

Surveillance Task Team Report to the IMB

Recommendations

INDEPENDENT **MONITORING BOARD**
OF THE GLOBAL POLIO ERADICATION INITIATIVE

EVERY
LAST VIRUS

14

FOURTEEN

Reviews currently being conducted must address:

- **Special case detection** initiatives in all areas of **inaccessibility**
- Clear course of **action** for **identification & resolution** of data manipulation
- Action to identify & close **surveillance gaps** at **national & subnational** levels

Consolidated report reviewing surveillance is a matter of urgency

Executive Summary

- GPEI placing more emphasis on polio surveillance assessment and improvement, particularly in conflict affected, hard-to-reach, and otherwise high-risk populations
 - Supplemental strategies deployed, documented, and evaluated in many areas of concern, but gaps remain. Simple SoPs and indicators for use of such strategies being developed
- Analysis of unusual patterns in AFP surveillance data has become a routine component of desk reviews, used to flag countries for follow-up of potential issues during field review
 - E.g. In Nigeria, prompted field reviews that found erroneous dates of onset in a number of northern states. Recommendations for action from in-country data quality review.
- Global surveillance assessment conducted by STT to identify national and subnational AFP surveillance gaps. Combined with risk of disease to draft priorities for headquarters and regional support.
- Surveillance action plan being developed to articulate common challenges and appropriate strategies for polio surveillance, and HQ-level engagement to support implementation in priority countries

IMB surveillance

recommendations and response

Recommendation: GPEI surveillance reviews to address **special case detection** initiatives in all areas of **inaccessibility**

Response

Systematic reviews of **surveillance** in areas of **insecurity**
Recommendations and **Standard Operating Procedures (SoPs) on** implementing surveillance in **insecure** and **hard-to-reach** areas and populations

Surveillance Performance and Best-Practices in Conflict Affected Areas

Assessments of surveillance in **conflict-affected areas** conducted in Q4 2016 by AFRO, EMRO, and WHO-HQ

Consultation Meeting in Nairobi, Kenya, July 2017. Participating countries included: Nigeria and countries in the Lake Chad Basin, the DRC, Somalia, South Sudan, Yemen, Afghanistan, Pakistan, Iraq, and Syria

Reviewed strategies and shared best practices

Products that are under development as a result of the meeting

1. Documentation of surveillance and strategies currently being used in inaccessible and hard-to-reach areas
2. Recommendations for supplemental surveillance strategies
3. Simple SoPs documenting process of implementation of different strategies

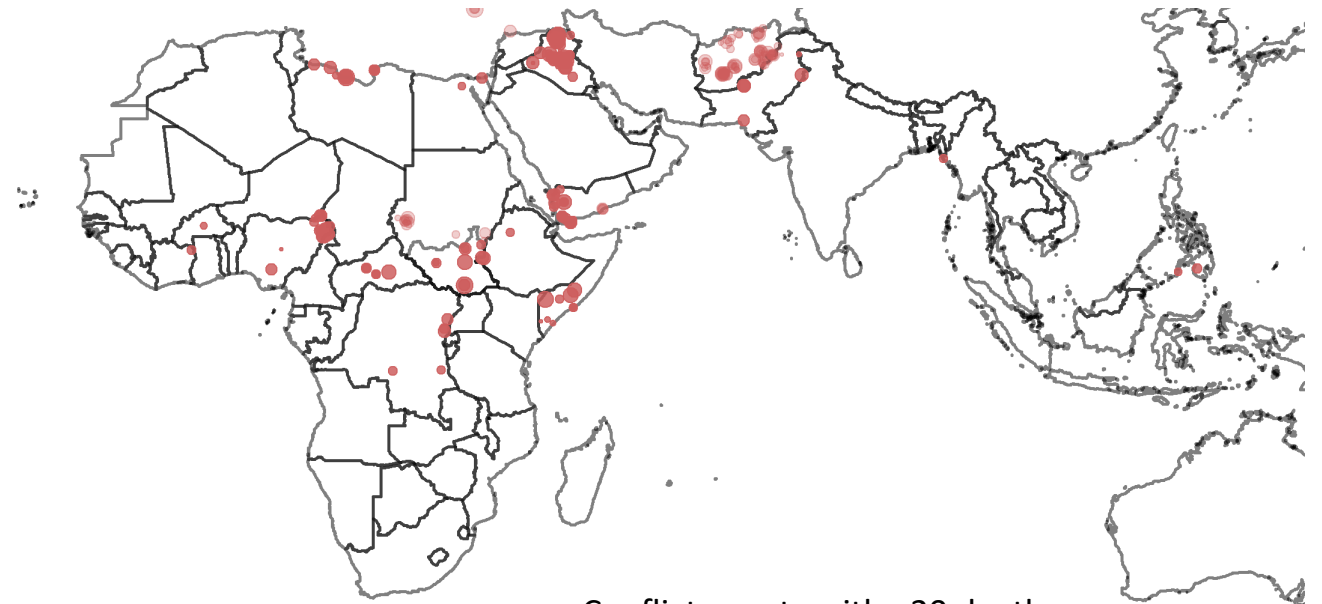
Review of surveillance performance and strategies currently used in inaccessible areas

Approach

1. Background: Summarize conflict and impact on program accessibility
2. Strategy: supplemental strategies planned or in-place
3. Performance: Review of indicators in accessible and inaccessible areas

Somalia, Nigeria, and South Sudan reviewed here

Yemen, Syria, Iraq, Afghanistan, Lake Chad, and DRC in Appendix slides



Conflict events with >20 deaths
Uppsala Conflict Database 2016 (excludes Syria)

Somalia

Conclusion: Despite security challenges, supplemental surveillance strategies are in-place, and appear to cover the whole country. The system seems sensitive enough to detect poliovirus circulation

Background

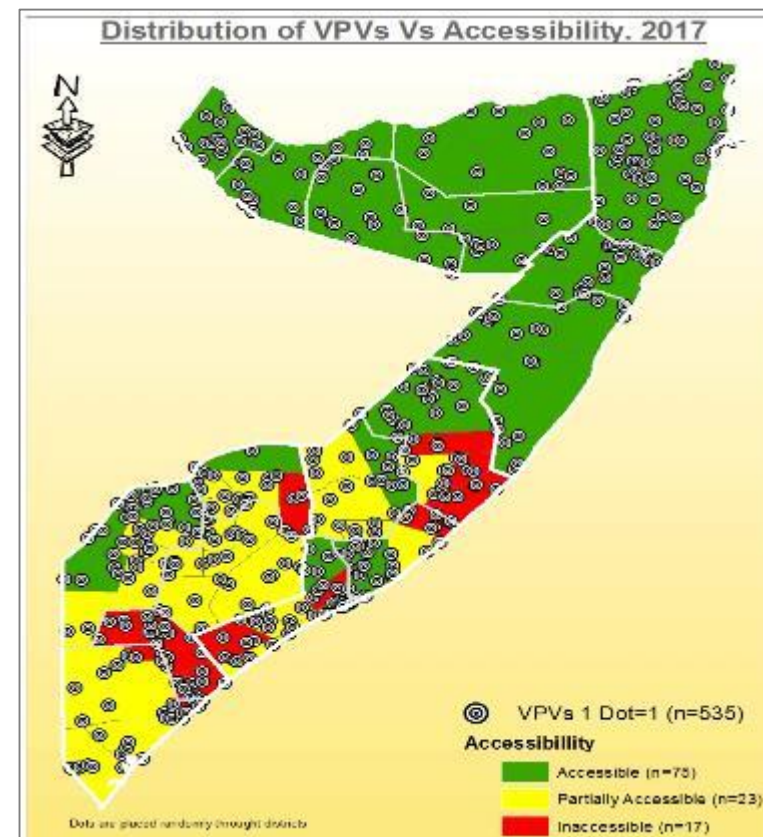
- WPV1 outbreak in 2013, largely in inaccessible areas. Last case in August 2014
- **446k <5s (15%)** are in vaccination-inaccessible areas, of whom **237k** may have not been reached by house-to-house vaccination since **2013** (<10s are vaccinated at transit points)
- **Vaccination access ≠ surveillance access**
- Insecurity limits movement of samples
- Monitoring surveillance activities is difficult

Strategies

- **Community-based surveillance** (Village Polio Volunteers) reports **80% of cases** in inaccessible areas. Others reported through medical providers
- Systematic **contact sampling** to improve sensitivity: avg 3 per AFP case
- **Environmental surveillance** started in Mogadishu in Q3 2017 (3 sites)

Performance

- **NP-AFP rate of 7** as of September 2017, with 99% stool adequacy.
- Inaccessible areas have **higher NP-AFP rate than national average**
- Somalia **'flagged'** for unusually high stool adequacy, and few 5-15 year old AFP cases.
- Cases in inaccessible areas currently validated through phone interviews with caregiver. In-person validation is limited. Ongoing effort with electronic case investigation, including pictures, and geo-coding of AFP cases



Accessibility	# of districts	U-15 Pop	# of AFP Jan-July 2017	# AFP reported by VPVs	Annualized NP AFP rate	% of Stool adequacy
Inaccessible	17	601,282	28	22	8.6	100%
Partially accessible	23	1,670,705	47	23	5.2	94%
Accessible	75	3,907,440	130	66	6.2	99%

Nigeria: Borno

Conclusion: Substantial populations remain unreached by AFP surveillance system, despite extensive special interventions. Cannot rule out transmission in inaccessible areas.

