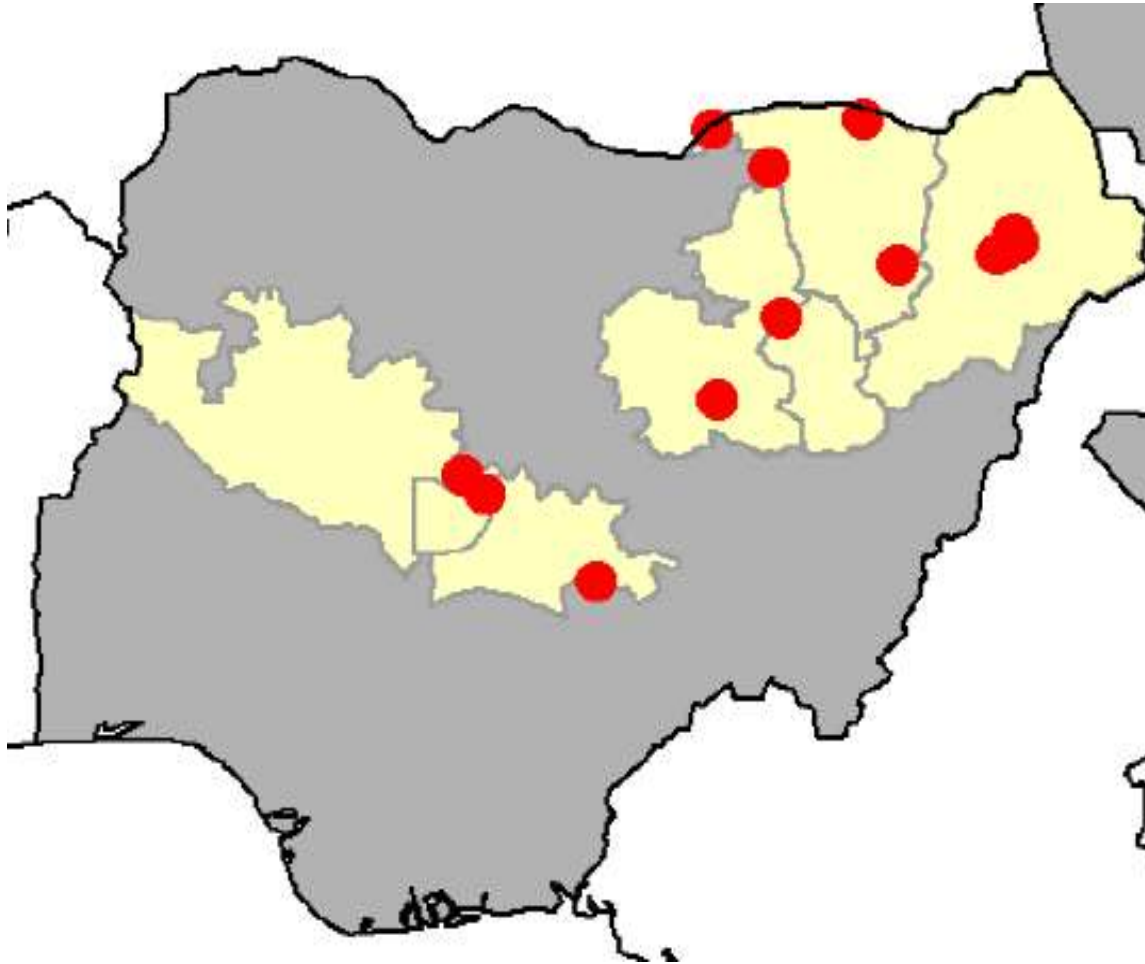# Using Mobile Phones to Capture Polio Data

