

# Health Care and Smartphone Integration

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# Basic concept

- The Problem
  - Outdated method of collecting information related to health care inventory
- Important
  - DHIS2
    - India
    - Africa

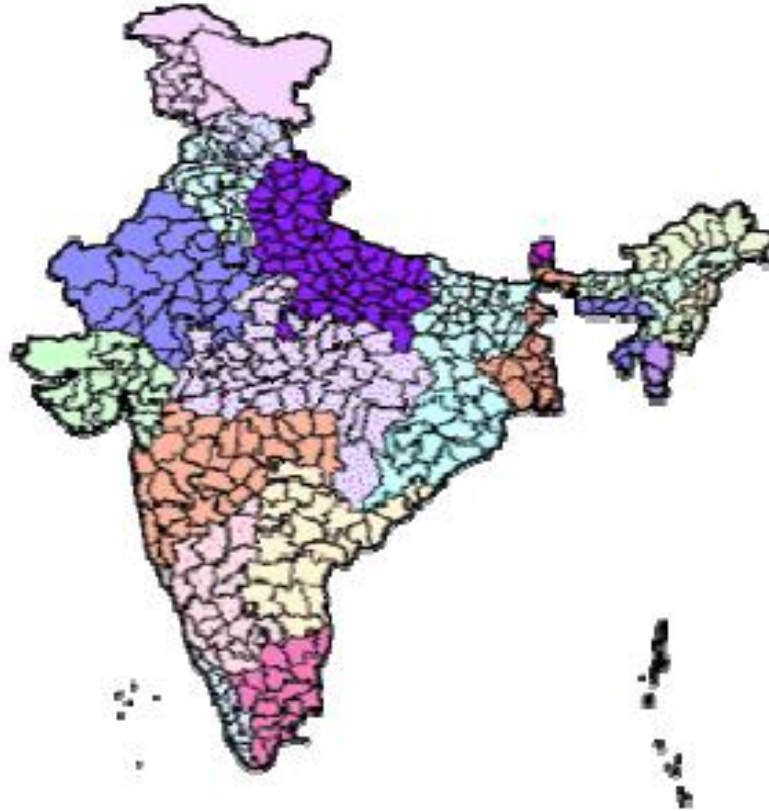
# India



# India - Districts



# India - States



# Basic Scenario (Today)



# Basic Scenario (Today)

1 - HEALTH FACILITY QUESTIONNAIRE			
GPS coordinates		Latitude	Longitude
Time: ____ am/pm		Time: ____ am/pm	Waypoint
<b>Administrative levels and facility information</b> 1. Region: (name of region) 2. Zone: (name of zone) 3. District: (name of district) 4. Sub-district: 5. Name of (health) facility:			
6. Type of health facility: Mark only ONE box <input type="checkbox"/> National vaccine store <input type="checkbox"/> Regional vaccine store <input type="checkbox"/> District vaccine store <input type="checkbox"/> District hospital - MoH <input type="checkbox"/> Central hospital - MoH <input type="checkbox"/> Rural hospital - MoH <input type="checkbox"/> Hospital - MOH <input type="checkbox"/> Hospital - Private <input type="checkbox"/> Health centre - MoH <input type="checkbox"/> Health centre - MOH <input type="checkbox"/> Health centre - Private <input type="checkbox"/> Maternity - Local Government <input type="checkbox"/> Maternity - MoH <input type="checkbox"/> Dispensary - Local Government <input type="checkbox"/> Dispensary - MoH <input type="checkbox"/> Health post - MoH			

