



# RESEARCH@PHSA A HEALTHY INVESTMENT

Research at PHSA supports better health  
for British Columbians and improves  
health system efficiency



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# 2010



# Welcome to PHSA's 2nd annual research report

This report offers compelling examples of how ground-breaking research at the Provincial Health Services Authority (PHSA) is improving patient outcomes and contributing to the sustainability of BC's public health system.

## A leader in health research

PHSA is one of Canada's foremost academic health science organizations and, in collaboration with its research partners, is a leader in the area of health research in BC.

Research at PHSA is funded by approximately \$180 million a year in research grants and other funding. This financial support enables the activities of a network of about 1,200 researchers and support staff involved in a wide range of lab-based, clinical and community health research.

## A collaborative approach

Health research at PHSA is conducted by researchers affiliated with its eight member agencies and its research partners. PHSA's member agencies include BC Cancer Agency, BC Centre for Disease Control, BC Children's Hospital and Sunny Hill Health Centre for Children, BC Mental Health and Addiction Services, BC Provincial Renal Agency, BC Transplant, BC Women's Hospital & Health Centre, Cardiac Services BC and BC Ambulance Services.

Research partners include the Child & Family Research Institute, Women's Health Research Institute and the University of British Columbia Centre for Disease Control.

Research at PHSA is also conducted in partnership with academic institutions across the province, including the University of British Columbia, Simon Fraser University, the University of Victoria, the University of Northern British Columbia, the BC Institute of Technology, and Royal Roads University.

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## Funding sources for major research projects in this report

Research conducted at PHSA is made possible through grants and funding from number of organizations, which are gratefully acknowledged.

### The safety of mothers' milk (p. 4)

- Canadian Institutes of Health Research
- Canada Foundation for Innovation
- Genome British Columbia
- Pfizer Canada

### Improving treatment, minimizing harm (p. 7)

- The Mary Toye Memorial Fund, the Turner Family Lymphoma Outcome Unit Fund, and the Yvette and Hershey Porte Lymphoma Research Endowment Fund, all administered by the BC Cancer Foundation.

### New beginnings (p.11)

- BC Children's Hospital Foundation

### Hitting a homer in research (p.15)

- National Cancer Institute / National Institutes of Health

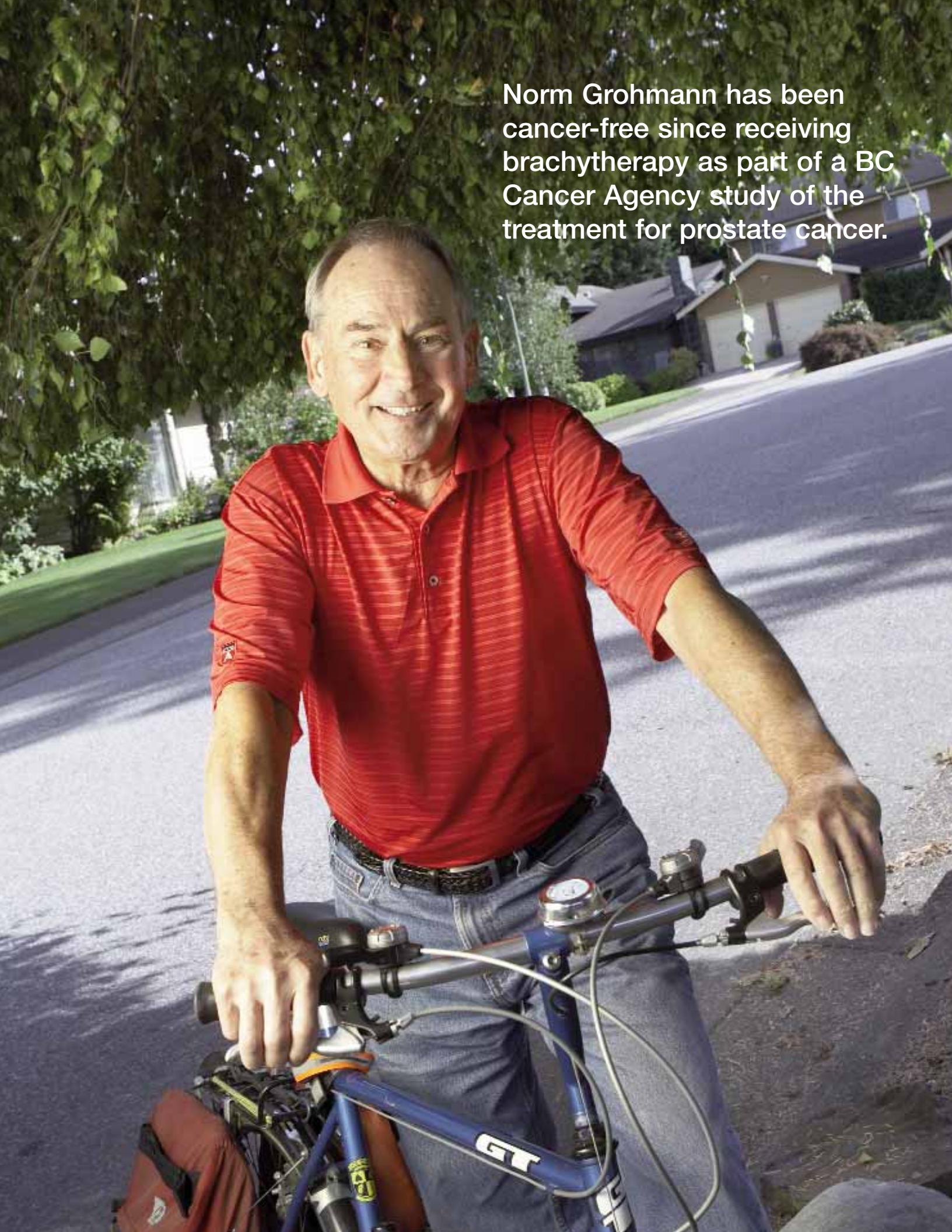
### Disease detectives (p.19)

- Genome British Columbia
- Simon Fraser University's Community Trust

### Sleep treatment (p. 13)

- BC Provincial Renal Agency
- Vancouver Coastal Health Authority

Norm Grohmann has been cancer-free since receiving brachytherapy as part of a BC Cancer Agency study of the treatment for prostate cancer.



