Mobile Telemedicine in Botswana

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Botswana-UPenn Partnership (BUP)

Telemedicine Workshop
Institute of Tropical Medicine
Antwerp, Belgium
September 30, 2011
Agenda

• Background
  o Botswana healthcare & IT landscape
  o BUP and Telemedicine / mHealth
  o Local Partners and Roles

• History of BUP Mobile Telemedicine/mHealth
  o 2008 - 2010: The 'study' era
  o 2010: Project/Local Interest Boom
    ▪ Outline of Projects [Video]
  o 2011: Setting The Sustainability Stage...
    ▪ Capacity building, local ownership, etc.

• Lessons Learned
• 2012 & Beyond...
• Demos
  o Coded-in-country telemedicine system
  o Doc2Doc group messaging app

• Discussion
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Botswana

- 2nd highest HIV prevalence in the world and 4th highest for TB
- University of Botswana launched first School of Medicine in 2009
- Challenging IT infrastructure, but high mobile penetration
Botswana continued
Botswana-UPenn Partnership (BUP)

- Partnership between the University of Pennsylvania and the government of Botswana
- PEPFAR-funded organization founded to help address the AIDS epidemic
- Clinical support, research, and health policy development
BUP Telemedicine/mHealth

- Dr. Carrie Kovarik launched Teledermatology in 2008
- 24 publications (journals/conferences)
  - Including comprehensive "mHealth in Botswana" papers/workshop at IST-Africa Conference
- Facilitate local partnerships
- Full-time in-country Program Manager since Oct. 2010 and adding one more in Oct. 2011.
Partners and Roles

Botswana-UPenn Partnership

ClickDiagnostics
(2008 - mid 2011)

Positive Innovation for the Next Generation
(mid 2011 - Present)

University of Botswana

Ministry of Health of Botswana

Orange Botswana
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2008-2010: "The Study Era"


Kathleen Tran, MD, MSc, Mohamed Ayad, MBBC, DipHM, Jennifer Weinberg, BS, Augustin Chereng, BS, Mridul Chowdhury y, MPA, Saadeddin Monir, MBBC, MSc, Mohamed El Hariri, MBBC, MS, and Carrie Kovarik, MD. “Mobile teledermatology in the developing world: Implications of a feasibility study on 30 Egyptian patients with common skin diseases.”

Achiamah Osei-tutu, MD, Ting Shih, Alyx Rosen, Nathan Amanquah, PhD, Edward Osei-Tutu, MD, Hector Addo, MD, Alhaji Konnie, MD, Don Yansen, Mridul Chowdhury Charles Haligah, MD, Daniel Siegel, MD, Carrie Kovarik, MD. “Mobile Teledermatology in Ghana: Sending and Answering Consults via Mobile Platform”

Studies were mostly in the fields of Dermatology and Women's Health and focused on proving feasibility and local perception.
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2010: Project/Local Interest Boom

Outline of Projects:
Access to Specialists (store and forward)
- Mobile Oral Telemedicine [Video]
- Mobile Cervical Cancer Screening
- Mobile Teledermatology
- Mobile Teleradiology

Access to Medical Resources
- National Treatment Guidelines SMS Query System
- Mobile Telementoring
Access to Specialists

- Mobile Oral Telemedicine [Video]
- Mobile Cervical Cancer Screening
- Mobile Teledermatology
- Mobile Teleradiology
Mobile Oral Telemedicine

Operations at a glance:
• 6 Locations
• 13 Clinicians Trained
• 107 Successful Cases
Mobile Oral Telemedicine in Maun
Mobile Cervical Cancer Screening

Operations at a glance:
- 1 location
- 2 nurses trained
- 356+ patients seen
  - (96 part of study)
- Dependent on Visual Inspection with Acetic Acid (VIA) in Botswana...
Mobile Teledermatology

Operations at a glance:
• 2 locations
• 3 nurses trained, 2 dermatologists with phones
• 126 successful cases
  o (mostly part of study)
Mobile Teleradiology

Operations at a glance:
- 2 locations
- 4 radiographers trained
- 54 successful report requests
- Experienced **significant** setbacks related to x ray machines
After...
After (cont.)...
Access to Medical Resources

- National Treatment Guidelines SMS Query System
- Mobile Learning (mLearning) with University of Botswana School of Medicine (UBSOM) Residency Program
SMS Query System

Operations at a glance:
• 80 Participants in focus group
• Technological setbacks prevented growth
• Big plans for future, including transitioning to USSD
Operations at a glance:
• Android phones with medical and drug information apps:
  o e.g. Dynamed, Archimedes, Medscape, ePocrates Rx, and 5-Minute Clinical Consult
• Phone users by residency program:
  o Internal Medicine: 8
  o Paediatrics: 8
  o Emergency Medicine: 4
  o Family Medicine: 8
  o Total: 28
Everyone agrees that these projects are nice.

