USAID's Support to Global Health Research and Development
Webinar Series:
Global Health Grand Health Challenges

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Global Health Grand Challenges: R&D

USAID Bureau for Global Health’s Center for Innovation and Impact (CII)
Agenda

- Background and CII Overview
  - Grand Challenges Model Overview
  - Deeper Dive on Global Health Grand Challenges
    - Saving Lives at Birth
    - Fighting Ebola
    - Combating Zika and Future Threats
  - Case Study: NEST 360
CII plays a complementary role to support innovation and scale for GH Bureau priorities

**Role**

Accelerate the development, introduction and scale up of priority global health interventions

**Approach**

Promote and reinforce innovative, *business-minded* approaches to address key bottlenecks in development, introduction and scale up

**What we do**

- **Catalyze Innovation**
- **Scale for Impact**
- **Identify Cutting-Edge Practices**
Innovation is an important part of reaching our shared global health goals.

We use a variety of novel approaches—from Grand Challenges to hackathons to prizes—to source groundbreaking solutions for tough and seemingly intractable health challenges.

USAID/GH is well positioned to support innovation:

- Cutting-edge technical expertise across high-priority global health challenges
- More than 60 country and regional missions with connections to political leaders
- Partnerships with leading global universities and corporations to facilitate collaboration

GH/CII brings complementary skills in:

- Pharmaceutical strategy
- Public-private partnerships
- Innovative finance
- Strategic marketing
- Health economics
- Management consulting
- Innovation strategy
- Inclusive markets
- Entrepreneurship
- Biomedical engineering
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Grand Challenges Model Overview

Deeper Dive on Global Health Grand Challenges
• Saving Lives at Birth
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• Combating Zika and Future Threats

Case Study: NEST 360
# Grand Challenges Program Model

| WHAT | • **Focus global attention and resources** on specific international development **problems**  
|      | • Crowd-source **innovative solutions** to solving them |
| WHO | • **Engage non-traditional solvers** such as businesses, researchers, designers, and scientists |
| HOW | • Broad Agency Announcement (BAA), which allows us to:  
|     |   o **Communicate and co-create** with applicants; encourage partnerships  
|     |   o Fund projects **more flexibly** (both in structure and amount) |
Grand Challenges Program Model

The four Global Health Grand Challenges include:

**SAVING LIVES AT BIRTH:** A Grand Challenge for Development
- Supporting **116 innovations** aimed at saving the lives of mothers & newborns, with potential to save 150,000 lives by 2030

**FIGHTING EBOLA:** A Grand Challenge for Development
- Rapidly sourced **14 innovations** in the midst of the Ebola crisis, developing and testing solutions to address key gaps in our outbreak response

**COMBATING ZIKA AND FUTURE THREATS:** A Grand Challenge for Development
- Supporting **26 innovations** aimed at curbing the spread of Zika and stopping future global health threats from becoming global crises

**ENSURING EFFECTIVE HEALTH SUPPLY CHAINS:** A Grand Challenge for Development
- Supporting **>10 innovations** with USAID/PRH and the Gates Foundation, with the goal of overcoming key roadblocks to more effective health supply chains

**Quick Facts**
- Funded **>150 innovations** across our portfolios
- Projects in **>35 countries**
- **25 innovations** scaling or transitioning to scale
- Leveraged **over $100 million** in external capital
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USAID’s Flagship Grand Challenge:
Saving Lives at Birth

Diverse Portfolio of Innovations

- **7 rounds** of global calls for solutions, with the Round 8 call in progress
- Highly competitive: funded **3% of >4,000 apps** (102 countries)
- Diverse portfolio of **116 innovations**

Driving Impact

- Already reached **1.5M mothers and newborns**
- Potential for **80-100K lives saved by 2030**
- Formed **9 new partnerships for scale**

Catalyzing >$150M Investment (10 yrs)

- USAID’s $20M investment leveraged **$80M** in donor funds + over **$100M** in additional project funds

