

November 4th, 2011

The Empire Club Presents

## **Health-Care Innovation: A Critical Engine of a Knowledge-Based Economy**

Chairman: Verity Craig, President, The Empire Club of Canada

### **Head Table**

**Anita Gupta**, President and CEO, NMI Tax Consulting Group, and Director, The Empire Club of Canada

**Senator Vim Kochlar**,

**Stephen Tile**, Vice-Chair, Sunnybrook Foundation/s Board of Directors

**Beverly Brooks**, Managing Director, Kingsdale Communications and Director, The Empire Club of Canada

**Lauren Chee**, Grade 11 Student, North Toronto Collegiate Institute

**Rev. M.J. Perry**, Vice President and Owner of Mr. Discount Ltd., and Director, The Empire Club of Canada

**Pankaj Puri**, President, International Audit Services Inc.; and

**Gerrard Schmid**, President and COO, Davis-Henderson

### **Introduction by Verity Craig**

It is now my delight and pleasure to introduce our keynote speaker for this afternoon, Dr. Barry McClellan, President and Chief Executive Officer of Sunnybrook Health Sciences Center.

While reading through the website for the Sunnybrook Center, I was struck by the sheer size; the statistics are staggering. And here's some of them.

- Sunnybrook has more than 1 million patients walking through their doors each year
- 10,000 staff work in specialized areas such as the world-renowned Cancer Center, the Veterans Hospital and the trauma and critical care unit
- More than 600 scientists work on groundbreaking research, with a budget totaling more than 100 million each year
- The Sunnybrook Health Center has an annual budget of 750 million

When I totaled up the numbers, I realized that the Sunnybrook Center was like running a city, but with the enormous responsibility and urgency to be leaders in their field that save lives every day. I'm certain that some days Dr. McClellan wonders what he has got himself into.

The hospital provides regional programs and services including specialties in cancer, cardiovascular disease, neurological disorders, high risk obstetrics and gynecology, orthopedic conditions, trauma and critical care and community care. In addition, Sunnybrook is Canada's largest Care Center for the country's war veterans.

Prior to his position as President and CEO at Sunnybrook, he was the Chief Coroner for Ontario.

In 1981, Dr. McClellan graduated from the University of Toronto with a medical doctorate and trained in emergency medicine. Dr. McClellan was the director of the Trauma Program and Vice-President of Specialty Services at Sunnybrook. He was also the director of the hospital's Emergency Department-based hospital program and trauma research.

Dr. McClellan is professor in the Department of Surgery at the University of Toronto. He has written more than 60 scientific papers, written a textbook on trauma care and lectured extensively, including

international presentations in the field of trauma care and forensic investigation. Ladies and gentlemen, please join me in welcoming Dr. Barry McClelland.

**Dr. Barry McClelland**

Good afternoon and thank you for inviting me here today to offer some thoughts about healthcare innovation, and specifically its critical role in building a knowledge-based economy.

Innovation in all fields is about looking at current practice and saying, “There has to be a better way of doing things.” In healthcare, innovation is about saving lives and improving care for everyone. In our field, you know you've progressed when you can look back and hear people say, “I can't believe they used to do that.” This is a photo of a young patient in an iron lung.

*[Picture is shown.]*

One of the first uses of this technology was in 1928. at the Children's Hospital in Boston. A young girl who was near death due to respiratory failure as a result of complications from polio, was placed in a machine just like this one, and within minutes, her breathing had returned to a normal rate. This case popularized the device and led to large scale production. Essentially, in a quick few breaths by a little girl helped to commercialize a product that helped thousands of other patients. Today, however, thanks in large part to advances in the development of vaccines against diseases like polio, and new respiratory technology, we can look back upon this type of machine and view it as arcane. The thought of locking a child into a device such like this seems cruel, but at the time, it meant the difference between life and death.