Background

- Ongoing conflict limits access for **both** vaccination and surveillance
- About **235k under 5** children are estimated to remain unreached by vaccination. An estimated **552k under 15s live in these areas**, with limited access to surveillance
- Dynamic population movement: large IDP and refugee flows

Strategies

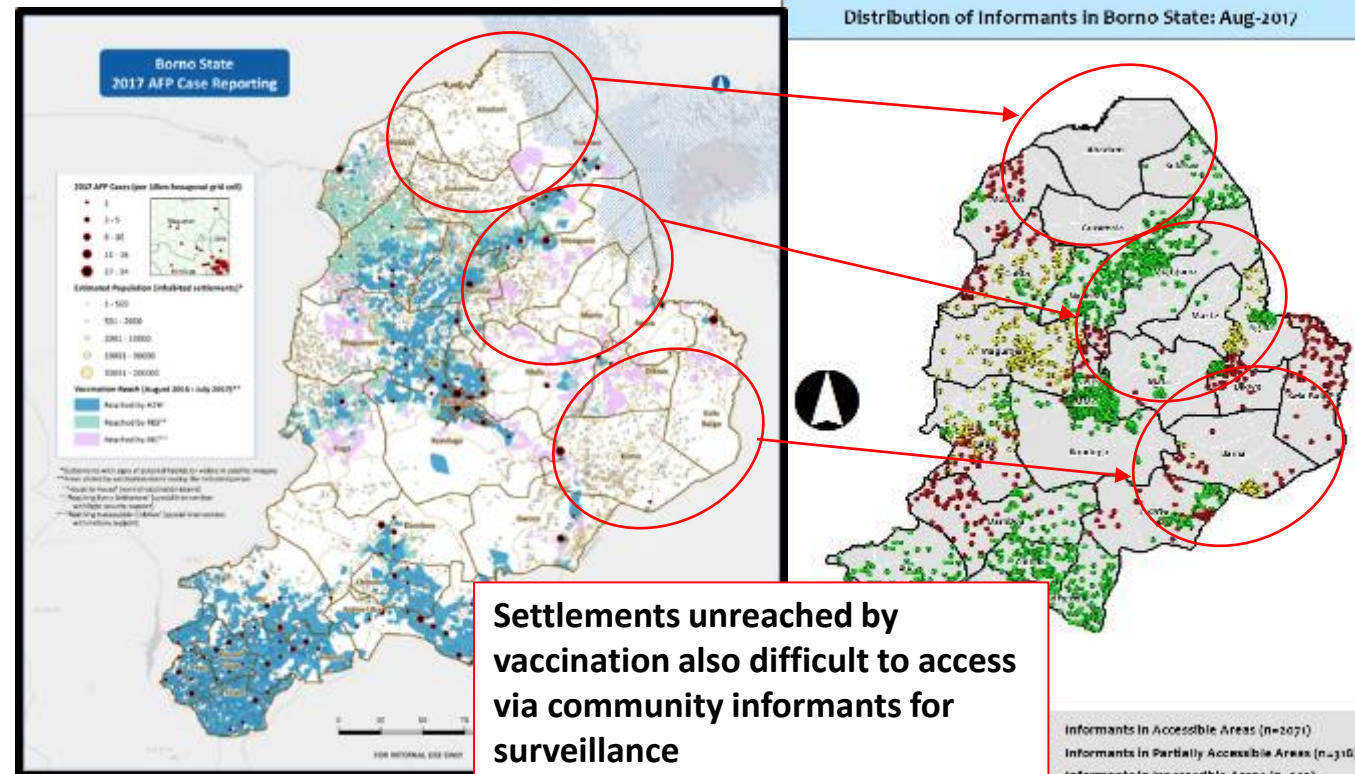
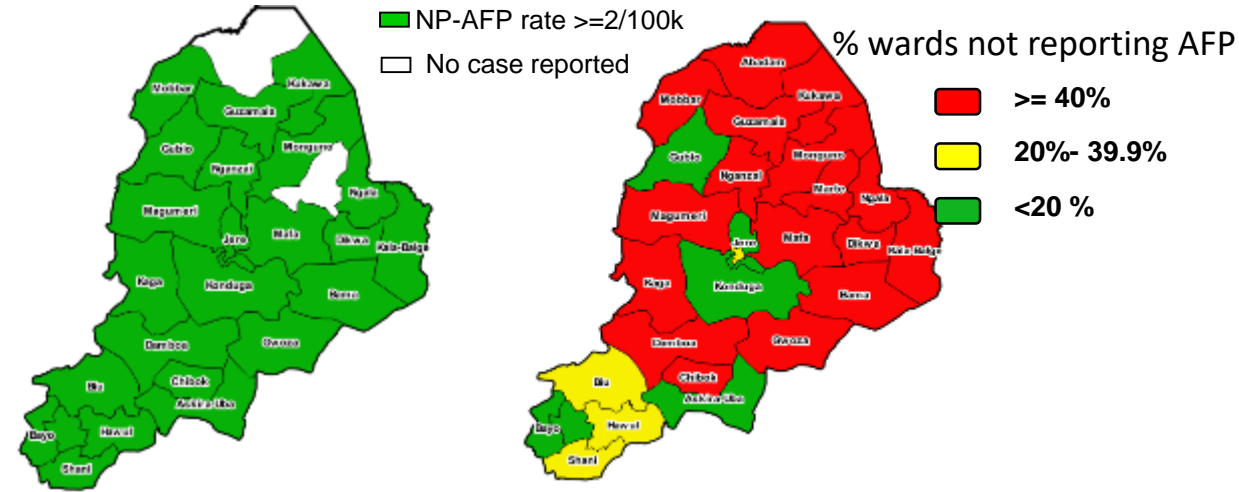
- Surveillance incorporated into vaccination activities by military and paramilitary (**RES & RIC**) but quality is unknown
- Training and **mapping of community informants** for monitoring and supervision
- **Ad-hoc environmental surveillance** sample collection
- Intensification of **surveillance in IDP camps**, including health-child sampling from arrivals from inaccessible areas
- Expansion of environmental sample collection sites in Maiduguri, and frequency of sample collection (7 sites with weekly ES collection)
- **Systematic contact sampling** of all AFP cases

Performance

- There is a functional system in **accessible areas**, but major gaps remain in inaccessible areas
- **RES and RIC** have reported 5 NP-AFP cases from areas inaccessible to the program
- **392 community informants** have been recruited in inaccessible areas, but many **areas still do not have informants and are unreached for surveillance.**

RES: Reaching Every Settlement; RIC: Reaching Inaccessible Children

High NP-AFP Rates at district level may mask sub-districts that are not accessible to the AFP surveillance system



South Sudan

Conclusion: Overall sensitive system, but gaps likely remain at province and district level. Need more information on process and validation of cases in conflict-affected areas

