

March 2018

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Technology, Freud and the Overtaxed Ego
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Innovative Research Facility Pushes Boundaries in Lab Design
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Vital Signs welcomes submissions (articles, notices, letters to the editors, announcements, photos, etc.) from physicians in Alberta. Please limit articles to 1000 words or less.

Please send any contributions to: Spindrift Design Studio Inc. Hellmut Regehr, hregehr@studiospindrift.com

Vital Signs reserves the right to edit article submissions and letters to the editor.

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Save the Dates!

CAMSS

Council Meeting: March 7, 2018 | FMC Boardroom 152 – 5:30-7:30 pm
Zone Advisory Forum: April 11, 2018 | Meredith Block – Boardroom 347, 5:30-7:30 pm
Council Meeting: May 9, 2018 | FMC Boardroom 152 – 5:30-7:30 pm
Council Meeting: June 13, 2018 | FMC Boardroom 152 – 5:30-7:30 pm

CZMSA

Executive Meeting: March 8, 2018 | WebEx
Zone Advisory Forum: April 26, 2018 | Red Deer
Executive Meeting: May 17, 2018 | WebEx
Executive Meeting: June 21, 2018 | WebEx

EZMSA

General Meeting & Awards: March 22, 2018 | NAIT Ernest Restaurant, 6:00-9:00 pm
Zone Advisory Forum: April 19, 2018 | Misericordia 1N-106, 4:00-7:00 pm
Executive Meeting: May 17, 2018 | Misericordia 1N-106, 5:00-5:30 pm
Council Meeting/AMA Rep Forum: May 17, 2018 | Misericordia 1N-106, 5:30-7:30 pm
EZMSA Golf Tournament: May 31, 2018 | The Links – Spruce Grove, 2:00 pm
Executive Meeting: June 21, 2018 | Misericordia 1N-106, 5:00-5:30 pm
Council Meeting/AMA Rep Forum: June 21, 2018 | Misericordia 1N-106, 5:30-7:30 pm

SZMSA

Executive Meeting & ZAF: May 7, 2018 | Lethbridge, 5:30 pm
Executive Meeting: September 10, 2018 | Lethbridge, 5:30 pm

CORRECTION NOTICE: In the October 2017 issue – Service Recognition Awards, Department of Critical Care Medicine was incorrectly noted as Division. We apologize for any confusion this may have caused.

Technology, Freud and the Overtaxed Ego



Dr. Sharron L. Spicer

My teachers lied to me. I'm sure they didn't mean to—but think about it. When we were learning multiplication tables, they said, "You won't always have a calculator in your pocket." We had to learn to spell words correctly, even tricky words like pneumonia. And then there were all the countries and their capital cities. Some of those countries don't even exist any more! All this memorization because we wouldn't have a dictionary, an atlas or whatever other reference materials at our fingertips. Well—guess what—we have all those and more on our smartphones now. My kid even thinks we should have a defibrillator app on our phones. We have enough trouble with pocket dialing; just think what would happen if a defibrillator misfired in your pants. Students these days are more encouraged to think of creative solutions and have collaboration across fields. Alas, technology has changed our day-to-day lives and has certainly changed how we teach our children in schools.

Technology has radically changed our medical systems as well, from the procedures we do to the information systems we use to record data. Some changes in a system are incremental; that is, you add a little more on the input side and you get a little more on the output end. Other changes are transformational. The whole system is radically changed from

within and the output increases by an order of magnitude. This kind of change requires Herculean effort and planning. Everyone in the organization is affected and needs to provide feedback. Change is seen over years, not weeks or months. If successful, the whole becomes greater than the sum of the parts.

In Alberta, we are on the cusp of a transformational change with Connect Care. The synergy that will be achieved by unifying the clinical information system (CIS) across Alberta Health Services (AHS) will lead to phenomenal increases in our ability to record and share clinical information, allow patients access to their records, and enable organizations to use secondary data for quality improvement and health economics work. I anticipate that Alberta will lead the way nationally with the integration of health data through Connect Care.

Transformation is never without growing pains. Furthermore, change is never singular. While we are planning for and adapting to a new CIS, we are facing other organizational, institutional and unit-based changes. There seems to be another initiative every week, each competing for bandwidth on our attention radar. Change fatigue is real and we need to be mindful of adding too many novel things at once. We need also to be planful in implementation, relying on specialists in change management to guide the efforts. Clearly, the implementation of Connect Care is less

about the technology *per se* and more about culture shift. I am heartened that AHS and Connect Care leadership understand this human dynamic.

I am also hopeful that a shift in our technology base will improve both patient safety and professional satisfaction. On the latter point, there is much in the body of literature regarding physician burnout that doctors experience a great deal of stress and frustration managing cumbersome electronic health records, navigating multiple sources of information and ensuring adequate privacy protection. Stanford University's model of Professional Fulfillment notes the importance of efficiency of practice to professional fulfillment (Figure 1). Notwithstanding short-term growing pains with Connect Care, I anticipate that we will develop a much more robust electronic support system that will increase our efficiency of practice and in turn lead to improved professional satisfaction.

