Problems and Solutions
Try and come up with solutions that others have been grappling with for years

Public Health - large centralized infrastructure to keep the general population healthy
Access to doctors, medicine, awareness, preventative, treatment
This exists in many places in the developing world (government)
Also other organizations that take care

Humanitarian Aid -
First measure responses to humanitarian situations
- Tsunami, refugee camps, humanitarian evacuation system
- This is how a lot of people get into Public Health initially
- Many humanitarian aid responses are reflective of the reaction in everyday life

Burden of Disease
Potential life + productive life = Disability Adjusted Life Years
Measuring how healthy a country is. Measuring the work of a healthy individual against disabilities (disease, permanent injury) and mortality

What people die from and suffer from on a daily basis are different

Gives people an idea of where they might want to have an impact

D-Lab Development
2009.11.20
Jose Marques-Gomez / Global Health

D-Lab Approach
How can you come up with more tactical approaches that can have a result/impact within 2 years. (Other options might be impacts over 30 years)

90% of medical equipment is hand me down that fails within 6 months
- environmental issues (leaky roof that shorts equipment)
- technicians not taking care of equipment (world cup / ultra sound / color monitor)

Dual-Use Technologies
Find things that can be developed here and used in developing world
Military is a huge source of this
Camping gear
Similar parameters of a lack of infrastructure

Medicines
Two-market pricing systems
Major reason to compete with local production that can reverse engineer and make a generic alternative (India, Brazil, China all have very good capabilities in this)
Balancing IP with the needs of country and people

Vaccines
Military going to places where soldiers are exposed to some of these diseases
Solutions

Many diseases have solutions (drugs/devices/diagnostics)

BAD NEWS

Not all are easy to deploy
(Cost/infrastructure/education/regulation)
People work on solving this aspect the most

MORE BAD NEWS

Infrastructure isn’t always easy or cheap to respond to

Case Study

Jet Injector (Peace Gun)

No needle

People started to use for other reasons
- Found it spread Hep B among people being vaccinated
Vacuum formed in chamber that draws small amount of blood from patient, that can infect the next customer

Device since improved with a spacer, so device isn’t against skin

With simple design approaches, you can recover technologies

Elements for Device Design Success

Select appropriate design attributes
Map to design?
Missed the slide

Impact/Resource Scale

Technology as intermediate solution while vaccines/cures researched

XoutTB

Cellphone + encrypted diagnostics to see if people have taken their drugs
Rewarded with cellphone minute credit
Paying for minutes is cheaper than having health worker go and check

1600 patient trial in Pakistan
Patients like it
Health Care Workers jobs?
Free them up to do what they are trained for
Not trained to write down compliance

Compliance is a big issue
$300 Billion lost in US because of non-compliance
Google: compliance and adherence

Aerovax

Maintaining the vaccine in a different state
Don’t need to refrigerate for 7 days

Microfluidic Chip

Replace electricity with liquids
Liquids run to different elements and reagents

Why Pakistan?
Because of this serendipitous networking occurrence
Attributes for Medical Devices

Essential
- Safe
- Accurate
- Robust (vials get dropped on floor all the time)
- Longevity
- Cheap (first thing to go is devices, consumables are purchased, vaccines, while syringes aren’t)
- Reliable
- Reusable/Disposable (varies depending on context)
  - Auto-disable syringe (cheaper to buy vacuum pack machine and fake new than buy new syringes)

Enhancing
- Mobile
- Connected (enough affordable electronics to make things connected, and there are many reasons why it should be made connected, devices that talk to each other)
- Smart
- Plug n’ Play (with other devices)
- Backup via Redundancy

Long-Term
- Local Mafg
- Local Innovation

Approaches
- Vintage Technology + New Function (old patents)
- Nerf Gun + Syringe Device
- Improvisation -> Design
- Coke Bottle + Inhaler OptiChamber
- Context Shifting
  - Taking device for one setting and apply in another