



Grand Challenges Canada®
Grands Défis Canada

News Release

September 22, 2014

Saving “Every Woman, Every Child”: Canada ‘Incubates’ 22 Bold New Ideas

Innovators worldwide receive seed grants to

- * Help Bangladesh garment workers express, store breast milk*
- * Assist with childbirths in remote areas via mobile telecommunications*
- * Stabilize vaccines without refrigeration*
- * Produce snacks from rice bran waste to fight children’s iron deficiency*

Toronto, Canada – On the eve of United Nations General Assembly events focussed on ways to save and improve the lives of mothers, newborns and children, Grand Challenges Canada, funded by the Government of Canada, today announced \$2.4 million in grants for 22 bold ideas to address this challenge.

The novel approaches include:

- A program for Bangladeshi mothers working in garment factories to express, pasteurize and store breast milk -- thereby improving infant nutrition, reducing absenteeism due to child illnesses, and lowering baby formula expense
- A clever new hand-pump device design to help struggling newborns take a first breath
- A low-cost, portable system for diagnosing child pneumonia in high-altitude Peru
- A program to train traditional midwives in the Peruvian Amazon to use smart phones to collect information from pregnant women and to schedule antenatal care delivered by medical river ships
- A snack produced from rice bran waste to combat child iron deficiency
- Using chicken feathers to make a universally-affordable, effective mosquito net
- A technique for safely storing vaccines at room temperature -- considered a holy grail of global health -- by applying a novel polymer coating
- A portable ultrasound imaging device to help medical professionals oversee childbirths in remote areas via cellular telecommunications.

Seed funding of \$112,000 is offered to each of eight projects based in Canada (Edmonton, Hamilton, Toronto and Sudbury) that will be implemented in the developing world, and to 11

BOLD IDEAS WITH BIG IMPACT®

projects from innovators based in low- and middle-income countries (Bangladesh, India, Kenya, Tanzania and Uganda). Also announced today; the first three award nominees of 22 projects based in Peru that are funded with Peru's National Council for Science, Technology, & Technological Innovation (CONCYTEC) under a collaboration announced January 6 (<http://bit.ly/1wwfEoE>).

The funding announcement comes as world leaders prepare for the annual United Nations General Assembly where, this year, women's and children's health will be at the heart of discussions. In September 2010, UN Secretary-General Ban Ki-moon launched 'Every Woman, Every Child' (<http://bit.ly/YLDEX5>), an unprecedented global movement that aims to save the lives of millions of women and children by 2015.

Through the "Muskoka Initiative" agreed at the G8 meeting in 2010, Canada assumed a leading role in promoting the health of women and children in developing countries. In May of this year, Prime Minister Stephen Harper convened 'Saving Every Woman Every Child: Within Arm's Reach', a high-level summit on maternal, newborn and child health, where Canada has committed another \$3.5 billion for 2015 - 2020 towards its top development priority: saving the lives of millions of mothers and children. Prime Minister Harper will also be addressing the United Nations General Assembly.

"Under Canada's leadership, many more women are surviving pregnancy and childbirth, and millions more children are celebrating their fifth birthday," said the Honourable Christian Paradis, Minister of International Development and La Francophonie. "Canada has led efforts to provide developing countries with proven, inexpensive and reliable approaches, such as improving nutrition and access to immunization, so that the poorest and most vulnerable no longer suffer deaths that are easily prevented."

Said Dr. Gisella Orjeda, President of CONCYTEC: "We are excited to see that our partnership with Grand Challenges Canada to support global health innovators in Peru is helping to improve the health of women and children in Peru through the implementation of bold ideas."

Dr. Peter A. Singer, Chief Executive Officer at Grand Challenges Canada, noted: "More and more children can celebrate their fifth birthday as a result of Canada's commitment and leadership. Through supporting these innovative projects, and by working in partnership with the Government of Peru, we are further strengthening the global pipeline of maternal, newborn and child health innovations."