# Going for gold

## Outcomes study supports brachytherapy as new gold standard for treating prostate cancer

When former television weatherman Norm Grohmann was diagnosed with prostate cancer ten years ago, he was given a choice of treatment options. By choosing brachytherapy he became part of a pivotal BC Cancer Agency study that has helped establish the procedure as a new gold standard for the treatment of prostate cancer - the most frequently diagnosed cancer among men.

The procedure involves implanting tiny radioactive particles or "seeds" into a patient's prostate and the tumour tissues around it. The result is a high dose of radiation delivered directly to affected areas with minimal effect on surrounding tissues. Within a year, virtually all of the radioactive material is depleted.

"Our treatment results are outstanding, with acceptable side effects for patients. Based on our results, I can confidently say we are one of the leaders in the brachytherapy community worldwide," says Keyes.

With 13 radiation oncologists providing brachytherapy in four centres across the province, BC Cancer Agency's brachytherapy program is now one of the largest in the world. And with growing recognition of its treatment success, the number of BC men with prostate cancer choosing the procedure is growing every year.

In recounting his experience with brachytherapy, Grohmann says the biopsy done for diagnosing his cancer was more uncomfortable than the procedure itself.

**"Based on our results, I can confidently say we are one of the leaders in the brachytherapy community worldwide"**

Dr. Mira Keyes, BC Cancer Agency

"Radical Prostatectomy has traditionally been the gold standard treatment for early-stage prostate cancer," says radiation oncologist Dr. Mira Keyes, head of the BC Cancer Agency's Prostate Brachytherapy Program. "So when you introduce a new type of treatment you really have to prove that it's working as well or better than the treatment that's already available."

Today, based on a study of long-term outcomes for the first 1006 patients who received brachytherapy at the BC Cancer Agency— including Grohmann — the evidence clearly shows the procedure is effective, providing excellent long term disease control and a likely cure for 95 percent of patients with cancer that has not spread from the prostate.

"I arrived at the hospital at ten in the morning, had the procedure and was having tea and a cookie by one o'clock. My wife and I went out for dinner that night and it's been clear sailing for me ever since," says Grohmann.

*Dr. Mira Keyes is a radiation oncologist and head of the BC Cancer Agency's Prostate Brachytherapy Program. She is also a clinical associate professor of radiation oncology at UBC.*

### Prostate cancer statistics

(2010 estimates)

- Prostate cancer is the most common cancer diagnosis for men
- This year 3,100 BC men will be diagnosed with prostate cancer (100 more than last year)
- About 570 men in BC will die of prostate cancer in 2010
- BC men have the lowest mortality rate for prostate cancer in the country

# Up to 19,000 babies born every year in Canada could be at risk from breast feeding if their mothers use Tylenol No.3 to manage post-delivery pain.

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## The safety of mothers' milk

Research shows potential danger for babies of nursing mothers who take Tylenol No.3

The most frequently used analgesic for women in Canada and the US following childbirth is Tylenol No.3, which contains codeine. The drug is routinely prescribed to women who receive an episiotomy during delivery or who deliver by caesarean section, and is used by more than half of all women after giving birth.

However, following a mysterious infant death in Ontario in 2006, researchers in Toronto aided by clinical pharmacologist Dr. Bruce Carleton and geneticist Dr. Michael Hayden at the Child & Family Research Institute (CFRI) uncovered evidence that Tylenol No.3 is not safe for all breastfeeding mothers.

Asked by the Ontario coroner's office to explain the death of the infant, the researchers found that the mother's breast milk contained high levels of morphine. Morphine is produced naturally in the body from codeine through a process of biochemical conversion. Normally, over time the body metabolizes this morphine into a harmless salt that is excreted through the kidneys.

Through genetic analysis of the infant's and mother's DNA, the CFRI research team found that the infant's mother had a genetic variation that caused her body to convert codeine into at least twice the normal amount of morphine. A second abnormality furthered the prob-

lem by interfering with her body's ability to metabolize the morphine and render it inactive.

Although the genetic variants responsible in this case are relatively rare, affecting approximately five percent of the population, Carleton points out that Canada — with an annual birth rate of 340,000 babies — could have up to 19,000 babies born every year to mothers with these genetic variations and exposed to risk if their mothers used Tylenol No.3 while breastfeeding.

As a result of these findings, physicians across North America have been warned regarding codeine use among breastfeeding mothers and all prescription drug labelling for Tylenol No.3 has been changed to include mention of the risk.

*Dr. Bruce Carleton is senior clinician scientist at CFRI, a professor in the department of pediatrics at UBC, and director of the Pharmaceutical Outcomes Programme at BC Children's Hospital.*

*Dr. Michael Hayden is director of the Centre for Molecular Medicine and Therapeutics at CFRI, Canada Research Chair in Human Genetics and Molecular Medicine, and a professor of medical genetics at UBC.*

# Vitamin vigilance

## Children's use of vitamins should be discussed with doctors

When parents bring their sick child in to see a doctor, they expect to be asked about their child's symptoms, medical history and medication use. But they may be surprised to find their doctor is also concerned about whether their child takes vitamins.

While vitamins are generally safe, the potential effects of their use in children shouldn't be ignored, according to Dr. Ran Goldman, a clinician scientist at BC Children's Hospital.

"We know that vitamins have active components that can interact with other over-the-counter or prescribed medications in a way that can create toxicities or present as symptoms of illness," he explains. "These symptoms could include abdominal pain, fatigue, or unexplained general weakness."

For example, vitamin C can interact with acetaminophen, which is commonly given to children to reduce fever or manage pain. Acetaminophen remains in the system longer in the presence of vitamin C, which could result in elevated and potentially harmful drug levels.

In interviews with 1,800 patients visiting a pediatric emergency department, Goldman and his colleagues found one-third reported using vitamins and only two-thirds of these patients mentioned it to their doctors. Further, the research team found that among vitamin users, one-third had a potential risk of interactions between the vitamins they used and other medications they were taking. Children with chronic illnesses who regularly take a variety of medications were identified as having the greatest potential risk.

