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Written by Diane Wild

## Big Bad Bug Killers

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*Meet a few of Fraser Health's key fighters in the war against our enemy – hospital infections and the bugs that cause them*

Hospitals around the world are battling hospital-acquired infections, with their dramatic cost to patient safety as well as to the health care system as a whole. One in 10 adults will contract an infection while in a Canadian hospital, including *C. difficile*, MRSA (Methicillin-resistant *Staphylococcus aureus*), urinary tract infections, or pneumonia. Besides the toll on patients and their families, it can cost \$10,000 to treat a single case of *C. difficile* or a wound infection. According to a recent article in the *Globe and Mail*, one out of every 12 patients in a Canadian hospital is colonized or infected by *C. difficile*, (MRSA), or Vancomycin-resistant *Enterococcus* (VRE). Recently, another one joined the list of bad bugs to make an appearance – antibiotic-resistant Carbapenemase-Producing *Enterobacteriaceae* (CPE). Fortunately, Fraser Health has an army of infection warriors taking aim at the complex issues involved in identifying, preventing and treating the causes of these infections. Meet just a few of them.

# The S\*\*t Disturber



## **Dr. Jeanne Keegan-Henry - pioneering fecal transplants in Fraser Health**

In 2010 Dr. Jeanne Keegan-Henry and Dr. George Sing performed Fraser Health's first fecal transplant. She bought a blender from a drug store, labelled it 'Don't Use For Food', and via a colonoscopy implanted the diluted donor feces mix with its 'good' bacteria' to restore the balance in a patient's C. diff-overrun intestines. Dr. Ed Auersperg performed the procedure on another patient the following year, this time giving the mix via a nasogastric tube.

Considered an experimental treatment at the time by the College of Physicians and Surgeons of BC, and by Fraser Health, local physicians could not continue providing the procedure despite calls from patients and families across Canada desperate for a cure.

"It's heartbreaking," says Keegan-Henry. "People die of this. People are incapacitated for months and months and months. People dwindle and are sick for years. It's an awful disease and it's so cheap and easy to fix it. The major cost is testing the donor for infectious diseases."

The prohibition has now changed thanks to the accumulation of significantly more data, including a **2013 article in the New England Journal of Medicine (<http://www.nature.com/news/faecal-transplants-succeed-in-clinical-trial-1.12227>)**. A randomized clinical trial – a gold standard of medical research – had to be stopped early on ethical grounds: the results showed fecal transplants cured 94% of patients compared to 27% with vancomycin. Recruitment into the study was halted, all those who relapsed were subsequently cured with fecal transplants, and the results were published as evidence that transplants were three to four times more likely to cure C. diff than antibiotics.

Given its greater success rate and lower cost compared to the traditional antibiotic treatment, what's the downside to fecal transplants as a cure for intractable C. difficile infections? "Ewww!" answers Dr. Jeanne Keegan-Henry. "That's the objection."

The thought of a stranger's feces being inserted into your gut might have an ewww factor, but she points out it was rarely patients who objected. "By the time you've had diarrhea for two to three months, if someone says 'I'm going to do something absolutely disgusting to you and within an hour you will stop having diarrhea and you may never have it again,' you'd be surprised how little resistance there is."

Her crusade has now paid off and Fraser Health is set to provide fecal transplants at Burnaby and Ridge Meadows Hospitals after diligently working through the previous barriers.

"I'm more impassioned than functional on this," she laughs, lauding Dr. Elizabeth Brodtkin, Dr. Ed Auersperg, and many others who helped create the complex infrastructure. "I was pretty publicly hostile to Fraser Health when they stopped me. Having seen how hard it is to create the process that is medically and legally safe and has all the players on board, I understand why they wouldn't let me just do it back then. And I'm grateful they've put the resources in now."

“All I care about is making my patients better,” she adds. “I don’t have any doubts this will save lives.”