In the last few years with the flood of new technology and ease of sharing information, we have been challenging the status quo more and more, which has allowed us to develop breakthroughs that have made patient care safer, reduced hospital stays, and allowed people to get on with their lives faster than ever before. Hospitals and their research teams have not been able to do this on their own. In fact, we rely on government, corporate and individual donor support to partner with us to create the next improvements in care.

With our wealth of healthcare expertise and concentration of business and industry, Ontario is uniquely positioned to become not only a North American leader in biotechnology, but also a strong player globally. Ontario is a hub of healthcare research, and driving this engine are our research-intensive hospitals. They conduct more than 80% of the publicly funded healthcare research in the province, represent the fourth largest biomedical center in North America, employ 10,000 researchers, conduct almost \$1 billion of research each year, and can offer investors annual returns on investments as high as 39% in some cases.

In a recent Research Infosource survey of the top research hospitals in Canada, based on research income, three Toronto hospitals placed in the top five in Canada. So how are we able to do this?

We've created a culture of discovery and inquiry and our academic health sciences centers. In my own institution, for example, we have set a very lofty vision to invent the future of healthcare. We tell people when they're hired at Sunnybrook, regardless of their role, they will play an integral part in achieving our vision. This has helped to create an organization where people feel included in discovery and innovation. They're motivated to do things differently than what they have done in the past. They say to

themselves, that there has to be a better way to do this. And we reward them for finding new and innovative ways of doing things.

As an organization, we are very fortunate we have 10,000 highly motivated staff members who care for more than 1.2 million patients every year. We have 1200 inpatient beds, so there's never a shortage of opportunities to capitalize on good ideas. Our research institute has been successful in attracting more than \$100 million in extramural funding each year, and it's continuing to grow. But we see the path to expansion of our innovation agenda is being made possible only through collaborative efforts with our sister organizations, industry and our community, and our partnership with the University of Toronto.

Growth in healthcare innovation, and the contribution to a knowledge economy is very much about relationships and building partnerships with people and organizations who share your vision, and who share your passion for achieving it. We want to partner with organizations who value innovation, and who understand our desire to improve patient care. We want people to join us and pursue our vision of inventing the future of healthcare. The reality is that we cannot do it on our own. We would be doomed if we felt we could run a closed organization that doesn't see itself as a partner that is open for business.

Our success is found in our ability to work with others and to share knowledge. If we view knowledge as a commodity in a new economy, then its value increases as we share it with others who can contribute to achieving the goal of creating an innovation that will improve the lives of those who need it most, our current and future patients.

I'd like to share with you a few examples of how we have been helping to build the new knowledge economy, and how our teams work with others to share their discoveries and expertise and build something that benefits society.

There are more than 300 million people worldwide who suffer from diabetes and sadly, many hundreds of thousands will develop complications such as the skin ulcers that are shown on this slide.

*[Picture is shown.]*

On the top is a microscopic image of a poorly healing diabetic ulcer. The microscopic image on the bottom is from a healthy healing ulcer. With the purple staining cells that you see on the slide representing granulation tissue or healing tissue, the result of increased blood vessels and increased blood flow from treatment with a molecule called vasculotide. Researchers Dan Dumont and Paul Van Slyke, shown in this photo that appeared in the Globe and Mail earlier this year, discovered this molecule that aids in the wound healing process.

*[Picture is shown.]*

The challenge with diabetic ulcers is that there's restricted blood flow to the damaged area, which prevents effective healing. In many cases, the wounds tend to reopen which leads to infections and in some cases, amputations or even death. The use of the molecule vasculotide improves blood flow to the wound area, and helps create a deeper and more effective healing of the area, preventing the likelihood that the wound may reopen.

So we have this fascinating discovery that is also inexpensive to produce and we have the data to demonstrate its potential. But where can scientists who may not have the business acumen needed to secure investments to further their work go for help to bring this important discovery to market? Thankfully, we have a strong partnership with a group called Mars Innovation that is dedicated to commercializing these types of ventures.

