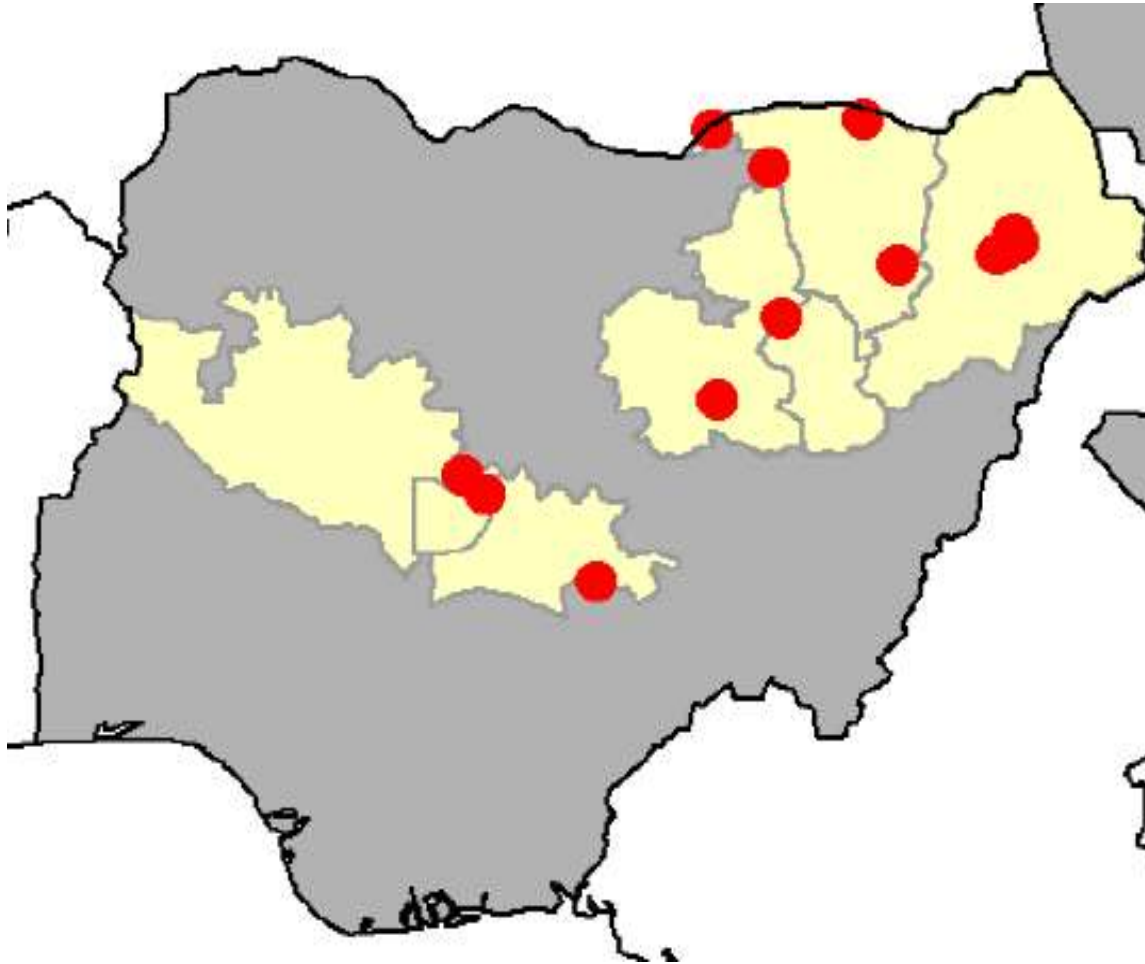


Using Mobile Phones to Capture Polio Data

Lot Quality Assurance Sampling
with Magpi and ESRI ArcGIS

Polio In Nigeria



2013 :
22/31
cases worldwide

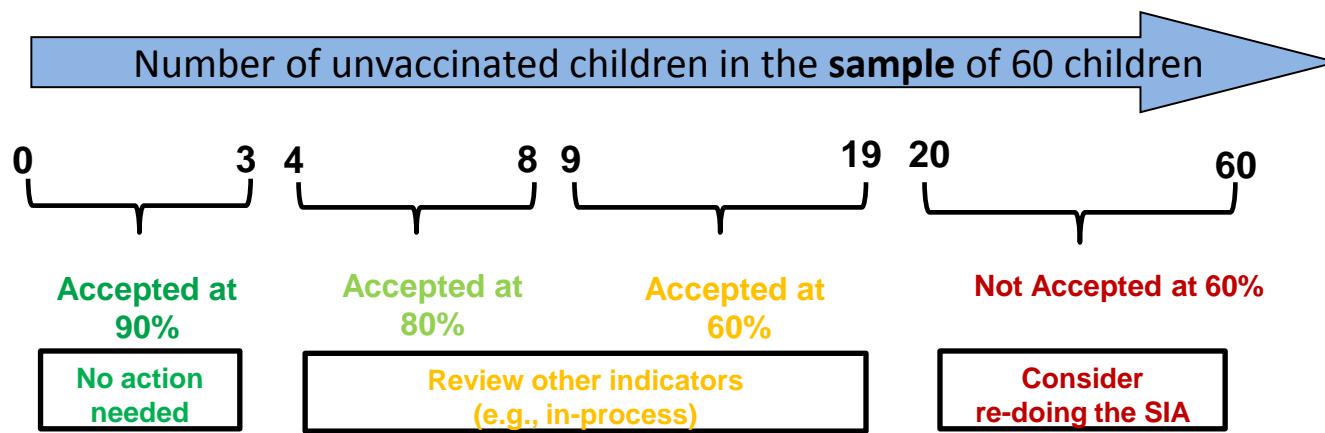
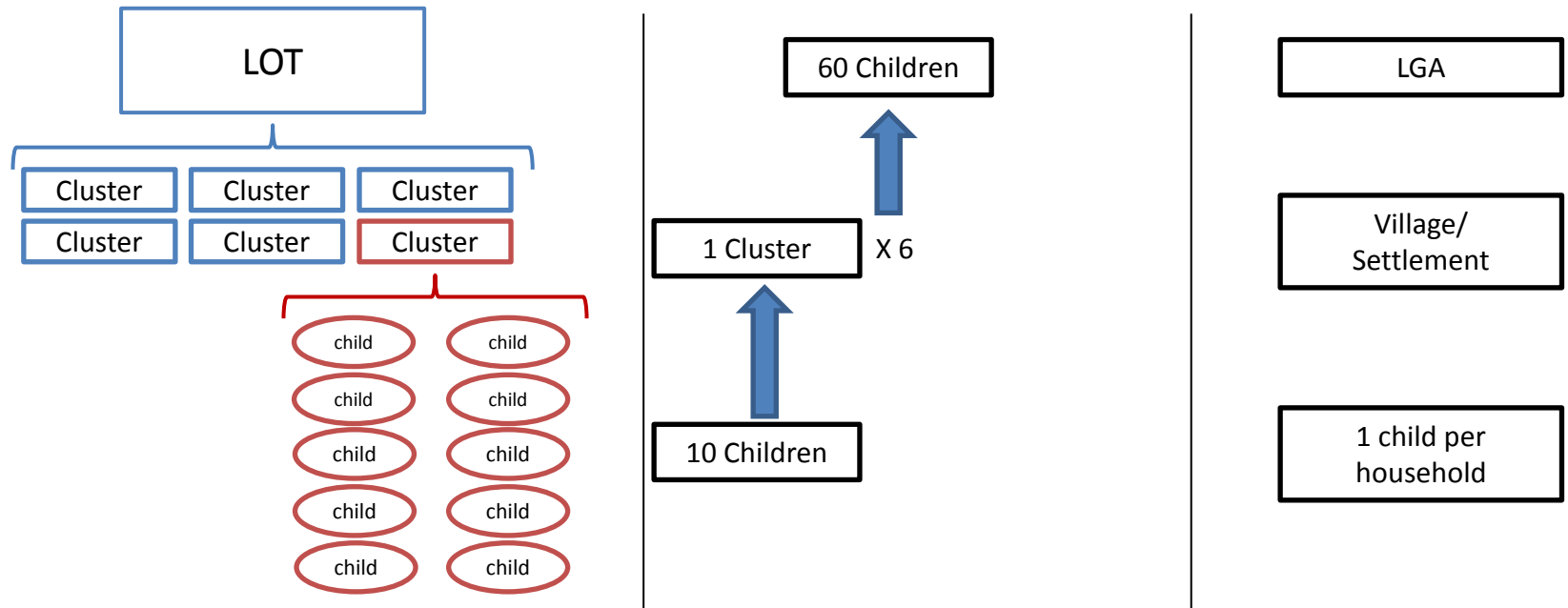
2012:
122/223
cases worldwide

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)



Conducting an LQAS Survey

Final version for Pilot LQAS

CLUSTER DATA COLLECTION FORM

Q1 Province: _____
 Q2 District: _____
 Q3 Lot Number: ____ (1-4)
 Q4 EPI Cluster Name: _____
 Q5 Cluster Number: ____ (1-4)
 Q6 EPI Cluster Area Code: _____

Q7 Name of Surveyor: _____ Signature: _____

Q8 Date: ____/____/____

Q9 Cluster Start Time: ____:____ (hh:mm)

Q10 Cluster End Time: ____:____ (hh:mm)

Q11 Is the starting settlement:
 20 households or less
 More than 20 households

OPV Vaccination Status

		Children sampled in the cluster									
		1	2	3	4	5	6	7	8	9	10
Q12 Total No. children (0-59 months) live in this household	Number										
Q13 Age	Months (0-59)										
Q14 Sex	M=Male F=Female										
Q15 Is finger marked for OPV?	Y=Yes N=No										
Q16 State reason if finger is not marked	M=household not visited N=Child Absent O=Non Compliance P=Newborn Q=Sleep Sick R=Refusal										
Total number of children vaccinated (finger marked): ____											
Total number of children unvaccinated (not finger marked): ____											

Comments (please specify how the first household/compound was selected and any difficulties encountered)

