in general practice. www.ksogroup.ca.

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

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