The only way we can get our discoveries to our patients is through the rigors of the commercialization process, beyond the scope of activity of our individual organizations. 17 research hospitals and universities in Ontario have partnered to create Mars Innovation, where scientists and inventors are brought together with investors who are looking for high potential opportunities, especially in the biosciences and technology.

In the case of the wound healing molecule, our colleagues at Mars Innovation were able to attract the interest of Sanofi and broker a multi-year deal that would help bring this discovery through further testing and ultimately to the patients who need it most. In this case, everybody wins; the scientists get rewarded for their discovery, the institution that supported them gets rewarded for creating an environment to incubate the idea. The investor takes a risk to bring the product to market but will be rewarded when it's commercially successful. And most importantly, 300 million diabetics around the world stand to benefit from this discovery. Partnership with the private sector towards creating a safe and efficient new product is critical to moving our health system forward and inventing its future.

Here is another example: focused ultrasound surgery is disruptive technology, both metaphorically and literally. We think this could change the practice of certain types of surgery forever. Through a partnership with a company called Insight Tech, Sunnybrook has been working to bring this technology to clinical trials, which have now been approved to move forward. Our early plans for applying this technology will be in the treatment of uterine fibroids, brain cancer, and other brain diseases that are difficult to treat with conventional methods. The process takes ultrasound waves and focuses them with a level of intensity that enables them to destroy tumors. In the case of uterine fibroids, the procedure takes a couple of hours, requires no anesthesia, and the skin is never broken. The patient may take a Tylenol after to manage any discomfort and is home within hours of the procedure.

Similarly, this procedure will be applied in the very near future to patients who have brain tumors. The challenge with some brain tumors is that they are located in areas of the brain that are impossible or dangerous to treat with traditional surgery. With the new device pictured here, we will be able to destroy tumors by the use of sound waves, making the once inoperable operable.

*[Picture is shown.]*

In addition to surgery, diseases of the brain are a challenge to treat medically, due in large part to a protective blood brain barrier, a barrier between the circulating blood and the brain. Extracellular fluid, something that does not exist in other parts of the body. With this innovation, we're able to use sound waves to disrupt the blood brain barrier and deliver medications to areas of the brain mean that were once extremely difficult or impossible to reach. Imagine for Alzheimer's patients, we would be able to deliver medication to regions and regions of the brain that are being overwhelmed with plaque buildups.

In preclinical testing, the results have been startling. We are achieving outcomes in just four or five days that once took months to see. And it's probably safe to say that the economic benefits gained through this technology are potentially astounding. We will be able to treat patients who are otherwise thought to be incurable, and we could all but eliminate some of the more common adverse events associated with surgery such as infections. As mentioned earlier, our children may ask us one day to tell them what traditional surgery was. With this technology, they may say to us, "I can't believe we used to do it any other way."

*[Picture is shown.]*

This slide looks like an average row of computers but to a company called Sonosite, it was a \$71 million innovation. When this deal was closed, it was one of the largest in the history of medical imaging. Originally developed at Sunnybrook Research Institute, this innovation represents another unique use for ultrasound. Pictured here were early versions of high-frequency ultrasound systems that are capable of seeing microscopically deeper and more accurately into the body than ever before. The technology is key in such clinical applications as inserting IV lines into critically ill premature babies, determining the quality of skin grafts on burn patients, assessing blood flow in heart patients and the better detection of cancers.

Earlier versions of this technology could view six frames per second, and the device weighed about 350 pounds. With the addition of investment from the government, venture capital and corporate interest, not to mention quite a bit of hard work on the part of the development teams which employed more than 100 people in Ontario alone, the Vivo Imaging System can now show 500 frames per second compared to six and weighs less than 15 pounds compared to 350 making it perfect for bedside applications.

This technology is an enormous success, and it is anticipated that revenues from this breakthrough could approach \$1 billion.

As a startup company, they credit their success to four key factors; the first, basic science innovation that was incubated at Sunnybrook Research Institute, the second Canadian venture capital investment, the third funding from government and tax incentive programs, and the fourth, the ability of highly qualified engineers and application specialists from universities right here in Ontario. Assigned essentially, the formula for success in this case was one we need to continue to develop and nurture. Find great people with great ideas. Give them a place to let them experiment, attract people who will invest in their ideas, and ensure there was public support from government to seed an incentive business to support these types of ventures.