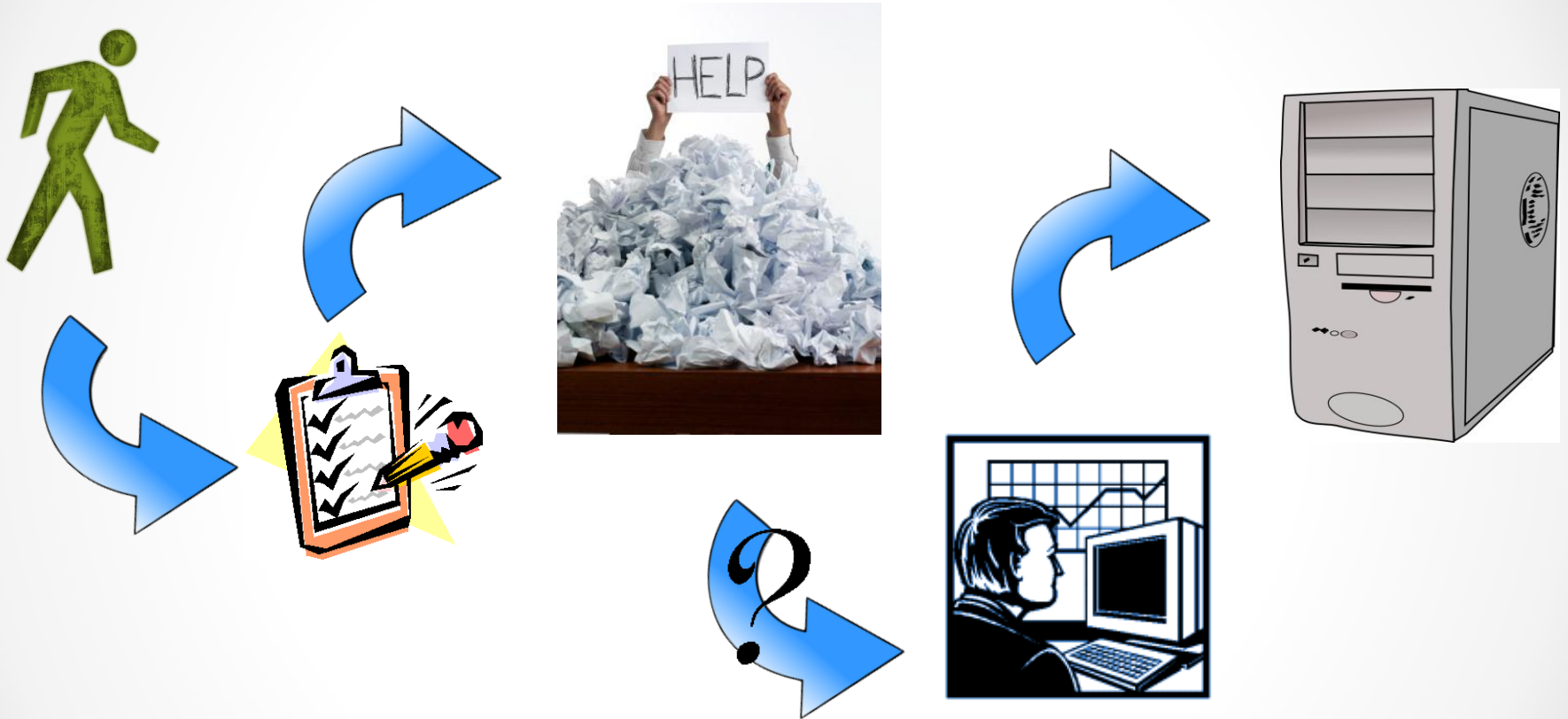
Health facility immunisation activities	
7. Total population in area served by facility: (number of)	14. Resupply interval of (weeks) Enter 0 if no stock
8. Live births per year in area served by facility: (number of)	15. Routine immunisation (number of)
9. Pregnant women per year in area served by facility: (number of)	16. SNID / NID ice pack (number of)
10. Women of child bearing age in area served by facility: (number of)	17. Distance to vaccine (number of)
11a. Vaccine storage: Check box below ONLY if the facility has a refrigerator or freezer, even if broken. Otherwise leave blank. <input type="checkbox"/> Storage	18. Mode of vaccine supply <input type="checkbox"/> Delivered <input type="checkbox"/> Collected
11b. Type of services provided: Mark ALL boxes that apply <input type="checkbox"/> Outreach immunisation services <input type="checkbox"/> Static immunisation services	19. Health care waste disposal <input type="checkbox"/> Burn and bury <input type="checkbox"/> High temperature incineration <input type="checkbox"/> Pit <input type="checkbox"/> None
12. Cold chain training: (number of staff trained in) Cold Chain Training for Users Cold Chain Training for Technicians Vaccine Management Training	
13. Stock outs in past 3 months: Mark only ONE box <input type="checkbox"/> Yes <input type="checkbox"/> No	