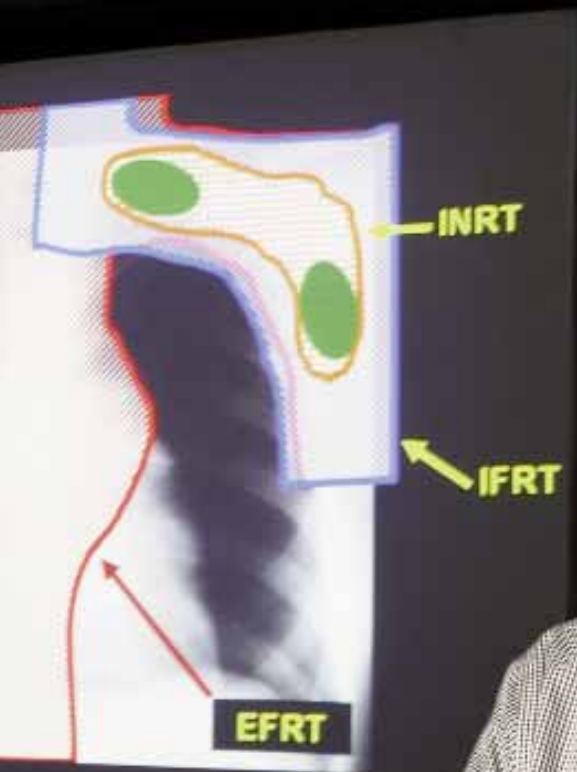
This research has led to more physicians asking their pediatric patients about the use of vitamins and other supplements. The key now, Goldman says, is communicating this information broadly so that more people are aware of the potential risks. "We need to change the perception that because vitamins are natural products, they can have no ill effects."

*Dr. Ran Goldman is research director and head of the division of pediatric emergency medicine at BC Children's Hospital, associate professor in the department of pediatrics at UBC, and senior associate clinician scientist at the Child & Family Research Institute.*

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**"We know that vitamins have active components that can interact with other medications in a way that can create toxicities or present as symptoms of illness"**

*Dr. Ran Goldman, BC Children's Hospital*



Dr. Joseph Connors helped establish a new approach to treating Hodgkin lymphoma that is now standard practice in Canada.



# Improving treatment, minimizing harm

## The BC Cancer Agency is a national leader in adopting new treatment approach for Hodgkin lymphoma

Six years ago the BC Cancer Agency acquired the latest in scanning technology — a positron emission tomographic (PET) scanner, which allows clinicians to accurately assess whether all cancer cells within a tumour under treatment have been destroyed.

With access to PET scanning and building on research findings from a major Canadian clinical trial at that time, The BC Cancer Agency's Lymphoma Tumour Group decided to see if radiation could be eliminated from the treatment for most patients with limited-stage Hodgkin lymphoma, a cancer of specialized white blood cells, or lymphocytes, which help fight infection and disease within the body.

At the time, the standard approach to treating Hodgkin lymphoma involved radiation therapy in combination with chemotherapy. Although the approach was

ed to trial a new treatment approach for the 20 British Columbians who develop limited-stage Hodgkin lymphoma each year, reserving radiation for only those patients not completely cured through chemotherapy alone.

"We always provide our patients with the best available treatments," says Connors, "but we also want to minimize any harm that might come from treatment." In adopting chemotherapy supported by PET scanning as its standard treatment for limited-stage Hodgkin lymphoma, the BC Cancer Agency became the first treatment facility in Canada and one of the first in North America to limit the use of radiation therapy for these patients.

Today, cure rates for British Columbians with limited-stage Hodgkin lymphoma continue to exceed 95 percent but now more than 80 percent of these patients are

**"The BC Cancer Agency was possibly the first treatment centre in North America to adopt this new approach as standard practice for treating limited-stage Hodgkin lymphoma, and was five years ahead of the rest of Canada."**

Dr. Joseph Connors, BC Cancer Agency

effective — providing a cure for more than 90 percent of patients with limited-stage Hodgkin lymphoma — exposing patients to radiation elevates their risk of developing other disorders, including heart problems and potentially even secondary cancers.

"The problem with radiation is that as it passes through tissues in the body it damages the normal tissue in addition to the cancer tissue," says Dr. Joseph Connors, clinical director of the BC Cancer Agency's Centre for Lymphoid Cancer. "For Hodgkin lymphoma, the radiation usually has to be delivered to the central portion of the chest, which raises concerns about damage to the heart and, even worse, a future risk for lung cancer and soft tissue sarcomas, as well as breast cancer for young women."

Equipped with the advanced capabilities of PET scanning, Connors says BC Cancer Agency clinicians decid-

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ed to trial a new treatment approach for the 20 British Columbians who develop limited-stage Hodgkin lymphoma each year, reserving radiation for only those patients not completely cured through chemotherapy alone.

In addition to the clinical benefits, the BC Cancer Agency's approach to treating limited-stage Hodgkin lymphoma also provided significant cost savings. The average cost of radiation therapy is about \$10,000 per patient, compared to \$400 for chemotherapy.

*Dr. Joseph Connors is clinical director of the BC Cancer Agency Centre for Lymphoid Cancer and a clinical professor in the Faculty of Medicine at UBC.*

### Hodgkin lymphoma

- Affects about 500 Canadian men and 400 Canadian women each year
- Occurs most commonly among people aged 15-25 and over 50 years of age.

The new HBV testing protocol is expected to save the provincial health system hundreds of thousands of dollars a year in lab, vaccine and clinician costs.

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## Study reveals vaccination issues for BC kidney patients

New standard for HBV testing reduces cost and improves patient care

Kidney patients on dialysis are regularly tested to make sure they are fully immunized against hepatitis B virus (HBV), a blood-borne virus associated with liver failure. Even after becoming immunized however, patients can lose their immunity and require booster shots.

In a recent study, a research team led by BC Renal Agency nephrologist Dr. Monica Beaulieu looked at how often dialysis patients around the province were tested and immunized for HBV and found only 50 percent of dialysis patients were tested at the recommended frequency, while 13 percent were tested less and 37 percent more than called for by clinical guidelines.

In response to these findings, the BC Renal Agency developed an online HBV testing protocol for use by

dialysis clinics across BC. The new protocol simplifies the process for tracking patient vaccination records and minimizes the potential for human error.