Background

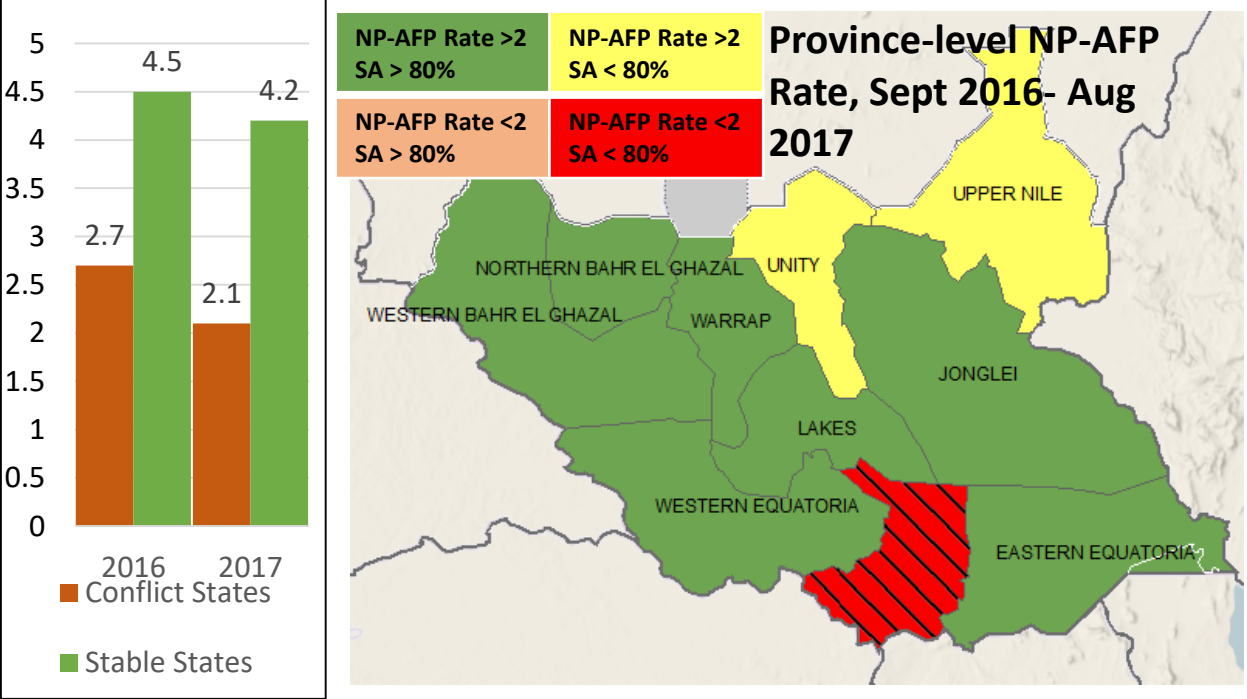
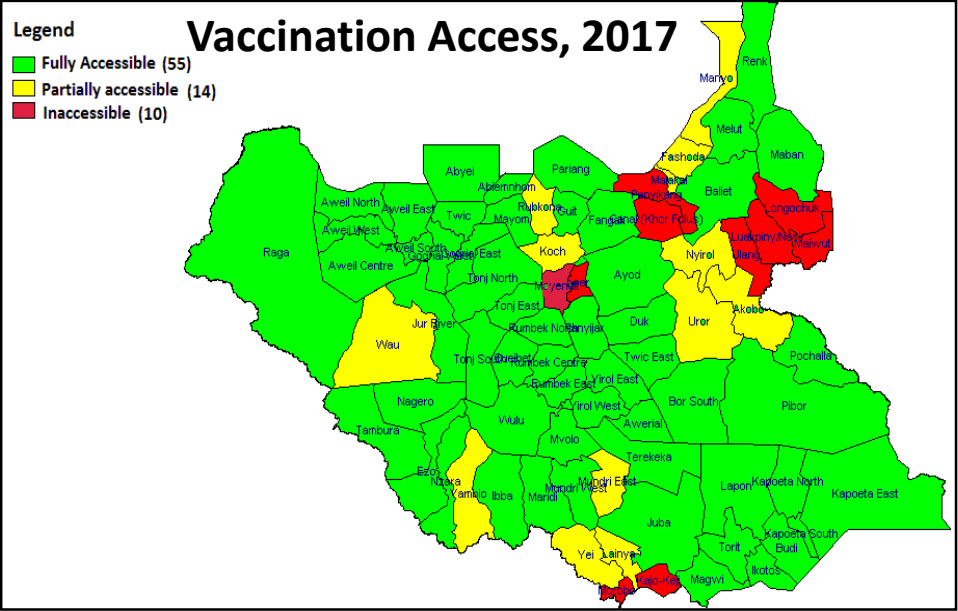
- >250,000 under 5s inaccessible to vaccination. Even relatively 'stable' states are volatile/insecure
- Conflict constrains access of the surveillance system
- High number of IDPs and refugees complicate planning
- Minimal financial support for AFP surveillance by Government

Strategies

- Partnership with NGOs** : 'Core' group supplements community based surveillance with **3,237 community informants**. Collaboration with WFP and others for vaccination and surveillance among IDPs
- Contact sampling** > 3 Contact samples are required for every AFP Case
- Environmental surveillance** 4 sites started in Juba, with plan of expansion
- Healthy children stool sampling** in districts that are silent for > 6 Months
- Unannounced **surveillance visits** by external reviewers in the 3-conflict affected states (Upper Nile, Jonglei, Unity)

Performance

- Lower NP-AFP rates in conflict areas**, though still meeting international standards
- Uncertain denominators** after large population movements
- Need clarity on **process indicators** and **case validation**



Supplemental polio surveillance strategies

There are four key areas in which standardized guidance is under development following Nairobi Consultation and will be included in the Global Polio Surveillance Strategic Plan

- Community-based surveillance
- Contact sampling of AFP cases
- Targeted stool samples in healthy children
- Ad-hoc environmental surveillance

Inter-agency SME to vet guidance and determine when, where, and how strategies should be conducted

Monitoring surveillance performance in areas of insecurity

STT is developing a standardized tool for surveillance assessment in conflict affected areas

Current challenges in surveillance data from conflict affected areas

- Relevant **measurement of accessibility status** often not available (conflict, access to vaccination, access to 'routine' surveillance system)
- Lack of **granularity** of global-level data
- **Inaccurate denominators** in conflict areas
- **Fluidity** in conflict areas over time and space
- Likely **poor supervision and validation** in access-compromised areas may impair **data quality and confidence in the indicators**
- **Process** of AFP surveillance especially important in access-compromised areas, but not measured or reported in standard way

IMB surveillance recommendations and response

Recommendation: GPEI surveillance reviews to address clear course of **action** for **identification** and **resolution** of data manipulation

Response:

Surveillance flags – highlight **unexpected patterns** in surveillance data coupled with **in-country reviews**

Identifying **unexpected patterns** in surveillance data: Rationale for development of Surveillance Flags

Even with high quality AFP surveillance system, **some cases** are likely to be **reported late** and **some stool collections** are likely to be **missed**.

Evidence from surveillance analyses and field reviews conducted in Nigeria suggest **unexpected** or **extreme values** (e.g. very low number of AFP cases with collection of stool > 14 days after onset of paralysis, very low percentage of missing stools) may indicate **underlying issues with data quality**. Surveillance flags were established after looking at **distributions** across 53 countries included in the analysis, and **selecting thresholds** based on **similarities** to **unexpected values** seen in Nigeria.

Surveillance flags point to areas for further investigation; **field reviews** are essential to understand **surveillance processes** that lead to **unexpected outcomes**.

Three Current Surveillance Flags

Timeliness flag

≤ 3% of cases with onset to stool2 >14 days
and/or

proportion ≥ 30.0 (cases with onset to notification > 14 days / cases with onset to notification > 60 days)

Missing stool flag

≤ 0.3% of cases missing any stool

Age flag

ratio ≥ 4.0 (age in years at onset of paralysis < 5 years : 5 – 14 years)

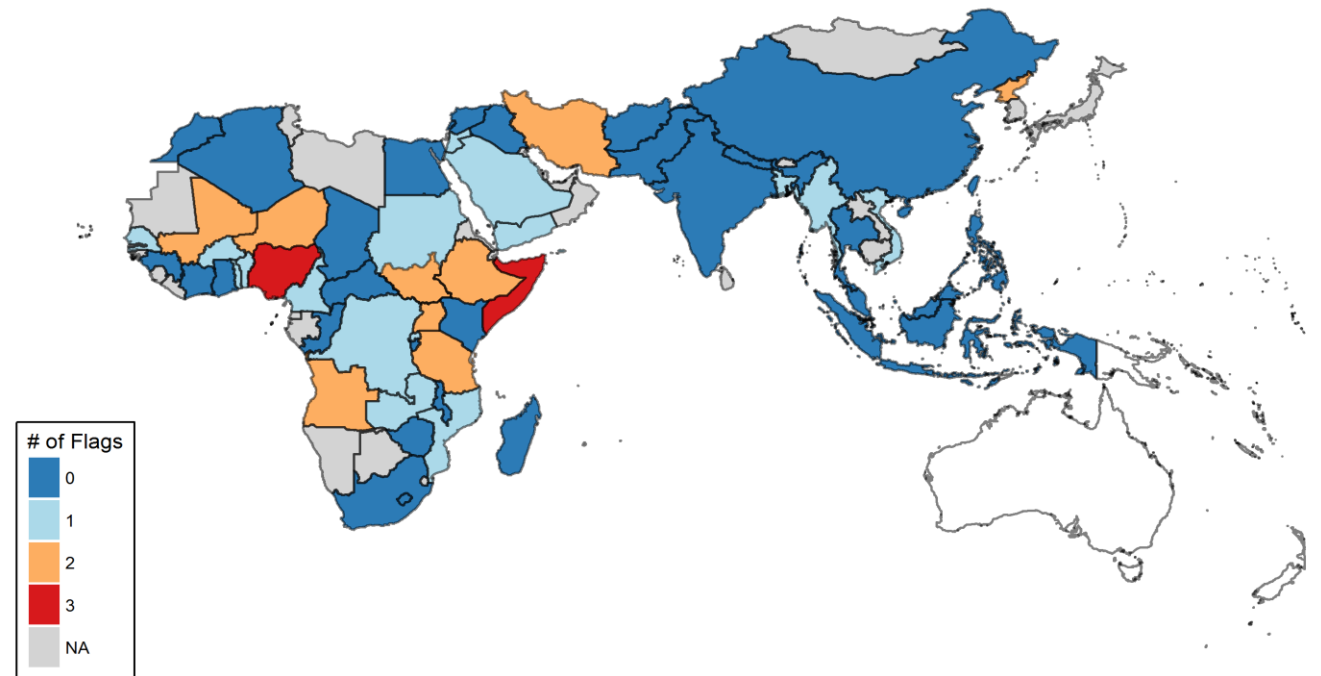
Surveillance flag methods described in appendix. All flags capture unexpected patterns. Some, however, focus on **data quality** (timeliness, missing stool) while others function as **auxiliary performance indicators** (age flag). Additional surveillance flags are under development.