Health facility energy sources available to power cold chain equipment

2 - REFRIGERATOR & FREEZER QUESTIONNAIRE	
EQUIPMENT RECORD OF (Fill in a separate form for each piece of equipment at health facility)	
Administrative levels and facility identification	
1. Region: (name of region)	4. Sub-district:
2. Zone: (name of zone)	5. Name of (health) facility:
3. District: (name of district)	
Refrigerator or freezer information	
6. Catalogue ID: E	Fill in questions #13-18 when found in the Equipment Identification Guide
7. Serial number: (located on equipment or assigned serial number)	14. Model name:
8. Year of first use: (estimate if information is not available)	15. Manufacturer / Make:
9. Working status: <input type="checkbox"/> Working well <input type="checkbox"/> Working but needs maintenance <input type="checkbox"/> Not working	16. Is there a CFC-free sticker? <input type="checkbox"/> Yes <input type="checkbox"/> No
10. Reason equipment not working: Check ALL boxes that apply. Leave blank if equipment is working <input type="checkbox"/> Spare parts are not available for repair/maintenance <input type="checkbox"/> Finance is not available for repair/maintenance <input type="checkbox"/> Not in use because electricity or fuel is not available <input type="checkbox"/> Equipment needs to be boarded off	17. Refrigerator/Freezer Type: <input type="checkbox"/> Chest freezer, AC electricity <input type="checkbox"/> Chest freezer, electricity <input type="checkbox"/> Chest freezer, electricity <input type="checkbox"/> Chest refrigerator, AC electricity <input type="checkbox"/> Chest refrigerator, AC electricity <input type="checkbox"/> Chest refrigerator, electricity <input type="checkbox"/> Chest refrigerator, electricity <input type="checkbox"/> Icepack freezer, AC electricity <input type="checkbox"/> Icepack freezer, electricity & gas <input type="checkbox"/> Icepack freezer, electricity & kerosene <input type="checkbox"/> Inclined refrigerator <input type="checkbox"/> Solar photovoltaic refrigerator <input type="checkbox"/> Upright refrigerator, AC electricity <input type="checkbox"/> Upright refrigerator, DC electricity <input type="checkbox"/> Upright refrigerator, electricity & gas <input type="checkbox"/> Upright refrigerator, electricity & kerosene
11. Equipment utilisation: Mark only ONE box <input type="checkbox"/> In use <input type="checkbox"/> Not in use and available for re-allocation <input type="checkbox"/> Not in use and not available for re-allocation Verify directly with health facility representative this equipment is available for re-allocation	

3 - VACCINE CARRIERS, COLD BOXES & ICE PACKS				
Administrative levels and facility identification				
1. Region: (name of region)		4. Sub-district:		
2. Zone: (name of zone)		5. Name of (health) facility:		
3. District: (name of district)				
Vaccine cold box and carrier information				
6. Quantities of vaccine cold boxes and carriers: Fill in a separate line for each model of cold box and vaccine carrier found at health facility, using the Catalogue ID referenced for each model in the Equipment Identification Guide and always starts with the letter E.				
(a) Catalogue ID:	(b) Total available for vaccination activities	(c) Quantity not working		
E				
E				
E				
E				
E				
Ice pack information				
7. Quantity of standard ice packs	Ice pack size	0.3	0.4	0.6
	Quantity			
Person responsible for cold chain at the facility		Cold Chain Inventory team leader's information		
Name:		Name:		
Designation:		Mobile number:		
Mobile number:		Signature:		

# Basic Scenario (Today)





# Basic concept

- Android Application Reporting
  - Allow data reporting to be submitted from any android device.
  - Solve the many hardships of the current reporting system.
    - Easier to transfer, copy, backup data
    - Easily find and access desired information
  - Who will find this useful?
    - Health administrators at the state, district and country level.

# Basic Scenario (Future)



# Basic Scenario (Future)

- Papers are Fragile
  - Humidity
- Easier to report
  - Leads to increase reporting
  - Faster communication
  - Possibility for data analysis

# Architecture Set-Up

- Server
  - DHIS2 – already implemented
- Android Application
  - Backend Component: Programming Interface to interact with DHIS2
  - Frontend Components: User Interface design for effective data entry.

# Interaction

Frontend

Server

Backend

**Login**

Username  
elmer

Password  
.....

Login Reset

Cholera (Deaths < 5 yrs) (default)  
1

Typhoid (Deaths < 5 yrs) (default)  
2

Accute Flaccid Paralysis (Deaths < 5 yrs) (default)  
5

Meningitis (Deaths < 5 yrs) (default)  
0

Plague (Deaths < 5 yrs) (default)  
0

DataSet is complete

Save

1	2 ABC	3 DEF	-
4 GHI	5 JKL	6 MNO	.
7 PQRS	8 TUV	9 WXYZ	DEL X
* # (	0 +		下一个



# Expected effort

- Fieldwork
  - Continued research into problems the current system has.
  - What will make a smooth transition from current system to new system
  - Features that they would like to see in the current system.
  - Connectivity issues.
- DHIS2
  - Understanding how to communicate with DHIS2 components

# Expected effort

- What pieces have to be built?
  - User Interface
  - DHIS2 connection interface
- Minimum Functionality
  - Report data to the DHIS2 database.
  - Cold Chain Refrigerator report
- Desired Functionality
  - Customize to match any paper forms/inventory
  - Ability to attach multimedia content (photo, receipt)
- What are the big unknowns?
  - HISP & DHIS2
  - Interaction/pipeline in inventory reporting

# Related Work

- Other Projects
  - DHIS2 Mobile Development Project
    - <http://dhis2.org/mobile>
  - Smartphone/RFID/Barcode inventory tracking
  - Insurance app also storing photos, receipts
  - ODK – android data report & collecting
- What ideas does it draw on and who has worked on them?
  - Richard Anderson
- What makes this project novel/interesting?
  - Communities already relying on DHIS2
  - Building on top of large, developed project