



Grand Challenges Canada™  
Grands Défis Canada<sup>MC</sup>

## **Grand Challenges**

**JITMM 2013, Bangkok, Thailand  
December 12, 2013**

**Peter A. Singer**  
Chief Executive Officer  
@PeterASinger

# Grand Challenges in Global Health

H. Varmus, R. Klausner, E. Zerhouni, T. Acharya, A. S. Daar, P. A. Singer

GOALS AND GRAND CHALLENGES

To improve childhood vaccines:

- GC 1: Create effective single-dose vaccines
- GC 2: Prepare vaccines that do not require refrigeration
- GC 3: Develop needle-free delivery systems

To create new vaccines:

- GC 4: Devise reliable tests in model systems
- GC 5: Solve how to design antigens for effective vaccines
- GC 6: Learn which immunological responses are protective

To control insects that transmit agents of disease:

- GC 7: Develop a genetic strategy to deplete insect population;
- GC 8: Develop a chemical strategy to deplete insect population.

To improve nutrition to promote health:

- GC 9: Create a full range of optimal bioavailable nutrients

To improve drug treatment of infectious diseases:

- GC 10: Discover drugs and delivery systems to treat resistant microorganisms.

To cure latent and chronic infections:

- GC 11: Create therapies that can cure latent infections
- GC 12: Create immunological methods that can cure latent infections

To measure disease and health status accurately:

- GC 13: Develop technologies that permit accurate measurement of health status;
- GC 14: Develop technologies that allow assessment of disease and health status in remote conditions or pathogens at point-of-care.

nature

Vol 450:22 November 2007

## FEATURE

# Grand challenges in chronic non-communicable diseases

The top 20 policy and research priorities for conditions such as diabetes, stroke and heart disease.

Abdallah S. Daar<sup>1</sup>, Peter A. Singer<sup>1</sup>, Deepa Leah Persad<sup>1</sup>, Stig K. Prammings<sup>2</sup>, David R. Matthews<sup>3</sup>, Robert Beaglehole<sup>4</sup>, Alan Bernstein<sup>5</sup>, Leszek K. Borysiewicz<sup>6</sup>, Stephen Colagiuri<sup>7</sup>, Nirmal Ganguly<sup>8</sup>, Roger I. Glass<sup>9</sup>, Diane T. Finegood<sup>10</sup>, Jeffrey Koplan<sup>11</sup>, Elizabeth G. Nabel<sup>12</sup>, George Sarna<sup>9</sup>, Nizal Sarrafzadegan<sup>13</sup>, Richard Smith<sup>14</sup>, Derek Yach<sup>15</sup> and John Bell<sup>16</sup>

Chronic non-communicable diseases (CNCDs) are reaching epidemic proportions worldwide<sup>1-3</sup>. These diseases — which include cardiovascular conditions (mainly heart disease and stroke), some cancers, chronic respiratory conditions and type 2 diabetes — affect people of all ages, nationalities and classes.

The conditions cause the greatest global share of death and disability, accounting for around 60% of all deaths worldwide. Some 80% of chronic-disease deaths occur in low- and middle-income countries. They account for 44% of premature deaths worldwide. The number of deaths from these diseases is double the number of deaths that result from a combination of infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and perinatal conditions, and nutritional



with known behavioural and pharmaceutical interventions<sup>4</sup>.

Yet the prevention of disability and death from CNCDs gets scant attention worldwide

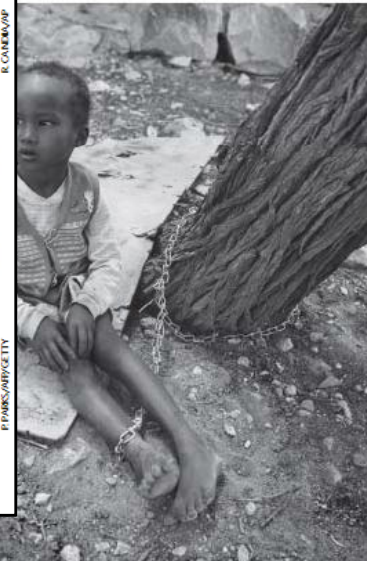


Poor diet and smoking are two factors that contribute to the millions of preventable deaths that occur each year.

meet the challenges, and brings new talent to the field. Although there has been interest in CNCDs among governments in developed countries, research funding opportunities

# COMMENT

Series related on **SUMMER BOOKS** Reviewers and editors suggest reading for your holiday p.32 | **CONSERVATION** Concern about alien species is scientific and practical p.36 | **EQUALITY** Action needed to stop science prizes going primarily to men p.37



Improving treatment for children with mental illness, like this girl in Somalia, is an urgent priority.