Surveillance Flags

Most countries are not flagged, but number of countries with apparently high-performing surveillance systems are flagged for one or more issues

Nigeria, Somalia have all 3 flags

Surveillance Flags

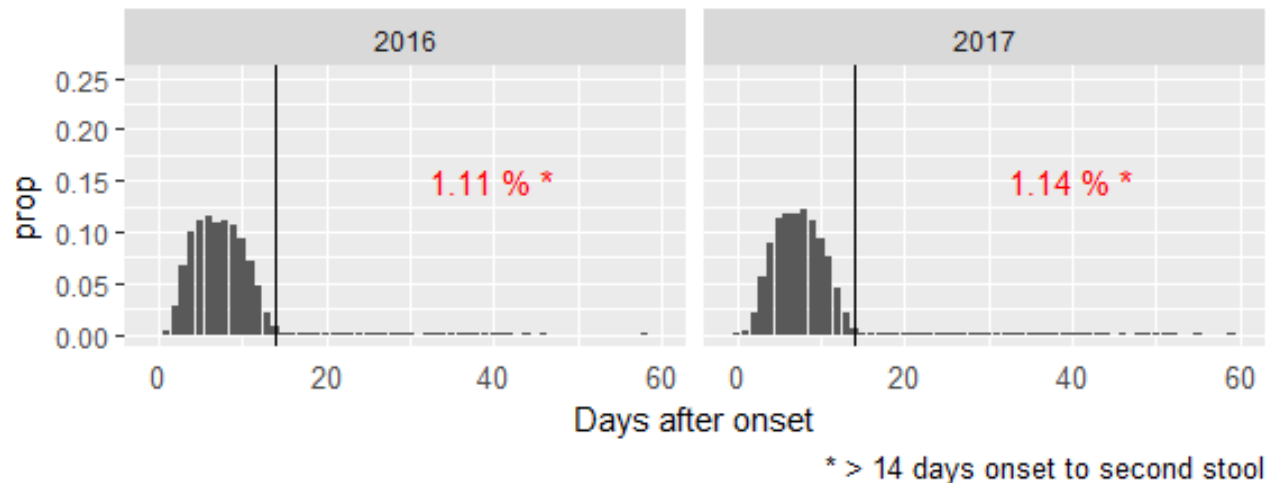


Beyond the Indicators

Field reviews essential to understand if data patterns originate from underlying surveillance **system processes**

Surveillance Flag

Onset to collection of second stool, Nigeria



Field Review findings, Nigeria August 2017

State	Reported stool timeliness	Stool timelines in field review of 100 cases
Kebbi	99%	74%
Jigawa	99%	79%
Sokoto	99%	81%
Nasarawa	99%	89%

Findings from field review found that **not all stools** reported as adequate were collected in a **timely manner** (stool timeliness concordance of 74% - 89%)

Actions to address unexpected patterns in surveillance data

The STT is incorporating surveillance flags into routine surveillance reviews and field investigation

Example: **Nigeria**

- Analysis detected unexpected patterns in surveillance data in February 2017
- Field review conducted by the country team in August corroborated evidence from flags analysis
- Data quality review held in September 2017
- Country program agreement for enhanced review of date of onset using AFP verification and validation data, and expansion of accountability framework to include manipulation of stool adequacy. Country team to incorporate unexpected pattern analyses into routine monitoring

IMB surveillance recommendations and response

Recommendation:

Revisit **reviews** of surveillance; action to **identify** and **close** surveillance **gaps** at the national and subnational levels.

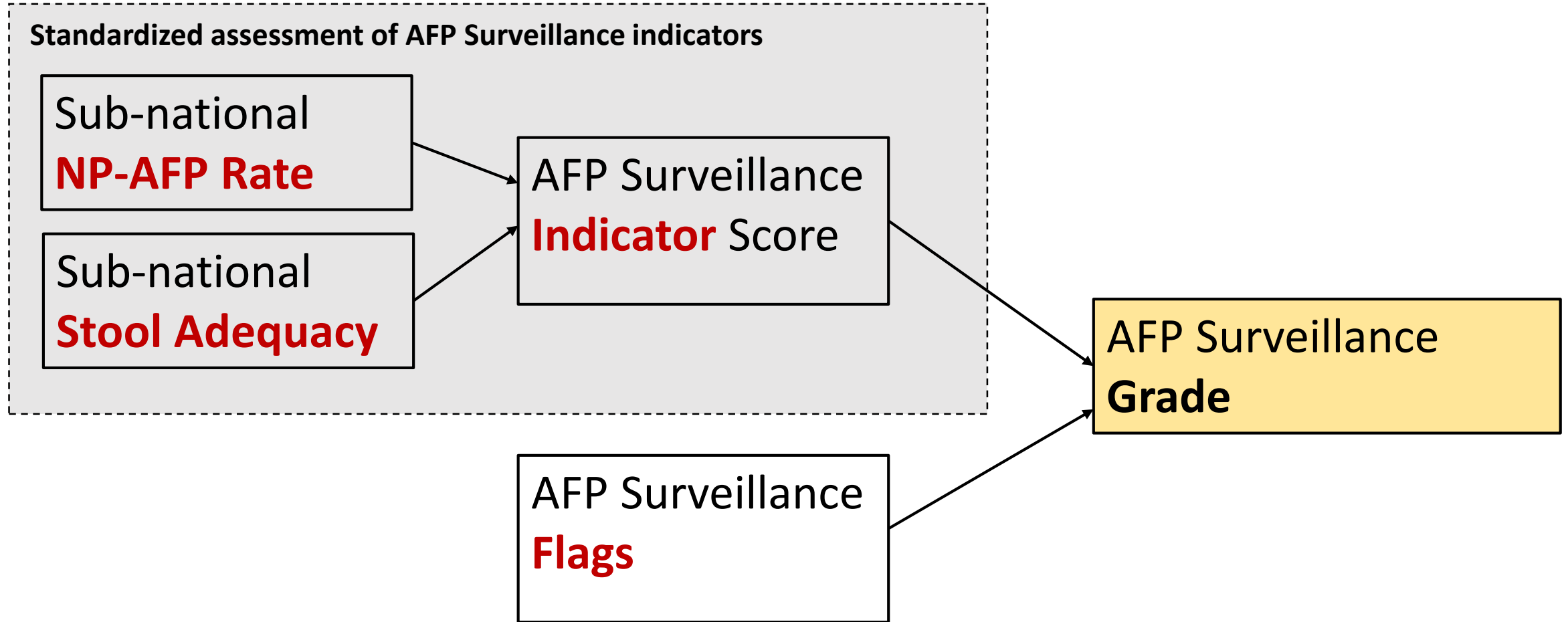
Response:

Global Surveillance Assessment

Improve **assessment** of surveillance data & revise methods of country desk reviews

Focus on **strengthening surveillance** activities (field component)

