

Summer Institute 2013, Rwanda CHUK Hospital in Kigali

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End-of-program
Conference
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CHUK Hospital Statistics¹

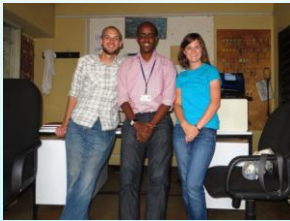
- ◆ Largest hospital in Rwanda (referral)
- ◆ 66 doctors (45 of which are specialists)
- ◆ 492 nurses/midwives
- ◆ 128 general practitioners
- ◆ 3 pharmacists
- ◆ 104 administrators
- ◆ 25 departments (17 of which are clinical)



¹ Taken from Human Resources for Health Program information
<http://hrhconsortium.moh.gov.rw/about-hrh/program-overview/>

People We've Met

- ◆ Jean Claude: Head of maintenance at CHUK
- ◆ BMETs: Maurice, Philemon, Francois, Moise, Jean Pierre, Gilbert, Albert, Alain, Jean Baptiste
- ◆ Baudouin from Craft Engineering



People We've Met

- ◆ Rwandan nurses and doctors



- ◆ Doctors and administrators from the Human Resources for Health Program
 - ◆ Dr. Cliff; Dr. Mark; Cari (not pictured)



Goals of the Human Resources for Health Program

- ◆ To “...build the healthcare education infrastructure and workforce necessary to create a high quality, sustainable healthcare system in Rwanda...”
- ◆ By addressing the following obstacles:
 - ◆ Shortage of skilled healthcare workers
 - ◆ Poor quality of education for healthcare workers
 - ◆ Inadequate infrastructure and equipment
 - ◆ Inadequate management of health facilities

<http://hrhconsortium.moh.gov.rw/about-hrh/program-overview/>



HUMAN RESOURCES
FOR HEALTH PROGRAM
REPUBLIC OF RWANDA

How will they do it?

- ◆ Team with 23 top US institutions
- ◆ Institutions will provide full-time medical, nursing, health management, and dentistry faculty
 - ◆ Transfer knowledge and train specialists
- ◆ Outcomes:
 - ◆ Train 550 medical specialists
 - ◆ Upgrade skill sets of over 5000 nurses
 - ◆ Introduce formalized training for health management and dentistry

<http://hrhconsortium.moh.gov.rw/about-hrh/program-overview/>



HUMAN RESOURCES
FOR HEALTH PROGRAM
REPUBLIC OF RWANDA

Primary Project: Repairing Medical Equipment

- ◆ Total # of pieces of equipment: 34
- ◆ Total # returned to service: 29
- ◆ Total # abandoned: 5

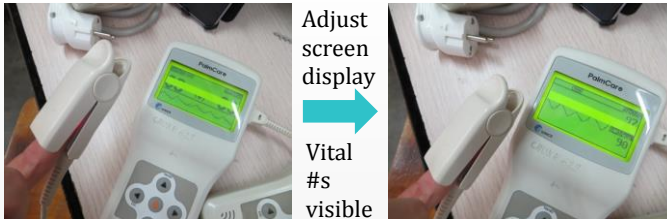
Repair Rate:
~85%

- ◆ Source of problem:
 - ◆ Motor (1)
 - ◆ Mechanical simple (2)
 - ◆ Electric simple (17)
 - ◆ Power supply (7)
 - ◆ Other (7): broken probe; broken LCD screen; broken plastic connector on filter, etc.

- ◆ Reasons for abandoning repair:
 - ◆ Broken transformer: 2
 - ◆ Missing spare part: 3



Pulse oximeter (x3)



Fetal monitor



(1) Wires disconnected from power supply connector; pins detached from inner circuit



(2) Solder wires directly to pins inside, avoiding power supply connector



(3) Secure cord with zip tie to try to prevent further problems



(4) Happily ask nurse to verify monitor repaired; tested on mother-to-be in labor!