## Grand challenges in global mental health

A consortium of researchers, advocates and clinicians announces here research priorities for improving the lives of people with mental illness around the world, and calls for urgent action and investment.

Schizophrenia, depression, epilepsy, dementia, alcohol dependence and other mental, neurological and substance-use (MNS) disorders constitute 13% of the global burden of disease (Table 1), surpassing both cardiovascular disease and cancer<sup>1</sup>. Depression is the third leading contributor to the global disease burden, and alcohol and illicit drug use account for more than 5% (ref. 2). Every seven seconds, someone develops dementia<sup>3</sup>, costing the world up to US\$609 billion in 2009 (ref. 4). By 2020, an estimated 1.5 million people will die each year by suicide, and between 15 and 30 million will make the attempt<sup>5</sup>.

The absence of cures, and the dearth of preventive interventions for MNS disorders, in part reflects a limited understanding of the brain and its molecular and cellular mechanisms. Where there are effective treatments, they are frequently not available to those in greatest need. In 83% of low-income countries, there are no anti-Parkinsonian treatments in primary care, in 25% there are no anti-epileptic drugs<sup>6</sup>. Unequal distribution of human resources — between and within countries — further weakens access: the World Health Organization's European region has 200 times as many psychiatrists as in Africa<sup>7</sup>. Across all countries, investment in fundamental research into preventing and treating MNS disorders is disproportionately low relative to the disease burden<sup>8</sup>.

To address this state of affairs, the Grand Challenges in Global Mental Health initiative has identified priorities for research in the next 10 years that will make an impact on the lives of people living with MNS disorders. The study was funded by the US National Institute of Mental Health (NIMH) in Bethesda, Maryland, supported by the Global Alliance for Chronic Diseases (GACD), headquartered in London. Answers to the questions posed will require a surge in discovery and delivery science. We use the term 'mental health' as a convenient label for MNS disorders. We exclude conditions with a vascular or infectious aetiology (such as stroke or cerebral malaria), because these fall within the scope of the two previous grand challenges initiatives — in global health and in chronic non-communicable diseases<sup>9</sup>.

This initiative differs from previous priority-setting exercises for mental

# Grand Challenges Approach

- **Grand Challenges ~ definition**
  - Approach to stimulating innovation with impact by identifying and tackling critical barriers between where we are and where we want to be
- **Grand Challenges ~ benefits**
  - Stimulates innovation with impact – innovative solutions
  - Accelerates innovation by creating communities of innovators
  - Attracts talent to defined challenge
  - Captures public imagination
  - Can lead to enterprise creation & jobs
  - Can help link public and private organizations and finance
  - Provides governance platform for different countries to solve together their common challenges

# Overview

## ***Bold Ideas. Big Impact. A Better World.***

- 🍁 Area of focus is global health
- 🍁 Funded by Government of Canada
- 🍁 Funds innovators from developing countries and Canada
- 🍁 Encourages Integrated Innovation
- 🍁 Catalyzes impact at scale and sustainability
- 🍁 **Focuses on results:**  
Saving and improving lives



Joseph L. Rotman (pictured top left); Peter A. Singer and the Honourable James Flaherty (pictured bottom right) at the ***Launch of Grand Challenges Canada on May 3, 2010***