The transformations from technology occurring in our society seem to be leading to increased anxiety. Is it the speed of change that is difficult to manage? Is it the technology itself? I recently read an explanation for technology-induced anxiety in the aptly titled book *Awkward: The Science of Why We're Awkward and Why That's Awesome*¹ by psychologist Ty Tashiro. Using Freud's archaic theories of psychological development as a metaphor of change, he reminds us that



Figure 1. WellMD Center's Model of Professional Fulfillment²

Freud's descriptor of the infant's drive for pleasure is the Id, the caregiver's pressure to adopt social rules the Superego, and the arbitrator between the two the Ego (p. 122). Much of the angst in the developing child, Freud proposed, is the struggle of the developing Ego to mediate the desires for immediate pleasure (the Id) with social norms and delayed gratification (the Superego). Tashiro draws the analogy that our Western social landscape has changed in the past 60 years from a society based on conformity to social norms and allegiance to institutions (a rule-governed Superego) to a society that more values individuals' freedoms (the more impulsive Id), with the result that the mediating Ego is overtaxed. "Our societal Ego has been caught in the middle, trying to figure out what it means to 'be yourself' while also showing respect for a set of societal standards that seem to be constantly on the move" (p. 152). In other words, we are trying to adapt to a technology-based world without the rule books being fully written.

In this issue of Vital Signs, we feature articles by several physicians who reflect on the impact of technology in medical practice. I hope you enjoy them. If you do, please send us a note — or at least an emoji — to let us know. TTYNM (Talk to you next month.)

Sharron Spicer, MD, FRCPC

Pediatrician, Physician Lead for Safety and Chair of the Alberta Children's Hospital Quality Assurance Committee; Past President, Calgary and Area Medical Staff Society

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¹ Tashiro, T. (2017) *Awkward: The Science of Why We're Socially Awkward and Why That's Awesome*. New York, NY: HarperCollins.

² <https://wellmd.stanford.edu/center1.html>



What Does the Future of Anesthesia Look Like...

Dr. Steve Patterson



Dr. Steve Patterson

Advances in anesthesia will be the result of improved monitors, improved pharmacology and improved training and record keeping.

When I first started my residency in Anesthesia there were no pulse oximeters, no automated blood pressure cuffs and no end tidal carbon dioxide monitors. Essentially you knew the patient was alive based on the EKG and a stethoscope. Times have changed, advances in monitoring have made anesthesia much safer. New monitors now display processed EEG and cerebral oxygenation as well as the traditional hemodynamic data. The next step is mating these monitors with computerized algorithms to vary drug doses based on the patient's monitored response to an initial calculated dose. This type of system was the subject of a May 2015 Washington Post article aptly titled "We are convinced the machine can do better than human anesthesiologists."¹

– continued on page 4

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What is happening is the creation of new delivery systems for established drugs. New delivery systems such as liposomal encased local anesthetics with an extended duration of action. Narcotics or similar lipophilic drugs that could be introduced into the CSF by the transnasal route or via transdermal technology to provide sustained plasma levels into the postoperative period.

The system described in the article (Figure 1) is being developed at UBC and has been used to provide anesthesia for human patients. What the next generation of “anesthesia machines” will look like after advances in artificial intelligence and remote monitoring is very difficult to predict.

There is also the potential for drugs that will provide a larger margin of safety. A narcotic that provides analgesia without respiratory depression and nausea would revolutionize perioperative care. The creation of new molecules is an expensive, time consuming process that requires substantial resources. Anesthesia is a relatively small market and pharmacologic advances come infrequently in our field. What is happening is the creation of new delivery systems for established drugs. New delivery systems such as liposomal encased local anesthetics with an extended duration of action. Narcotics or similar lipophilic drugs that could be introduced into the CSF by the transnasal route or via transdermal technology to provide sustained plasma levels into the postoperative period.



Figure 1. The iControl-RP, which fully automates anesthesia for operations, stands on the right. On the left are traditional anesthesia monitors that would be used by a human doctor. *University of British Columbia Photo*

Virtual reality simulations and record keeping systems that integrate with medical databases to provide intraoperative suggestions are other examples of how technology can help us provide safer care.

It is possible that the technological advances described above will be translated into clinical practice in the near term, resulting in a safer and more comfortable operative experience. This may give us more time to lean over the drapes and provide insightful commentary for the benefit of our surgical colleagues.

What I actually believe the future holds is much less optimistic. I foresee our automated anesthesia records being used to create report cards that give us the cost/case and cost/hour of our care. The records combined with the computerized nursing records will be used to generate turnover time scores. These reports will generate “motivational feedback” and “educational initiatives” that will directly influence access to hospital work.