By eliminating unnecessary HBV testing for dialysis patients, Beaulieu estimates the new protocol saves the provincial health system hundreds of thousands of dollars a year in lab, vaccine and clinician costs. The protocol also ensures that dialysis patients in every region of the province are tested consistently and according to clinical guidelines.

*Dr. Monica Beaulieu is a nephrologist and medical lead for special projects for the BC Renal Agency.*

# Battling flu on the fly

## BC-led network delivers fast answers on influenza vaccine effectiveness

The world of seasonal influenza prevention proceeds at a breakneck speed. "Every year we're in this intense rush to get vaccine out the door and into people's arms before the influenza season hits us in November," says Dr. Danuta Skowronski at the BC Centre for Disease Control.

To evaluate the effectiveness of the seasonal influenza vaccine each year - and respond quickly to issues if they arise - the BCCDC received national funding in 2007 to lead a surveillance network across BC, Alberta, Ontario and Quebec. Physicians in the network provide BCCDC with swab test results and vaccination information from patients who present with influenza symptoms during the flu season. "This allows us to compare the vaccine rates between those who test positive and those who test negative for influenza," explains Skowronski.

This observational method has proven to be a cost-effective and reliable alternative to yearly randomized controlled trials of seasonal vaccines. Importantly, it also provides the infrastructure to rapidly evaluate new vaccines during a pandemic situation.

This occurred in 2009, as Canada braced to respond to H1N1 virus (human swine flu), declared a pandemic by the World Health Organization. A small BC-based study led by Skowronski raised the initial flag that people who had received the seasonal flu vaccine may be at greater risk of catching H1N1. To test this finding on a much larger scale, she turned to data gathered by the four provinces through the surveillance network. "Lo and behold, we found the same thing," she says, citing a doubling of H1N1 infection risk for those who'd had the seasonal flu vaccine.

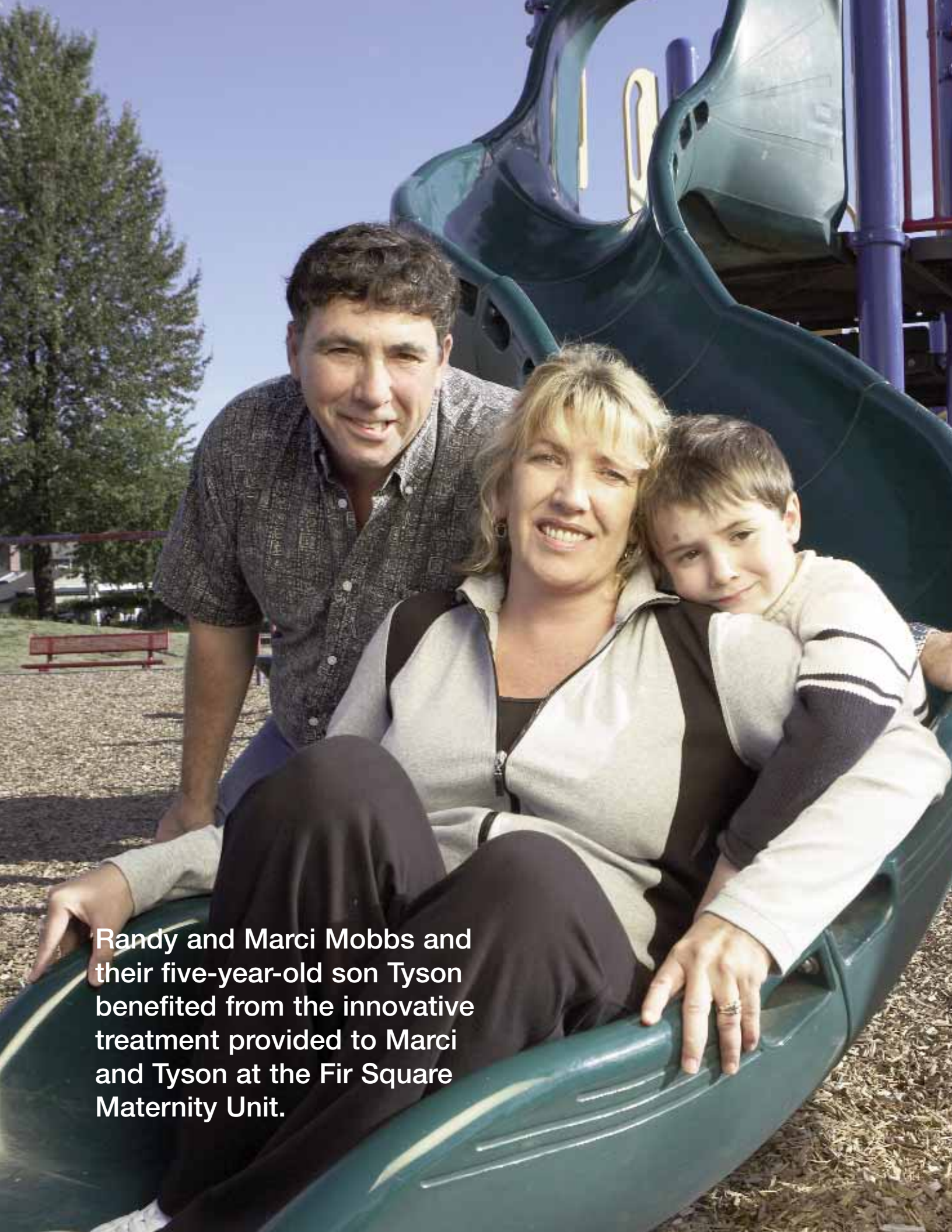
Over the summer of 2009, Skowronski and her team notified agencies around the world, conducted further studies and presented their results to help inform vaccination policy for the coming fall influenza season. This work prompted most provinces to delay their seasonal flu vaccine programs until after the H1N1 vaccine was rolled out.

*Dr. Danuta Skowronski is the epidemiologist lead for influenza and other emerging respiratory-borne pathogens at the BC Centre for Disease Control, and a clinical professor at UBC's School of Population & Public Health.*

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“Having our provincial laboratory and epidemiologists in one centre makes the BCCDC unique in Canada. Because of this long-standing collaborative environment, it's natural that the national vaccine surveillance network first evolved in BC.”