Lot Quality Assurance Sampling

with Magpi and ESRI ArcGIS

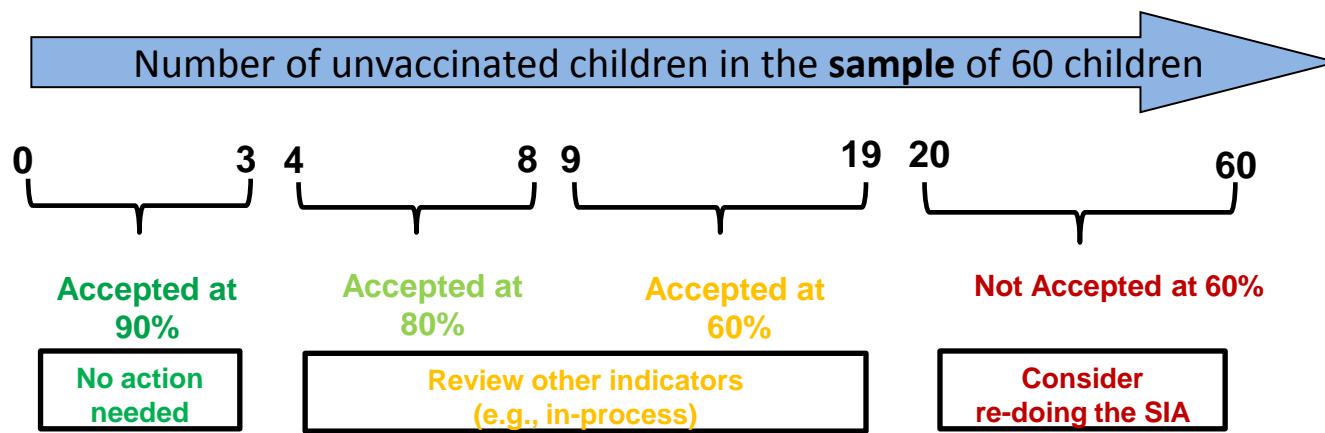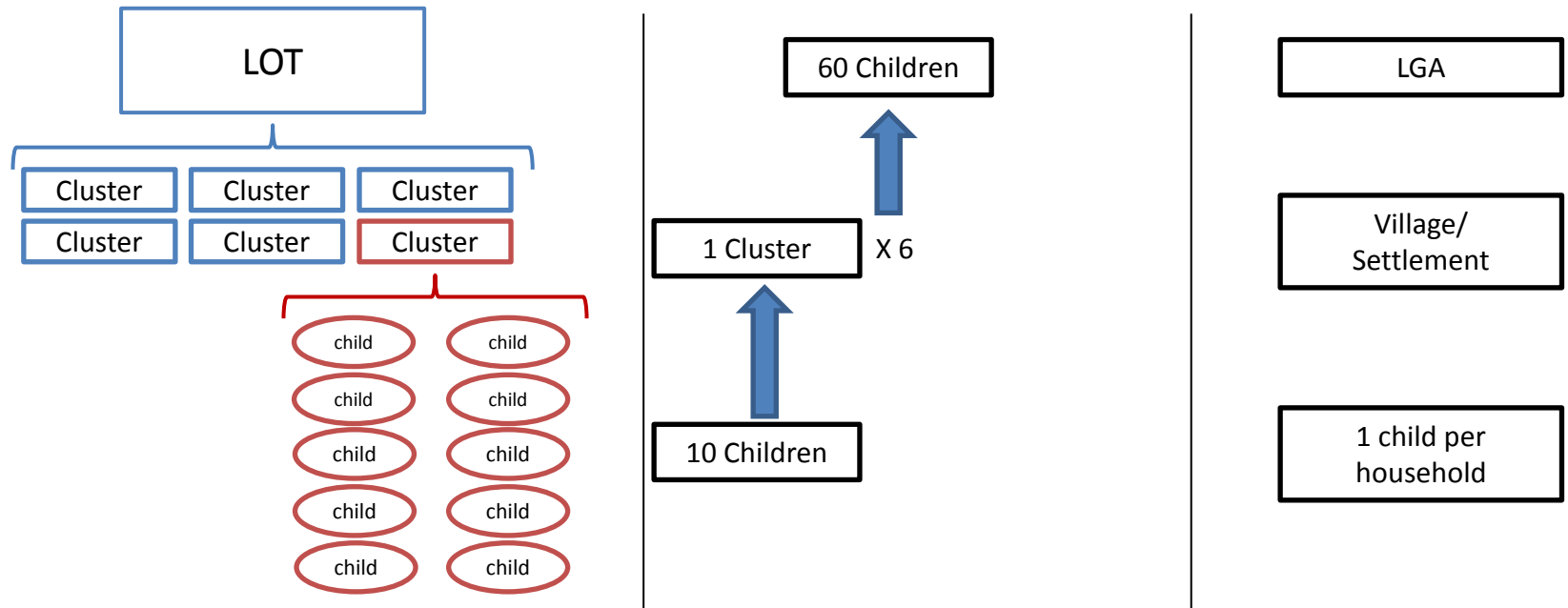# Polio In Nigeria

2013 :
22/31
cases worldwide

2012:
122/223
cases worldwide

As of May 2013

Lot Quality Assurance Sampling (LQAS)

- To combat continued transmission in Nigeria, GPEI introduced LQAS

- LQAS = sampling methodology used to classify geographical areas (lots) at "acceptable" or "not acceptable" levels of vaccination coverage.

- LQAS also used to assess campaign quality in Pakistan, DRC, Chad, and Afghanistan.

Lot Quality Assurance Sampling (GPEI LQAS Guideline)

LOT

Cluster | Cluster | Cluster
Cluster | Cluster | Cluster

child | child
child | child
child | child
child | child
child | child

60 Children

1 Cluster X 6

10 Children

LGA

Village/ Settlement

1 child per household

Number of unvaccinated children in the sample of 60 children

0 — 3	4 — 8	9 — 19	20 — 60
Accepted at 90%	**Accepted at 80%**	**Accepted at 60%**	**Not Accepted at 60%**
No action needed	**Review other indicators (e.g., in-process)**		**Consider re-doing the SIA**

Conducting an LQAS Survey

- Formerly on Paper
- Surveyor travels to assigned village
- Randomly selects 10 children per village to survey
- Checks fingermark for polio vaccination
- Reports data to state level → federal level for analysis
- Surveys could take 10 hours to complete and 2-3 weeks to compile data