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CANADA-BASED PROJECTS

A new rice bran snack to combat iron deficiency in children **Impact Centre, Toronto (Implementation: Philippines) (#0622-01-10)**

Is there a chance kids could snack their way to good health? This project is developing snacks fortified with iron-rich rice bran, an abundant by-product of rice processing typically discarded, burned, fed to animals or turned into cooking oil. The project will engage local expertise in food and chemistry, and capitalize on the “culture of snacking” in the Philippines, a country where iron deficiency affects 70% of children, leading to anemia and other debilitating conditions.



Video: <http://youtu.be/kt7JcHcueNw> / Images: <http://bit.ly/1nyK1Cs> / Website: <http://bit.ly/ZmbxxL>

Stable vaccines without refrigeration **McMaster University, Hamilton (Implementation: India) (#0627-01-10)**

Stable vaccines without refrigeration is a holy grail of medical science. In resource-poor locations, vaccine refrigeration is difficult and expensive, contributing to 2.5 million deaths each year that could be prevented with diphtheria, tetanus, measles and other immunizations. Innovators behind this project have found that *entrapping* vaccines with a polymer allows vaccine viruses to be kept stable at room temperature for months. The polymer, pullulan, is a safe, food-grade polysaccharide (used in Listerine breath strips) with a unique ability to provide a good oxygen barrier while readily dissolving in water. The project will evaluate the technology’s potential use in stabilizing a wide range of vaccines and develop a package for transporting dry, pullulan-coated vaccine and sterile water. At the point of use, the vaccine will be dissolved in water within a sterile package before injection. The approach is easily scalable, as all the materials needed are available at industrial scale.

Video: http://youtu.be/tz6L_ymfFZM / Images: <http://bit.ly/1u43Elu> / Website: <http://bit.ly/1AP8xWd>

Disinfecting harvested rainwater with the sun **University of Toronto (Implementation: Bangladesh) (#0634-01-10)**

In coastal Bangladesh, as in many other places, rainwater is collected from rooftops and stored in large cisterns for use during the dry season (four to six months). It is often contaminated during collection and microbes proliferate during storage, causing health problems for millions. This Enhanced Solar Disinfection (eSODIS) project combines interventions in a novel way to minimize microbial growth during storage using sunlight, as well as treating the water using a small “just-in-time” solar-activated disinfection/dispensing module. Longer-term, the method may



also offer a low-cost way to treat water that is contaminated with arsenic and select pesticides, both challenges that affect millions more in the developing world.

Video: <http://youtu.be/J7p1YJB5LQY> / Images: [url](#) / Website: <http://bit.ly/1qCFmFD>

A quick water test to help conquer deadly diseases

University of Toronto (Implementation: Canada, Philippines) (#0636-01-10)

This project in the Philippines is developing a biosensor system for the rapid and accurate identification of Cryptosporidium microbes in water, a cause of diarrhea that leads to half of all deaths of children under five. Working closely with the Puerto Princesa Water District, provincial health offices and non-profit organizations, the project will help oversee the manufacture and distribution of the Cryptosporidium screening systems, and conduct training to ensure their effective deployment, with aims of introducing the systems in other Asian countries.

Video: <http://youtu.be/eJXvEO2s9js> / Images: <http://bit.ly/1nyAVWq> / Website: <http://bit.ly/1D9pFtF>

Water purifier powers itself

H2O4ALL, Toronto (Implementation: Uganda) (#0620-01-10)

A groundbreaking water purification device that powers itself by producing electricity from any source of flowing water has been created through a partnership between H2O4ALL and Formarum, a Canadian engineering company. Based on conventional copper-silver ionization, the technology needs no external power source and can automatically adjust the disinfection rate required – both features being of great importance in regions lacking reliable electricity sources and technical expertise. The technology can also develop economic growth within communities by creating power for other essential needs.