How would we get access to newer expensive drugs or technology in a deficit budget environment? We cannot get access to existing drugs that can improve the safety for our current patients. Alberta is the only province where we cannot access sugammadex, a new type of reversal agent for neuromuscular blockade. Think of it as “Narcan for muscle relaxants.” The idea of having easy access to expensive newer drugs and technologies is a bit of a reach.

We are a victim of our own success, we are very good at nursing sick patients through substantial operations. The marginal benefit of improved outcomes in a small number of critically ill patients is measured against the political cost of increasing healthcare spending. I am not optimistic that the technology we see and read about will be available in an operating room near you.

Steve Patterson, MD, FRCP(C) Anes.
PLC Hospital Calgary

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- https://www.washingtonpost.com/news/the-switch/wp/2015/05/15/one-anesthesiology-robot-dips-its-toes-into-whats-possible-this-one-jumps-all-in/?utm_term=.5163bb0f737f



Check It Out

Dr. Darren Hudson has produced some informative videos on EMR systems and IT.

<https://www.youtube.com/watch?v=2TVIDOXL5mU&feature=youtu.be>

<https://www.youtube.com/watch?v=rbeZL1rX0Jo&t=23s>

Exercise Apps Undermine Most Patients' Best Intentions

Dr. Peter Rawlek

There are two populations of users that access fitness app technologies: the exercise-engaged – those with a history of being active and appreciate being physically active – and the exercise-naïve – those with relatively no exercise experience to lean on in starting their journey. For the exercise-naïve, starting to exercise is a comparatively novel, deer-in-the-headlights experience. The prevailing apprehension deeper in their psychology is “I will try this, BUT I really shouldn't be here.” The exercise-naïve primarily reside in the 85% of Canadians who do not meet the minimum exercise guidelines to maintain health. You have patients who fall in to this category. This distinction is important to appreciate when recommending exercise apps to patients or, after considering the points in this article, to recommend avoiding them.



Dr. Peter Rawlek

The problem lies in the business model that drives revenues in fitness technologies. Fitness app technologies commonly generate revenue through the add-on offerings they pitch. Who are these offerings aimed at? Definitely not that someone getting off the couch and struggling to start to exercise! The easiest and quickest sale for fitness app technologies is to build/design what will target the exercise-engaged user those who already has exercise experience and then leverage this into driving sales. The take home point is that the challenge is to pitch an offering to the exercise-naïve user, struggling to start, to put on their shoes, organize themselves. This results in these technologies not being thoughtfully designed to address the challenges of the exercise-naïve. Though initially enthusiastic, the exercise-naïve are equally hesitant and carry a great degree of doubt

and uncertainty as to where their future with exercise lies. Making a sale of the offerings to this group is quite unlikely.

Thus, building for the exercise-engaged creates a problem of optics for your patients who are the exercise-naïve. The theme to most fitness technology offerings is “comparison”; that is, exercise “competition” or “challenge” as the motivator. Who appreciates this approach better than the exercise-engaged? However, there is a problem here for the exercise-naïve. These offerings can look intimidating. They look at these “competition” features, thinking “that is not me.” Understandably the doubt that follows is, “if that is what exercise is all about, should I really be here?”

Exercise technologies are not built for the exercise-naïve. What the exercise-naïve need is support, and a lot of it, to overcome the struggles and barriers they will encounter with this novel experience of exercise. They cannot

be thrown into an unsupportive environment where they are engaging with a competition/ comparison focused exercise app experience.

Who are the Exercise-Naïve?

They are a dominant part of those **85% of Canadians who do not meet the minimum activity to maintain one's health**. They are likely the patient in front of you whom you finally convinced to start to exercise. That patient who struggles with the following:

1. Comparatively, they are more likely challenged with a **lower self-efficacy** toward attempting to become active;
2. They likely have poor physical literacy with respect to exercising;
3. They are more likely to be **exercise facility phobic**. Lacking previous experience with exercise communities, they are uneasy in exercise facility settings and with gym culture.

Habit support does not sell like competition/comparison. The exercise-naïve are not looking to spend money when starting because for the most part, the observation is that they tend to harbor a deep seated belief that these exercise activities are not who they really are, that trying to exercise is temporary.

The Achilles Heel to Present-Day Exercise Technology

The problem with hundreds of popular exercise apps is **they are not built with a primary focus to support habit formation**. The industry focus is on profit. This is understandable but this is problematic when considering the barriers to physical fitness faced by the exercise-naïve population we deal with. Offerings that speak to the exercise-engaged, centered on performance outcomes and performance comparison, are exactly the opposite of what the typical exercise-naïve patient needs. Some apps now have a sprinkling of evidence-based behavioral sciences in their design, but for the most part, this is an after-thought. Behavioural change is not the focus, rather, it seems to be merely an attempt to check the boxes. Habit support does not sell like competition/comparison. The exercise-naïve are not looking to spend money when starting because for the most part, the observation is that they tend to harbor a deep seated belief that these exercise activities are not who they really are, that trying to exercise is temporary. They do not feel connected and cannot relate, often carrying a low self-efficacy for becoming active.