Adaptation of Mobile Phones

- Introduction of mobile phones for collecting and transmitting LQAS data in 2011
- Magpi Data collection application on Android phones
- Improved collection, transfer, and analysis in four main ways
  - Fewer errors
  - Faster data collection
  - Faster data transmission
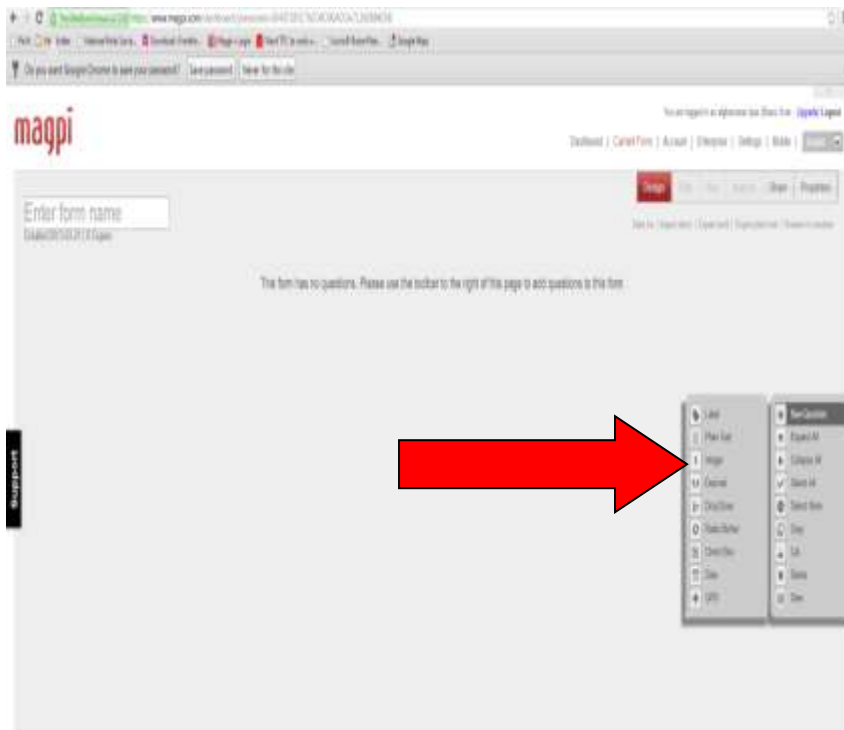 - Faster data analysis

Magpi Online - Forms

Signing in to Magpi.com

1. **Sign in** to your Magpi account at http://www.Magpi.com
2. Select "New" to create a new, unique form
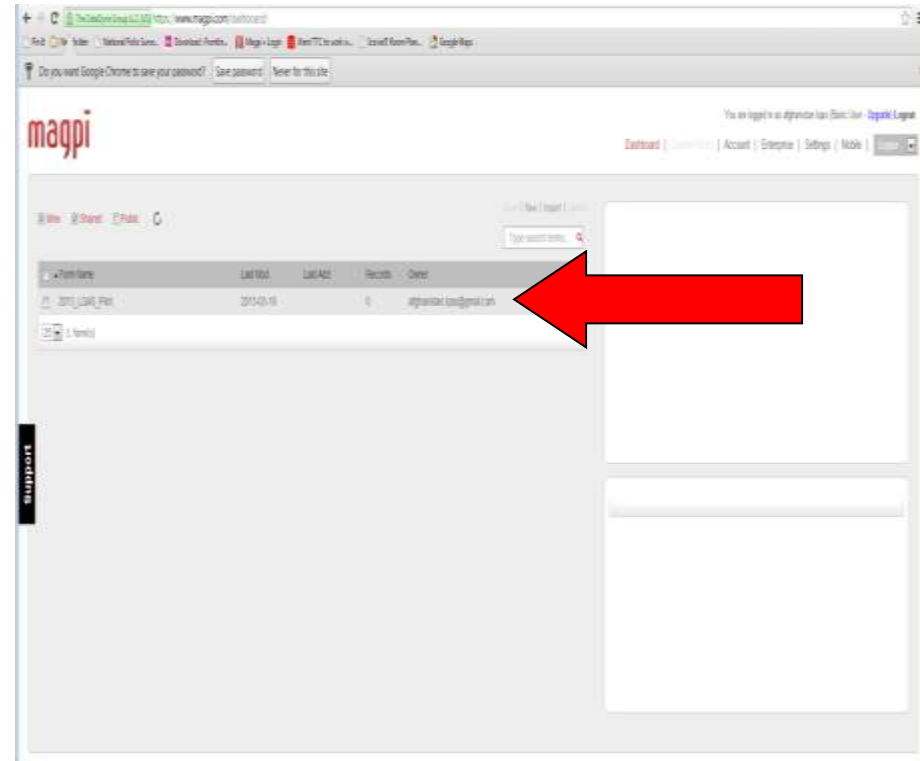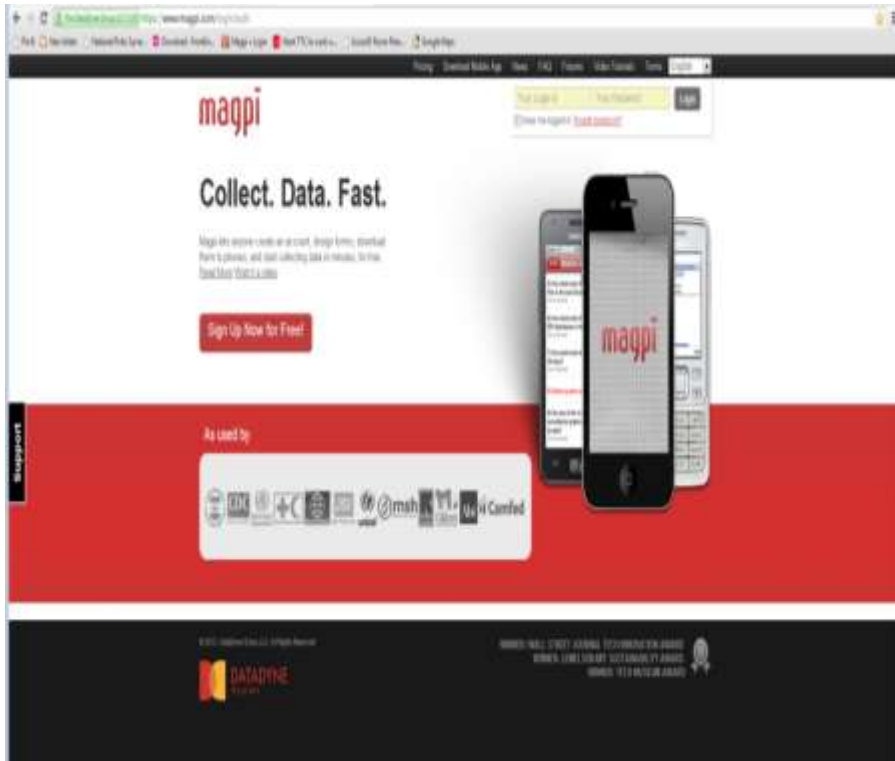
Creating Forms in Magpi