## The Laser-Focused

### **Dr. Peter Blair- Researching the latest in MRSA fighters**

Dr. Peter Blair has helped spearhead Fraser Health’s efforts in the National Surgical Quality Improvement Program (NSQIP) and he’s always sniffing out ways to reduce surgical infection rates: using chlorhexidine wipes, adjusting antibiotic timing and dosing, keeping patients’ bodies warm during surgery, and controlling blood sugar levels throughout surgery are just a few weapons in that arsenal.

So when a generous Abbotsford donor provided the funding for a new way to fight surgical wound infections using photodisinfection of the nose, he got to work on creating a randomized clinical trial that, if successful, ultimately will benefit not only Fraser Health but also other hospitals looking at the same therapy.

MRSAid is the name given to a non-antibiotic therapy from a local company that targets the patient’s own bacteria – one of the most common causes of wound infections in ‘clean’ surgeries (surgeries that do not involve the bowel or cutting into infected areas).

In this procedure, the inside of a patient’s nose – the primary area for colonization – is first swabbed with a light-absorbing chemical compound called methylene blue. Next, a laser is directed at the area to kill MRSA and other bacteria. “It’s obviously a fixed-wave-length laser so it doesn’t burn a hole in your brain,” says Blair chuckling.

It’s quick, simple, and there’s some evidence to suggest it works. But Fraser Health will be conducting a rigorous randomized control trial before deciding whether it merits investing in the equipment and operational costs for the rest of the health authority’s surgical sites.

“Fraser Health has the required skill set to do proper research as we’ve demonstrated time and time again, and we have the population and the volumes of surgery to do big trials,” says Blair. “We are so lucky to have the infrastructure to set up a proper randomized control trial through our Department of Evaluation and Research Services. It says a lot about your organization when you can do that.”



## The Investigator

### **Trudy Robertson - Beating pneumonia with oral care**

When Clinical Nurse Specialist Trudy Robertson noticed high rates of pneumonia while attending rounds on a Royal Columbian Hospital neurosurgical unit, “I did what Clinical Nurse Specialists (CNSs) do: I went to the literature,” she says.

She discovered that this population – immobile and dependent on others for their daily care – was at greater risk for infection, with an estimated pneumonia rate of 26% or higher. She further discovered that the source of pneumonia infections was usually bacteria in the mouth.

What she didn’t find in the literature was solid evidence or protocols for oral care in dependent medical/surgical



patients. The research done to date had focused on ventilated critical care patients, or people in residential care.

"It's not that nurses weren't providing oral care, but we didn't all have a full appreciation of how important it was," explains Robertson. "It's not just about comfort, it's about decontaminating the mouth. And we didn't know the details of how frequently it was needed, or what equipment was best."

Seizing the opportunity of a Fraser Health point of care research challenge, Robertson teamed with registered speech language pathologist Dulcie Carter to lead a study that successfully linked enhanced oral care to a reduction in hospital-acquired pneumonia in non-ventilated, care-dependent patients – a 75% reduction, in fact.

"It was wonderful to see the work validated," says Robertson. "And our little neuro study in RCH has blossomed from such a simple foundation."

Fraser Health has established a regional protocol for enhanced oral care, now in the implementation phase, and the findings are spreading internationally. Robertson and Carter have presented their findings around the world, published in the Canadian Journal of Neuroscience Nursing and won a Canadian Association of Neuroscience Nurses research award, in addition to being shortlisted for another international research award.

"It just took a clinical observation and somebody to pursue it. And when I think, 'Somebody's got to do something,' I feel a huge responsibility to be that somebody."

## The Human Shield

### **Dr. Chris Wong - Preventing infection and antibiotic resistance**

As chair of the antimicrobial stewardship committee, Dr. Chris Wong promotes optimal antibiotic use as a way to reduce the risk of antibiotic-resistant bacteria in our hospitals. For example, he's on a mission to prevent the testing and treatment of patients who don't show clinical signs of a urinary tract infection – one of the most common types of hospital-acquired infections. "We're going to have a comment on the lab report that a positive urine culture isn't an indication to start microbial therapy. That's going to be a real education piece for doctors."