Offering to those with a lower self-efficacy for exercise a product that compares or challenges is simply the wrong message. They cannot relate to this, it communicates, “you don’t belong,” “this is not you.”

How Does the Research See It?

- Besides the low hanging fruit — goal setting, tracking, feedback from the app, simple rewards, and social media supports — 2017 fitness technology does not leverage much for evidence-based behavioral science design from the 26 Behavioural Change Techniques (BCTs) identified as impactful (Sullivan 2017).
 - There has not been much movement in the industry position in incorporating evidence based BCTs in app designs in five years (Cowan 2012).
 - Identifying individual barriers and subsequent barrier problem resolution strategies is “rarely included in fitness trackers and smart phones” (Mercer 2016). Though an essential BCT, barrier identification and resolution are overlooked in exercise support app design (Conroy 2014).
 - In any approach where the focus is to support transformation, among the essential BCTs that support the pursuit to establish an active lifestyle, most key BCTs are overlooked. For the exercise-naïve one of the most important of these is barrier identification that facilitates “in changing not only physical activity behaviors but also beliefs in one’s own ability...” (i.e. self-efficacy) is overlooked (Sullivan 2017).
 - In our review of 2,500 of the more popular exercise apps on Android and IOs platforms our findings were consistent with published observations. Reviewing these apps using the CALO-RE taxonomy of BCTs (Hagar 2014) fitness app technologies incorporated less than 5 BCTs in their design (unpublished; 2016 CSEP poster presentation).
- What are the key features that fitness technologies should deliver to optimize your exercise-naïve patient’s success? The 10,000 foot view:
1. The transformative process: A successful exercise app must, at its core, be focused on supporting transformation. The key is leveraging evidence-based BCTs driving the user experience.
 2. Education informs, it does not transform: Education moves minds ever so gently, one small step at a time. It is an essential piece for the exercise-naïve who by definition have a lower health literacy.
 3. Networked to your Healthcare Professional (HCP), whose support alone provides over a 200% increase in success. A common thread to studies demonstrating success is the impact of you, the doctor or HCP. Impact? 200-300% improved outcomes!

Over 80% of patients will quit in the initial months while making efforts to transform their life. Fitness technologies in their present design clearly are not the best medicine for the exercise-naïve. If you choose to recommend poorly-designed fitness technologies, you will continue to have that unfortunate follow-up office visit months later with the words, “I tried, but...”. Time to change this conversation with technologies that do not damage best intentions, but optimize outcomes.

Peter Rawlek, MD
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FOOTNOTES

1. Michie S, et al. “The behaviour change technique taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an Interventional Consensus for the Reporting of Behavior Change Interventions.” *Annals of Behavioral Medicine* 46.1 (2013): 81–95.
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Innovative Research Facility Pushes Boundaries In Lab Design

Facilities team, Cumming School researchers enable collaborative research, teaching and learning in new childhood cancer research lab

By Lisa Rowson, University Relations

It took leadership and a few design risks, but the Charbonneau Cancer Institute Childhood Cancer Research Program at the Cumming School of Medicine (CSM) now has a new modern, open-concept collaborative research and support space. It provides the perfect environment for the team of researchers, grad students and postdoctoral scholars to focus on their work researching the biology of childhood cancer and blood disorders.

Challenging How We Think About Lab Design: Modifiable Workspace

Guided by her vision for a transformative lab, Dr. Jennifer Chan, associate professor in the CSM and deputy director of the Arnie Charbonneau Cancer Institute, worked with IBI Group Calgary and the campus Facilities team of architects and planners to push boundaries and challenge traditional approaches to laboratory design.

The result is an open-concept lab with shared workspaces equipped with fully configurable benches, specialized research rooms, student workspaces accessible through sliding glass doors, and glass-walled supervisor offices along the outer edges creating an unbroken line of sight across the facility.

“Our new space is very different than any other on campus,” says Chan, Kids Cancer Care Chair in Pediatric Oncology Research. “The lab design allows for easy reconfiguration to accommodate future technology or new equipment—it’s like Lego. That’s the beauty of it. We’re working as we intended in a modifiable space. Although complete ‘future-proofing’ is a challenge, we can still anticipate that change will happen.”

Jane Ferrabee, campus architect, and the Facilities team designing and building the space were prepared to push themselves to think about their standards more critically in an effort to provide a space that allowed the researchers to work more efficiently.

“We saw this as an opportunity to explore innovation and go new places in lab design,” says Ferrabee. “It challenged everyone involved—from electrical, IT and lighting to the lock shop and furniture—to think differently about the way we do things.”