Choose the type of question

9 types of questions

| Label	Information questions/instructions
Plain text	Response in text
Integer	Response is integer
Decimal	Response can be decimal
Drop down	One option multi choice
Radio button	Yes/no multi choice
Check box	All that apply multi choice
Date	Response is date
GPS	Response is GPS coordinates

Form Adjustment

- **Basic skip logic, constraints, calculations**
- **Question language and type can be changed**
- **Question order can be changed**
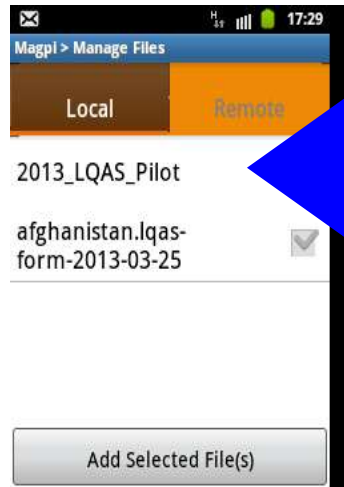- **Current development of "push" feature**
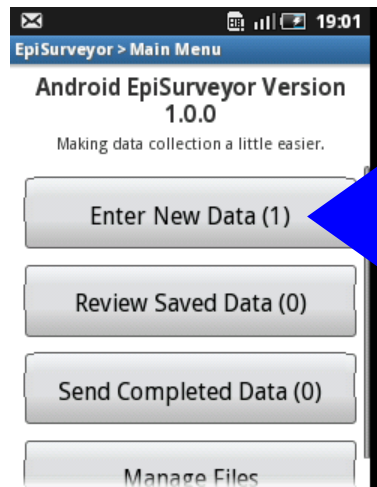
Magpi on Mobile Phones

Installing Magpi and Completing Forms
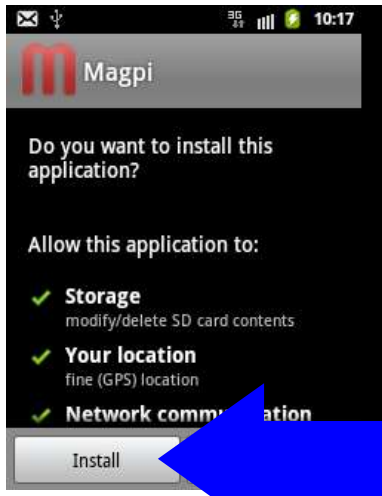
Install the application (via internet or USB transfer)
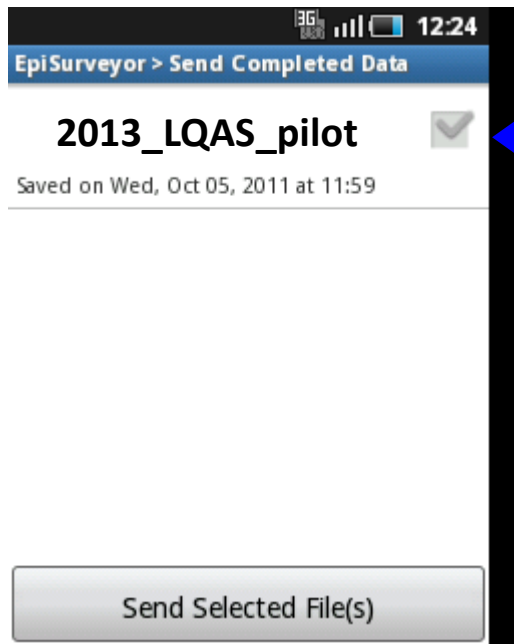
Load the form to the phone
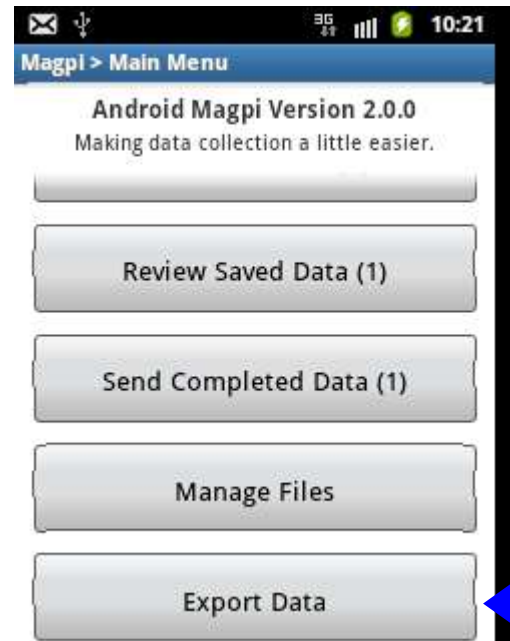
Choose the form to fill out

