



Grand Challenges Canada®
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News Release

Canada Funds 22 Inventive Ideas for Better Health in Developing Nations

Innovators from 10 countries share \$2.4 million in seed grants to:

- * Turn power drills into sterile surgery tools*
- * Convert words into visual symbols to help deaf “hear”*
- * Link Tanzania’s traditional spiritual healers with mental health MDs*

Toronto – Grand Challenges Canada, funded by the Government of Canada, today announced \$2.4 million in seed funds shared between 22 projects from Canada and nine developing nations, to pursue inventive new ideas for improving health in low-resource countries.

Selected through independent peer review, the projects will address major health burdens in the developing world, including tuberculosis, deafness, mental health problems, liver and thyroid illness, and non-communicable diseases.

Among the innovations:

- A device that converts sound into symbols for display on Google Glass, a tablet or laptop, captioning conversations in real-time for deaf people
- A sterile cover that enables the substitution of an everyday \$100 power drill for a \$30,000 orthopaedic surgery unit.

Today’s grants (\$112,000 each), implemented across 22 low-and middle-income countries, are awarded to:

- 13 innovators from 9 developing countries in Asia, Africa and Latin America (Cameroon, Madagascar, Nigeria, Tanzania (3 grants); Bangladesh, India (3 grants), Mongolia, Sri Lanka, Bolivia)

- 9 Canadian-based innovators from Toronto (5 grants), Montreal, Vancouver, Winnipeg and Saskatoon.

Dr. Peter A. Singer, Chief Executive Officer of Grand Challenges Canada, said, “The difference between a human life burdened by serious health challenges and a life lived to its full and healthy potential may be a bold idea developed by an innovator in Canada or abroad. Through our Stars in Global Health program, we are proud to identify these exceptional global health innovations that aim to have a far-reaching and positive impact on the well-being of individuals and communities in developing nations.”

In six rounds of funding since 2011, Grand Challenges Canada’s Stars in Global Health program has provided \$43 million in seed grants to 392 projects.

CANADIAN-BASED INNOVATIONS

Listen with your eyes: Helping deaf children ‘hear’ through a personal eyepiece *Sense Intelligent Inc., Toronto (Implemented: China) (#0481-01-10)*

Some 32 million children worldwide suffer from disabling hearing loss. In developing nations, many of them rarely receive any schooling and are faced with stigma and marginalization. Sign language for native dialects often has very limited vocabulary, and a surgically implanted electronic device (*a cochlear implant*) is extremely expensive and invasive.

Sense Intelligent provides an innovative tool and specialized training to help deaf people ‘hear’ in real time. Sound signals are collected from a microphone and transferred into visual signals projected onto a virtual screen (such as Google Glasses), a tablet and laptop. Thanks to highly accurate feedback of one’s own voice, it also helps train deaf people in speaking.

With a successful trial on 20 Canadian volunteer students completed, the technology – as well as the tools and training courses – will be launched for trials in schools for the deaf in China and India.

Video: <http://bit.ly/1neRU Ae> / Images: N/A / Website: <http://bit.ly/VLdFgs>

Sterile Drill Covers for Low-Cost Orthopaedic Trauma Surgery *University of British Columbia, Vancouver (Implementation: Uganda) (#0491-01-10)*



The World Health Organization estimates that 20 to 50 million people each year are injured in traffic accidents. About 90% occur in low- and middle-income countries, where resources for treatment are insufficient.

Commercial power tools are widely available but expensive (\$30,000 or more) but surgical equipment is often unavailable, while donated surgical drills fail in low-resource settings because technical support and replacement parts

are unavailable. The end result: permanent disability for many.

This project offers a potential solution in the form of low-cost sterilizable cover that enables the use of widely available commercial power drills for orthopaedic trauma surgery in low-resource settings.

Video: <http://bit.ly/1n8ekhO> / Images: <http://bit.ly/1w1TLsz> / Website: <http://bit.ly/1sy8qeV>

Screening for drug safety

University of Toronto (Implementation: Ghana) (#0564-01-10)

Counterfeit and substandard drugs are increasingly pervasive in developing nations. Current testing methods cannot identify compounds that are not normally present when the drug is produced, including harmful contaminants that can arise if the drug is improperly made or counterfeit.

A stem cell-based drug testing platform will allow healthcare workers in developing communities to identify the source of counterfeit-drug induced illnesses at ultra-low cost with the same high standards used by pharmaceutical companies.

Video: <http://bit.ly/1oCtTRp> / Images: <http://bit.ly/1ojKBn5> / Website: <http://bit.ly/1mgoUI7>

Easy-to-use and intelligent tuberculosis diagnosis on a mobile phone

Flarian Innovations Inc., Toronto (Implementation: Pakistan) (#0500-01-10)

Tuberculosis (TB) affects nine million people annually. On average, an untreated patient infects 15 others. Early case detection and treatment are crucial to stop the epidemic. Sputum smear fluorescence microscopy is the recommended method to detect TB but accessibility to it is limited in resource-poor settings.