*Dr. Danuta Skowronski, BC Centre for Disease Control*



**Randy and Marci Mobbs and their five-year-old son Tyson benefited from the innovative treatment provided to Marci and Tyson at the Fir Square Maternity Unit.**

# New beginnings

## Research validates unique approach to supporting substance-using women with newborns

Maternity centres around the world are set up to encourage healthy bonding between a mother and her newborn. Babies room in with their mothers to encourage skin-to-skin contact and breastfeeding. Research has shown this rooming-in approach strengthens the mother-infant bond and helps babies thrive.

However, for newborns of mothers struggling with addiction, the story is quite different. In anticipation of withdrawal symptoms, these babies are removed from their mothers and put in a quiet room with no stimulation. As a result, there is no bonding and no breastfeeding. Predictably, many of these infants end up in foster care, and their mothers — now childless — return to substance use.

likely to end up in the neonatal intensive care unit, and more likely to be discharged home with their mothers rather than into foster care.

Marci Mobbs experienced this firsthand. She and her husband Randy were long-term drug users in Squamish. When their son was born in 2005, it seemed inevitable that he would be taken from her.

Instead, Marci and baby Tyson were accepted into Fir Square. During their 30 days in the unit Marci learned to care for Tyson while she was supported to begin her recovery. It was the positive push she and Randy desperately needed to get clean. Both parents went on to successfully complete rehab programs, find

**“We believe that babies are better off in the care of their mothers than being separated from them.”**

Dr. Ron Abrahams, BC Women’s Hospital and Health Centre

Since 2002, a program at BC Women's Hospital & Health Centre led by Dr. Ron Abrahams has challenged this approach. The Fir Square Maternity Unit helps substance-using mothers and their newborns to stabilize and withdraw from substance use, and is the only such unit in the world that provides rooming in for these mothers and babies.

"Our attitude is that these women are capable of rooming in and being safe with their babies if they're supported," says Abrahams. "We believe that babies are better off in the care of their mothers than being separated from them."

While this idea may seem radical, it's grounded in solid research evidence. A recent study led by Dr. Zoë Hodgson at the Women's Health Research Institute compared outcomes for more than 1,200 substance-exposed newborns in British Columbia: 371 infants roomed-in with their mothers at Fir Square, while the remaining 834 received standard care at other BC hospitals. Babies who roomed-in were more likely to be breastfed, less

employment, and start their lives anew. "It's like three people were born on the day Tyson was born," says Marci.

"These women do well with their babies if they can be supported in their community," says Abrahams. "Their struggles are not with their babies, it's with poverty and substandard housing. That's where the infrastructure is really lacking."

The impact of this important research is being felt across Canada, prompting maternity centres to review their practices.

"The word's getting out now," says Abrahams. "We're producing the evidence, and we're starting to be recognized as a program to be emulated."

*Dr. Ron Abrahams is medical director of perinatal addictions at BC Women's Hospital & Health Centre.*

*Dr. Zoë Hodgson is director of research at the Women's Health Research Institute.*



**Kathy Denamy is now able to work full-time since starting nocturnal dialysis as part of a BC Renal Agency-sponsored pilot project.**

# Sleep treatment

## Overnight dialysis cuts treatment costs and improves outcomes for kidney patients

Three nights a week 55-year-old dialysis patient Kathy Denamy arrives at Vancouver General Hospital with her pyjamas, ready for a full night of dialysis while she sleeps.

Denamy, who works as a bookkeeper in Surrey during the day, is a participant in the BC Renal Agency-supported nocturnal hemodialysis pilot program. Believed to be the first of its kind in North America, this innovative program is for patients trained to manage their own dialysis, but who are unable to accommodate the equipment and supplies required for dialysing at home.

Using hospital dialysis machines that would normally sit idle through the night, patients in the program are able to dialyse for eight hours while they sleep. This is double the dialysis time provided to patients at dialysis clinics during normal daytime hours.

dialysis they receive compared to conventional treatment," says Dr. Michael Copland, head of independent dialysis for the BC Renal Agency.

According to Copland, longer dialysis treatments are associated with better health outcomes and improved quality of life for kidney patients.

In addition to patient benefits, the nocturnal program offers significant cost savings from the minimal staffing required for patients managing their own dialysis. With just one nurse on duty six self-managing dialysis patients, the annual cost of care is \$36,000 per patient. By comparison, with a ratio of one nurse for every three patients, the average per patient cost for conventional dialysis is \$60,000 a year.

Research into the longer-term effectiveness of the nocturnal dialysis program involves ongoing tracking of patient outcomes and analysis of health system impacts.

**“When I started doing nocturnal dialysis I found I had more energy and I could last the whole day (at work).”**

Kathy Denamy, nocturnal dialysis patient

"Before, I was dialyzing three times a week during days and after four and a half hours of dialysis I'd find I was really tired," says Denamy, who was forced to reduce her hours of work because she needed more rest in the afternoons.

"I'm a single person so I need to work to support myself," says Denamy. "When I started doing nocturnal dialysis I found I had more energy and I could last the whole day." As a result, she is now back to working full-time hours at her job.

"We've created a situation where patients can take ownership of their treatment and double the amount of

The results of this work could provide a foundation for future expansion of the program to other centres around the province.

*Dr. Michael Copland is a nephrologist and medical director of the BC Renal Agency's independent dialysis program.*

BC patients on dialysis		
Dialysis modality	2001	2010*
Hospital-based hemodialysis	896	1210
Community unit hemodialysis	412	718
Home hemodialysis	14	152
Peritoneal dialysis	482	640
Nocturnal independent dialysis – pilot program	-	6

\* As of January 1, 2010



**Dr. Kirk Schultz led the study of a new drug treatment that has tripled the survival rate for children with a high-risk type of leukemia.**

# Hitting a home run in research

## BC-led study shows new drug triples survival rate for children with high-risk cancer

It's not very often that a researcher is involved in the discovery of a new medical treatment that dramatically improves patient survival rates and attracts worldwide attention.

In fact, Child & Family Research Institute pediatric haematologist and oncologist Dr. Kirk Schultz calls the discovery of a new treatment for childhood leukemia the "home run" of his career as a clinical researcher.