Complete the survey on the phone

Sending Data to Server

Directly From Phone

Through phone's SD card

Magpi Online - Data

Exporting Data from Web to Computer

1. Click on the boxes to the left of the data you want to export
2. Click on the export data link
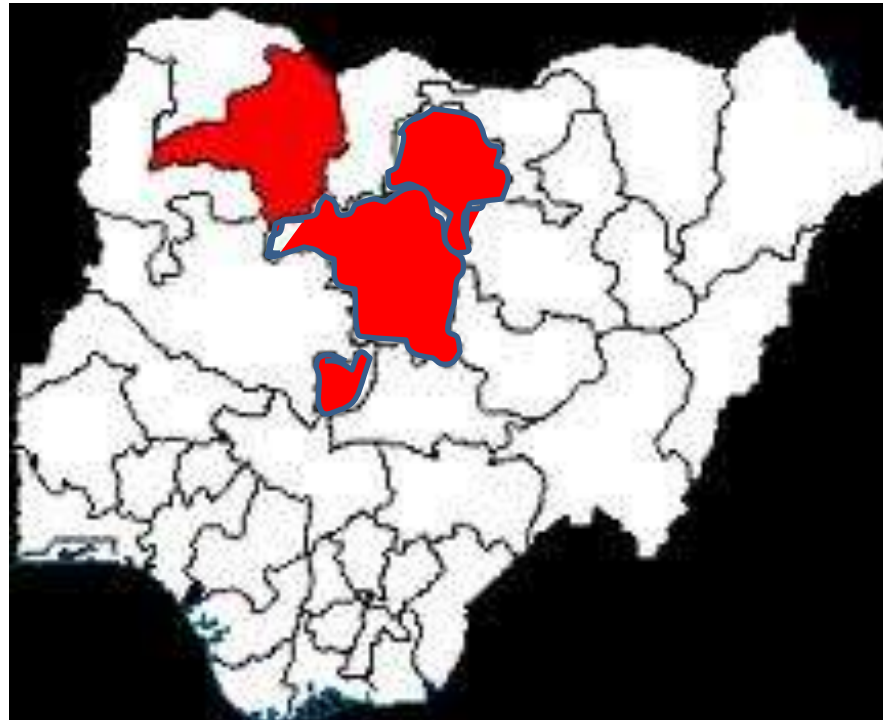3. Export into excel

The file should appear on your screen or in your computer downloads file

Using Magpi in the field
Nigeria Pilot

Global Polio Eradication Initiative

Lot Quality Assurance Sampling

Pilot

- **Phone application**: Magpi, March 2011
- **Study area**: four states (FCT, Kaduna, Kano and Zamfara)

Pilot

- **Results:** 90% (24/27) of LGAs reported by the end of the survey

- **Results:** all results came in faster on mobile phones than on paper (average 2-4 days vs. 2-3 weeks with then paper form).

- **Outcome:** The initiative has since been scaled-up to include 120 phones in all 10 high-risk northern states.