Video: <http://youtu.be/eBN67GITp0I> / Images: <http://bit.ly/1wfYlba> / Website: <http://bit.ly/XINehT>

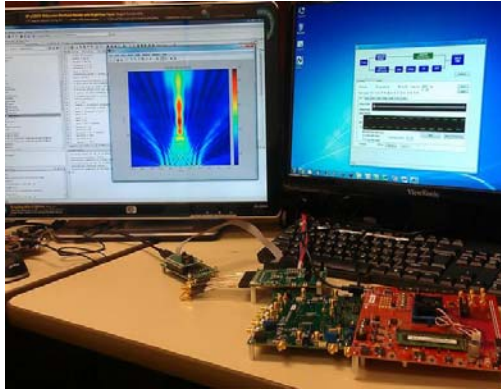
Kenya's CeraMaji water filter uses clay and sawdust, sugar cane

ICChange, Edmonton (Implementation: Kenya) (#0623-01-10)

For many people in rural Kenya, purifying water by boiling it is prohibitively expensive and is limited by the availability of raw materials. Innovators behind this project have developed the CeraMaji Ceramic water filter that uses clay and sawdust or sugar cane to remove 99.97% of Giardia and coliform bacteria from local stream water. The CeraMaji filters will be manufactured at a large, new factory in Kenya.

Video: <http://youtu.be/CzfjobVLJBw> / Images: <http://bit.ly/1nyATxQ> / Website: <http://bit.ly/X4M61G>

Maternal tele-ultrasounds in rural Philippines
Sonola Inc. with Impact Centre, Toronto (Implementation: Philippines) (#0621-01-10)



In the Philippines, some 44% of mothers give birth without a doctor. In this project, an affordable ultrasonic obstetric care solution will be developed to improve maternal healthcare for the rural Philippines. In partnership with the Provincial Health Office of Palawan, nurses and midwives will be trained to use portable ultrasound devices to screen for obstetric complications, and get access to medical professionals when diagnostic information is transmitted through cellular telecommunications.

Video: <http://youtu.be/PEh9v3MmfjU> / Images: <http://bit.ly/1nyAVWp> / Website: <http://bit.ly/1sUSrK5>

Destroying the eggs of disease-spreading mosquitoes in Guatemala's jungles
Laurentian University, Sudbury (Implementation: Guatemala) (#0624-01-10)

This project will empower indigenous people in Sayaxche, Guatemala with knowledge and tools to use a modified “ovitrap” (<http://en.wikipedia.org/wiki/Ovitrap>) that effectively destroys mosquito eggs, thereby reducing malaria, dengue fever and other diseases. In a pilot study last year in Mexico that used only 50 modified ovitraps, more than 350,000 mosquito eggs were destroyed during one year, representing a reduction of 70–80% of mosquito eggs compared to unmodified traps.

Video: <http://youtu.be/qT3UJzaE0Zq> / Images: <http://bit.ly/1nyAVWs> / Website: <http://bit.ly/1APdzSt>

PROJECTS FROM LOW- AND MIDDLE-INCOME COUNTRIES

AFRICA

Using chicken feathers to make mosquito nets

Ifakara Health Institute, Tanzania (implementation: Tanzania) (#0681-01-10)



This innovative project combines two facts of life in Tanzania: the abundance of unused chicken feathers (a waste by-product of food production and not typically recycled) and the prevalence of malaria, a major health burden. Mosquito nets have proven effective against malaria transmission, but are not readily accessible and affordable to every family. The innovators will recycle chicken feathers from markets and people's homes to produce mosquito nets from keratin fibers (found in hair). Keratin fibers are lightweight and strong, and resistant to mechanical and thermal stress, features that will make these novel nets far more durable and

reusable. This approach will not only contribute to malaria control, but will have a positive impact on the environment and create many business opportunities.