He's also principle investigator for Fraser Health's *C. difficile* vaccine trial. The double blind study is taking place in 80 countries and over 200 sites, including Royal Columbian and Surrey Memorial Hospitals, and will be recruiting patients over the next couple of years, offering hope for another effective way to prevent *C. diff* infection in high-risk patients.

But his latest major project will help patients who test positive for MRSA. About one out of every 100 people carry MRSA without getting sick, but in hospital the risk of infecting other vulnerable patients is high. To reduce the risk, the MRSA-positive patients are isolated, and staff must gown and



glove before entering their room.

“When a patient is in contact isolation, they’re 50% less likely to be visited by a health care worker. It just takes more time to go in the room,” says Wong. “From the patient’s point of view, they’re upset that they’re isolated, and because they have less support they’re more likely to fall.”

To eliminate the need for contact isolation, a pilot project is underway in Intensive Care at Royal Columbian Hospital in which patients are bathed daily with a special chlorhexidine-based soap and treated with an antimicrobial nasal ointment. For the treatment to be effective, the hand hygiene rate among care providers must be at least 80%.

“If we do these three things, it’s been shown that you cut the rate of MRSA so much you don’t need the gown and gloves,” says Wong. “In addition to improving the patient experience, can you imagine the convenience to health care workers and the money saved?”

If the ICU pilot is successful, the plan is to roll the process out through all Fraser Health hospitals.

## The Change Champion



### **Dr. Mitra Maharaj - Reducing UTIs and sustaining the reduction**

In 2011, Langley Memorial Hospital faced a 3.3% occurrence rate of urinary tract infections (UTIs) – significantly above the expected rate. By 2013, it had plummeted to 1.5%.

Surgeon champion Dr. Mitra Maharaj, along with a squad of frontline workers known as the Langley Infection Fighting Team (LIFT), coordinated by surgical clinical reviewer Lila Gottenbos, led the charge against catheter-associated UTIs in surgical patients. They were armed with data from the National Surgical Quality Improvement Program (NSQIP) and a plan to end the practice of routine catheterization, develop catheterization guidelines, remove catheters as soon as possible, and use chart stickers to quickly identify patients who still have catheters.

“NSQIP connects frontline staff with strong, risk-adjusted data that accurately reflects what is currently happening in our surgical patients,” says Dr. Maharaj. “The frontline staff are engaged in the process because their expertise and bedside perspective is highly valued and is integral in

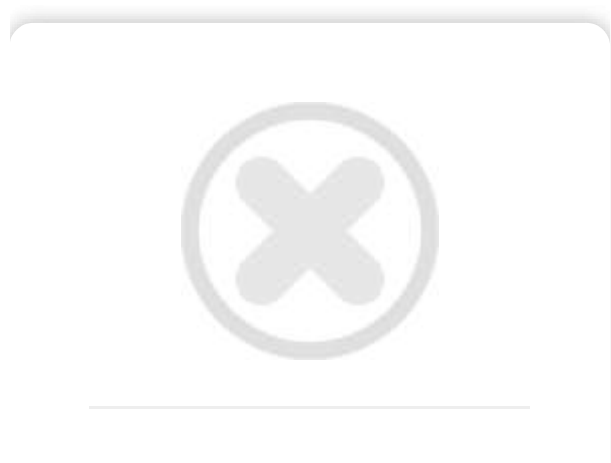
transforming data into action.”

He points to one example where frontline staff changed the thinking on a proposed solution to provide further education on the technique for inserting catheters. It turns out the barrier was the type of catheter kit then in use, so the better solution of acquiring new kits was implemented.

His role as surgeon champion is to act as a bridge between the frontline staff and physicians and to keep quality improvement visible throughout the surgical program. “Sustainability is the challenge, now that we have these measurable results,” says Dr. Maharaj. “It’s about a culture shift, which involves an ongoing dialogue.”

“There’s no question that quality is an issue,” he says, pointing to other factors such as reducing surgical site infections and hospital-acquired pneumonia. “We need to talk about it informally, we need to talk about it formally at presentations and meetings, wherever we can, and we need specific activities, outcomes and goals in order to improve our performance.”

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