- 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

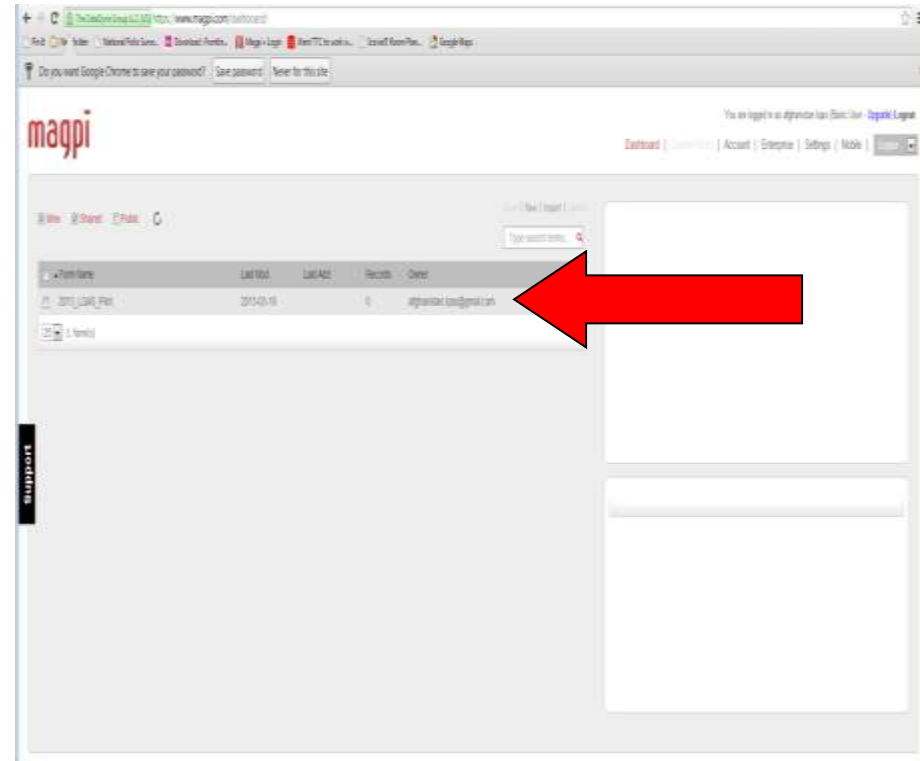
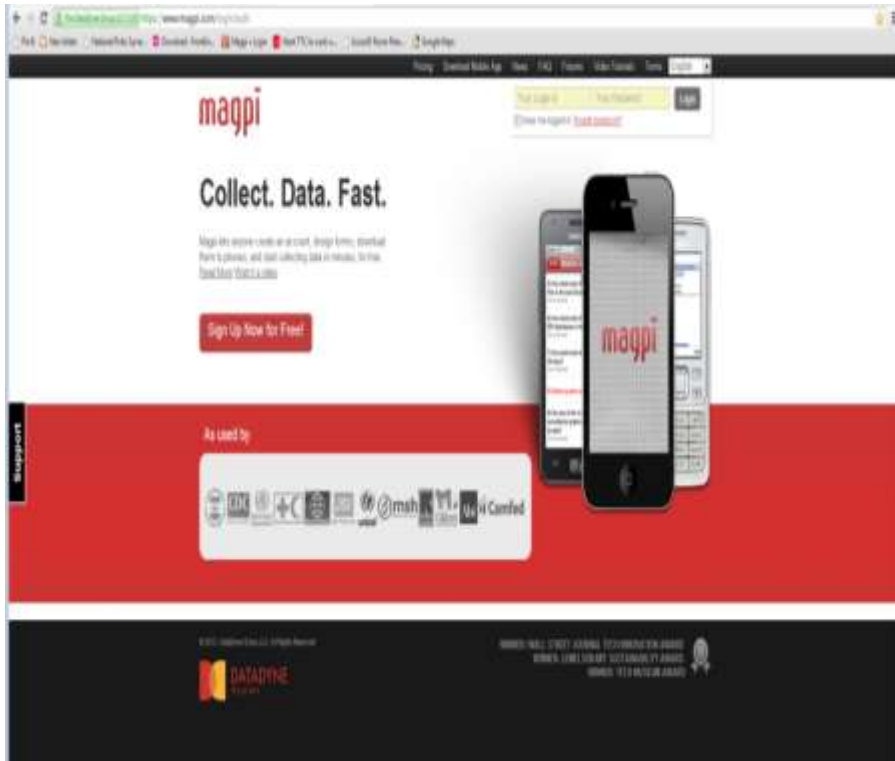
Adaptation of Mobile Phones