Process of Initiating Mobile Phone Program

1. Procurement of Android phones
2. Preparation of training materials and user manuals
3. Creation of forms online unique to each country
4. Discussion with local data team and staff members
5. Training of local supervisors and surveyors
6. Pilot study to test implementation
7. Scale-up when requested

Mapping LQAS Results

- Benefit of mobile phone use = addition of GPS points to surveys

- To visualize LQAS data in a geographic way, we use ESRI ArcGIS mapping software to identify areas of need in three different ways:
  1. Movement within the cluster for surveyor accountability
  2. At cluster level for classification of cluster based on unvaccinated children
  3. At LGA level for overall coverage quality at lot/administrative action level
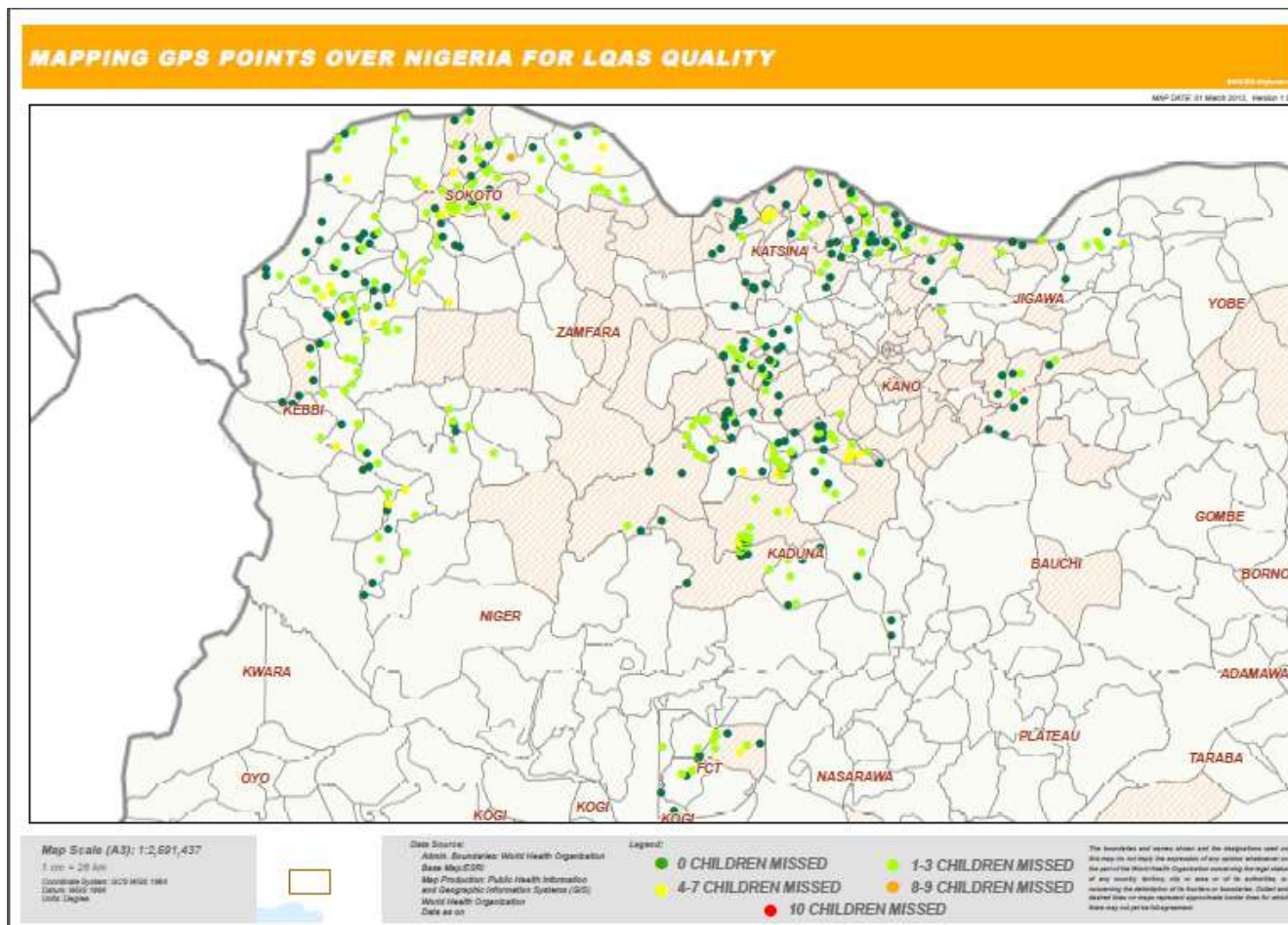
Movement within cluster