Combining a specialized lens, image processing software and widely available camera phones, this innovation will create an easy-to-use, intelligent sputum smear reader that will help improve TB diagnosis.

Video: <http://bit.ly/U4cTdj> / Images: N/A / Website: <http://bit.ly/1n82CUr>

A low-cost, non-invasive system for early detection of liver cancer

Oncoustics Inc., Toronto (Implementation: Egypt) (#0480-01-10)

When liver cancer is diagnosed early, an 80% survival rate is achievable. Nearly eradicated in developed nations, liver cancer remains a major cause of death in low-income nations. Countries such as Egypt are particularly susceptible to liver cancer because of high levels of hepatitis C. This project aims to utilize novel ultrasound image processing methods sensitive to tissue abnormalities to detect early liver cancer in rural and urban Egypt.

Video: <http://bit.ly/1r8RIIt> / Images: N/A / Website: <http://bit.ly/1neH5y7>



Preventing physical punishment of children: a community-based program to reduce adverse health outcomes

University of Manitoba, Winnipeg (Implementation: Kenya and Kosovo) (#0493-01-10)

Globally, millions of children are physically punished every day, increasing their risk for lifelong mental and physical problems. Physical punishment fosters aggression, generates feelings of rejection, disrupts the brain's stress response mechanism and compromises the neural systems needed for self-regulation. Addressing this epidemic requires a paradigm shift in parental thinking.

Created at the University of Manitoba in partnership with Save the Children, the Positive Discipline in Everyday Parenting (PDEP) project aims to transform parents' beliefs about punishment and control to promote problem-solving and mentorship, helping parents understand the emotional, cognitive and neurodevelopmental bases of children's behaviour, empowering them to resolve conflict in health-promoting ways.

Video: <http://bit.ly/1k5YOmp> / Images: <http://bit.ly/1pZKrZ3> / Website: <http://bit.ly/U48Z4r>

Plant-Based Passive Immunization against Dental Caries

University of Saskatchewan, Saskatoon (Implementation: Yemen) (#0497-01-10)

More than one-third of the global population (2.8 billion people) suffers from tooth decay and cavities in permanent teeth, with a large increase being recorded in developing countries. This project aims to destroy bacteria responsible for dental caries with a combination of synthetic human antibodies and antibodies from edible plants.

Video: <http://bit.ly/1ojLXOJ> / Images: N/A / Website: <http://bit.ly/1jekotV>

HumanIT3D: innovative way to manage spatial focused projects in disaster and post-disaster context

Quebec Medical Association, Montreal (Implementation: Haiti) (#0477-01-10)

Spatial project management based on a geographic information system (GIS) can be used in a humanitarian setting to plan optimal location of field hospitals or sanitary installations. This approach is difficult in a disaster setting, since it requires collaborative assessments, complex planning concepts and deep knowledge requirements. It also needs to be mobile, adaptive and usable, especially for complex rural and urban settings.

This project is introducing an innovative way to manage 2D and 3D information, especially for spatial-focused projects, in disaster and post disaster context. HumanIT3D is collaborative, evidence-based, field-tested mobile solution enhancing humanitarian response.

Video: <http://youtu.be/CPXkUAA0Z4I> / Images: N/A / Website: <http://goo.gl/ndGu2e>

A toolkit to protect workers, children and families from occupational risks

University of Toronto (Implementation: India) (#0503-01-10)



Silica dust inhalation causes tuberculosis, cancer and silicosis, affecting millions of people worldwide. In India, cottage industries grinding agate used in jewelry and trinkets expose 20,000+ workers and their families to silica dust. This project will pilot prevention strategies and locally sourced technical solutions that can be adapted to other industries and occupational diseases caused by dusts.

Video: <http://bit.ly/VYIKyS> / Images: N/A / Website: <http://bit.ly/1mJrabO>

INNOVATIONS FROM LOW- AND MIDDLE-INCOME COUNTRIES

AFRICA

Cell phones and psychosis: a pilot study connecting traditional healers and bio-medical staff in rural Tanzania

Muhimbili University of Health and Allied Sciences, Tanzania (Implementation: Tanzania) (#0558-01-10)

Due to cultural beliefs and lack of rural medical services, over 60% of Tanzanians seek mental care from widely accessible traditional healers who tend to treat the spiritual causes of psychosis – an easily recognizable and prevalent condition. Without integrated systems of care, biological symptoms of psychosis may go untreated and reach chronic stages, leading to severe, long-term disability.

