Grand Challenges Canada is five years old. It has been my privilege to watch as we have grown from a new organization to one that has supported over 700 innovations in more than 80 countries, while helping to reinforce Canada’s leadership in global health. This letter is a celebration of five years of growth, learning and impact.

At the same time, this year Grand Challenges Canada, and all of Canada, suffered a tragedy with the loss of our founding Chairman, Joseph L. Rotman. A successful entrepreneur who devoted the last 20 years of his life to philanthropy and making Canada a better country and the world a better place, he championed the importance of integrating science and technology, social, business and financial innovation (“integrated innovation”) to maximize impact. He took a broad view of innovation, which recognized the importance of bold ideas and of scaling and sustainability, to ensure the best ideas would have big impact. He believed in the power of bringing resources – people, knowledge, experience and capital – together from the public and private sectors, and in building partnerships.

We mourn his loss, celebrate his wisdom and leadership, and we will honour his legacy.

Perhaps the most important lesson that Joe taught me was to focus on results. For him, Grand Challenges Canada was about saving and improving lives – the results are what counts. I have come to see demonstrating results as the most significant challenge that any innovation organization faces, so the thinking below will be relevant to anyone interested in innovation. In tribute to our founding Chairman, this year my annual letter will focus on measuring impact.
Results as their Own Reward

It is easy to think of results as numbers on a page, as simply an exercise in accounting. Numbers are important, and we take our accountability to measure and assess our impact very seriously. That being said, results are about more than numbers; they are about the lives of the people that our projects are touching. That is why I made a New Year’s resolution to go into the field and meet the real people whose lives had been saved and improved by the innovative projects funded by Canada through Grand Challenges Canada. It has proven the most rewarding part of my job.

I remember standing with my colleague Karlee Silver in a room in Bihar, India. We were deep in a village with no running water, no toilets and piles of dung to be burned for cooking. The room kept filling up until it was almost bursting. I asked, ‘Who are all these people in the room?’ The answer: everyone in that room was alive thanks to Grand Challenges Canada’s support of a project on the point-of-care diagnosis of visceral leishmaniasis.

I spoke with two 12-year-old girls who were diagnosed with the disease and subsequently treated. They are now healthy and dreaming about the future, aspiring to become teachers. These girls would not be alive today but for the innovative project supported by Canada.
Karlee and I also visited Nepal. A couple of hours outside of Kathmandu, we held a newborn girl who received chlorhexidine on her umbilical cord through a Saving Lives at Birth project. A tube of chlorhexidine costs a mere 20 cents, and we knew that for each 200 newborns who received chlorhexidine, one life would be saved. (This project no doubt will be of even greater importance in the wake of the earthquake, since we know from other humanitarian settings that the health of vulnerable women and children suffer in humanitarian emergencies.)

We also visited a construction site in India where I watched more than a hundred children of migrant workers receiving high-quality pre-schooling and stimulation offered by Mobile Crèches, one of the innovators we support through Saving Brains. We know these types of interventions lead to higher wages, lower rates of criminality and better health for those children.
Finally, we visited a project by Zanmi Lasante in Haiti. We met three people who had undiagnosed, untreated epilepsy until their conditions were identified by this innovative, community-based screening, referral and treatment program. In each case, their lives had been very difficult – being burned in a fire during a seizure, destroyed relationships and the like. For the past two years, none of these people had seizures on treatment.

These visits reinforced for me the importance of the work of our innovators — the real people, families and children whose lives are changed for the better. You can watch some of these visits on YouTube here: http://bit.ly/1g3vbGZ. Participating in this work and seeing the results has been one of the greatest privileges of my life.

In addition to these individual experiences – which collectively are powerful – demonstrating accountability for our investments is critical. Accountability is a strong point of Canada’s approach to its top development priority, maternal, newborn and child health. What I discovered in speaking with other organizations pursuing development innovation is that the systems to measure results were not well developed, perhaps because of the difficulty of doing so for innovation, which is unpredictable and forward looking. The remainder of my letter will touch upon how we can meet this challenge.
Timeline of Innovation

The question I get asked the most is, “Peter, when can we expect to see results from Grand Challenges Canada’s investments?” This is an important question and, to answer it, we need to understand the timeline of innovation. By definition, the results of innovation are in the future. Some innovations have impact in the short term (five years or less), some in the medium term (five to ten years) and some in the longer term (10+ years). Some interesting examples of each type of innovation can be seen in Figure 1 (below).

On this chart, discovery science would be to the left of the 15-year innovations and, as you can see, delivery programs are to the right of the five-year innovations. As you can imagine, different types of innovations appear at different points along this continuum.

- **Fifteen-year** innovations tend to be scientific innovations, which take a longer time to move from the lab, to scale up and then to market.
- **Ten-year** innovations tend to be technological innovations and can be focused on new product development.
- **Five-year** innovations tend to be social or business innovations that are focused on improved service delivery.