- 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

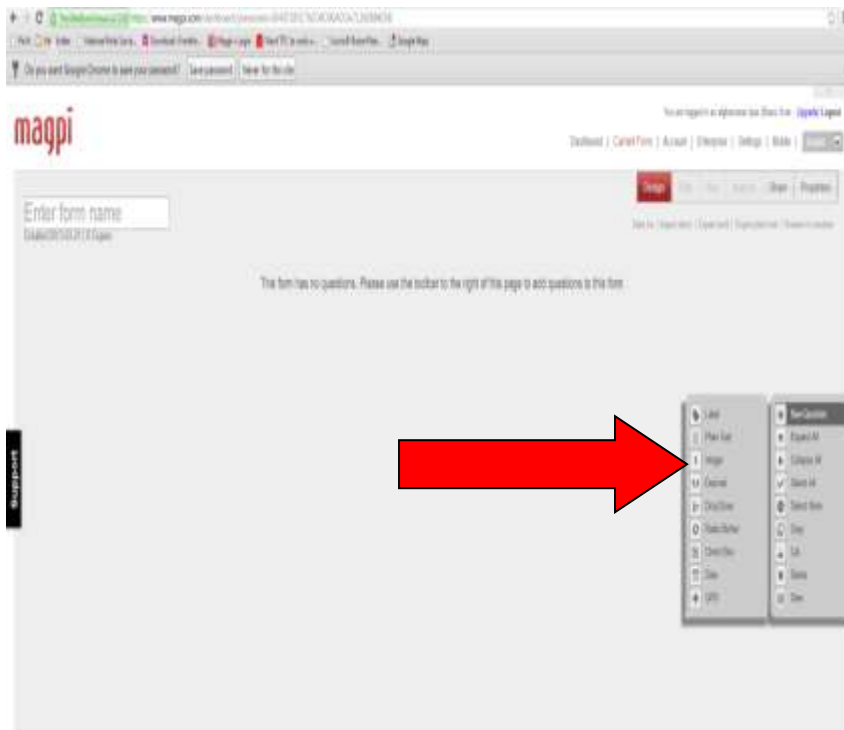
Signing in to Magpi.com

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

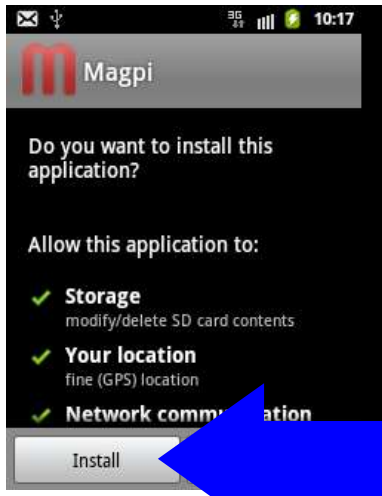
Form Adjustment

- **Basic skip logic, constraints, calculations**
- **Question language and type can be changed**
- **Question order can be changed**
- **Current development of “push” feature**

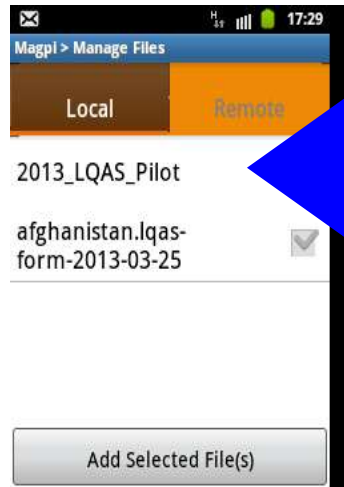


Magpi on Mobile Phones

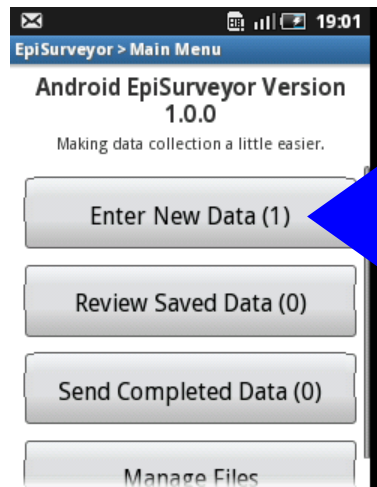
Installing Magpi and Completing Forms



**Install the application
(via internet or
USB transfer)**



**Load the form
to the phone**



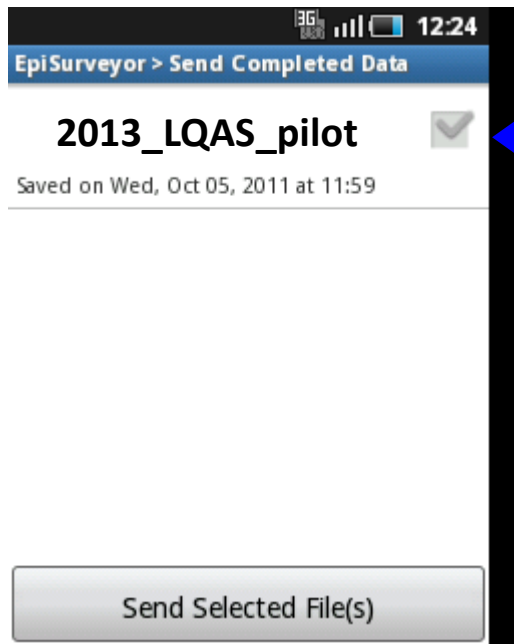
**Choose the form
to fill out**



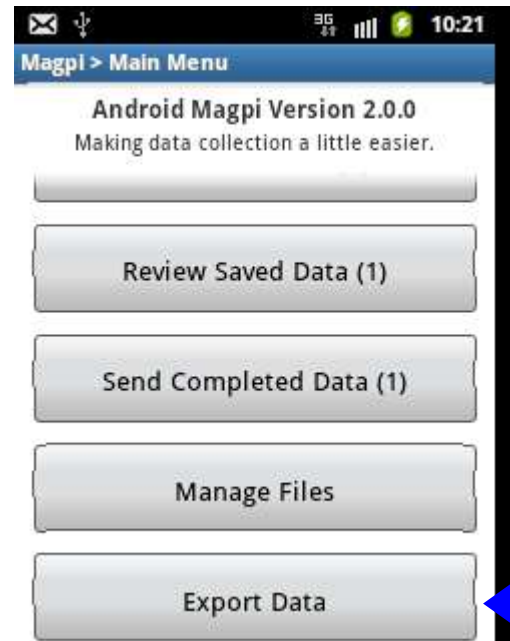
**Complete the
survey on the
phone**

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 screenshot shows the magpi web application interface. The main content is a table titled "Nigeria_LQAS_FT" with columns: Last Update, Start Record, End Record, Last Submit, Name, State, LQA_Bauch, LQA_Bama, LQA_FCT, LQA_Ganda, and LQA_Agona. The table contains 12 rows of data. A blue box with the number "1" points to the checkboxes in the first column. Another blue box with the number "2" points to the "Export" button in the top right corner of the table area.