Lab Design Fosters Environment for Improved Teaching and Learning

With the new research facility, Chan saw an opportunity to create an improved team environment, to cultivate new ways of teaching and learning in the lab, and to strengthen the connection between medicine and basic science.

“We’re changing the culture of how we work—any time there’s a change, there’s an opportunity to improve the work culture,” says Chan. “We’re promoting the culture of the group with our decisions.”

The new lab is not only improving the quality of workspace for researchers and students, but also demonstrating the University of Calgary's Eyes High commitment to becoming a top-five research institution.

Chan explains how the new lab setup fosters collaboration: With the old lab space, it was like “sitting at a bar, facing forward with your food in front of you — you’re in your own compartment. This new approach is like a dinner setting where everyone is facing each other with food in the middle, and everyone is communicating and collaborating around the table. We took our then-current notion of ‘open concept’ and looped it into a circle.”

With private spaces on the outer edge, common spaces in the middle and sliding glass doors connecting everything together, students can get their work done in the quiet student workspace while still keeping an eye on what’s happening in the lab. This spatial layering means students are close to their group, work and supervisors’ offices, allowing for close-knit interactions and mentorship between student and supervisor, as well as passive supervision important for safety and productivity.

“It builds a sense of community,” says Chan. “You see someone working and it inspires and motivates you to work.”

Research Facility Supports Eyes High Goals

The new lab is not only improving the quality of workspace for researchers and students, but also demonstrating the University of Calgary's Eyes High commitment to becoming a top-five research institution.

“To be a top research institution we’ve got to think creatively,” says Ferrabee. “As a university, we should be able to be innovative and push the boundaries, create the environment for collaboration, and show that we are a university that cares about its researchers as we invest proactively in their research space.”



Dr. Jennifer Chan, associate professor in the Cumming School of Medicine and deputy director of the Arnie Charbonneau Cancer Institute, works alongside researchers and grad students in the new Charbonneau Cancer Institute Childhood Cancer Research Program lab. *Photo by Riley Brandt, University of Calgary*

Jennifer Chan, MD, is an associate professor in the departments of Pathology and Laboratory Medicine, Oncology and Clinical Neurosciences at the Cumming School of Medicine and is a member of the Alberta Children's Hospital Research Institute, the Arnie Charbonneau Cancer Institute and the Hotchkiss Brain Institute.

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FMC Medical Staff Association

The FMC Medical Staff Association is seeking nominations for its 2017 Physician of the Year Award!

This award is presented annually by the FMC MSA to recognize a physician for their outstanding commitment to the patients, staff and students of Foothills Hospital and to the community they serve.

You can find more details, previous winners, and the nomination form on our website:

www.albertazmsa.com/fmc-msa

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So, Let Me Tell You a Story!



Dr. Richard Bergstrom

Dr. Richard Bergstrom

I was an eager resident in anesthesia; learning about inhaled agents, intravenous drugs, ventilators and a bit about monitoring patients. If you came for an anesthetic in the early eighties you would have an ECG placed, a blood pressure cuff under which there was a stethoscope which attached to an ear plug with which I could listen, and... Uh... I was the other monitor. Blood was red, chest went up and down, there was no such thing as an automated blood pressure cuff. No measured gases you could actually give, and one of the rather more adventurous anesthesiologists would give pure nitrous oxide. The patient went black and would as he said, "Suck the tube in".

My, how times have changed. Technology has not just crept into the Operating Room, it has been a tidal wave. Not quite a tsunami, but it has moved front and center to advance care and decrease harm/error rates. This is reflected in the CMPA dues for anesthesia that have plummeted over the years. Mostly, it reflects on the focus of the anesthetic community to create safer systems and provide safer care. It is very much like the airline industry. My job should look boring and easy. Yet, vigilance is not seen as a person rushing around like a dog with rabies. It should just look calm and focused.

So, what has changed and how has technology changed my life. Well, what about changing the care that my patient gets; in addition has it changed quality of care? Are there any downsides? If you do not think that there might be downsides you are wrong, just wrong. The downside might be minuscule but it does exist, you just need to look for it.

I can tell you a story about me but that is a rather boring story. I can tell you a story from the aspect of care and care delivery, for me that is a lot more impressive. I will also tell you about "Distracted Anesthesia" secondary to technology. Oh, the future might bite some of us big time! Beware the barbarians at the gate!!

So, how is anesthesia care better because of technology? It is harder to screw up and what was a mysterious thing is now "out from behind the curtain" (thinking of the Wizard of Oz).

Our machines and monitoring is better and more focused on what we need to know rather than guess at or wonder about. Yes, you used to be able to give hypoxic mixtures and I am sure it happened. We now have the anesthetic machine designed to not allow you to give a low oxygen gas mixture. An alarm will tell you if there is less than 21 percent oxygen in your circuit. How do you know

the endotracheal tube is in the trachea? It used to be by auscultation of the lungs and hearing breath sounds on both sides. Well, that was proven to be not as good as end-tidal carbon dioxide, a new standard was set. Better standard, better care.