Examination Lamp (Repair 1)



(1) One of the wires completely disconnected



(2) Solder wire; secure with heat shrink; secure remote with zip tie



(3) Thumbs up for working exam light

Examination Lamp (Repair 2)



(1) Metal bar (neutral) disconnected

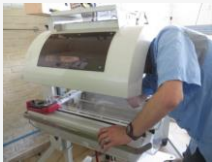


(2) Live inside of connector broken



(3) Working *again* after soldering live wire and strengthening ground bar

Phototherapy Units (2)

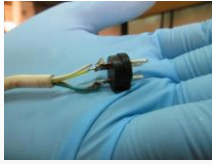


- Start: phototherapy unit on (*top*) has 2 out of 5 working bulbs and on (*bottom*) has 4 out of 16
- After checking bulbs and cleaning both units, ended with top unit having 5 working bulbs and bottom unit having 8 (covering top but not bottom of 360° unit)

Portable X-ray



(1) Hand-held remote for portable x-ray broken



(2) Wire completely disconnected within connector



(3) Reassemble and have x-ray technician verify by taking x-ray



Power Strip



(1) CPAP not working *(twice)* because plugged into 1 of 3 broken outlets on power strip



(2) 2 switches show signs of fire; wire outlets directly to avoid switches



(3) Use zip ties to hold cable in place



(4) 6 working outlets!

Temperature probe



(1) Two broken temp. probes for infant warmer; 1 without sensor & 1 with broken plug



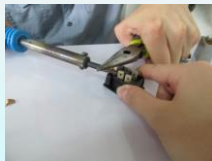
(2) Combine the two for one working temperature probe; use heat shrink to protect wires from shorting and provide strength



Infant Incubator



(1) Switch broken; used epoxy to hold pin in place



(2) Melted plastic to correct position of metal piece



(3) Completely rebuilt switch, which works!



(4) Test unit; all alarms work; holds set temp.

Negatoscopes (2)



(1) Two broken negatoscopes; negatoscope on right plugged into outlet with no power; electrician rewired to bring power



(2) Negatoscope on left needed new starters, bulbs, and switch



(3) Both work!



Secondary Project: Securing Laptops

- ◆ 9 laptop computers donated by university in U.S. for teaching and point-of-care use at CHUK/CHUB
- ◆ Dr. Cliff interested in method for securing laptops within departments
- ◆ We scavenged computer-on-wheels (COWs) to serve as portable desk for the computer, and with Claude's help, asked machinist to build metal device to secure computer onto COWs
- ◆ We also purchased locks for each of the computers for secondary deterrent



Needs-Finding Assessment

- ◆ CHUK Hospital has a large amount of very impressive equipment
- ◆ However, testing/diagnostic equipment for repair and preventative maintenance is scarce
- ◆ Top 3 diagnostic equipment needs:
 - ◆ Electrical safety analyzer (leakage current)
 - ◆ Must detect the presence of leakage current
 - ◆ Defibrillator tester
 - ◆ Must provide **quantitative** assessment of energy delivered
 - ◆ Incubator tester (temperature, noise level, humidity level, etc.)
 - ◆ Must measure noise level



Thoughts and Lessons Learned

- ◆ Procurement is one of the main sources of difficulty regarding healthcare
 - ◆ Spare parts take months or years to obtain
 - ◆ Equipment sits unused for long periods of time/indefinitely
- ◆ A holistic approach to moving forward is requisite for healthcare in Rwanda
 - ◆ Train doctors and nurses (HRH)
 - ◆ Train BMETs (EWH)
 - ◆ Educate about the importance of equipment maintenance/repair and role of BMETs

Thoughts and Lessons Learned Cont'd

- ◆ Most nurses/doctors we've met seem eager to learn and want to be better trained
- ◆ Regarding design for developing countries:
 - ◆ Must be rugged (we've witnessed that the nurses are not careful with their equipment)
 - ◆ Must be rapid (nurses and doctors here are extremely busy and do not have time to wait)
 - ◆ Must require few, if any, spare parts; any spares and maintenance needs should be included

Questions??



Other items we repaired