Schultz was the leader of a North America-wide clinical trial to explore the effectiveness of imatinib, a new generation "targeted" drug, in treating Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ALL), a particularly difficult type of leukemia that affects about one child in BC every year. Targeted drugs attack specific molecules on cancer cells, unlike chemotherapy which kills all rapidly dividing cells in the patient's body.

The five-year survival rate for children with Ph+ALL treated with conventional chemotherapy is less than 30

"I have to say I was very surprised by the results," says Schultz. "It's what every research doctor wants to see, and it's likely the only time in my career that this will happen."

Because PH+ALL only occurs in three percent of children with leukemia, to ensure statistical significance the imatinib clinical trial involved patients from 20 different cancer centres across the continent, including a young boy from Chilliwack.

Schultz says studies are now underway to test the effectiveness of other next-generation targeted drugs similar to imatinib, and to explore treatment for adults, among whom PH+ALL occurs much more frequently than for children.

*Dr. Kirk Schultz is head of childhood cancer & blood research at the Child & Family Research Institute, CIHR/Wyeth Clinical Research Chair in Transplantation and associate professor of pediatrics at UBC.*

**"I have to say I was very surprised by the results. It's what every research doctor wants to see, and it's likely the only time in my career that this will happen."**

Dr. Kirk Schultz, Child & Family Research Institute

percent, while bone marrow transplantation achieves a 60 percent rate of success, but is associated with toxic side effects. In the clinical trial however, combining intensive chemotherapy with imatinib was shown to provide a cure for 87 percent of children with this leukemia.

### About Ph+ALL

- A difficult-to-treat type of leukemia that occurs among 3% of children with leukemia
- Affects about one child a year in BC
- Previously the best treatment option was bone marrow transplant, with much higher toxic side effects

# Research prompts new services for youth with mental illness

## Unique metabolic clinic treats youth for side effects of anti-psychotic drugs

In January 2010, BC Mental Health & Addiction Services opened the Provincial Mental Health Metabolic Clinic at BC Children's Hospital. The first of its kind in Canada, the clinic was established in response to local research highlighting health concerns among youth who use a certain class of anti-psychotic medications.

Atypical anti-psychotic drugs treat a range of serious mental and behavioural disorders among youth, including schizophrenia, ADHD, autism spectrum disorders and substance abuse. Prescriptions for these medications in youth are increasing, and it's estimated that up to 5,500 BC youth currently use these drugs.

However, atypical anti-psychotics are also associated with an increased risk for metabolic disorders such as obesity and type 2 diabetes among adult patients. This knowledge prompted researcher Dr. Dina Panagiotopoulos to look at whether youth faced similar risks.

A chart review of patients admitted to the hospital's Child and Adolescent Psychiatry Unit revealed that youth treated with atypical medications had three times the risk of developing abnormally high blood sugars (pre-diabetes) or type 2 diabetes and twice the risk of becoming overweight or obese.

Although the long term impacts haven't been studied, "The concern is that if we don't intervene early on, these children could develop serious health issues," says Dr. Jana Davidson, medical director of Child and Adolescent Mental Health Programs at BC Children's Hospital. "In each child, we need to look at whether the potential risk for side effects outweighs the potential benefits."

For those whose mental health and quality of life depend on these medications, the new clinic offers the support of a healthy living coach, nutritionist, endocrinologist, nurse and consulting psychiatrist to assess, treat and monitor metabolic issues. The program also offers toolkits and educational resources for health professionals and families, and a provincial database for physicians to monitor their patients' metabolic health.

*Dr. Jana Davidson is medical director of Child and Adolescent Mental Health Programs at BC Children's Hospital and a clinical associate professor and head of the Child & Adolescent Psychiatry Program at UBC.*

*Dr. Dina Panagiotopoulos is a clinician scientist at CFRI, a pediatric endocrinologist at BC Children's Hospital and assistant professor of endocrinology in UBC's department of pediatrics.*

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“There isn't a clinic similar to what we have here anywhere else in the world.”

*Dr. Jana Davidson, BC Children's Hospital*

“Independent dialysis may not only offer better health outcomes for some patients, it's also a more cost effective approach to dialysis care.”

*Dr. Nadia Zalunardo, nephrologist*

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## A better landing for “parachute patients”

Study confirms benefit of counselling for patients with sudden kidney failure

Most patients with kidney disease experience a gradual loss of kidney function over many months or years before they need to begin dialysis. However, for about 40 percent of kidney patients the need for dialysis occurs much more quickly, over a few months or weeks, and sometimes literally overnight.

These "parachute patients" don't have time for the normal process of becoming prepared for dialysis and informed about their dialysis options, which include conventional hemodialysis as well as such independent options as home hemodialysis and peritoneal dialysis (PD) in which the patient manages their own dialysis care.

"There is evidence that independent dialysis modalities can be associated with better clinical outcomes and improved quality of life for patients in comparison with conventional hemodialysis," says nephrologist Dr. Nadia Zalunardo.