# Bold Ideas with Big Impact & Solving Global Challenges

**The Stars in  
Global Health  
program –  
stimulating  
pipeline of  
innovation &  
delivering early  
results**

**Saving Lives at Birth**



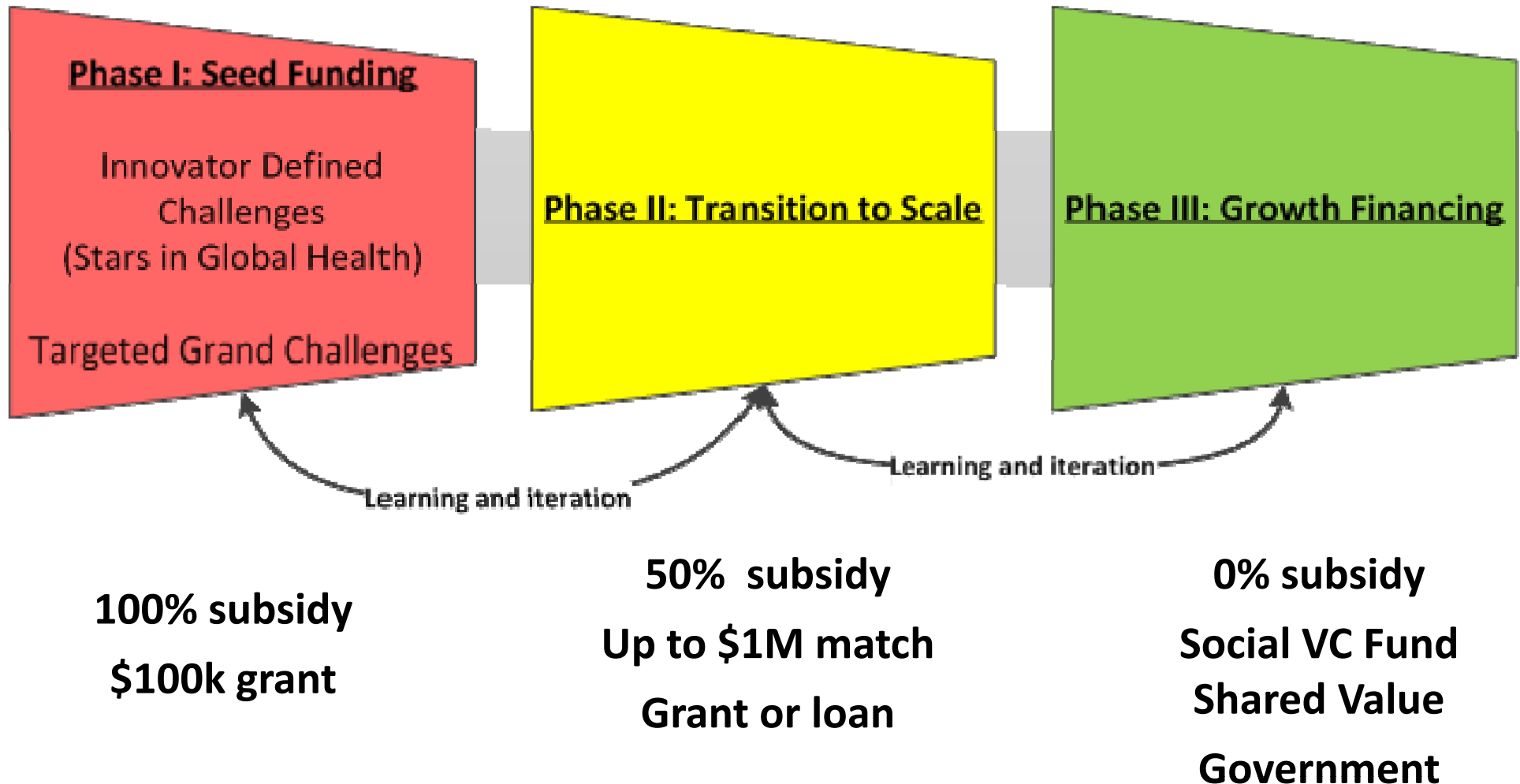
**Saving Brains**



**Global Mental Health**



# GCC Financial Ecosystem





To date, Grand Challenges Canada has committed **\$12.9M** to **36 innovations** in the ASEAN region. Half of those innovations (\$8.8M) are being implemented by institutions based in an ASEAN member country, and half (\$4.1M) are being implemented by institutions based in Canada or other countries



To date, Grand Challenges Canada has committed **\$2.9M** to **7 innovations** in Thailand. Of these innovations, 5 are being implemented by Thai institutions.



# Innovators in the ASEAN Region



**Bunpote Siridechadilok (Thailand)**

*High-throughput approach to discover new dengue vaccine*



**Frank Mallory (Laos)**

*A community-based health watch network using treatment and health education to reduce liver fluke infection and liver cancer*

**David Hall (Vietnam)**

*Ecosystem approaches to improved water and farm health*



**Lidya Chadir (Indonesia)**

*Early detection of dengue fever in primary care settings with rapid molecular assay*

**Harvy Joy Liwanag (Philippines)**

*The ctrl.para.site Project: A Medical Teleparasitology System for the Philippines*







*(Minister Baird) highlighted Canada's investment of \$8 million over the last 18 months in the Southeast Asia region through Grand Challenges Canada to support applied medical research, with an additional \$1 million this year to empower ASEAN-based entrepreneurs and innovators to address science, technology and health priorities in ASEAN.*