Last Update	Start Record	End Record	Last Submit	Name	State	LQA_Bauch	LQA_Bama	LQA_FCT	LQA_Ganda	LQA_Agona
ngn@magpi.com	2012-10-11 16:22:26	2012-10-11 16:22:26	2012-10-11 16:22:26	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-11 12:55:24	2012-10-11 12:55:24	2012-10-11 12:55:24	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-10 18:30:58	2012-10-10 18:30:58	2012-10-10 18:30:58	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-10 17:42:12	2012-10-10 17:42:12	2012-10-10 17:42:12	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-10 15:36:40	2012-10-10 15:36:40	2012-10-10 15:36:40	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-10 13:21:36	2012-10-10 13:21:36	2012-10-10 13:21:36	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-09 18:00:44	2012-10-09 18:00:44	2012-10-09 18:00:44	ABDULKARIM S-E	Kano					
ngn@magpi.com	2012-10-09 16:08:26	2012-10-09 16:08:26	2012-10-09 16:08:26	A	Kano					
ngn@magpi.com	2012-03-26 12:13:44	2012-03-26 12:13:44	2012-03-26 12:13:44	Tariy Allah	FCT				Municipal Area Cont.	
ngn@magpi.com	2012-03-26 12:13:44	2012-03-26 12:13:44	2012-03-26 12:13:44	Tariy Allah	FCT				Municipal Area Cont.	
ngn@magpi.com	2012-03-26 11:57:05	2012-03-26 11:57:05	2012-03-26 11:57:05	Siya	FCT				Municipal Area Cont.	
ngn@magpi.com	2012-03-26 11:45:48	2012-03-26 11:45:48	2012-03-26 11:45:48	Patiba	FCT				Municipal Area Cont.	
ngn@magpi.com	2012-03-26 11:43:25	2012-03-26 11:43:25	2012-03-26 11:43:25	George Gerting	FCT				Municipal Area Cont.	
ngn@magpi.com	2012-03-26 11:35:08	2012-03-26 11:35:08	2012-03-26 11:35:08	Mwanda	FCT				Municipal Area Cont.	

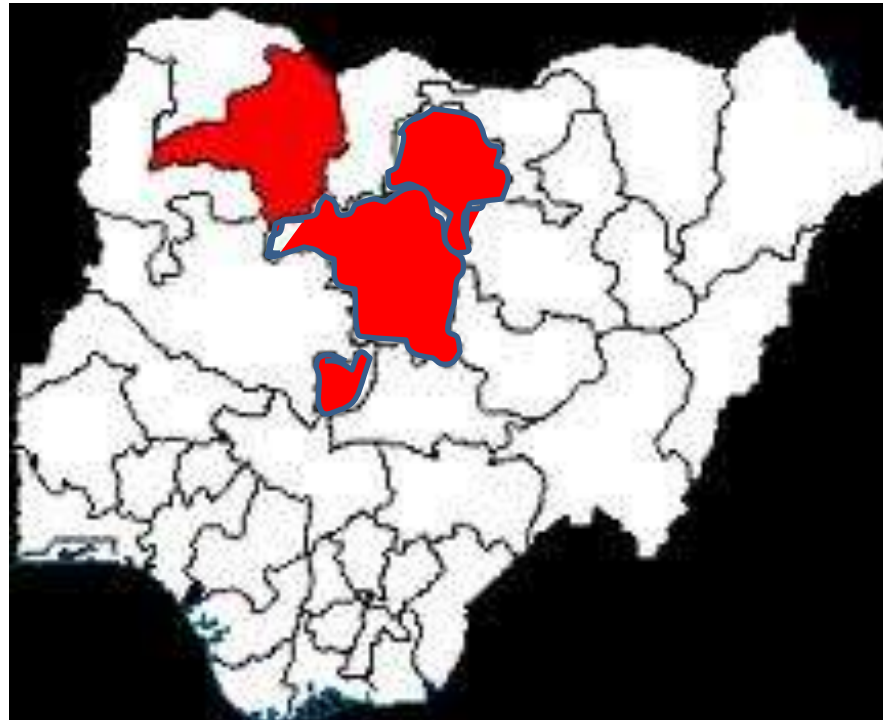
The file should appear on your screen or in your computer downloads file