A mobile psychosis screening and consultation app for both traditional healers and medical practitioners will harness the power of the nation's ubiquitous mobile devices to bridge treatment of psychosis between Tanzania's rural traditional healers and urban medical practitioners -- improving diagnosis and management, increasing referrals and reducing stigma.

Video: <http://bit.ly/1xTa1z3> / Images: <http://bit.ly/1mqgrxU> / Website: <http://bit.ly/1sxSoBL>

The Tanzania Acute Kidney Injury Project

Pamoja Research Centre, Tanzania (Implementation: Tanzania) (#0557-01-10)

Acute kidney injury (AKI) is caused by other conditions such as malaria, HIV-related infection, diarrheal disease or pregnancy-related complications. It is a neglected global health issue and a significant cause of illness and death in low-income countries, particularly in sub-Saharan Africa, where access to early diagnosis and timely access to therapy are lacking.

This project will develop and test a system that uses a smartphone biosensor and two drops of blood to rapidly measure kidney failure in any setting for less than \$1.

Video: <http://bit.ly/1qkmlE4> / Images: N/A / Website: <http://bit.ly/1xT10WC>

Using pharmacists and an electronically-monitored referral system to speed diagnosis and reduce transmission of tuberculosis

Ifakara Health Institute, Tanzania (Implementation: Tanzania) (#0552-01-10)



Tuberculosis (TB) is rampant in Tanzania and the detection rate is low (50%). People who potentially have TB tend to go to pharmacies to purchase antibiotics before getting a proper diagnosis. A training and referral system from pharmacies to facility-based diagnostic/treatment centres will increase early detection rates and reduce transmission by shortening the diagnosis delay.

Video: <http://bit.ly/1oCtAWT> / Images: N/A / Website: <http://bit.ly/TT2AZr>

Combination of Body Fat Monitoring and Awareness-Raising To Promote Physical Activity and Combat Non-communicable Diseases In Cameroon
Health of Population in Transition research Group, Cameroon
(Implementation: Cameroon) (#0511-01-10)

Non-communicable diseases (NCDs) such as diabetes are on the rise in Africa due to changing lifestyles. Half of Cameroon's urban women are obese and, in 2002, NCDs caused 43% of deaths in the country.

This project aims to increase awareness of body fat composition and monitoring beyond hospital settings by tapping into existing exercise groups in several Cameroon cities -- a novel approach to motivate exercise adherence and healthy weight maintenance, providing equipment for body fat tracking.

Video: <http://bit.ly/1xT8Csa> / Images: <http://bit.ly/U4a9wC> / Website: <http://bit.ly/1IUnbDu>

A free, on-demand health resource via simple mobile phones for everyone in Madagascar
Human Network International, Madagascar (Implementation: Madagascar) (#0531-01-10)

In Madagascar, high illiteracy rates and rural isolation restrict access of poorer people to crucial health information. While most existing communication efforts have relied on mass media, this project will pilot a free public health resource, accessible via simple mobile phones. Rural, poor, illiterate audiences will have access on demand to 350 audio files offering useful information on a range of health topics.

Video: <http://bit.ly/1qkITWu> / Images: <http://bit.ly/1ojKIVd> / Website: <http://bit.ly/1ojJaoQ>

A novel method of obtaining donor cells for bone marrow transplantation
Innovative Biotech Nigeria Limited, Nigeria (Implementation: Philippines, Nigeria)
(#0535-01-10)

Up to 60% of the millions of people registered on bone marrow donor registries worldwide opt out before donation, and there is a severe lack of donors among minority groups. The primary factor for opting out and the shortage of minority donors: concern over the health risks related to bone marrow donation.

This project aims to develop a way to generate the needed cells from a simple blood draw, creating a less-invasive method of obtaining donor cells for bone marrow transplants, eliminating the risks, complications, adverse health effects and donor concerns associated with bone marrow aspiration, drug-induced blood mobilization and apheresis.



Video: <http://bit.ly/VL4JYH> / Images: N/A / Website: <http://bit.ly/1UUnm7>

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ASIA

A One Health approach to Japanese encephalitis in Bangladesh: Vaccinating pigs to save human lives

Icddr,b, Bangladesh (Implementation: Bangladesh) (#0506-10-01)

Research suggests that pigs are the primary environmental reservoir in northwestern Bangladesh for the Japanese encephalitis (JE) virus, which kills 30% of those infected and causes permanent neurologic deficits in another 30%.

While the conventional approach to preventing JE is to vaccinate humans, this project will vaccinate pigs, reducing risk to people of all ages. This approach is too costly where pigs are produced on large farms but, in Bangladesh, it is practical because pig populations are smaller.