Global Surveillance Assessment



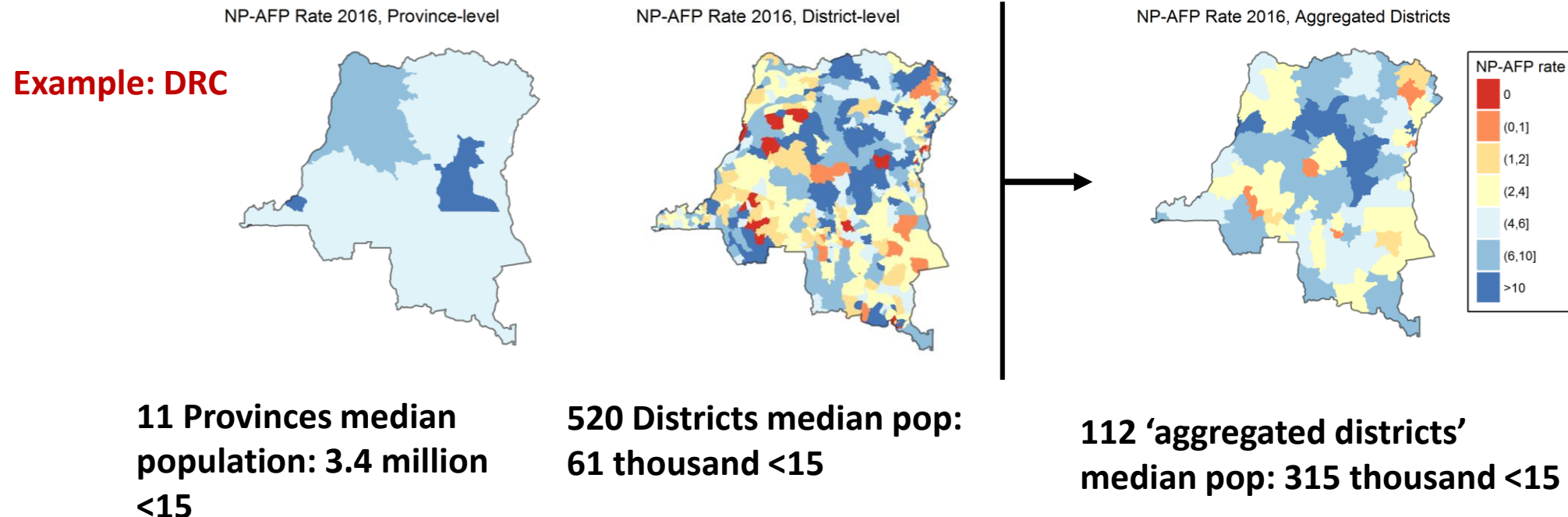
Surveillance indicators must be based on high quality data in order to reach valid conclusions

AFP Surveillance Indicator Score Incorporates Subnational Analysis

High-level analysis of indicators **may mask gaps** in smaller areas.

District-level analyses may be misleading when **populations** are too **small**

Solution: group small districts to make **uniform, epidemiologically relevant blocks**



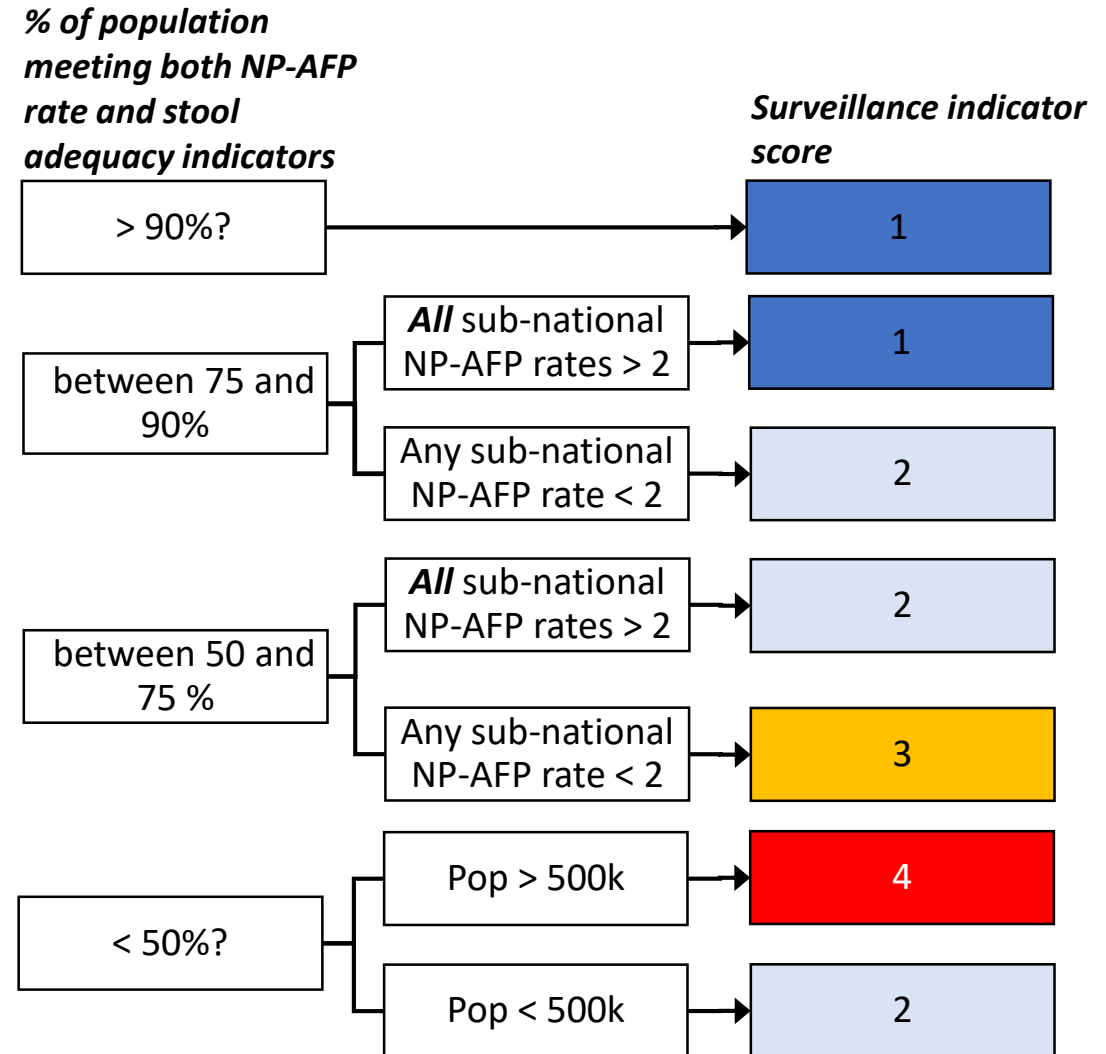
This analysis applied to **all countries** in the assessment. The appendix shows a map of the resulting NP-AFP rates for 2016 and 2017

AFP Surveillance Indicator Score

Key indicator: Percentage of population (based on sub-national areas) where surveillance indicators are met

Score adjusted up if all sub-national NP-AFP rates > 2

This places **more weight** on **NP-AFP rate** than **stool adequacy**



AFP Surveillance Grade

Consolidated from:

AFP Surveillance indicators

Score 1-4, based on NP-AFP rate and stool-adequacy

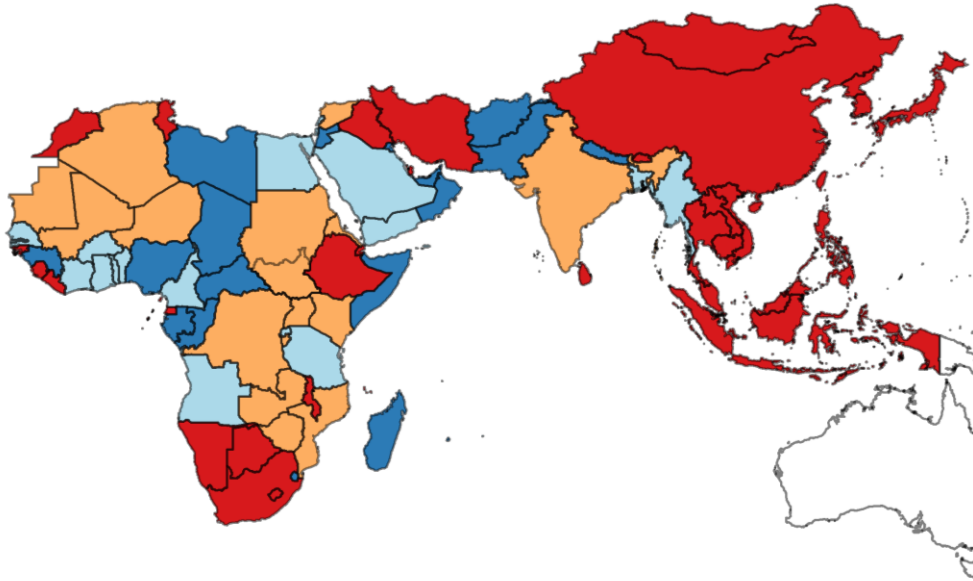
AFP Surveillance Flags

Suggestive of data quality issues or process (**unexpected patterns**)