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

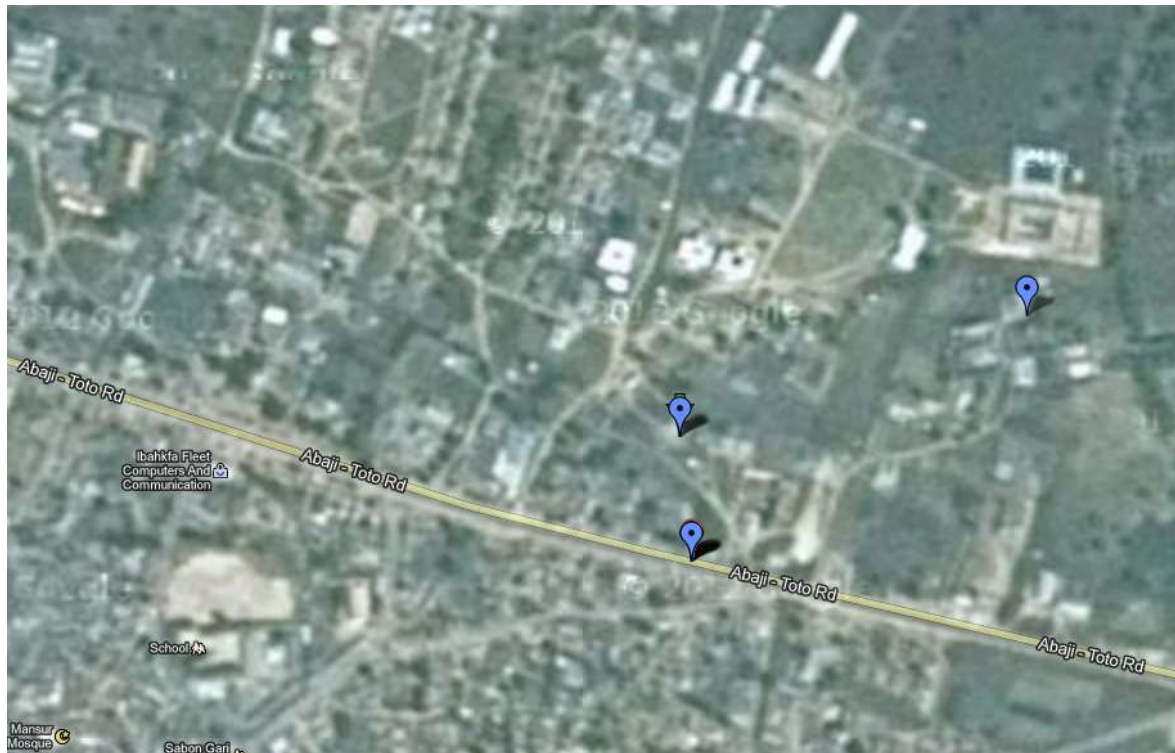
Mapping LQAS Results

- 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

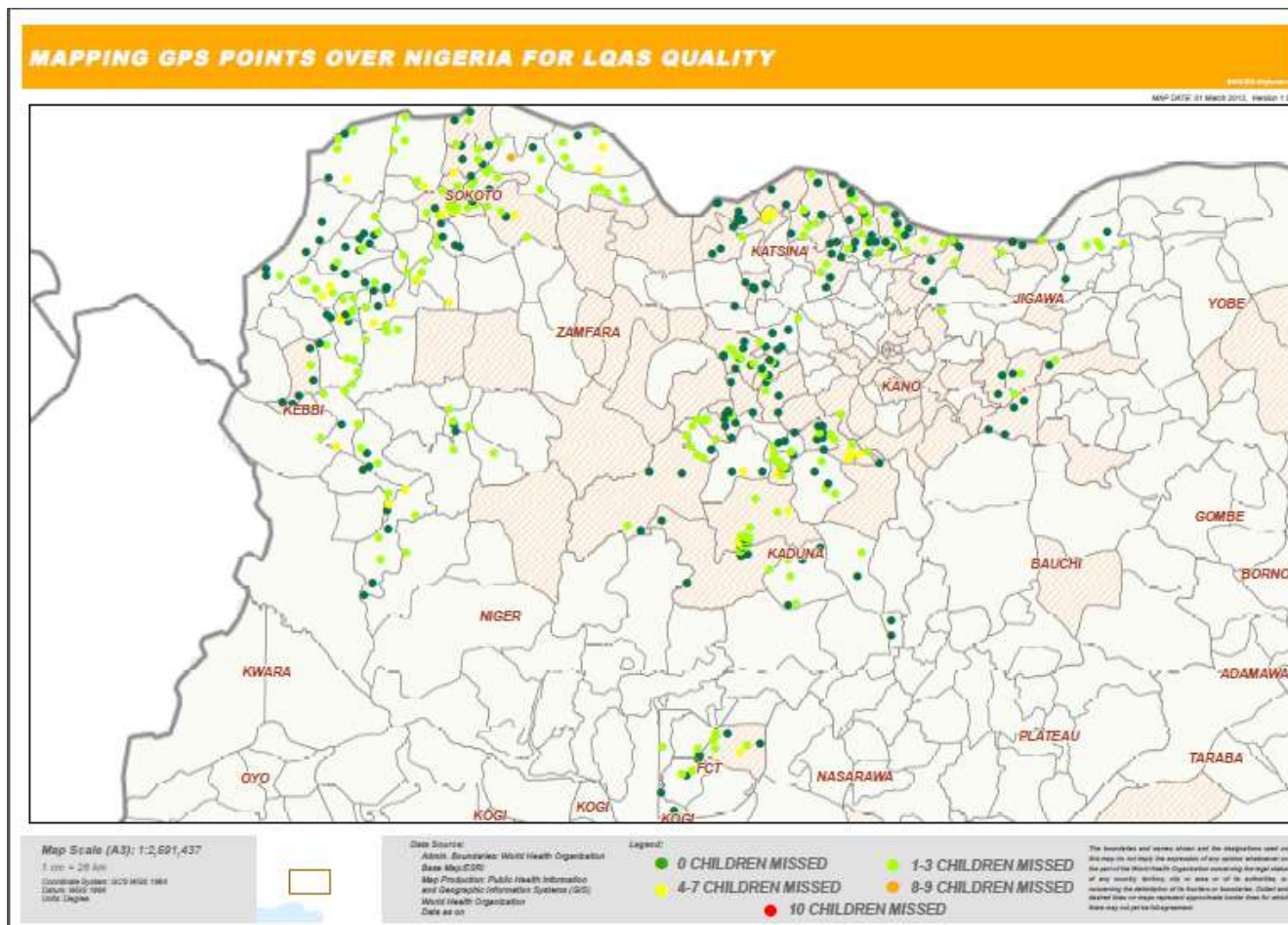
3 GPS points within the cluster (10 children) to measure surveyor movement in the field for accountability