Staged Funding

116 innovations, 144 awards

- 91 SEED
- 41 VALIDATION
- 28 TTS
- 2 SCALING

Saving Lives at Birth DevelopmentXchange, Washington DC
SL@B supports innovations focused on ending deaths of children and mothers at birth

Supporting innovations for neonates...
2.6 million neonatal deaths worldwide in 2015

- Low-cost, rugged **devices and treatments for managing pre-term birth** and its complications
- **Diagnostics and treatments for neonatal infections** like sepsis, tetanus, and pneumonia
- Innovations to help manage **intrapartum complications** and expand access to safe c-sections

...and mothers
300,000 maternal deaths worldwide in 2015

- New, accessible **interventions for managing post-partum hemorrhage**
- New **tests and treatments for critical conditions** like preeclampsia
- Innovative approaches to **vitamin & mineral supplementation**, supporting maternal & neonatal health
- New community-based methods aimed at broadening access to high-quality prenatal care

Providing cross cutting innovator support

- Our **Xcelerator partnership with Duke University and VentureWell** provides all of our innovators with a structured training program in business model development, market understanding, product design, and launch planning
- We foster a **community of innovators** through our annual **DevelopmentXChange** and other events to promote cross-fertilization and sharing of lessons learned
Four examples (of 100+) of SL@B innovations sourced via the Grand Challenge

**WHO / Becton Dickinson, and Co.**

The Odon Device: A low-cost, easy to use innovation for assisted vaginal delivery

**Highlights:**
- **Catalyzed by SL@B** – funded as Rd 1 Seed and Rd 5 Validation
- **Non-traditional innovator:** invented by Argentinian car mechanic
- **Catalyzed partnership** – funded WHO for clinical trials, and brought in BD to license device

**JSI, Inc.**

Using Chlorhexidine for better cord care in Nepal

**Highlights:**
- **Scaling** to 74 of 75 districts in Nepal
- Gov. of Nepal has included CHX on their EML
- Global demand/interest: Nepal is seen as a “Living University”
- **Mission Engagement:** Nepal Mission invested ~2 million for scale up

**Massachusetts General Hospital**

Next generation uterine balloon tamponade (UBT) device to treat postpartum hemorrhage

**Highlights:**
- Implemented in 350 facilities
- 321 UBT uses with 97% survival
- Over 20 countries expressed interest in implementing UBT into their healthcare systems

**Rice University**

Low-cost bubble continuous positive airway pressure (bCPAP) to reduce deaths from respiratory distress

**Highlights:**
- **Catalyzed by SL@B** – funded as Seed and TTS
- Over 2,000 neonates treated to date
- Currently scaling to all public hospitals and largest PNFP provider in Malawi
- **Mission Engagement:** Malawi Mission invested ~$1 million for scale up
Fighting Ebola Grand Challenge developed a pipeline of outbreak preparedness tools

1,500 ideas

14 awards ($8.9M)

Reimagined Suits

Healthcare Worker Tools

Reimagined Care Setting

Changing Behavior

ICT

Decontaminants
**Ebola GC** supports innovations to identify, contain, and treat future outbreaks faster

Innovations to quickly contain and treat outbreaks abroad help avoid a global crisis

<table>
<thead>
<tr>
<th>Tools and treatments to track, contain, and treat outbreaks</th>
<th>Innovations protecting mission critical health workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapidly responding to the Ebola outbreak created an opportunity for ‘reverse innovation,’ where tracking and response tools developed for West Africa will inform the response to future outbreaks around the world, including in the U.S.</td>
<td>The Ebola outbreak took an unprecedented toll on health workers, accounting for 8% of all cases in communities that already faced severe health-worker shortages. Health worker safety is critical to rapidly containing outbreaks.</td>
</tr>
<tr>
<td>ICT tools for fast identification, tracking, and containment</td>
<td>Reimagining the care setting to facilitate quick start-up, more comfortable patients, and safer healthcare workers</td>
</tr>
<tr>
<td>Behavioral interventions that support early identification and reduce spread</td>
<td>New PPE and disinfectant technologies to protect mission-critical health workers</td>
</tr>
<tr>
<td>Improved healthcare worker tools to enable more rapid, effective treatment</td>
<td></td>
</tr>
</tbody>
</table>