3 GPS points within the cluster (10 children) to measure surveyor movement in the field for accountability

Can be done in google maps for country office / local supervisors (as below)
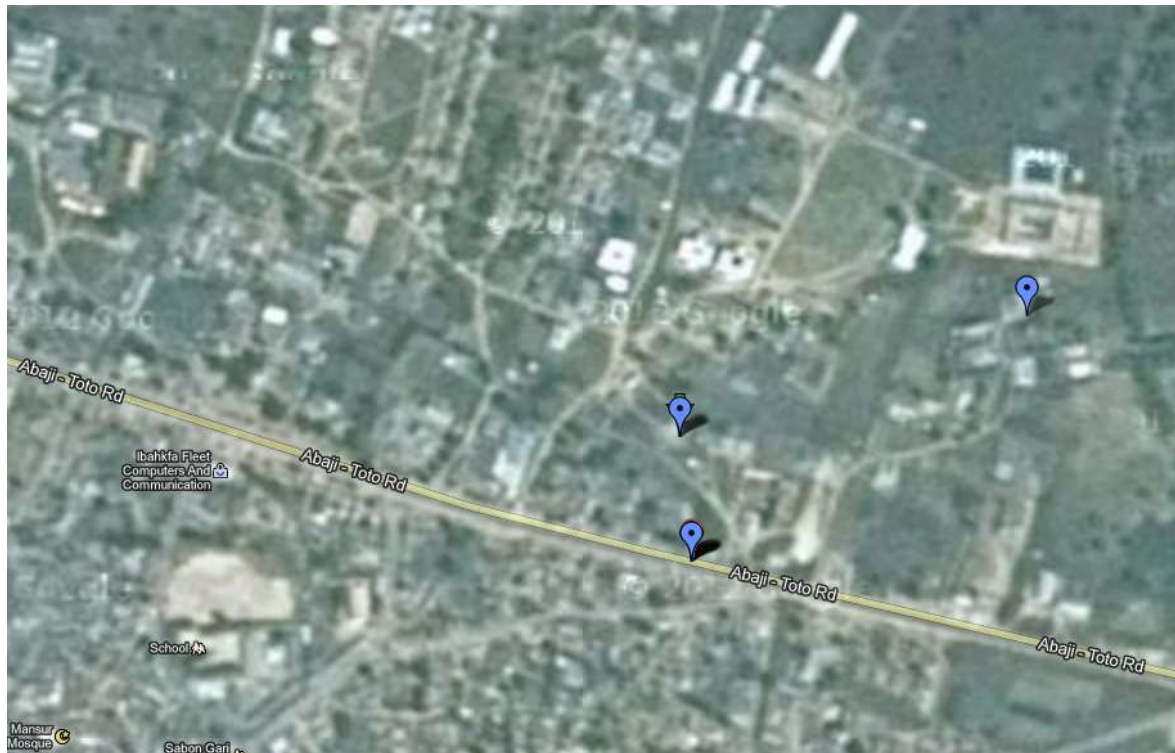
At cluster level – national view

1 GPS point at cluster level to demonstrate the number of unvaccinated children per cluster in five levels of classification:

0, 1-3, 4-7, 8-9 and 10 children unvaccinated out of 10 children surveyed.

At cluster level – state view

At LGA level

Mapping at the LGA level to see overall coverage quality at the administrative/programmatic action level
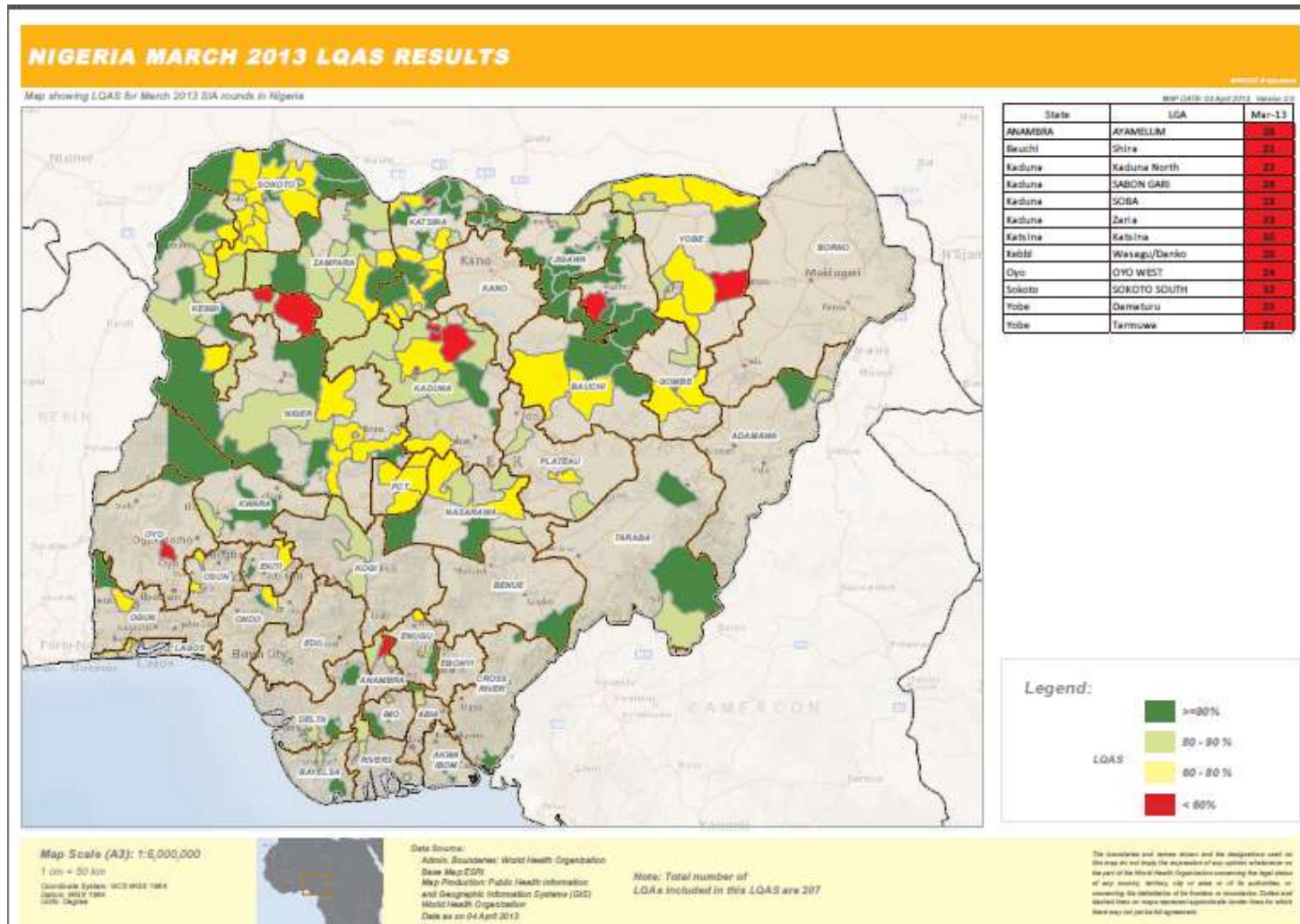
Campaign Trends Through Mapping