Video: <http://bit.ly/1jennT8> / Images: N/A / Website: <http://bit.ly/1qNXJSX>

Urine dipsticks as a screening tool for chronic renal disease (CRD)

Indian Institute of Technology, Bombay (Implementation: India) (#0518-01-10)

About one-third of India's population is prone to chronic renal disease. Screening the population can be done by measuring micro-albumin levels in urine but existing methods are costly. This project presents an indigenous, low-cost micro-albumin to creatinine urine dipsticks with a screening mat integrated to a mobile device.

Video: <http://bit.ly/1UUrXAW> / Images: <http://bit.ly/1kENmhC> / Website: <http://bit.ly/TT2tx1>

A low-cost way to quantify thyroid-stimulating hormone

Indian Institute of Technology, Hyderabad (Implementation: India) (#0519-01-10)

If diagnosed early enough, most thyroid disorders – which affect roughly 42 million people in India – can be treated and well managed, avoiding complications such as decreased fertility, depression, a lowered heart rate and high cholesterol levels.

Testing the level of thyroid-stimulating hormone is often the initial step when screening for any type of thyroid disorder and this project is developing a low-cost tool to do that, using a combination of fabric-based lateral flow immunoassay (LFIA) and a mobile-based image-processing platform. Fabric-based LFIA makes the assay controllable and repeatable. Robust image processing algorithms would result in precise quantification of analyte without the requirement of dedicated hardware.

Video: <http://bit.ly/1kEREFT> / Images: N/A / Website: <http://bit.ly/TT2uAM>



The Systematic Medical Appraisal, Referral and Treatment (SMART) Mental Health Programme for rural India
The George Institute for Global Health, India (Implementation: India) (#0524-01-10)

This project aims to deliver mobile-based services for some common mental disorders among tribal populations in Andhra Pradesh, India, empowering primary healthcare workers to identify and provide basic evidence-based mental health care to disadvantaged communities where almost no such services exist today.

Video: <http://bit.ly/1oCt5vU> / Images: N/A / Website: <http://bit.ly/1oCnypc>

Oral therapeutic TB vaccine
Ekomed LLC, Mongolia (Implementation: Mongolia and Nigeria) (#0532-01-10)

Multidrug-resistant tuberculosis and TB with HIV require long and costly treatment.

These innovators will modify an injectable TB vaccine into a convenient, once-daily pill to be taken together with TB drugs -- a simple, affordable approach to help tackle the enormous TB burden in developing countries. As an adjunct to TB chemotherapy, this approach can dramatically reduce TB treatment duration.

Video: <http://bit.ly/VYmLXQ> / Images: N/A / Website: <http://bit.ly/1zpQ7NH>

PFA for the World: Empowering the public to provide Psychological First Aid after crisis events
Institute for Health Policy, Sri Lanka (Implementation: Sri Lanka) (#0550-01-10)

This project aims to use mobile phones and radio immediately after major crises to train and mobilize the general public to provide Psychological First Aid to affected people. This novel approach can massively outperform conventional approaches in terms of cost, speed and targeted coverage, empowering the general public near a crisis event to deliver support on a major scale.

Video: <http://bit.ly/1mJxm3L> / Images: N/A / Website: <http://bit.ly/1mzAI7M>

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LATIN AMERICA

Forget me not: tackling dementia in Bolivia
Fundacion Horizontes, Bolivia (Implementation: Bolivia) (#0507-01-10)

In Latin America, dementia affects more than 3 million people, a number expected to quintuple by 2050. In Bolivia alone, an estimated 40,000 people are thought to have dementia but less than 1% have been identified. Public awareness, appropriate care and effective infrastructure are non-existent. The result: patients have an unacceptably low quality of life and families are over-burdened.



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This project will create the nation's first neuro-cognitive lab, introduce a multi-actor approach to increase impact and sustainability, and deploy new technologies (such as culturally-adapted software), developing a new, affordable model of care for dementia that redistributes the weight of costs among all actors.

Video: <http://bit.ly/1oCsxGo> / Images: N/A / Website: <http://bit.ly/VKXfoB>

About Grand Challenges Canada

Grand Challenges Canada is dedicated to supporting Bold Ideas with Big Impact® in global health. We are funded by the Government of Canada; we support innovators in low- and middle-income countries and Canada. The bold ideas we support integrate science and technology, social and business innovation to find sustainable solutions to health challenges – we call this Integrated Innovation®. Grand Challenges Canada focuses on innovator-defined challenges through its Stars in Global Health program and on targeted challenges in its Saving Lives at Birth, Saving Brains and Global Mental Health programs. Grand Challenges Canada works closely with Canada's International Development Research Centre (IDRC), the Canadian Institutes of Health Research (CIHR) and the Department of Foreign Affairs, Trade and Development Canada (DFATD) to catalyze scale, sustainability and impact. We have a determined focus on results, and on saving and improving lives.

www.grandchallenges.ca

For more information, visit grandchallenges.ca and look for us on Facebook, Twitter, YouTube and LinkedIn.

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