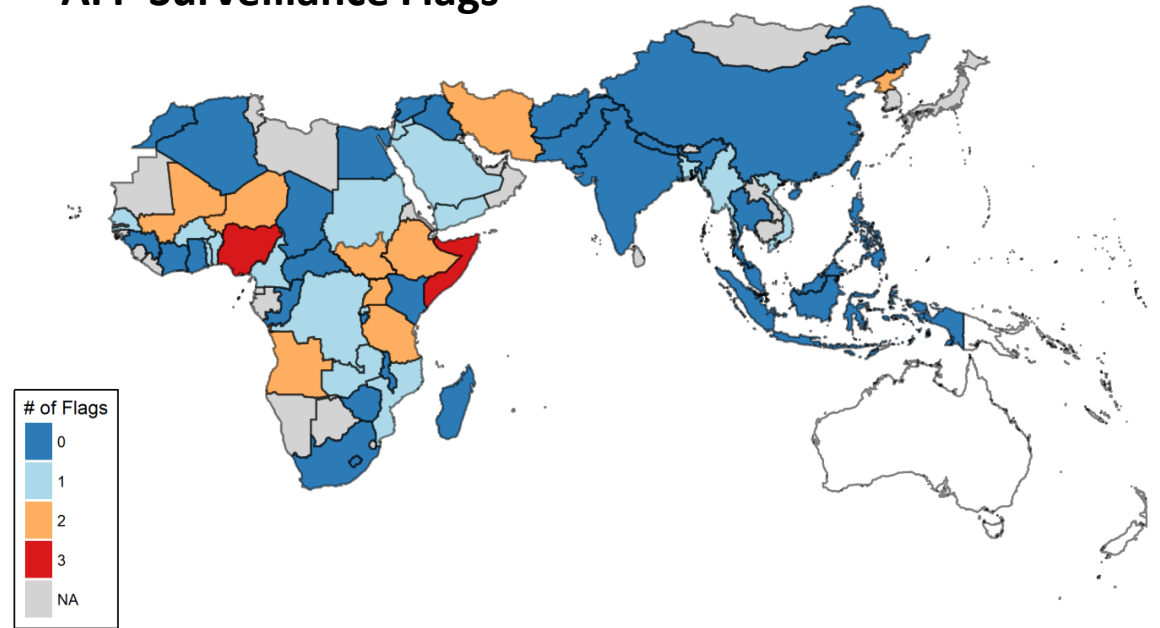
		AFP Surveillance Flags			
		3	2	1	0
AFP Surveillance Indicator Score	3-4	Gaps			
	1-2	Possible Gaps		No evidence of Gaps	

AFP Surveillance Grade

AFP Surveillance Indicator Score



AFP Surveillance Flags



- AFP Surveillance indicators suggest **high-performance** in most GPEI **priority countries**
Low scores in high-risk areas often due to **subnational gaps in stool-adequacy** (e.g. DRC)
- Apparently high-performance is often **qualified** by surveillance flags (e.g. Nigeria, Somalia)

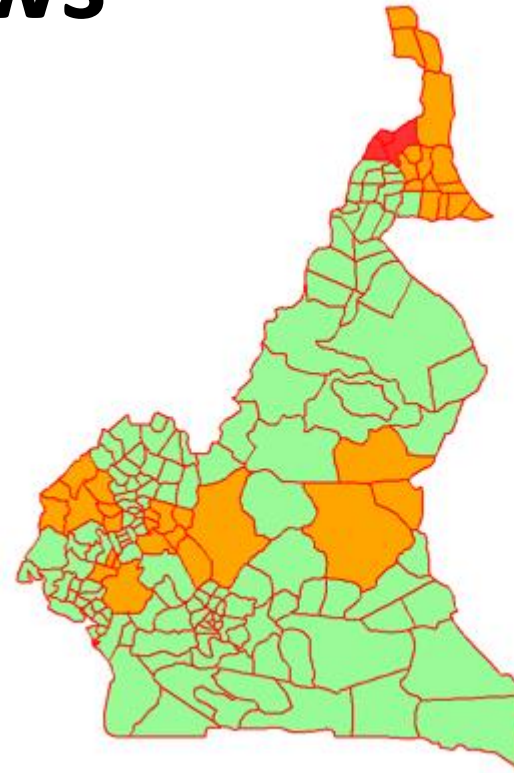
Revision of Desk Reviews

Granular analysis to identify areas of weak performance

Inclusion of surveillance flags to identify areas with **unexpected patterns** in surveillance performance.

Polio Disease Risk with surveillance performance identify **priority subnational areas**

Draft **prioritization matrix:**
Cameroon (July 2015 – July 2017)



		Virus transmission	
		no	yes
Composite index	met	light green	yellow
	not met	orange	red

Composite index – Surveillance indicators met/did not meet for past 24 months

Virus transmission – history of any virus transmission in district¹ or neighboring district², past 24 months

¹ small districts grouped to make uniform, epidemiologically relevant blocks; ² includes districts in neighboring countries.

Focus on strengthening surveillance activities

- Polio Surveillance Strategic Plan to articulate solutions to common surveillance problems challenges (table at right)
- SoPs for supplemental surveillance in areas of insecurity
- Direct HQ engagement through STT through focal person (DRC, Somalia, CAR)
- Regional office and country innovations
 - Audio-Visual AFP Detection and Reporting (**AVADAR**) provides video prompt to focal points. Facilitates focal point measurement and tracking. Deployed in selected districts in Nigeria, Liberia, Sierra Leone, Chad, Cameroon, Niger, and DRC
 - **Geo-coordinates** on AFP case investigation forms in AFRO/EMRO
 - **Text-message AFP reporting** system to engage private health care providers in Sindh, Pakistan
 - **ES expansion**: 67 sites in 18 countries in 2017. 11 more countries expected to start in Q4 2017, use of Bag Mediated Filtration System (BMFS) in Pakistan

Challenge	Recommended strategies to address challenge
Ongoing country and partner engagement	<ul style="list-style-type: none"> • Ensuring government ownership as evidenced through detailed costed national plans for surveillance • Integrating/ cost-sharing with VPDs
Improving surveillance program management and coordination	<ul style="list-style-type: none"> • Supportive supervision • Training and sensitization • Development of work plans and documentation of activities
Capturing AFP cases from all sectors (e.g. private providers, military)	<ul style="list-style-type: none"> • Sensitization and advocacy among relevant providers • Expansion of active surveillance/zero reporting • Monitoring reporting trends
Incomplete detection in security compromised areas	<ul style="list-style-type: none"> • Access mapping and identification of key partners/factions • Access negotiation • Revise surveillance network and identify and train appropriate focal points for case reporting i.e. Community based surveillance as appropriate • Segregated analysis
Incomplete detection in security IDPs/refugees	<ul style="list-style-type: none"> • Identifying focal point for AFP surveillance in camps (IDP or refugee camps) and include in the network of CBS • Profiling new arrivals • Community IDP and refugee tracking
Improving data quality and management	<ul style="list-style-type: none"> • Checking data for completeness and inconsistencies • Reconciliation of databases • Data validation • Desk reviews • Supportive supervision
....