So, we have oxygen coming from the machine, going into the lungs and that is good. But not good enough, you need to deliver oxygen to the tissues, not just the lungs. We used to look at the colour of the blood and we knew when it was red and when it was not. That was an urban myth, or should I say doctor myth. We were absolutely flabbergasted when pulse oximetry arrived. We had been so confident in the 4:2 ratio of nitrous oxide to oxygen that we would always deliver adequate oxygen. We knew that our eyes did not deceive us; rather, we had deceived ourselves. We were horrified at the percentage of our patients who had oxygen saturations between 80 and 90 percent. We had been so confident that we were right until we were soundly proven wrong. Better monitoring for better care.

What a relief, care was so much better now that we knew we were delivering oxygen. And then we measured what happened with oxygen in the brain. Oh my, we had a lot to learn. Oximetry now went to the brain! We thought that all that mattered was adequate

oxygen saturation and “all was well”. Well, all was not well! The brain needs oxygen but it also can be fickle with respect to what blood pressure it needs. Cerebral oximetry has helped us look at tissue delivery of oxygen and certainly has been helpful in our deliver of care for cardiac surgery patients. What we do in the Operating Room is not necessarily consistent with human physiology. We now look at the brain tissue, and how it is supplied by and uses oxygen.

Whew, all fixed.... Well, almost...well, not really. We have all these “surrogates” for creating an environment for what we call “best care”. We need to look at “better care”. We flood the brain with chemicals to keep you anesthetized. Sounds OK, but what about a “down side” which might result in postoperative delirium. We have oxygen going to the brain but what about all the other stuff we give? It just goes in and goes out, right? Well, we have started to look at depth of anesthesia and this might well be the next big gain in better care, especially in the elderly.

Maybe in infants, too! I can just speak of my practice, mostly in the elderly with diseased arterial flow. Titrating anesthesia needs to be both for the patient’s benefit with respect to awareness and also for the possibility of decreased delirium afterwards.

How about ultrasound! Was it the panacea? Well, sort of. I took six months off to become a Level II echo cardiographer. It was a big bite out of my income but it made me such a better physician. I told my best friend that it completely changed my fluid management in patients. It did! We used to drown our patients in electrolyte solutions. We used to give massive amounts of fluid (containing enough sodium to put almost anyone in congestive heart failure, well, almost). We used CVP’s then Pulmonary Artery Catheters to show how wise we were in deciding how much fluid to use. All this was put to shame when you could actually see how full the heart was. Seeing is believing!

We have had numerous changes in safety and decision making with the advent of new technology. The only problem is that it is not a panacea. Ultrasound makes putting in central

lines so much easier for both physician and patient, as long as the physician is using the technology along with their knowledge and skill set. I have seen people working to improve oxygen saturation when I come in and change the probe location and everything is fine. I have heard of a central line being placed using ultrasound that ended up in an artery. No help there from technology. In the cardiac theatres, transesophageal echocardiography has dramatically changed our ability to monitor the heart and provide better care. Yet, people can give “distracted anesthesia” where the colour doppler and 3E echo distract them from patient care. It is easy to be caught by “shiny things”.

Technology has made my life better. Better care, better insight, better outcomes. Yet, it drives care of the patient not just focus on the technology. We need to remember that technology helps us deliver better care, not just more technology.

Richard Bergstrom, MD
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Breaking in Beaker:

A Brief Look at the Lab Side of the Connect Care Movement



Dr. Etienne Mahe

Dr. Etienne Mahe

I recently had the pleasure of joining some 2400 of my colleagues in Edmonton for the first of 6 major direction-setting events of the Connect Care roll-out. For those few of my colleagues not already aware, Connect

Care is an initiative of Alberta Health Services (AHS) meant to unify Alberta's clinical information systems, overhaul the management and exchange of Alberta's clinical information, and standardize clinical work-flows throughout the province. For healthcare professionals, the most significantly visible change will relate to AHS' electronic health records (EHRs), the vast majority of which will be managed under the Epic EHR system. For patients, it is hoped, Connect Care will mean more seamless information exchange between sites and providers, and improved access to (and potential control of) one's medical data.

Calling the Connect Care initiative a "movement" may seem somewhat disingenuous, but I did note an almost campaign-style opening to the welcome session of February 13, although certainly with an apolitical purpose (and coffee served in place of Kool-Aid; see Figure 1 for a visual perspective). In all seriousness, however, credit is justifiably deserved to AHS for the scale of the Connect Care undertaking: Connect Care will unify data communication and sharing across all of Alberta's health regions; Connect Care will see the computer technology upgrade of AHS facilities to the tune of \$400 million; Connect Care will consolidate much of the 1300 current and disparate health information systems; Connect Care will provide patients with improved access to their health information, and is actively involving patient and family representatives in the roll-out process; and, perhaps of greatest import to myself and my fellow laboratorians, Connect Care will unify the vast majority of our current laboratory workflows under the single system that is Beaker.

