

# Surgical innovation: When do I see it in my operating room?

**W**here oh where has my promised surgical innovation gone? Where has my — insert your wish here (voice-controlled scalpel, 3D-enabled surgical helmet, tricorder or exoskeleton that stops me from surgical misstep) — gone? As an academic surgeon I have been bathed in the promises of the future being just around the corner. I might be pessimistic, but I don't think I can even see that corner anymore.

I should have known early on in my career that delivery does not follow promise, even when the technology is proven and the money is already spent. We are finally moving half of our core university activities into a new supposed “super-hospital” about a decade after my chairman at the time I was hired (actually 4 chairman mandates ago) assured me it would happen. Apparently the obstacles of delivering just a building are overwhelming — imagine then the obstacles for any piece of surgical innovation you would want to use. I am not talking about the incremental advances of Class 1 devices or surgical procedures with a twist. A new crutch or another way to stick a probe in the abdomen are both great, but not really in the scope of what I expected when I signed up for academic medicine. I want paradigm shifts, as promised in the lay press. When is the Internet of Things (probably the number one hyped technology on the annual Gartner hype cycle research report<sup>1</sup>) going to make my life easier and patient care better?

The roadblocks in the way of a good idea in Canada are daunting. We are a small market so, except for a few well-placed individuals, we are seen as the backwaters of economics. Because business enterprises in Canada invest more than double<sup>2</sup> what the federal government invests for innovation, this handicaps us in some ways. Most ideas from our end of the continent are met with amusement and not a lot of alacrity. The odds of a random, smart individual being able to easily drive technology investment and expansion to a product line in order to help in my surgical suite are quite small. The problem does not start at the individual level — surgeons are constantly trying to make their lives easier and innovate at both the academic and community levels, and they have already bought into the concept that newer might be better. The blame really starts with an environment that encourages surgeons to be happy with what we already have — if not we might lose it. Research and development as a percentage of gross domestic product continues to fall; Canada is behind at

least 22 other countries, including Slovenia and Estonia.<sup>2</sup> The Canadian Institutes of Health Research (CIHR) grant about \$1 billion in peer review funding per year, whereas the National Institutes of Health funding board in the United States allocates \$30 billion — 3 times the per capita investment seen in Canada. The CIHR success rate is about 15%, or just enough to fund the constantly engaged individuals or institutions — no new researchers need apply. We all look forward to seeing how the recently changed funding structure translates to changes in the success rate.

Despite these walls to innovation, perhaps a new researcher with a good enough concept may receive funding for an idea and find a Canadian company to buy into it (although there are so few Canadian-based medical device companies). But this is not the end for barriers to innovation. There is yet another wall when implementation of the new mousetrap is attempted, and it might be the biggest wall explaining why I will never see surgical innovation applied in my hospital. It is simple and brutal. The “new” has to be cheaper than the “old.” Administration is not really interested in new technology if it increases the budget; in our hospital we are still having even old ideas removed as we dial back levels of care to those seen in 1980.

So that robotic laser-driven nanotechnology that will cure cancer you dreamed up in a eureka moment will remain a sparkle in your eye or a picture on your office wall. Maybe you can sell it to South Korea — they invest in innovation all the time.

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