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

MAPPING GPS POINTS OVER NIGERIA FOR LQAS QUALITY



State	LGA	Ward	Starting Settlement	Classification
FCT	Municipal Area Council	Kubwa	Pykasa	2
Kaduna	Igabi	Igabi	Maheri by makaheri	2
Kaduna	Igabi	Hura	Hura	2
Kaduna	Zaria	GYALLESU	LOW-COST A.	2
Kaduna	Gwas	Kidan	Bamao b.	2
Kaduna	Zaria	TUKUR-TUKUR	LAYN MAI NASARA.	3
Kaduna	Kara	Kara	Kandi	2
Kaduna	Kara	Kara	tshin tshin	2
Kaduna	Kara	Jamban	Hoyin mastara	2
Kaduna	Kara	Kara	Ugwan liman	2
Kaduna	Kara	gali	gaurwa	2
Kaduna	Kaduna North	Kaan	Zangon Gaura	2
Katsina	Katsina	Kudu I	Nakke	2
Katsina	Katsina	Yamma II	Masanawa 1	2
Katsina	Katsina	Gatas II	Kofar marusa B	2
Katsina	Katsina	Gatas I	Yar adu 4	2
Katsina	Katsina	Yamma I	Tuban Yankinada C	2
Katsina	Katsina	Anasa II	Tuban Lhinda C2	2
Katsina	Katsina	Shinkafi I	Hancin karef	2
Katsina	Katsina	Gatas II	Yan dadi	2
Kebbi	Yauri	Yauri south	Wali D G Isabale	2
Kebbi	Yauri	Yauri central	Dam side A.	2
Kebbi	Shanga	Sakace	Unhaji	2
Kebbi	Koko/Besse	Dutsin mali	Faru	2
Kebbi	Jega	Magaji A	Takamaawa Yamma	2
Kebbi	Jega	Magaji B	Shiya Ah Gatsa FII	2
Kebbi	Birin Kebbi	Kari	Rungun daji nugar kumari	2
Kebbi	Birin Kebbi	Zaku	Yammao kwatagi	2
Sokoto	Kebbe	sargi	sabta	2
Sokoto	Tambuwal	Romo saki	Riya	2
Sokoto	Tambuwal	Bagira	Maradu Kanewi	2
Sokoto	Shagan	Lambara	Gidan burga	2
Sokoto	Tambuwal	Jabo kagara	Barkin	2
Sokoto	Rabah	Kurya	Shiyar saiyaddawa	2
Sokoto	Wamako	Gumfi	Gumbi shiyar samra.	2
Sokoto	Sokoto South	Goyi C	Shiyar karef	2
Sokoto	Wamako	Gidan kumari	Gidan kumari	2
Sokoto	Sokoto South	Rijya A	Mama Isamiya	2
Sokoto	Sokoto North	Magaji Raf A	Sarki Tudu Si Danko	2
Sokoto	Kwara	Hama al	Gidan gabas	2
Sokoto	Tangaza	Kifuru	Kifuru	2
Sokoto	Oudu	Kaffen saki	Gamin malam	2
Sokoto	Kwara	Suban bira	Tungar madugu	2
Sokoto	Sabon Biri	Kalgo	Tubatawa	2
Sokoto	Goronyo	Goronyo	Akga ana	3
Sokoto	Sabon Biri	Kuzawa	Shiyar Sarkin Raf A	2

MAP DATE: 01 March 2012, Version 1.0

Map Scale (A3): 1:1,253,010

1 cm = 12 km

Copyright © 2010
Map Production: Public Health Information
and Geographic Information Systems (PHGIS)
World Health Organization
Date: 2010

Data Source:

Admin: Geoportal; World Health Organization
Data: PHGIS
Map Production: Public Health Information
and Geographic Information Systems (PHGIS)
World Health Organization
Date: 2010

