OUTLINE

• CIMIT/GHI Overview
• Background
• Neonatal Resuscitation Program
• “Car Part” Incubator
CIMIT’s Core Business: Fund and facilitate the most innovative clinicians/technologists to impact patient care

CIMIT Members: Sources for Clinical Needs and Innovation
- Massachusetts General Hospital
- Beth Israel Deaconess Medical Center
- Children’s Hospital
- Boston Medical Center
- Newton-Wellesley Hospital
- Massachusetts Institute of Technology
- Boston University
- Draper Laboratory

Solution Rich Environments

Problem Rich Environments

Portfolio of Clinical Programs

Science Review and Funding

Convening and Education

Institutional Site Mining

Industry Liaison Program and Development

Project Management and Expertise Consulting

CIMIT PARTNERS: Pathway to Commercialization

Academia
Government
Foundations
NGOs

Business Schools
Angels/VCs
Mentor Programs

Small start ups
Large corporations
Non Healthcare Businesses
(Co-development and Licenses to Industry)

Entrepreneurship

Alliances

Industry Partnerships

Science Review and Funding

Convening and Education

Institutional Site Mining

Industry Liaison Program and Development

Project Management and Expertise Consulting
WHAT WE DO

Focus by clinical area... *to diagnose and treat illness*

- Bio-detection & Sepsis
- Biomaterials and Tissue Engineering
- Cardiovascular Disease
- Image-Guided Therapy
- Inhalation Technology
- Global Health Initiative
- Minimally Invasive Surgery (NOTES)
- NeuroTechnology
- Simulation
- Trauma and Casualty Care
- Optical Diagnostics

*Natural Orifice Transluminal Endoscopic Surgery*
CIMIT 2010 Grants & Awards

- [http://www.cimit.org/grants.html](http://www.cimit.org/grants.html)
- CIMIT Grants support early stage, collaborative research projects for improving patient care, with emphasis on devices, procedures, diagnosis, and peri-procedural systems.

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PRIZE</th>
<th>DEADLINE</th>
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<tbody>
<tr>
<td>Primary HeathCare Prize</td>
<td>10 finalists: $10k</td>
<td>1/15/2009</td>
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<td>Top 3 finalists: $150k; $100k; $50k</td>
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<tr>
<td>Science Grants</td>
<td>Small Science: up to $40k</td>
<td>2/15/2009</td>
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<td>Medium Science: up to $100k</td>
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<td>Clinical Systems Innovation Grants</td>
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<td>Young Clinician Award</td>
<td>$50k</td>
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<td>Career Development</td>
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<td>5/31/2009</td>
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<tr>
<td>Medical Engineering Fellowship</td>
<td>$55k for stipend and tuition</td>
<td>Oct-09</td>
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<tr>
<td>(graduate level)</td>
<td>$500 for travel</td>
<td>Oct-09</td>
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<tr>
<td>PIPELINE</td>
<td>SOLICIT</td>
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<tr>
<td>Working Group Grant</td>
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<td>Fast Forward Grant</td>
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<td>Jul-09</td>
</tr>
<tr>
<td>New Concept Grant</td>
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CIMIT’s Global Health Initiative (GHI) Mission

To improve the effectiveness of health care providers in low-income settings by developing sustainable technologies and targeted training.
GHI Vision: Clinical Focus and Training

Work with local resources to identify clinical needs, establish training and health outcome measures, and improve clinical processes

Clinical Priorities:
- Maternal-Child Health
  - Set as international priority in the Millennium Development Goals (MDGs) #4 and #5
  - “Blind spot” field in global health, but gaining increasing interest and attention
  - Appropriate medical technologies needed to augment lagging clinical care

Diagnostics
- Leverage already funded microfluidic, nanotechnology point-of-care diagnostic projects and capabilities
- Focus on key design features and attributes

Training
- Develop and implement curricula to augment the continuum of care and establish outcomes for health care providers
*Other direct causes include: ectopic pregnancy, embolism, anesthesia-related
*Indirect causes include: anemia, malaria, heart disease
- ¾ of Maternal death preventable
- Post Partum hemorrhage causes anemia - 1.6 million
- Pre eclampsia and eclampsia: high blood pressure and convulsions


[Table 4.1 Incidence of major complications of childbirth, worldwide](http://www.who.int/whr/2005/whr2005_en.pdf)

-Every Child and Mother Count
Image removed due to copyright restrictions.
Source: UNICEF. "World map of Maternal mortality ratios (MMR) per 100,000 live births (2005)."
Major causes of death among children under 5 years of age and neonates in the world, 2000-2003

- Pneumonia: 19%
- Diarrhoea: 17%
- Neonatal: 37%
- Others: 10%
- HIV/AIDS: 3%
- Injuries: 3%
- Measles: 4%
- Malaria: 8%
- Others: 10%

Undernutrition is an underlying cause of 53% of deaths among children under five years of age.

Early Neonatal Mortality

© Copyright 2006 SASI Group (University of Sheffield) and Mark Newman (University of Michigan). Used with permission. For high res images, see: http://www.worldmapper.org/map_list.html.
Doctors working

*www.worldmapper.org Poster 260

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Thirty-three week premature newborn in Burmese refugee camp.
GHI Vision: Clinical Focus and Training

Improving clinical care is required to realize a greater than 50% reduction in 4 million annual neonatal deaths.*

Resuscitation Device

Tekno tube & mask
Laerdal® paediatric pocket mask
Topster® bag & mask
Ambu® bag & mask

FROM: PATH/SNL/Indonesian MOH Unpublished Study
Midwife Training in Indonesia
Healthy 57 Day Baby After Resuscitation
Technology as a symbol of medical sophistication
Broken Incubators in Katmandu:
95% of medical equipment in public hospitals in developing world is donated and more than 80% of these are non-functional within 5 years.

Donated incubator from France in Aceh, Indonesia. 6 of 10 these donated devices were non-functional within 3 years.
Challenge:
To potentially improve health care for 4 million babies who may need a source of thermoregulation often lacking in resource limited settings. Is it possible to leverage the existing parts supply and technical understanding of local car mechanics in poor countries to create an incubator?

Broken Incubators in Katmandu, Nepal
Photo courtesy of Design that Matters, Inc. Used with permission.

Auto repair yard in rural Benin – often the most skilled labor resource
Process:
In 2007 CIMIT’s Global Health Initiative (GHI) partnered with Design that Matters (DtM) and along with volunteers from IDEO and Rhode Island School of Design deconstructed a Toyota 4 Runner along with off the shelf parts to explore the feasibility of building a low cost incubator from locally available parts.

Operational Toyota 4 Runner

Assembled team – Dr. Kris Olson (bottom left) and Timothy Prestero (second from the bottom left)

Photos courtesy of Design that Matters, Inc. Used with permission.
Results:
Incorporated human design factors for user-friendliness. Automotive parts are capable of being repurposed to produce heat, light, air, convection, a power reservoir, as well as auditory and visual alarms.

Photos courtesy of Design that Matters, Inc. Used with permission.

Courtesy of Design that Matters, Inc. Used with permission.
Results Continued:
User Stimulated Maintenance: Air filter – visible to users; Headlights – intuitive to fix if broken
Uses: Incubator, Warming Table, and Blanket Warmer Drawer

Photography by Joshua Touster

Courtesy of Joshua Touster. Used with permission.
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