While the wise might question change for the sake of change, especially when many of our laboratories in Alberta have taken great care to devise best-in-breed practices, the wise will also note the distinct advantage

to the greater system as a whole of unified workflows and seamless information exchange. In the high-volume area of clinical pathology, for example, the Beaker laboratory EHR will allow any laboratory in the province to see in real-time what specimens have been collected from a given patient, where and by whom; specimens can be tracked as they move between sites to prevent unnecessary repeat testing; the laboratory EHR will also be able to communicate with ordering providers, through clinical portals and middleware, opening the door for paperless ordering. My hope (as something very dear to my heart) is that these functionalities will reduce error and waste in the lab.

I would not suggest that Beaker is panacea-realized. Indeed, there are published data reporting less-than-stellar ease of use, ease-of-implementation and a somewhat lacking breadth of available functionality in Beaker. Beaker currently does not offer a Transfusion Medicine module and lacks Molecular Pathology functionality¹ (an alternative platform is currently being considered for the former, and my understanding is that AHS and Epic are working to identify a solution to the latter within Epic). The Stanford health system, for example, reported their experience with Beaker implementation², suggesting that, while the degree of integration was excellent, the Beaker QC and aliquotting functions were less than stellar (to this end, I will note that these drawbacks may be improved upon in our implementation of Beaker, as suggested by our introductory sessions in Edmonton). The Stanford experience is also notable for the sheer level of resource effort, both personnel and otherwise, that was required to implement Beaker². The cautious reader might take pause, worried perhaps that anything less than a herculean effort on our part might end in disaster. A high-quality user-experience is also ideal, and unfortunately has been reported as lacking in Beaker, based on published user-survey results³. The reader would be well to note, however, that Beaker scored no lower in user-survey opinion than our current EHRs³. Indeed, the only system in this recent user-survey publication to improve upon the average in user satisfaction offered no counterpart for clinical data management³.



Figure 1: A pre-emptive panoramic shot of the Epic Connect Care opening session

The next several months will allow Connect Care “subject matter experts” to see the full breadth of Epic’s functionality. We will continue meeting at direction-setting events to identify how Epic and its modules should be implemented. To my laboratorian colleagues, I promise to provide updates on as many facets of Beaker’s functionalities as possible, with a promise to address the many subspecialties of lab medicine, all of whom will be affected in some way or other by Beaker’s implementation. It remains to be seen how all of the varied clinical lab work that is done in Alberta will find its place in Beaker, although I am confident that well-over 90% of Alberta’s clinical lab workflows will be satisfactorily addressed by the Connect Care implementation.

In closing, despite the panic that many of us might feel when faced with great change, and the potential sense of dread that great efforts demanded of us might instill, I offer a concluding “glass-half-full” perspective for disquieted minds. One of the Connect Care direction setting “mottos” requested that participants not encase themselves in their workflows to the detriment of improvement. Indeed, the optimists among us (and, surprisingly, my usually cynical self included) would see this “movement” as an opportunity for introspection and self-improvement. Just because we have been doing something one way, and it has thus far worked for us, does not make it the *optimal* way.

Our *current* methods do not preclude *better* methods. And improved communication between our many healthcare silos offers at least the *potential* for improved patient care. With this perspective in mind, as I have before mentioned to many of my colleagues, I invite us all to take advantage of this opportunity to taste the Kool Aid.

Etienne Mahe, MD, MSc, FRCPC, FCAP

Consultant Pathologist with the Division of Hematology of Calgary Lab Services. Clinical Assistant Professor in the Department of Pathology & Laboratory Medicine at the University of Calgary. President of the Calgary Lab Services Medical Staff Association.

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Interventional Pulmonology:

Using Minimally Invasive Techniques to Diagnose, Stage, and Treat Lung Cancer

Dr. Pen Li



Dr. Pen Li

When my colleagues ask me about my specialty, I explain that I am trained in interventional pulmonology. Many have not heard of this specialty and inevitably ask me what specifically I do. In essence, interventional pulmonology is a maturing sub-specialty of pulmonary medicine using minimally invasive techniques to diagnose and treat a variety of pulmonary diseases. The most common patient population we treat have malignant disease involving the lungs, pleura, or mediastinum.

Endobronchial ultrasound (EBUS) is newer technology that came to Canada in the mid 2000s and helped to propel the specialty forward. Essentially an ultrasound probe built into the end of a bronchoscope is used to localize lymph nodes and lesions external but adjacent to the airway. Lymph nodes can then be biopsied under direct visualization.