(Botswana-UPenn Partnership, funders, ClickDiagnostics, Orange Botswana, University of Botswana, Ministry of Health, phone users, specialists, patients, etc.)
... but are these projects SUSTAINABLE?
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2011: Setting the Sustainability Stage

• Locally owned and locally driven
  o Public Awareness Posters
  o Specialty coordinators and phone trainings
  o Educational workshops
• Telemedicine referral model mirrors physical referral model
  o Patients the specialist would already see
  o Only international consults are voluntary
• IT Transition
  o Hardware & Software
• Public-Private Partnerships
  o Win-win-win...win?
Public Awareness Posters

Kokelwana e, e dirisa tlhaletsano ya mogala wa letheka mo go dingwe tsa kalafi ya legano

**Mobile Oral Telemedicine**

Tiriso ya mogala wa letheka go fa Batswana botsogo jwa tlhwatlhwa.

This clinic proudly utilizes **Mobile Oral Telemedicine**

Using mobile phones to extend the reach of the highest quality health care to all Batswana

This mHealth service is made possible by:
• One specialty coordinator per project
• Interest in specialty OR interest in telemedicine
• ~30% of time to projects (MoH agreement)
• Administrative, training, regular communication with phone users, represent projects, etc.
Specialty Coordinators / Training
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Educational Workshops
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- IT Transition
  - Hardware & Software

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IT Transition - "Study Era"

- Hardware was "smuggled" into the country.
- Software was proprietary and servers/support were located out of country.
IT Transition - Sustainability setup

- Devices acquired through existing regional distribution channels.
- Software is coded-in-country using open source tools. PING is local NGO with a mentorship program for educating local youth in basic IT skills
  - Mobile app: ODK Collect, xml forms
  - Server (in country): Ubuntu Linux
  - Tools: php, html, mysql, phpmyadmin
2011: Setting the Sustainability Stage

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  - Public Awareness Posters
  - Specialty coordinators and phone trainings
  - Educational workshops
- Telemedicine referral model mirrors physical referral model
  - Patients the specialist would already see
  - Patients are seen by same doctors, just using new tools
  - Only international consults are voluntary
- IT Transition
  - Hardware & Software
- Public-Private Partnerships
  - Win-win-win...win?
Public-Private Partnerships

- Next stage's upgrades/rollouts will be funded by BUP (~40%) and MoH (~60%)
- Orange will provide all phones, sim cards, and data at special "mHealth discounts"
- BUP is hiring local program manager, whose operational responsibilities will eventually be phased into MoH IT department
- MoH IT staff will be involved with training and system maintenance.
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• **2012 & Beyond...**

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• **Discussion**
Lessons Learned

- Local ownership is key
- Social engineering > technological engineering
- Expect the unexpected
- "Never assume it will work" - R. Wootton
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- Phones...
  - dropped in water
  - dropped in sanitization liquid
  - dropped on rock
  - stolen (by a patient!)
  - lost - at least he's honest.
- Software bugs
- Hackers
- X-ray machines broken
- Sim cards malfunctioning
- App registrations expiring
- Nation-wide public servant strike
- Email threats to phone users (strike)
- Power outages
- etc.
2012 and Beyond...

- 2012 potential scale up:
  - Remote consultation
    - 40 devices
    - 25 new locations
  - UBSOM
    - 50+ devices
- Cost-Benefit Analysis and other business studies
- Increased MoH involvement
  - Explore more specialties
  - IT
- Upgrades
  - educational features
  - Interoperability with other HIS
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Demonstrations

• Coded-in-country telemedicine system

• Doc2Doc Group Messaging App

**please be conscious of new-tech wariness**
Coded-in-country Telemedicine System

• Usernames:
  o Referring Doc: BotsDO
  o Botswana-based specialist: BotsSpecialist
  o International Specialist: InternationalDoc
• Passwords: 1234
• Notifications can be customized for each user
  o SMS, email, work, personal, reminders, etc.
Doc2Doc Group Messaging App

• Usernames:
  o ryan
  o malaakgosi
  o ketshogileng
• Passwords: same as username (should be saved)
• Walk through user guide...
DISCUSSION