**How we worked differently**

- **Collaborative problem identification:** Innovated for a crisis during a crisis by working with practitioners to identify gaps and develop opportunities for innovation to fill them
- **Rapid live feedback:** Brought 12 innovators into the field for rapid testing, feedback, collaboration
- **Convened key decision makers quickly, in the midst of a crisis:** Integrated live feedback into the WHO’s Target Product Profile for new technologies, ensuring their availability in the next crisis
- **Accelerated public-private partnerships:** Facilitated a commercial licensing agreement between DuPont and Johns Hopkins for improved and potentially more commercially scalable PPE suits
CII support now focused on supporting introduction and scale of select innovations

**Kinnos**
Highlight is a colorized bleach additive that increases visualization of decontaminated areas

**Baylor College of Medicine**
The Emergency Smart Pod is a rapidly-deployable treatment center that can be assembled in < 5 min.

**Shift Labs**
Gravity powered infusion drip monitor that ensures an accurate flow rate.

**Johns Hopkins University & Jhpiego**
Redesigned PPE for HCWs that improves visibility and safety

**Major Updates:**
- BCG engagement facilitated selection of manufacturer
- MSF has requested a quote for recurring order of Highlight
- Developed Highlight infused bleach wipes
- Deployed to ELWA Hospital; used for cataract surgery for Ebola survivors
- Will be used as an isolation unit for cholera or TB patients going forward
- Devices being used in 19 developing countries
- Partnered with ZMapp
- Nominated for SL@B Round 7 award to test application to maternal health use cases
- Signed a licensing agreement with DuPont
- Completed DoD Contaminated Doffing testing
Combating Zika and Future Threats supports a diverse portfolio of innovations

Combating Zika and Future Threats
A Grand Challenge for Development

850 ideas
26 awards ($30M)

Vector Control
Personal & Household Protection
Vector Surveillance
Disease Surveillance
Community Engagement
Diagnostics
Unmanned Aerial Vehicles
Zika and Future Threats is building capacity to respond to vector-borne epidemics

Pre empt epidemics before they start

New vector surveillance approaches to quickly identify emerging dangers

New environmentally-friendly vector control tools to reduce the threat from key vectors

Respond quickly to an emerging epidemic

New community engagement & household protection approaches to slow the spread of disease

New diagnostics & disease surveillance tools to support rapid identification of disease spread and coordination of treatment

Apply cutting edge tech to health crises

Using UAV technology to accelerate our ability to deploy vector control and respond to outbreaks in far-flung communities

We are helping innovators build the tools to respond to this Zika outbreak and the capacity to stop future vector borne outbreaks before they spread
CII now supporting **Combating Zika and Future Threats** portfolio intro/scale

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**Development**

**Johns Hopkins University**

**Problem**
There are currently no attractive lures that can be combined with traps for effective and efficient vector control and surveillance

**Solution**
Development of a chemical lure that mimics the signature profile of the human scent to attract mosquitoes

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**Premise Data**

**Problem**
Current data reporting mechanisms are slow and manual, which prohibits timely aggregation of localized data to maximize operational impact

**Solution**
Citizen-led disease risk mapping and vector monitoring that enables real-time reporting for community leaders and vector control workers

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**Monash University**

**Problem**
Dengue and Zika are estimated to threaten the health of over 4 billion people in tropical and subtropical regions of the world

**Solution**
Scaled deployment of Wolbachia-infected mosquitoes to block disease transmission in Colombia

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**Transition to Scale**

**Validate > Transition to Scale**
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Case Study: NEST 360
THANK YOU
Our grand challenge model is enhanced through a variety of partnerships