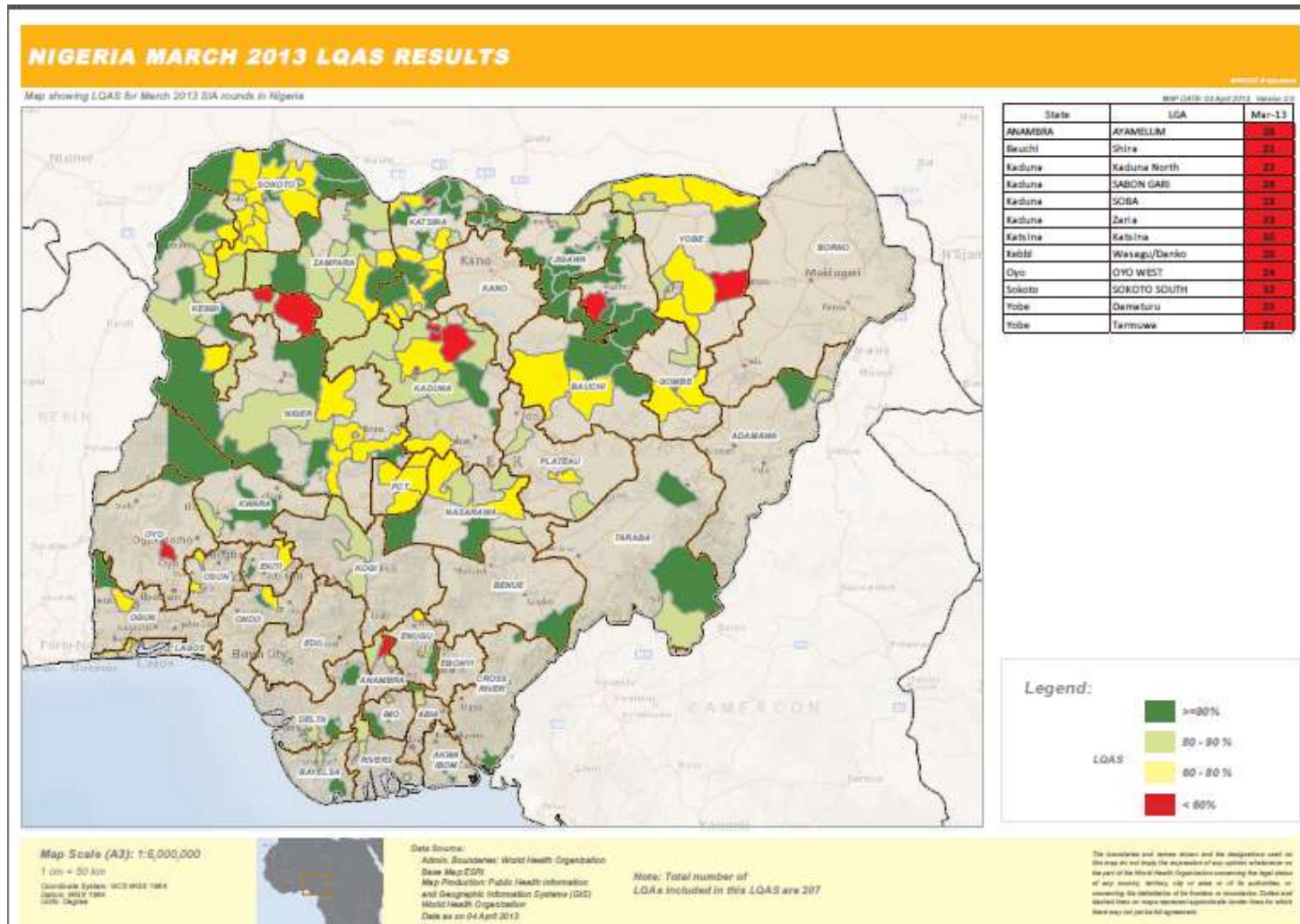
Legend:

- 0 CHILDREN MISSED
- 1-3 CHILDREN MISSED
- 4-7 CHILDREN MISSED
- 8-9 CHILDREN MISSED
- 10 CHILDREN MISSED

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Cities and locations that are not officially recognized have their names shown in small capital letters.

At LGA level

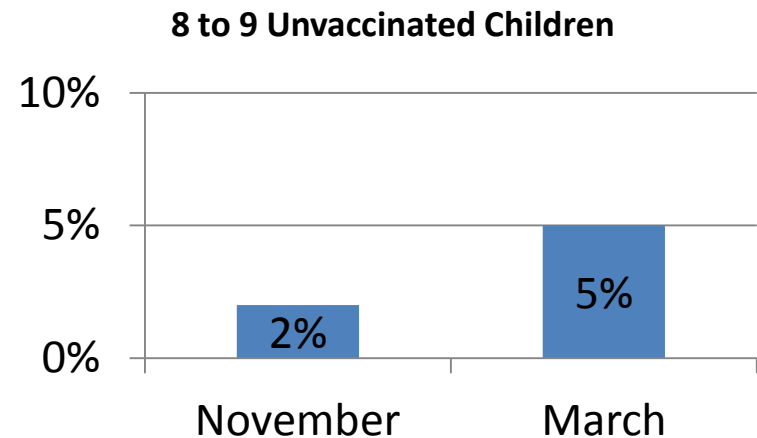
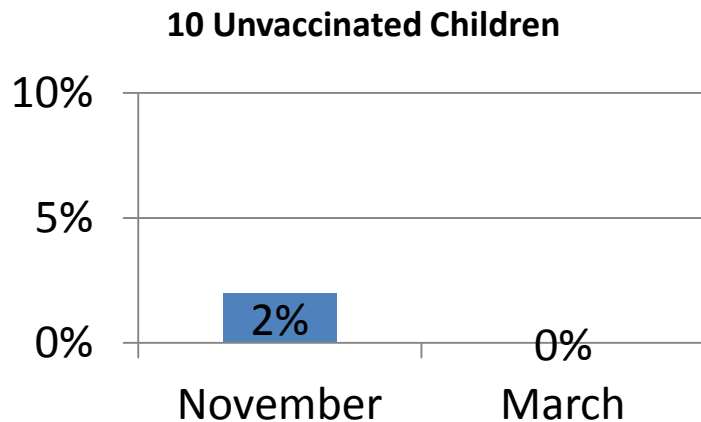
Mapping at the LGA level to see overall coverage quality at the administrative/programmatic action level



Campaign Trends Through Mapping

Need to know:

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



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 unsend 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