Here's what happens when you give a cancer surgeon, his resident, and a couple of engineering students a Microsoft Xbox game console, an iMac, access to Linux and some duct tape. Sounds a little like MacGyver, but in this case, the bad guys they were fighting were bugs or bacteria that can cause serious infections.

As one of our general surgery residents was jogging with his engineering friend one day, they began discussing their work and life in the operating room. One of the challenges in the OR is maintaining the sterile field while being able to view CT or MRI images of the patient which are so important for the procedure.

This is particularly important when surgeons are removing a tumor. You want to make sure that you resect the diseased tissue and leave as much of the healthy tissue intact as possible. Achieving this requires consulting with medical images which are displayed on a computer screen. The unfortunate part about this is that you may have to actually leave the sterile field, the operative field, to manipulate the image on the screen by using a mouse or some other method.

Fortunately, our students were well-versed in the use of new gaming software that enables players to motion in front of the screen to interact with the game. By moving your hands or waving your arms in a certain manner, you can blast aliens, you can play tennis, you can do a whole host of other things, likely known better to your children than many of you in the room today, but our young gamers had a much better idea. What if you could use the same technology to move medical images in the OR without ever having to leave the patient's side or the sterile operative field? Take the same movements that you use to play a game and apply them to the electronic scans of our patients that appear on a computer screen in an OR? They tried it, and it worked famously. In fact, Microsoft has spoken about this internationally as an example of one of the most innovative uses of their technology that they have ever seen.

Let me show you in a 32nd video clip in a moment how this actually works in real life. And just before we run this clip, runs for 30 seconds, you're going to see the surgeon in this case, moving his arms back and forth. This is Dr. Calvin Law, one of our cancer surgeons, but pay particular attention to the actual images that are on the screen from the abdomen and see how by moving his arms back and forth, without touching anything, he can move and manipulate those images which are so critical to being able to best manage the patient, can we run the clip now, please.

*[Video is shown.]*

So this is the actual machine picking up doctor Law's, arms and hands. And if you look on the top, you'll see the images move in and out. If you watch on the screen you'll see the images, which are cuts through the abdomen, moving in and out. And once again, the surgeon simply needs to stand in front, moving his arms and hands and on the top, you'll see those image images come in and out. Very simple, but now is already being used in many parts of the world and recognized as changing patient care.

So, our formula for innovation truly held through the Xbox; we found people who had a great idea, we gave them the room to develop it, we attracted interest from a rather large company called Microsoft. And now this is expanding across the world.

And now, I'm going to move on to a different area. What we've talked about so far has included innovations happening with people within our own organization. I'd also like to leave you with an example today of a new technology from a company in Oakville that was developed in partnership with our organization. The role of an Academic Health Sciences Center or teaching and research hospital should go beyond sharing and translating knowledge. We should also be a resource for people who have a concept, but need an organization to help them bring it to market. In this case, we played an incubator role for a small organization with a very big idea.

If you're not close to a pharmacy, particularly relevant in rural parts of the world, how do you get your prescription filled? This company proposed to answer that question with the help of a prescription

vending machine. Now this is much more sophisticated than the type of machine you turn to to buy a snack, but it operates on a similar principle. The company you may have heard of called PharmaTrust, partnered with Sunnybrook and our pharmacists to help pilot a new technology that would dispense medication to people by way of teleconferencing, and a kiosk. Patients and family members at our Holland Orthopedic and Arthritic Institute on Wellesley have been able to get their prescriptions filled by placing their script in a machine and connected with a pharmacist by video conferencing. This is wonderfully convenient for patients leaving the hospital.