Traditionally, these lesions are biopsied “blind” using anatomical landmarks with yields of about 50%.¹ The limited sensitivity of conventional bronchoscopy often prompts the need for surgical mediastinal biopsies by mediastinoscopy in the operating room. The advent of EBUS has allowed accurate lymph node staging for lung cancer with sensitivities of 90-95% and reduces the need for the patient to undergo surgery for staging. In addition, these procedures are like bronchoscopy and can be performed in an endoscopy suite, which is associated with lower costs, shorter wait times, and better patient experience. As such, EBUS is recommended as the preferred initial method to diagnose and stage lung cancer.²

Another disease we treat frequently are recurrent pleural effusions. Malignant pleural effusions often reoccur despite repeat thoracentesis and patients become short of breath and can require repeat hospital visits and procedures, as often as every 2 weeks. Traditionally, to stop fluid from reaccumulating, a patient will undergo either chemical pleurodesis with talc instilled through a chest tube, or by video-assisted thoracoscopic surgery. These procedures, especially if talc is used, are often very painful with success rates of about 75%. Pleurodesis also cannot be achieved if the patient has a non-expanding or “trapped” lung. A less invasive yet effective option is the use of tunneled pleural catheters, the most common of these in Alberta is the PleurX catheter. These small catheters are tunneled underneath the skin and then into the pleural space to reduce the risk of infection. Although the catheter may be in place for several years, the overall infection rate is only about 3%. In addition, about 50% of patients will achieve spontaneous pleurodesis and may have their catheter removed with at about a median of 1.5 months.³ Tunneled pleural catheters can also be inserted in the clinic and drainages are done via vacuum bottles by home care nurses, essentially permitting complete outpatient care without the need for hospital or emergency utilization. Being such an effective intervention, use of tunneled pleural catheters in benign diseases such as heart failure and hepatic hydrothorax are being explored.



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Other technologies emerging, although experimental, to treat non-malignant disease include bronchial thermoplasty to ablate airway smooth muscle to treat patients with asthma and frequent exacerbations, cryobiopsies of the lung to diagnose interstitial lung disease as an alternative to surgical biopsy, and endobronchial lung volume reduction with endobronchial valves and coils to treat chronic obstructive pulmonary disease.

Along the theme of minimally invasive alternatives to surgery, interventional pulmonologists may also be trained to perform medical thoracoscopy. For pleural effusions that are persistent and not diagnosed by thoracentesis, patients would typically have a general anesthetic and undergo thoracic surgery to investigate and have biopsies performed in the operating room. Medical thoracoscopy can be safely performed with conscious sedation in the endoscopy suite as a day procedure using a semi-rigid scope.⁴ Similar to EBUS, benefits include quicker access to a diagnostic procedure, offloading from the operating room, reduced costs, and likely better patient experience.

Other technologies emerging, although experimental, to treat non-malignant disease include bronchial thermoplasty to ablate airway smooth muscle to treat patients with asthma and frequent exacerbations, cryobiopsies of the lung to diagnose interstitial lung disease as an alternative to surgical biopsy, and endobronchial lung volume reduction with endobronchial valves and coils to treat chronic obstructive pulmonary disease.

Interventional pulmonology is a maturing procedure-based specialty that utilizes minimally invasive techniques to treat respiratory disease. Many of procedures we perform serve as effective alternatives to surgery, thereby improving access, reducing costs, and improving patient experience. Although most of what we treat is in the realm of cancer, new therapies are emerging for non-malignant diseases.

To facilitate timely diagnosis and treatment of lung cancer patients, patients with suspected lung cancer or thoracic complications of cancer, can be referred to the Alberta Thoracic Oncology Program in Edmonton (Fax 780-735-3971) or Calgary (403-944-8848). Patients will be seen by a thoracic surgeon and/or interventional pulmonologist typically within 2 weeks.

Pen Li, MD, FRCPC

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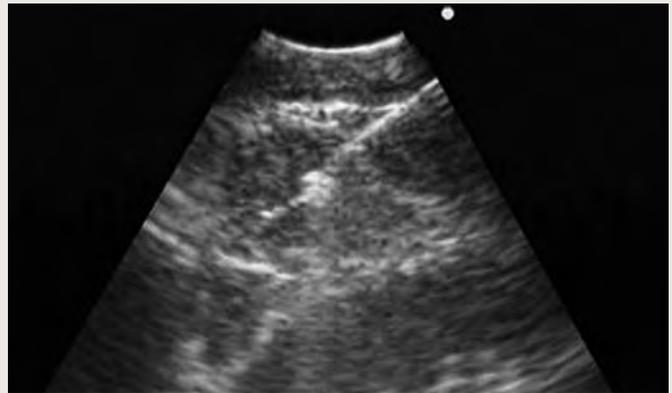


Figure 1: Direct visualization of needle in mediastinal lymph node at time of EBUS biopsy.



Figure 2: Chest x-ray of a patient with a large recurrent malignant pleural effusion.



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