Video: <http://youtu.be/pD9Qf5Bea60> / Images: <http://bit.ly/1u43CQY> / Website: <http://bit.ly/1DbTj1s>

Integrating biolarvicides with fertilizer in rice fields to control malaria vectors

Catholic University of Health & Allied Sciences, Tanzania (Implementation:Tanzania) (#0677-01-10)

The majority of all 243 million reported cases of malaria worldwide occur in children under five in Africa. While effective treatment has lowered the mortality rate, current malaria interventions are unlikely to halt the actual transmission of the disease, showing the need for supplementary intervention measures. This project aims to introduce biolarvicides in rice farming practices in rural Tanzania, as an innovative approach in malaria control. By offering larvicides in the form of pellets that can be mixed with fertilizers, local skills are put to use, creating a double impact: the reduction of malaria transmission and increased rice yields. The integrated application of biolarvicides is a safe, effective and environmentally sustainable component of a successfully integrated vector management strategy.

Video: <http://youtu.be/KBGfkccs0VU> / Images: [url](#) / Website: <http://bit.ly/1tXcZ6g>

Treating water bodies to control mosquito larvae with the help of Pastoralists

Ifakara Health Institute, Tanzania (Implementation: Tanzania) (#0678-01-10)

Malaria is responsible for 21,000 deaths in Tanzania each year. In the dry season, controlling mosquito larvae (which live in water) is not workable because water bodies are hard to locate.



Pastoralists (nomads who raise livestock on natural pasture) know where these water bodies are, since they rely on them to water their cattle. Ifakara Health Institute will recruit pastoralists to find and then treat mosquito breeding sites with the eco-friendly and human-safe insecticide pyriproxyfen (PPF). Livestock nutrient supplements will be an added incentive to pastoralists. This social innovation of integrating pastoralists into a malaria control strategy will enable the efficient treatment of larval hotspots in rural Africa, while improving livestock health and the economic situation of pastoralist tribes.

Video: <http://youtu.be/nN48eys6GTE> / Images: [url](#) / Website: <http://bit.ly/1uPeccY>

**Baited traps to control houseflies and reduce diarrhea in urban slums and rural areas
Ifakara Health Institute, Tanzania (Implementation: Tanzania) (#0680-01-10)**

Diarrhea is a leading cause of death among children in most low-income countries. Outbreaks of diarrhea are closely related to an abundance of houseflies and research has shown that control of houseflies may have a substantial impact on diarrhea incidences. Innovators at Ifakara Health Institute will introduce a baited fly-trap as a sustainable and effective tool to reduce the transmission of related infections by controlling houseflies in slums and rural areas. The traps will be combined with increasing community awareness of houseflies to optimally locate fly-traps. To self-sustain, the fly-trap boxes will show paid ads by mobile phone companies.

Video: <http://youtu.be/17JyBWoU9IE/> / Images: [url](#) / Website: <http://bit.ly/1uPeocn>

**Subscription-based delivery of improved sanitation to low-income households
MSABI, Tanzania (Implementation: Tanzania) (#0682-01-10)**

According to the World Health Organization (WHO), 2.6 billion people in the world do not have access to improved sanitation, resulting in 1.6 million deaths every year. The vast majority of that burden is borne by children under five. Affordability is considered a major barrier. A high-quality and environmentally safe toilet will be delivered and maintained for a nominal fee and a regular premium. Customers can pay the premium through mobile money solutions, thus making the service available to users without access to conventional banking systems. This integrated approach combines a personalized and affordable waste collection service with an attractive, comfortable and safe hardware product, and novel financing solutions as an added bonus.

Video: <http://youtu.be/765tFEoM4n4/> / Images: <http://bit.ly/1nyAVWr> / Website: <http://bit.ly/1qFVpCs>

**Combining mobile phones with microscope adapters to diagnose infectious diseases remotely
Makerere University, Uganda (Implementation: Uganda) (#0684-01-10)**

Misdiagnosis of diseases due to the lack of microscopical examination capacity has taken its toll: high mortality rates, drug resistance, economic burden and distrust in local medical practitioners. While microscopes are available to most clinics, there is a lack of trained lab technicians who can process the images. Leveraging recent advances in mobile phone camera-based microscopy, automated lab testing to be carried out with existing microscopes and ubiquitous smartphones would be available. Using 3D printers to produce a hardware adapter for virtually any model of



smartphone will enable clinics to easily capture and transmit images using a mobile phone and available microscopes. The appropriate software would automate diagnostic tasks (not focusing on a single pathology), leading to either a local automated diagnosis (lab-on-the-phone) or the transmission of images to a central server where a human expert would review the data.