We will also be trialing the new version of this called TouchPoint in our emergency department beginning in the next couple of weeks. In this case, we've been able to help the company research the technology and act as a kind of living laboratory for safely trialing the device. The company receives advice from our clinicians and patients, and we're able to offer people a unique and convenient experience. Since the original launch PharmaTrust has attracted significant interest across Canada and internationally. In order to implement this technology broadly, we're proud to say that we have helped this company develop a service that has the potential to benefit many thousands of people each and every year.

In closing, while showing images of two health care innovations that I've touched on today, separated in time by more than 80 years, I want to reiterate a couple of my earlier points. We have the ingredients in Ontario to build a sustainable economy that has as one of its key drivers, innovation and discovery. But this doesn't come without effort and commitment. As leaders in industry, government, and healthcare delivery, we have to challenge ourselves to ask the question, "What is next? How can we improve what we are doing?" We have to say, "There has to be a better way."

But saying it is not enough. We have to continue to incent people and organizations to support and encourage innovation, tax breaks, venture capital, creating an environment where people can experiment, including failing and succeeding are all critical to moving forward. We have to own a sense of discomfort for the present and have a vision for the future that inspires others to do something they haven't done before. We have to say we can do better than this, and we have to work collaboratively to achieve the things we never thought were possible before.

I want to thank you all for coming today. And like you, I very much look forward to seeing what comes next. Thank you.

### **Verity Craig**

Ladies and Gentlemen, this is the beginning of our Question-and-Answer period, so, there'll be a microphone going around.

### **Questions & Answers**

**Q: Dr. McClellan. excellent presentation very much enjoyed it. I wonder if you could share with us, at such a large institution as Sunnybrook how you first find out when the good information is coming through. And I took a look at two examples you gave, the minimally invasive idea on the uterine fibroid embolization, which was around 10 or 15 years ago but came later to Canada from the States, and an idea like PharmaTrust which had been around for a while, the concept, and then finally arrived. You obviously picked up both of them. They were both very helpful, very**

**successful. How do you know when the entry point is and how do you make sure that happens soon enough to achieve the results you want long term?**

**BM:** It's a great question. And it really in my opinion points to the importance of focus. You need to focus your expertise in some specific areas. If you look at what I presented today, there is a very common theme around imaging and Imaging Research. That's a very significant investment at Sunnybrook. We have recruited internationally in order to grow our Imaging Research. We have three research platforms, it includes biology and includes some of our clinical epidemiology and trials. When we look at the programs that we offer at Sunnybrook, we've got 4 strategic priorities, not 10, not 20. We believe your best position to make a difference, to be able to know when something looks like it's an innovation or not by focusing your energy and your people in select areas. So once again, if you look at what I presented today, some very common themes, and that, from my opinion, is how academic health sciences centers in general will be most likely to be able to identify that important innovation, and quite frankly, grow their research in some select areas.

**Verity Craig**

Any other questions? We have one at the very back.

**Q: Speaking as students, do you have any advice for how future generations sort of prepared and entering this field of medicine and biotechnology?**

**BM:** So, you know, it's never too early; you might think that grade 11 is early to be having this discussion and it's not. First of all, in grade 11 you may not know exactly what you're going to do and I'm aware because I visited the table that this is a class of science students. But there's no question that whether or not one pursues medicine, engineering or other areas of science, quite frankly, we're going to be contributing tremendously to our future economy through innovation, through always challenging ourselves to look for how things can be done differently and better.

When we talk in healthcare about what's better, we talk about value, we talk about making the biggest difference, improving quality, and at the same time dealing with the important issue of efficiency. Whether or not it's in medicine or other areas, all of us need to be alive to and have that spark for how we can do things differently and where we can make the biggest difference. And I can tell you that, you know that that iron lung goes back more than 80 years, there's some in the room who probably didn't know what that was when it was projected. And for others, they would be aware from family and others that that was at one time state of the art.

We know that the future is exciting, and I have to tell you, the future minds that are going to change things for Ontario in the world are more likely positioned at that table at the back than in some of the other parts of this room. Because that is really where we need to invest for the future. So, I think it's great that you're here today. There's exciting times ahead. At this point in time, you may not know exactly what you're interested in, but that spark for discovery and making a difference is something that I hope is within you and something that we can see grow in the future.