![Figure 1 – Timeline of Innovation Examples](image)
MEASURING IMPACT

Timeline of Innovation (continued)

An example of a 15-year innovation is the meningitis vaccine, developed by PATH and others. To date, over 215 million people have received the vaccine and, by 2020, it is expected to protect more than 400 million people, prevent one million cases of meningitis A, save 150,000 lives and avoid 250,000 cases of severe disability. Another example, from the original Grand Challenges in Global Health program of the Bill & Melinda Gates Foundation, is an effort to modify the vectors (mosquitoes) that transmit dengue, through the introduction an intracellular parasite called Wolbachia.

The Wolbachia project was like many of the original Grand Challenges in Global Health projects: a 15-year innovation. Passing the 10-year mark in their development, some of these ideas promise to be truly transformational. However, it is not surprising that many of the innovations have yet to demonstrate outcomes in humans. Grand Challenges Canada does not support 15-year innovations at transition to scale, as this timeframe is too long for the use of taxpayer dollars in international development. We do, however, support some proof-of-concept projects that could be 15-year innovations and, if successful, encourage and enable others to pick them up and take them to scale.

Examples of 10-year innovations can be found in the Saving Lives at Birth partnership portfolio (in which Grand Challenges Canada is a founding partner), including inhaled oxytocin and the Odón Device; these are summarized below. These projects can be characterized as being primarily technological innovations.

Preventing bleeding after childbirth*: Efforts to accelerate development of an innovative, heat-stable and low-cost inhaled form of oxytocin to manage postpartum hemorrhage after childbirth in developing countries. This innovation was developed by Monash University and initially supported by the Saving Lives at Birth partners. It is now being accelerated through a collaboration with GlaxoSmithKline (GSK), McCall MacBain, Planet Wheeler Foundation and Grand Challenges Canada. It has the potential of saving the lives of almost 20,000 pregnant women per year who have postpartum bleeding.

Assisting difficult births*: The BD Odón Device™ is a delivery assistance device supported by the Saving Lives at Birth partners that is designed to be safer and easier to use in resource-limited settings than forceps, vacuum extractors or Caesarean sections. It has the potential to prevent 200,000 deaths per year in sub-Saharan Africa. Development of this new device is ongoing, in partnership with the World Health Organization (WHO), and BD (Becton, Dickinson and Company) intends to manufacture and distribute it at full scale, assuming ongoing clinical testing further validates its safety and efficacy.

Examples of 5-year innovations include chlorhexidine delivery in Nepal and visceral leishmaniasis elimination in Bihar, India. Our site visits to both countries were described earlier in this letter and summarized below. Note that these are characterized by primarily social or business (delivery) innovation, with some embedded technology.

**Preventing infection among newborns***: With investments from the Saving Lives at Birth partners, John Snow International has pioneered the use of the antiseptic compound chlorhexidine (CHX) in Nepal as a safer, more effective alternative than existing methods for disinfecting a newborn’s umbilical cord stump. Research indicates that routine use of CHX could reduce the incidence of newborn death by 24%; 1.2 million babies have already had CHX applied to their umbilical cord stump, leading to an estimated 7,500 lives saved in Nepal alone, and scale-up is already occurring in Nigeria and Madagascar, as well as other countries.

**Point-of-Care Diagnosis of Visceral Leishmaniasis (Rajendra Memorial Research Institute of Medical Sciences)**: There is more visceral leishmaniasis, a potentially fatal disease, in Bihar, India, than anywhere else in the world. This innovative project pushes visceral leishmaniasis detection into villages by training women known as Accredited Social Health Activists (ASHAs) who live in endemic villages, using a point-of-care diagnostic test and treatment performed in primary health centres. This model has increased referral rates for this disease by nearly 50% and over 100 lives have been saved. This approach is now being rolled out to accelerate the elimination of this disease. It is being implemented across endemic districts of Northern India, supported by the government, and in Nepal and Bangladesh, supported by the World Health Organization. It has the potential to save or improve over 215,000 lives in these regions. The ultimate goal is elimination of the disease in the region.

Measuring Outcomes of Innovation

Another question that I am often asked is, “What kind of impact do your innovations really have?” Grand Challenges Canada, while only five years old, has already shown significant results: almost 10,000 lives have been saved and 150,000 lives have been improved. We estimate by the end of next year 1.4 million lives will have been improved. These results would include the 7,500 lives saved in the chlorhexidine delivery project and the 100 lives saved in the visceral leishmaniasis project. Lives improved include people who are using toilets, eyeglasses, health services, etc. that were not available before.

These results, of course, are only the tip of the proverbial iceberg, since only about half of our projects are far enough along to report results and, even of these, many are not yet completed. Most of the benefits of innovation will occur after the lifetime of the current projects. For example, think about the future impact the inhaled oxytocin or Odón Device projects could generate. We are currently working with David de Ferranti of Results for Development Institute on projecting the outcomes of the innovations supported through 2030, to align with the Sustainable Development Goals agenda timeline. Of the 700 innovations supported by Grand Challenges Canada to date, about 70 are being supported for transition to scale with around $1 million or more. Projecting outcomes for only 10 of these projects, we can estimate that hundreds of thousands of lives will be saved and millions of lives improved.