Video: <http://youtu.be/nrcCR-NFCJ0> / Images: <http://bit.ly/1nyATxR> / Website: <http://bit.ly/1q8EFxB>

Peepoo: a biodegradable toilet turning human waste into valuable fertiliser
Peepoople, Kenya (Implementation: Kenya) (#0659-01-10)

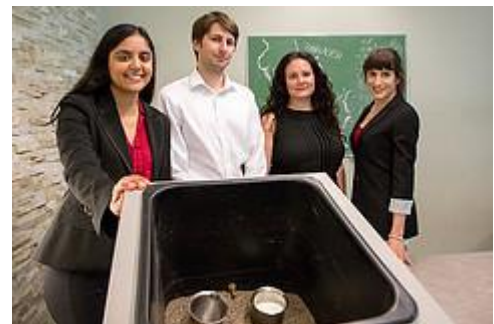
Poor sanitation poses a major health threat. Human excreta released into the environment without treatment causes illness and death. Every 15 seconds, a child dies due to contaminated water from human feces, with the situation being the worst in urban slums. Peepoople is rethinking sanitation with the design of a personal, self-sanitising and fully biodegradable toilet that prevents feces from contaminating the immediate area, as well as the surrounding ecosystem. After use, Peepoo turns human waste into valuable fertiliser that can improve livelihoods and increase food security. This ecological and economically sustainable toilet will be available for those who need it the most and who can least afford it.

Video: <http://youtu.be/CJeFzdIKkbc> / Images: <http://bit.ly/1nyATxO> / Website: <http://bit.ly/ZneOq5>

ASIA

Mothers' milk pasteurization for Bangladesh garment workers
ICDDR,B, Bangladesh (Implementation: Bangladesh) (Grant # 0612-01-10)

Mothers working in Bangladesh garment factories will receive access to breast pumps and a low-cost way to extend the shelf life of expressed breast milk. The technique uses an alternative heating medium, minimizing the amount of water and energy normally needed for pasteurization but effectively killing bacteria and viruses while leaving nutrient content largely intact and extending shelf life. The results offer major benefits for the workers, their babies and employers alike, among them improved infant nutrition, reduced absenteeism due to child illnesses and less expense for baby formula. Using existing factory clinics to promote long-term sustainability, the project can be scaled up in Bangladesh and other low- and middle-income countries.



Video: <http://youtu.be/0LM1uBnvRok> / Images: <http://bit.ly/1u43CQZ> / Website: <http://bit.ly/1uEacNi>

Counselling moms on infant feeding, psychosocial stimulation in Bangladeshi slums
ICDDR,B, Bangladesh (Implementation: Bangladesh) (Grant # 0610-01-10)

A combination of poverty, malnutrition, illness and a lack of stimulation at home puts at risk the cognitive development of millions of children in the developing world. Operating in an urban



slum of Bangladesh, women trained within this project will make 13 home visits in a child's first year of life to counsel parents on infant feeding and psychosocial stimulation — an integrated, sustainable, cost-effective approach potentially able to be implemented through the existing health system in Bangladesh. In the scale-up phase, the project will promote integrating such counselling into mainstream government nutrition programs provided through newly-established community clinics.

Video: <http://youtu.be/-QulxHL7RJ8> / Images: <http://bit.ly/1nyATxM> / Website: <http://bit.ly/1BGWFlb>

School health centers in urban India

AddressHealth Solutions India Pvt Ltd. (Implementation: India) (#0646-01-10)

In urban India today, AddressHealth offers primary and first-contact medical care, dental treatment, vision services, health education, nutrition, psychosocial health and chronic disease interventions to 40,000 urban children through its chain of integrated clinics and comprehensive school programs, with a goal of reaching one million children in low-income schools by 2019. The onsite program in schools is delivered by nurses, supported by a multidisciplinary child health team and a technology platform that includes televideo links and electronic school health records. In urban India, 40% of children are undernourished; 15 % are overweight; 20% have vision issues (half of which go uncorrected); one in eight have psychosocial issues (almost all of which go unaddressed), while 50% have dental caries.