**Verity Craig**

We have time for one more question.

**Q: Dr. Barry when I saw you showing that vending machine for prescriptions and so on, you said, "Now this is something can be used remotely; it could presumably be used anywhere at all." It**



**reminded me that some years ago, Sunnybrook was very much a pioneer in the telemedicine field. So, you know, a physician in Timmins or someplace like that may be unsure of the diagnosis, but he can get in touch this way with an expert in Toronto, have the images sent there, and all that sort of thing. Is that progressing? Has that worked well for you?**

**BM:** Well George, it's a great example for a couple of different reasons. One of which is that we believe that the initial application of telemedicine was for those who are furthest away from some of the larger hospitals, and I can tell you, it's being used today for consults between organizations that are eight kilometers away from one another. That's simply because we know we can offer the same benefit to the patient and not have to go through the expense or inconvenience or even pain for that patient to have to move them between two locations. Telemedicine has grown in this province and internationally in a very major way, and it's a very cost effective way of delivering care, and most importantly, the patients and their families love it because they can get access to specialists that they otherwise might not. And if they could get access, they can do it without having to leave their home, or in some cases a hospital room in a different location.

So, I started off when talking about the PharmaTrust rural application. I won't be surprised if this is something that we see in future in our local Walmart in a large city, because quite frankly, it's more convenient, it's very cost effective, and in all of the work we've done so far it's proven to be very safe.

### **Verity Craig**

I'd like to call upon Anita Gupta to give the formal Thank you

### **Note of Appreciation by Anita Gupta, President and CEO, NMI Tax Consulting Group, and Director, The Empire Club of Canada**

Madam President, distinguished guests, fellow members, and the guests of the Empire Club of Canada, I have the honor to express your formal thanks to Dr. Dr. McClellan.

Thank you, Dr. McClellan for a fascinating look into the future of health care. Often laypeople like most of us here think of the marvels of the medical breakthroughs as somehow magical. You've shown us that this is not magic at all. They are the result of investment, collaboration, and hard work that you have put into it.

You shared with us many innovations today. And some of them really struck me here, surgery with sound waves that you were showing here, instead of a scalpel. You're reducing infections with X Box machines, I would have never thought of that, and medications from unique vending machines. These are the innovations that really show us that not only rapidly healthcare is advancing, but they also show us the needs of the patient are at the center of it all. I wish some of these innovations were there 20 odd years ago, I wouldn't have had to go through general anesthesia, and had it done with sound waves. Very impressive, I must say.

More importantly than the picture that you drew off today's innovations is the vision that you've shared with us today. He had discomfort with the present, and also always looking at what's next. This is creating an environment that tolerates experiment, and sometimes failure, working collaboratively across the private and public sectors to achieve this vision. These are really inspiring words, Dr. McLennan and again, thank you for sharing with us the innovations of today and your stirring vision for the future of healthcare. Appreciate you coming here today. Thank you.

### **Concluding Remarks by Verity Craig**

On behalf of the Empire Club, in appreciation we'd like to present you with a copy of *Who Said That?* And what this is about is this is 100 years of quotes and notes of speakers; and we'd like to present this to you. Thank you, sir.

Finally, each of you should have on your table, a list of upcoming events, some very exciting events. On November 10, we have Lyse Doucet and on November 17, we have the Chief of Police, and on December 2, we have the Country Manager for Dell Canada.

I'd like to thank the board for sponsoring our event today. And I'd also like to thank Sunnybrook Foundation for sponsoring our student table. I'd like to thank the *National Post* as their print media sponsor. And this meeting will be carried and aired on Rogers TV and we're very grateful to them. And now we are now on Twitter and Facebook as well as our own website [www.empireclub.org](http://www.empireclub.org). Thank you all for coming. We look forward to having you again soon.

This meeting is now adjourned