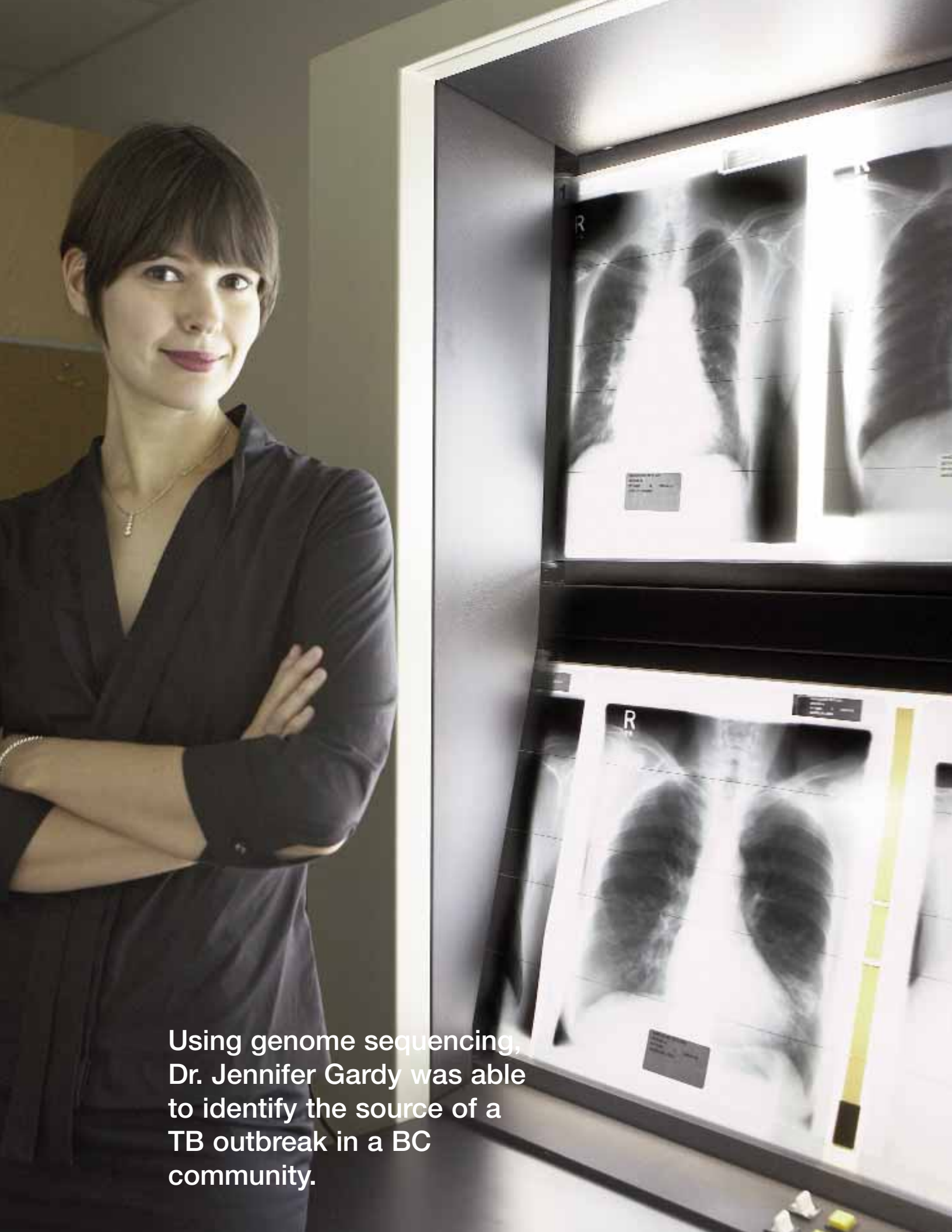
To provide better information about dialysis to parachute patients and ensure more informed dialysis decisions by this patient group, in 2007 pilot project funding was provided by the BC Renal Agency for a dedicated renal triage nurse (RTN) at Vancouver General Hospital.

The effectiveness of the RTN pilot project was evaluated in a recent retrospective study supported by the BC Renal Agency and led by Zalunardo. The study involved 73 parachute patients on conventional hemodialysis, about half of whom received dedicated counselling about their dialysis options from a renal triage nurse (RTN). The other half did not have access to an RTN and received information about their dialysis options through clinic visits or from their doctors.

The study found that 34 percent of the patients who received RTN counselling eventually switched to independent dialysis — either PD or home hemodialysis. By comparison, only 15 percent of parachute patients who did not receive RTN counselling made this switch.

"These results provide strong support for continuing our renal triage counselling program for parachute patients," says Zalunardo. "Independent dialysis may not only offer better health outcomes for some patients, it's also a more cost effective approach to dialysis care."

*Dr. Nadia Zalunardo is a nephrologist at Vancouver General Hospital*



Using genome sequencing, Dr. Jennifer Gardy was able to identify the source of a TB outbreak in a BC community.

# Disease detectives

## New methods help identify and stop outbreaks of disease

When it comes to an infectious disease outbreak, it's never enough to simply diagnose and treat patients who get sick. To stop the spread, the BC Centre for Disease Control must also locate the source of the disease and identify everyone who may have been exposed.

This type of detective work is used to control tuberculosis, a highly-contagious bacterial infection that primarily attacks the lungs. While many people don't consider TB to be a disease of modern times, it remains a significant health issue in certain Canadian populations. Poor nutrition, substandard or transient housing, illicit drug use and genetic factors can all make individuals more vulnerable to TB infection. The bacterium can lay dormant in a person for many years before it becomes active, meaning that many people may be infected without any signs of illness.

**“We believe we're really on to something important. These new methods make it much easier to identify transmission events and target the right people for follow-up.”**

Traditional methods for investigating an outbreak are two-fold. The first approach is epidemiological, where diagnosed individuals provide a list of people they come into contact with on a regular basis. At the same time, simple genotyping — which looks at DNA sequences on specific locations of the bacterial genome — determines whether all TB patients in an outbreak carry the same disease strain, which would point to a single source of infection.

Recently however, the BCCDC was confronted with a medical mystery. Traditional tracing methods were yielding no clear infection source in a TB outbreak that began in 2006. In less than three years, a total of 41 cases were diagnosed in a single community.

What was needed was a deeper level of understanding, according to Dr. Jennifer Gardy, head of BCCDC's Genome Research Laboratory. First, epidemiologists implemented a more detailed contact tracing method called social network analysis to identify key people,

places and behaviours that might contribute to the spread of TB. Second, Gardy and her research colleagues decided to analyze the entire bacterial genome of each TB patient.

"Surprisingly, we discovered that even though they all had the same genotype, there was actually a significant degree of genetic diversity lurking below the surface," she explains.

This led the team to identify two separate strains of TB circulating in the community, each originating from different individuals who became ill with active disease around the same time. Combining this information with the social network analysis allowed the BCCDC to identify three TB "superspreaders," who were the direct source of the majority of infections. "Finding these spreaders is key to stopping an outbreak," says Gardy.

Dr. Jennifer Gardy, BC Centre for Disease Control

The results of this work demonstrate the power of a combined approach to investigating disease outbreaks. "We believe we're really on to something important," says Gardy. "These new methods make it much easier to identify transmission events and target the right people for follow-up."