<table>
<thead>
<tr>
<th>GRAND CHALLENGE</th>
<th>DESCRIPTION</th>
<th>PARTNERSHIP CATEGORY</th>
<th>INNOVATOR</th>
<th>PARTNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fighting Ebola: A Grand Challenge for Development</td>
<td>JHU’s redesigned personal protective equipment (PPE) suit licensed by Dupont; plans for production of the suit to begin Summer 2018.</td>
<td>PROOF OF CONCEPT</td>
<td>Johns Hopkins Biomedical Engineering</td>
<td>Dupont</td>
</tr>
<tr>
<td>Fighting Ebola: A Grand Challenge for Development</td>
<td>WHO and MSF provided guidance throughout the development process for Ebola innovators. This engagement led to pilot studies at MSF sites and updated PPE protocols by WHO.</td>
<td>SCALE</td>
<td>Fighting Ebola: A Grand Challenge for Development</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>Saving Lives at Birth: A Grand Challenge for Development</td>
<td>Spearheaded by the SL@B Partnership, BD licensed the product from Jorge Odón. After WHO-led clinical trials are complete, BD will offer affordable-access pricing in developing countries.</td>
<td>SCALE</td>
<td>Odón (Device)</td>
<td>BD</td>
</tr>
<tr>
<td>Saving Lives at Birth: A Grand Challenge for Development</td>
<td>Acceleration model of support and coaching to advance business models and partnership opportunities to help scale innovations in target markets.</td>
<td>SCALE</td>
<td>Duke Global Health Innovation Center</td>
<td>Grand Challenges Explorations</td>
</tr>
<tr>
<td>Combating Zika and Future Threats: A Grand Challenge for Development</td>
<td>Leverage Innovative Vector Control Consortium product development partnership (PDP) platform to provide innovators with critical guidance on their product development pathways and commercialization.</td>
<td>PROOF OF CONCEPT</td>
<td>Innovative Vector Control</td>
<td>IVCC</td>
</tr>
</tbody>
</table>
2.6 million newborn deaths worldwide
1.1 million newborn deaths in Africa

3 MAIN CAUSES

Prematurity 35%
- Respiratory Distress
- Thermal Instability
- Feeding Challenges
- Infection
- Jaundice
- Hypoglycemia

Infection 23%
- Sepsis
- Pneumonia
- Diarrhea
- Tetanus

Injured in Delivery 24%
- Hypoxic Brain Injury
75% of newborn deaths are preventable
EFFECTIVE + AFFORDABLE + SUSTAINABLE
NEST 360 Product Categories

Breathing Support
- O2 Concentrator & Splitter
- O2 Concentrator Protector
- CPAP
- Suction Machine
- Pulse Oximeter
- Apnea Monitor

Manage Jaundice
- Photo-therapy Lights
- Bilirubin Monitor

Temperature Stability
- Radiant Warmer
- Continuous Temp Monitor
- Warming Crib

Hydration & Nutrition
- Syringe Pump

Prevent & Treat Infections
- Sepsis Diagnostic
- Syringe Pump

Point of Care Diagnostics
- Glucose Monitor
- Bilirubin Monitor
- Hemoglobin Monitor
- pH Monitor
- Sepsis Diagnostic

Separate Neonatal Ward
- NEST Maintenance Tools
- Back Up Power

Commercially available: 8
To be available (12-24 mo): 4
To be available (24-48 mo): 5
D-Rev: Jaundice Treatment
NEST: Jaundice Diagnostic
$1.48 per birth
3 shifts

- Powerful evidence base (15 years)
- Political will (2 years)
- Place of birth in hospital (happening now)
Reduce hospital newborn deaths in Africa by 50%

For just $1.48 per birth

- Malawi – Evaluation of scale up
- Tanzania – Step Wedge Trial
- Nigeria – Evaluate Market Model
- Cote d’Ivoire
- Ethiopia
- Ghana
- Uganda
Q&A

Please submit your questions in the chat box on the screen to the right.

Any questions not addressed during the session can be submitted to info@ghpod.com and will be answered by email.
Thank you for joining us today!

Please join us for our fourth seminar
Health Systems and Maternal and Child Health
Wednesday, April 11, 12-1PM
https://ghpod.adobeconnect.com/usaid_gh_rd/