

Computing and Global Health

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Undergraduate Research Seminar
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Computing and Global Health

- ▶ Broad interest in introducing computing based solutions to health challenges
- ▶ Rapidly changing technological landscape



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Research Domains

- ▶ ICTD / CHANGE
- ▶ Mobile Wellness Toolkit: NSF Project
 - Anderson/Borriello/Kolko
- ▶ Educational Technology
- ▶ Computing for Low Resource Environments
Capstone (CSE 490D / CSE 481K)
- ▶ PATH

Extended Sabbatical at PATH (2009–2011)

- ▶ Seattle based NGO working in health technologies
- ▶ Program for Appropriate Technology in Health
- ▶ Focus areas:
 - Maternal and Child Health
 - Reproductive Health
 - Immunization
 - Infectious diseases
 - Safe Water



 PATH

NSF Mobile Wellness Toolkit Project

- ▶ 3 year NSF funded project
- ▶ UW co-PI's:
 - Richard Anderson, Gaetano Borriello, Beth Kolko
- ▶ Partner: PATH
- ▶ Mobile technology for health and wellness



Immunization systems

- ▶ One of the world's most effective health interventions
 - Wide coverage of basic vaccines
 - Diphtheria, Pertussis, Tetanus: 77% in poorest countries
 - Tremendous reduction in deaths
 - Some diseases close to elimination
- ▶ Large scale global programs
 - Decade of Vaccines
- ▶ Introduction of new vaccines
 - Pneumococcal and Rotavirus vaccines



Change Seminar 1/5/2012

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Immunization: National Health Information Systems

- Manage health information on national scale
- Reporting from facility level
 - Web based submission to central database
- Integrate tools into existing systems

Immunization: Health System Modeling

- Analyze health system based on data
 - PATH CCEM: Vaccine Cold Chain Analysis

Estimated costs to address cold chain equipment deficiencies in four countries¹ (USD in 000's)

Country	Base Schedule with Pneumo				Base Schedule with Pneumo and Rota			
	ILR units	Gas/Ker units	Cold rooms	Cost USD in 000's	ILR units	Gas/Ker units	Cold rooms	Cost USD in 000's
Country A ²	219	258	0	745	558	405	7	1,825
Country B ³	47	56	4	242	100	67	8	675
Country C ⁴	94	413	13	1,604	210	846	25	3,481
Country D ⁵	55	35	0	97	65	38	11	540

Immunization: Facility Monitoring

- Data collection to understand status of health facilities
- Link with multiple sources of data

Immunization: Health Worker and Manager Support

- Develop (mobile) tools to support management of the health system
 - Manage and track assets
 - Record information during facility visits

Communication and Education

- Promote behavior change and adoption of practices
- Maternal and child health focuses on small number of interventions
 - Taking iron pills
 - Exclusive breast feeding
 - Keeping babies warm
 - Promoting institutional delivery
 - Birth preparedness
- Mobile Interventions
 - Multimedia playback
 - Reminders
 - Community building
 - Spam

Digital Public Health

Mobile Job Aids

- ▶ Job aids
 - Process walk through
 - Calculator
 - Care protocol
- ▶ Support with mobile applications
 - Tool for use during care
 - Often these tasks are rare
 - Training
 - Standardization

Community Health Worker Supervision

- ▶ Health workers not permitted to treat patients
 - CHW, ASHA, VHV, . . .
- ▶ Tracking pregnancies, promoting health practices, identifying disease suspects, collecting information
- ▶ Mobile applications
 - Job aids, data collection, supportive supervision
- ▶ Technology issues
 - Usability, low cost phones

C4D Capstone

- ▶ CSE Capstone course
 - Winter: Design seminar
 - Spring: Implementation
- ▶ Offered since 2008

Encouragement System for CHWs

- ▶ Develop system for automatic reminders
- ▶ Allow different levels of escalation and triggers
- ▶ Key technical challenge: develop a finite state machine implementation

Smart Phone Vaccine Register

- ▶ Register to track children and immunizations
- ▶ Link to existing PC systems

Interactive Health Videos

- ▶ Digital Green Model
 - Community created content
 - Facilitated showings
- ▶ Work with Global2Local