Homogeneity vs heterogeneity: for each of our Targeted Challenges (such as Saving Lives at Birth, Saving Brains and Global Mental Health), we have commissioned the development of a Theory of Change and a set of core metrics that enable us to measure progress in addressing these challenges. So, for example, in our Global Mental Health program, we are focusing on how much symptomatic mood improvement people suffering from depression experienced across our projects. (If you wish to delve more deeply into an actual example, here is our Global Mental Health Theory of Change: http://bit.ly/1HuvDbA). Even more importantly, these common metrics allow the global community of innovators working on these issues to assess their progress in a consistent and comparable way, and to assess the overall progress of the portfolio against the global challenge.

Moreover, it is important to keep in mind that one wildly successful innovation taken to scale – like the Odón Device or inhaled oxytocin, or a new Ebola test we are supporting to stop outbreaks from becoming epidemics, or a new approach to diagnosis and treatment of childhood diarrhea being studied – could alone save sufficient lives to justify the entire investment in Grand Challenges Canada.

In addition to helping scale innovations, another key goal of Grand Challenges Canada is to develop and strengthen sustainable social enterprises, which will continue to deliver outcomes well beyond the life of the project and independent of further support from Grand Challenges Canada. For example we know that while we scale 7% of our Stars proof-of-concept pipeline, other people, without our participation, scale another 9%.

This, then, is the essence of innovation, which ‘bends the curve’ by offering new benefits that were not available before (think polio vaccine versus iron lungs) or improves efficiency by providing the same level of outcomes for less input – and keeps these benefits going without further support from the original funder.
Results from Knowledge Driving Policy Decisions

Many projects we support generate new knowledge, which can lead to health outcomes outside of the projects themselves and therefore are difficult to measure (and are not included in the figures above). A good example of this is a project we funded that aimed at strengthening street food safety in Bangladesh by testing a variety of foods for contamination. As a result of this project and its findings, Bangladesh implemented the Safe Food Act 2013 and passed the Formalin Control Act 2015 to protect public health. This will lead to lives saved through enhanced food safety.

Another example of the impact of new knowledge is a project that looked at the use of flocked swabs for collecting stool specimens in children with gastroenteritis in Botswana. With support from Grand Challenges Canada, a team from Botswana, in collaboration with McMaster University, collected and analyzed samples from over 1,000 children under five to determine the cause of their diarrhea. The vast majority of cases were caused by rotavirus. In 2012, as a result of the analysis of data that this project collected, the Government of Botswana fast-tracked approval of a national rotavirus vaccine program – three years earlier than planned. The program has since vaccinated over 100,000 children. For 2013 and 2014, analysis of data from four Botswana hospitals in the post-vaccine era reveals a 55% decrease in all-cause diarrhea-related infant mortality during rotavirus season. It further shows an overall 28% decrease in all-cause diarrhea mortality and a 14% decrease in all-cause diarrhea hospitalizations. The flocked swab is currently being validated in other low- and middle-income countries, as well as for use in rural and remote areas in high-income countries, including in Nunavut, Canada.

Value for Money

I am often asked whether Grand Challenges Canada can demonstrate whether investing in innovation is an efficient use of taxpayer dollars in international development. This is a very fair question, which stimulated the unfolding technical work mentioned above. Looking at other development innovation organizations, I found none were very far advanced in being able to answer this ‘value for money’ question. It’s easy to point to individual examples, such as $100,000 for an important randomized clinical trial we funded in Uganda showing that group support psychotherapy improves symptoms in people with depression. Another example is our entire strategy of re-enrollment of randomized clinical trials conducted in the past, to show the effects of various interventions on Saving Brains. Yet other examples are some of the individual examples at the beginning of this letter. It is virtually impossible to truly measure value for money without a systematic approach to projections, since the value of innovation is in the future. We are now in the process of developing these projections and a comprehensive approach to value for money that can also be used by other innovation organizations.
Concluding Thoughts and Thanks

There is no greater privilege in life than to serve one’s country and help to solve global challenges. I deeply appreciate the Government of Canada’s support for Grand Challenges Canada over the past five years, and for its recent announcements of $161M for Grand Challenges Canada in maternal, newborn and child health and an additional $22.8M in fiscal year 2016–17 “to continue supporting GCC’s innovative and promising work in a variety of areas.” I am also appreciative of our Grand Challenges Canada innovators, partners, team, advisory committees and Board of Directors, and our Chair, Mme Guylaine Saucier – and our founding Chairman, a great mentor, the late Joseph L. Rotman.

Yours truly,

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Grand Challenges Canada: Changing Lives, One Innovation at a Time

You can watch some of the visits mentioned in this letter on YouTube: http://bit.ly/1g3vbGZ

Share this video on social media: Tag our Twitter account @gchallenges or use the hashtag #GCCinnovator

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