Need to know:

* is program missing entire settlements or only children within settlements?

10 Unvaccinated Children

8 to 9 Unvaccinated Children
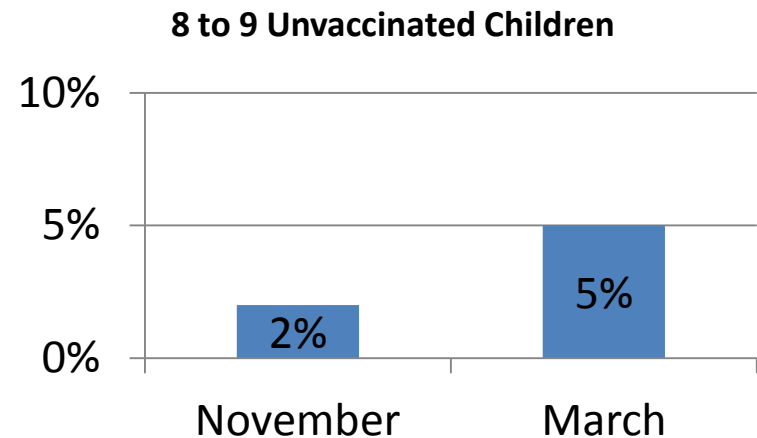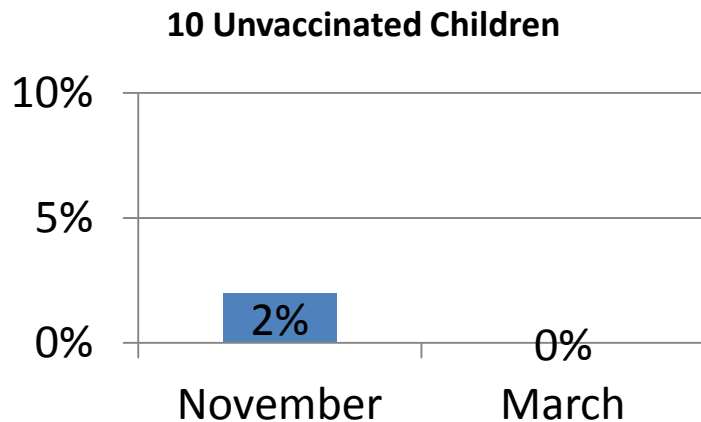
Conclusion:

* Suggests entire settlements are not being missed, but rather vaccination performance remains weak.
* Main Challenge = increase coverage within the settlements

Campaign Trends Through Mapping

10 unvaccinated children			
November		**March**	
State	**LGA**	**State**	**LGA**
Kaduna	Birnin gwari		

8-9 unvaccinated children			
November		**March**	
State	**LGA**	**State**	**LGA**
Kaduna	Lere	Bauchi	Shira
Katsina	Kankia	Kaduna	Soba
Sokoto	Dange Shuni	Kaduna	Zaria
		Katsina	Katsina
		Sokoto	Tambuwal

Geographic Distribution:

- 9 different LGAs, but only 4 northern states. Indicating local issues within a relatively small geographic area

Conclusion

- Using mobile phones has good implications for field level data collection and transmission

- Has been welcomed by countries – Nigeria, Pakistan, Afghanistan

- Magpi has good support network, but we do encounter some issues in terms of sending and exporting data

- Use of GPS is great bonus to the program for geographically identifying program trends

Backup Slides

Process of LQAS Round

Day	Action
After LQAS completed → week before vaccination campaign	Phones are held at the Lot level or Federal Level
Week before campaign	Phones are distributed to the lot level supervisors and then to LQAS surveyors
Week before campaign	New surveyors must be trained on mobile phone use
Week before/during campaign	Test data is sent from states to ensure forms and phones are working correctly
Over 2-4 days, 1 day after campaign is completed	Surveyors conduct data collection on mobile phones over period of 1-2 days
During LQAS (2-4 day period)	Preferably, after each form is completed (1 cluster = 10 children), surveyor sends data to central server
End of LQAS collection day	Any unsent data collated and sent from local / state office
During LQAS / final day of LQAS	Data is exported from Magpi server site and cleaned
1 week after LQAS completed	Data is compiled with paper data
1-2 weeks after LQAS completed	Analysis is conducted and sent to all levels of organization

Areas that still require extra time – paper based