*Jennifer Gardy leads BCCDC's Genome Research Laboratory and is an adjunct professor in the department of microbiology and immunology at UBC*

### Genome Sequencing

Five years ago researchers would have had trouble sequencing two or three bacterial genomes — let alone the 36 sequenced for this research project — with DNA segments processed a few hundred at a time.

Today's high-throughput technology processes millions of DNA segments at a time, for just a fraction of the cost of the old method. This high-volume/low-cost processing capability opens the door for many new avenues of research.



Vancouver Coastal Health community nurse, Jeremy Martin, prepares to give HPV vaccine to Aleksandra, as part of provincial immunization program.

# Two=Three in HPV vaccine research

## Change to two-dose HPV vaccine for BC schoolgirls helps cut costs

A recent study led by researchers in BC has determined that two doses of the human papillomavirus (HPV) vaccine provides the same protection from HPV as three doses – the previously recommended dosage. Based on these results, the immunization schedule for HPV has been changed in BC to two doses given to grade six girls followed, if necessary, by a third dose five years later.

Principal investigator for the HPV vaccine clinical trial was Dr. Simon Dobson from the Vaccine Evaluation Centre at BC Children’s Hospital. The study also involved researchers and subjects in Quebec and Nova Scotia.

“What we did was compare the antibody response from two-doses versus three-doses of the vaccine,” says

HPV research group, BC Centre for Disease Control, which provided epidemiology and evaluation expertise, and the BC Cancer Agency, which provided essential data from the agency’s centralized registry of cancer for ongoing evaluation of the new two-dose program.

Another element of the study involved PHSAs Laboratories, which developed new tests for measuring the performance of the vaccine.

By cooperatively engaging scientists from a variety of disciplines across different PHSAs agencies, and by linking with the efforts of researchers in other provinces, Dobson says the study proved to be “a tremendous success,” and has established a promising pathway for future work.

“To be able to link the vaccine registry at BCCDC with the cancer registry at BC Cancer positions BC as a leader in the world for doing this sort of research.”

Dr. Simon Dobson, clinical investigator, Vaccine Evaluation Centre, BC Children’s Hospital

Dobson, adding that no difference in response was found between the two protocols.

“Our results gave confidence to BC policy makers to change the HPV vaccine program to a two-dose schedule,” says Dobson. “As a precaution we’re holding the third dose in reserve in case we find the vaccine needs a boost in future.”

The HPV vaccine has been given every year to BC girls in grades six and nine since 2008, when about 31,000 girls received three doses of the vaccine, spread throughout the year. At a cost of about \$100 per vaccine dose reducing the schedule to two doses could result in a substantial cost saving to the province’s immunization program. Furthermore, elimination of the third dose would also reduce the work load for public health nurses and delivery costs for the program. In BC, co-investigators for the study included researchers from the Women’s Health Research Institute, which hosts the

“The shape of the future is the ability to do data linkages,” says Dobson. “To be able to link the vaccine registry at BCCDC with the cancer registry at BC Cancer... positions BC as a leader in the world for doing this sort of research.”

*Dr. Simon Dobson is a clinical investigator at the Vaccine Evaluation Centre at BC Children’s Hospital and a clinical associate professor in the Department of Pediatrics at the University of British Columbia.*

### HPV

- HPV is spread through sexual contact and shows no signs or symptoms
- Every year up to 150 women in BC develop cancer of the cervix caused by HPV
- 40 BC women die from the disease each year
- The HPV vaccine provides almost 100 percent protection from HPV



Dr. Sarah Finlayson is promoting a simple change in clinical practice to help prevent ovarian cancer for BC women.

# Simple change saves lives

## Fallopian tube removal during hysterectomy helps prevent ovarian cancer

The number of deaths caused by ovarian cancer in BC could be reduced by 30 percent if gynecologists follow the recommendation of BC Cancer Agency oncologists and remove the fallopian tubes of women undergoing hysterectomies or tubal ligations.

The recommendation is based on a recent discovery by BC researchers at the Ovarian Cancer Research Program (OvCaRe) that most high-grade serous tumours – the deadliest type of ovarian cancer – arise in the fallopian tube rather than the ovary.

Further research revealed 18 percent of women who developed ovarian cancer had previously had a hysterectomy. Since fallopian tubes are not removed as a standard practice during hysterectomies, researchers note this relatively simple change in practice could pre-

vent ovarian cancer and perhaps death for a significant number of women.

Finlayson says response to the DVD from BC physicians has been excellent, and that BC is likely the first jurisdiction in the world to recommend this practice change for gynecologists.

Ovarian cancer is the fifth leading cause of death for women in Canada. Every year about 310 BC women are diagnosed with ovarian cancer, and each year 220 women in this province die from the disease.

According to Finlayson, the research finding that identified the connection between the fallopian tubes and high-grade serous ovarian cancer generated a “eureka moment” among clinicians in the research group when they realized they could act on the finding.

“We saw that we could actually take that knowledge and translate it into a real change that could have an immediate impact. It’s very exciting in medicine when that happens.”

Dr. Sarah Finlayson, Gynecologic oncologist, BC Cancer Agency

vent ovarian cancer and perhaps death for a significant number of women.

In September, every gynecologist in the province received a DVD explaining the research evidence supporting the recommendation. Dr. Sarah Finlayson, a gynecologic oncologist at Vancouver General Hospital and the BC Cancer Agency, is leading the effort to change the practice of BC’s gynecologists.

“We’re not recommending that women come in off the streets and have their tubes taken out,” says Finlayson. “All we’re saying is that the fallopian tubes should be considered as part of the uterus and should be removed with the uterus for women already undergoing major gynaecological surgery. It’s a very simple surgical change.”

“We saw that we could actually take that knowledge and translate it into a real change in the way we provide care, and that it could have an immediate impact,” says Finlayson. “It’s very exciting in medicine when that happens.”

*Dr. Sarah Finlayson is a gynecologic oncologist at Vancouver General Hospital and the BC Cancer Agency, and an assistant professor in the Faculty of Medicine at the University of British Columbia.*

### Ovarian cancer

- About 310 women are diagnosed with ovarian cancer every year in BC
- Each year 220 women in BC die from the disease
- Hysterectomy is the second most common surgery for Canadian women