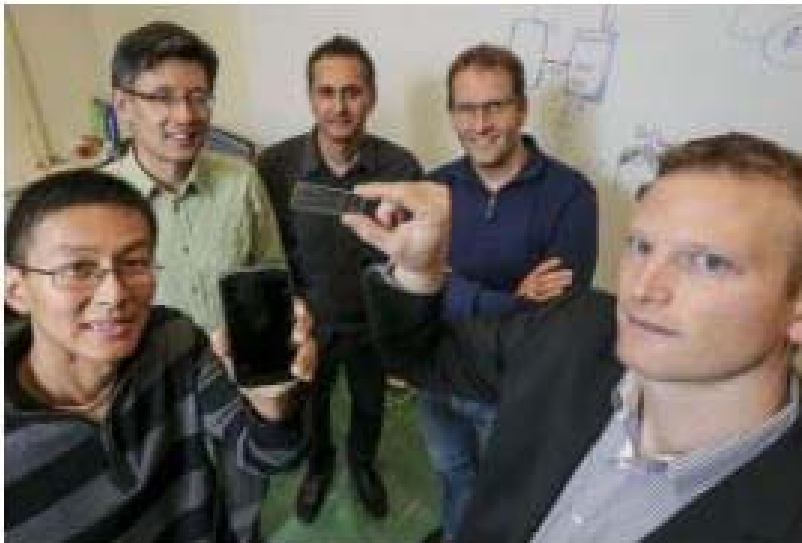
**Canada Strengthens Partnership With ASEAN, July 2013**

[thestar.com](http://thestar.com)

Life / Health & Wellness

## ChipCare project puts blood test on your smartphone

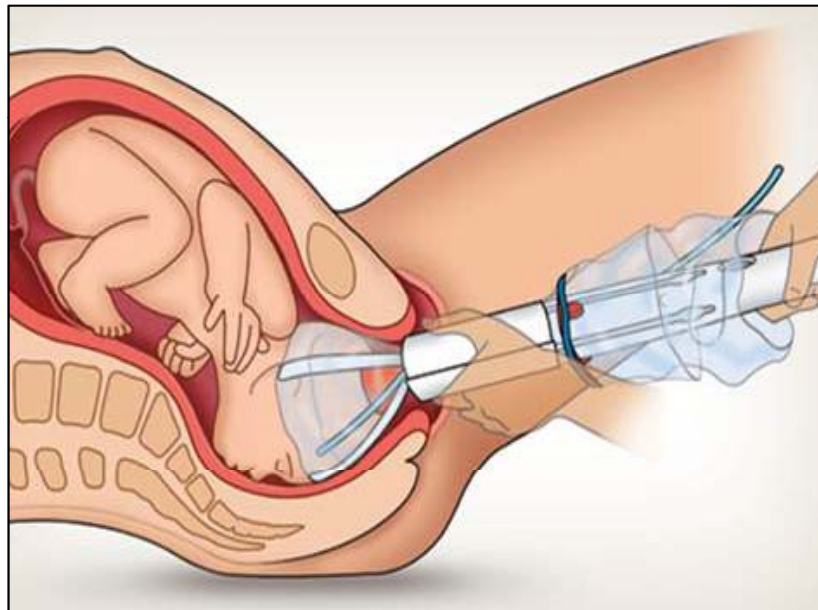
A \$2-million cash infusion — from Ottawa and “angel” investors — will bring a Toronto-built handheld diagnostic analyzer closer to the marketplace.



DAVID COOPER / TORONTO STAR



# Odon Device



A  
PARTNERSHIP  
OF



BILL & MELINDA  
GATES foundation



# Global Health Investment Fund



BILL & MELINDA  
GATES foundation

BMZ  Federal Ministry  
for Economic Cooperation  
and Development

CIFF CHILDREN'S  
INVESTMENT FUND  
FOUNDATION

 GlaxoSmithKline

  
Grand Challenges Canada™  
Grands Défis Canada™

 IFC International  
Finance Corporation  
World Bank Group

JPMORGAN CHASE & CO.

**KFW**

 **MERCK**  
Be well

 Pfizer The Pfizer Foundation

 Sida

 storebrand



# Grand Challenges Canada™ Grands Défis Canada<sup>MC</sup>

## Thank you!



**@PeterASinger**

T 416.673.6568  
info@grandchallenges.ca

Grand Challenges Canada  
MaRS Centre, South Tower,  
101 College Street, Suite 406  
Toronto, Ontario, Canada M5G 1L7  
**grandchallenges.ca**

**Connect with us:**



Grand Challenges Canada



@gchallenges



Global Health Innovation



grandchallengesca



grandchallenges.ca/blog