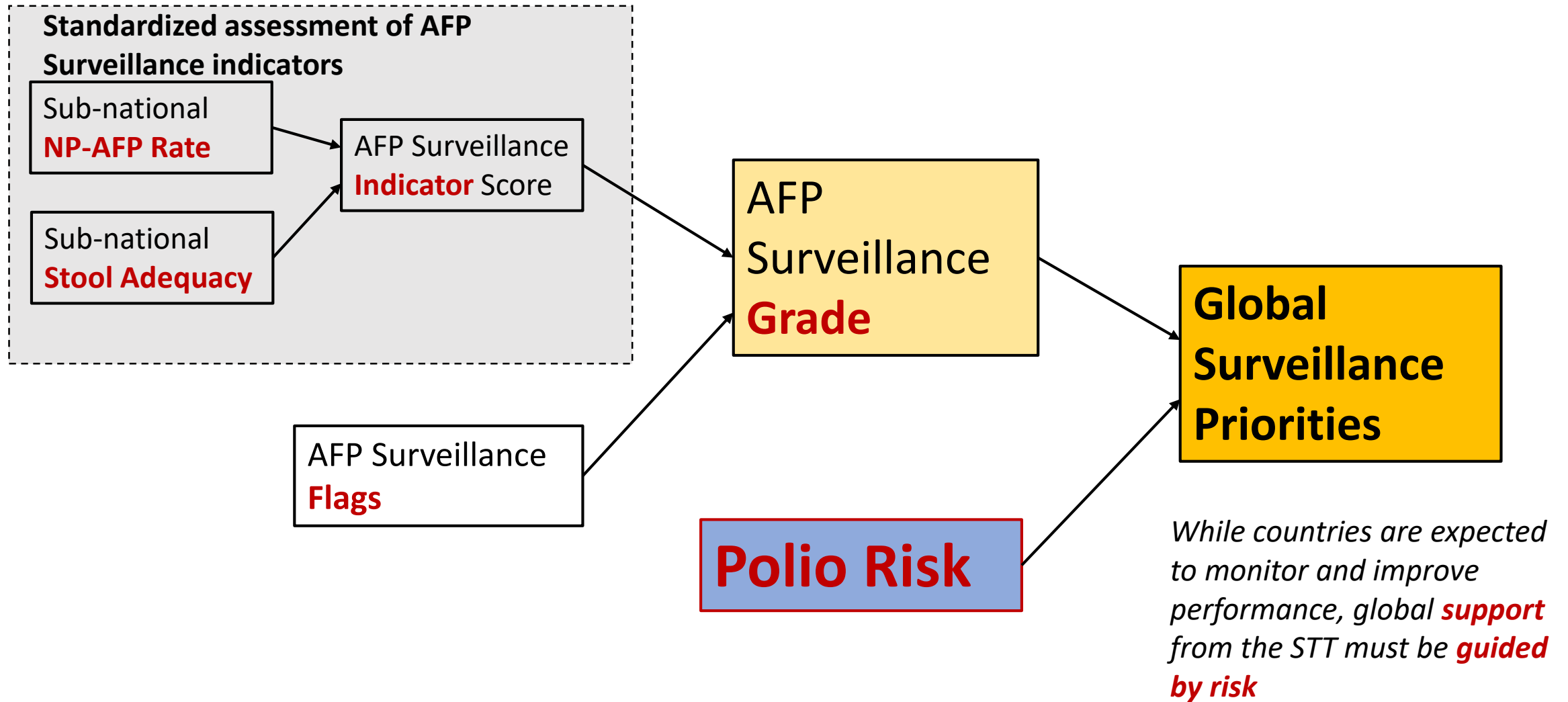
IMB surveillance recommendations and response

Recommendation: A **single** consolidated **report**
reviewing surveillance

Response:

Overall **surveillance assessment** for each country and
prioritization framework for support and follow-up from
the surveillance task team

Global Surveillance Priorities



Global Surveillance Priorities

Combination of:

AFP surveillance grade

Polio disease risk (RATT grade)

Disease risk given **more weight** than **surveillance grade**

***Draft* prioritization framework**

Requires post-hoc adjustment from field assessments

		AFP Surveillance Grade		
		Gaps	Possible gaps	No evidence of gaps
Polio Disease Risk Assessment (RATT)	High	High Priority		
	Medium High		Medium-High Priority	
	Medium			
	Low			Low Priority

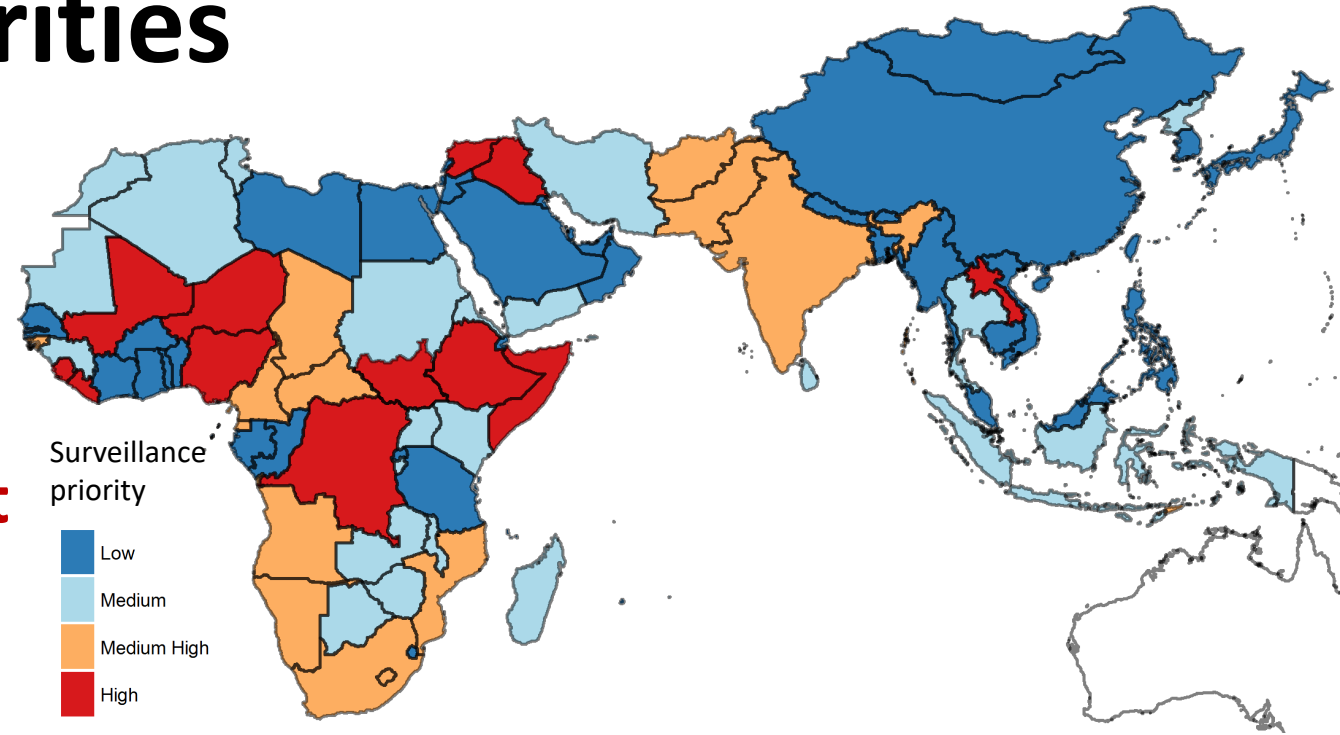
Global Surveillance Priorities

Next Steps:

Draft Surveillance Prioritization

Refine with **regional/country input**

Identify **subnational priority** areas in priority countries



Operationalizing priorities: prompt more in-depth desk- and field- reviews. Used along with regional and country office to draft surveillance improvement plan.

Summary

- Countries are placing more emphasis on surveillance in conflict and hard-to-reach areas. Plans adapt to each unique situation.
 - Regions and Headquarters also recognize surveillance limitations and are providing support where possible (e.g., SOPs, additional analyses, focal points)
- Detailed analysis at regional and HQ level with field evaluation are being used wherever possible
 - The polio program continues to assess issues with unexpected patterns, including surveillance flags
 - The STT is pursuing alternative analyses that inform the ability to detect polio (e.g inaccessible areas)
- We can not rule out gaps in surveillance in some countries but we are less likely to be surprised

Next Steps

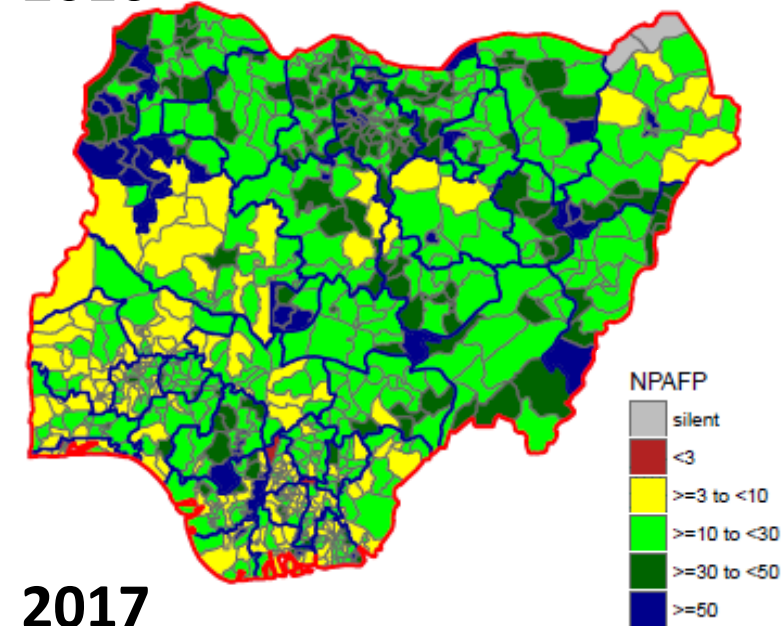
- Develop **surveillance strengthening plan**
 - In collaboration with regional and country offices for priority countries
 - Identify reasons for surveillance gaps using in-depth new and prior field reviews
- Develop **framework** for **tracking** implementation of surveillance strengthening plan
 - **Improve effectiveness** of existing resources
 - Deploy **additional** resources, if needed