Video: <http://youtu.be/DU-ZnHrlu9Q> / Images: <http://bit.ly/1nyATxS> / Website: <http://bit.ly/1ph4KKE>

Worms help revolutionize sanitation in India

Primove Infrastructure Development Consultants, India (Implementation: India) (#0652-01-10)

A new technology, proven in the lab and now in field tests in rural India, uses composting worms to degrade fecal solids and a filtration system to treat the liquid effluent. The technology takes half the space of a twin pit latrine, treats fecal waste effectively, requires less frequent emptying and costs about the same to install. The new system links to a pour-flush toilet with a water seal, thus providing a hygienic environment, free of smells and flies.

Video: <http://youtu.be/UBilxVEY3Ns> / Images: <http://bit.ly/1u43EIs> / Website: <http://bit.ly/1oRhwQV>



AWARD NOMINEES FROM PERU

A maternal and newborn health program for remote communities in the Amazon *Universidad Peruana Cayetano Heredia, Peru (Implementation: Peru) (#0674-01-10)*

Traditionally, hard-to-reach rural areas show increased maternal and child mortality. In Peru, rural villages of the Amazon basin have the worst health indicators in the country and many are only accessible by medical river vessels. The under-five and maternal mortality rates are well above the national average. The Mama River Program, a maternal and newborn program for remote riverine areas in the Peruvian Amazon, wants to change this. The program will train traditional midwives to use smartphones (widely available in Peru) to collect information from pregnant women at their communities and to schedule antenatal care visits by the medical ship staff. It will alert the medical vessel whenever a high-risk pregnancy is identified and send reports when a birth or death occurs, making civil registration and administrative follow-up more effective.

Video: <http://youtu.be/4dTpuquj9Rs/> / Images: [url](#) / Website: <http://bit.ly/1uEb58A>

FIRST BREATH – A portable device to help breathing during the first seconds of life *Instituto Nacional de Salud del Niño, Peru (Implementation: Peru) (#0690-01-10)*

During the first 60 seconds of life, neonatal resuscitation procedures are highly effective in reducing complications and increasing survival of newborn babies. However, an additional intervention may be needed when neonates can use a little help with their first breath, often requiring a ventilation device. Such a device is harder to find in low- and middle-income countries. The solution is a manual and portable device for initial respiratory support that allows positive pressure ventilation, acting as a respiratory trigger to improve chances for spontaneous breathing. The device employs a bellows mechanism, a valve and a connector, and will be available for different neonatal size groups. Local production will be encouraged to create business opportunities and it is intended to be available at a cost of at least ten times less than standard devices.

Video: <http://youtu.be/l96jL3UKLZ4/> / Images: <http://bit.ly/1uFSJnl/> / Website: <http://bit.ly/1oRiDir>

The Highapp: Improving pneumonia diagnosis among children living at high altitudes *Instituto Nacional de Salud, Peru (Implementation: Peru)*

Every year, pneumonia kills 2.5 million children under five, most of them in developing countries. Peru in particular has above-average mortality numbers. Standard pneumonia diagnosis is based on respiratory rate (RR) or Oxygen Saturation (SaO₂). However, the reference values established at sea level cannot be used at high altitudes, which is a problem in the Andean Region where a large number of people reside 1,500 meters above sea level or more. Recognizing the need to improve diagnostic accuracy and prognosis of pneumonia in children under five years in the Andean region, this novel project will determine clinical reference values for pneumonia diagnosis at different higher altitudes. A mobile app integrating a score with appropriate reference values to each altitudinal level will help guide community health workers in the evaluation of children.

Video: http://youtu.be/M5_S_xTllyk / Images: [url](#) / Website: <http://bit.ly/1wxfdKE>



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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 through 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.

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