Endemics Topline Surveillance Messages

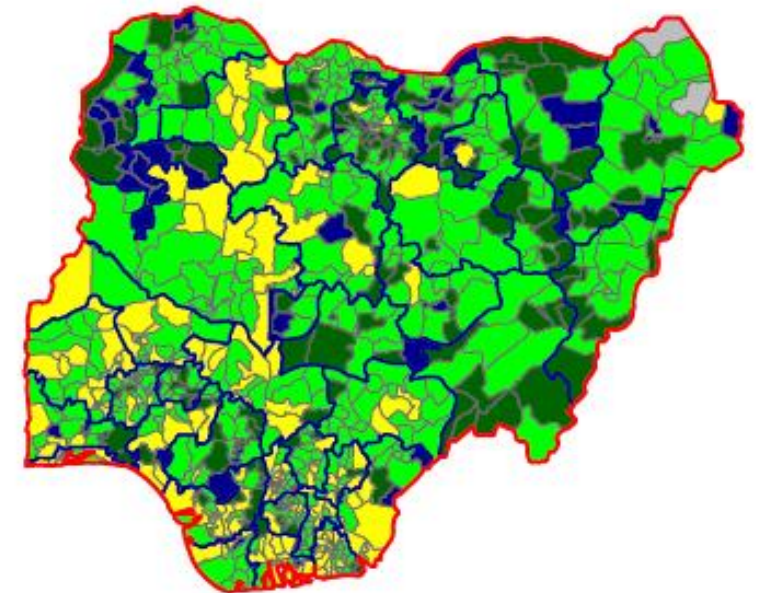
Nigeria

- **Overall** sensitive AFP surveillance system, supported by a large environmental surveillance network, but important surveillance gaps remain in north east
- Strong efforts have been taken to address recommendations from numerous surveillance reviews since August 2016
- However, the quality of the case investigation and verification remain a concern
 - Very high NP-AFP rates, and unrealistically high stool adequacy continue
 - Recent field review in four northern states found low concordance with reported true AFP cases and stool adequacy
 - Cases identified >60 days after onset are not included in the AFP database
 - Stools are rarely collected for cases identified after 14 days of onset

2016



2017



Nigeria: Borno

AFP cases in **some** inaccessible areas are being identified by innovative strategies:

- Reaching Every Settlement (RES) [n=4 in 2017]
- Reaching Inaccessible Children (RIC) [n=1 in 2017]
- Special intervention teams [n=8 in 2017].

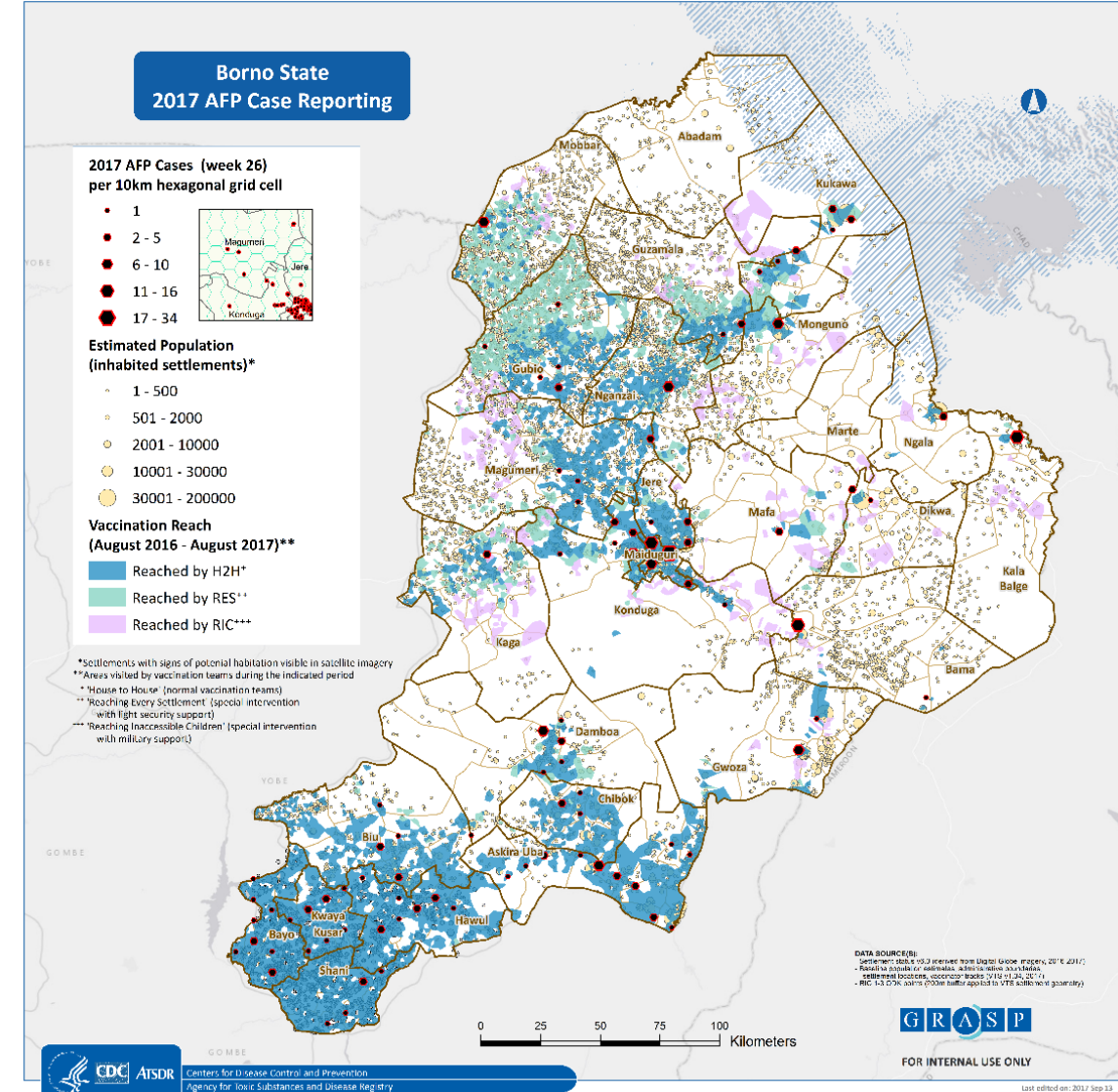
Stool samples from recent arrivals to IDP camps from inaccessible areas

AVADAR implemented in 8 accessible LGAs

Community informants have been trained and are contacted weekly, some of whom live in security-compromised areas.

However, 164 (50%) of wards have not reported a case to date this year (under 15 population ranges from 780-29,588). In addition, mapping of community informants and AFP cases against settlement locations shows that **some areas in Borno do not have high-quality access to the surveillance system.**

The exact extent of the surveillance system is unclear.



Nigeria: Recommendations from September Data quality Review

General Recommendations

- All AFP cases discovered within 6 months of onset should be investigated
- Standardize the case verification process with updated and expanded SOPs
- Develop a specific plan to address the problems in case investigation and case verification identified during the August 2017 peer review including reporting incorrect dates and false AFP cases.
- Revise the accountability framework to put in place specific repercussions for intentional falsification of surveillance data
- Conduct a retraining of all surveillance staff with a new focus on accuracy, quality and accountability.
- Adopt procedures such as surveillance flags for data analysis that appear unreasonably or unbelievably good for further investigation.

Borno Specific:

- Include the collection of ward of onset, ward of notification and ward of investigation during the verification of AFP cases in Borno
- Develop a tracking system for the areas reached for surveillance through innovative strategies and which remain unreached (building on the current system for tracking areas reached for vaccination).

Upcoming activities:

Quarterly 'peer reviews' planned to validate stool adequacy and case criteria

OBRA planned for Q4 2017

Follow-up external data-quality review in March 2018

Afghanistan: Conflict Affected Areas

Conclusion: Despite conflict and disruption of primary health care system, surveillance system appears sensitive. Extensive CBS network in inaccessible areas linked to focal points at tertiary facilities

Background

- Longstanding conflict and intermittent vaccination access
- Difficult transportation of stool specimens to PAK lab
- Large population movement, both internally and exchange with Pakistan
- **Vaccination access \neq surveillance access**

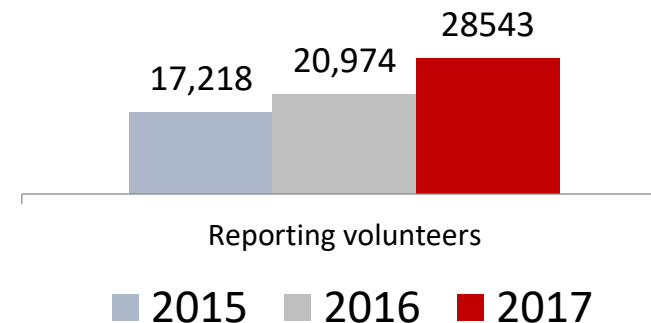
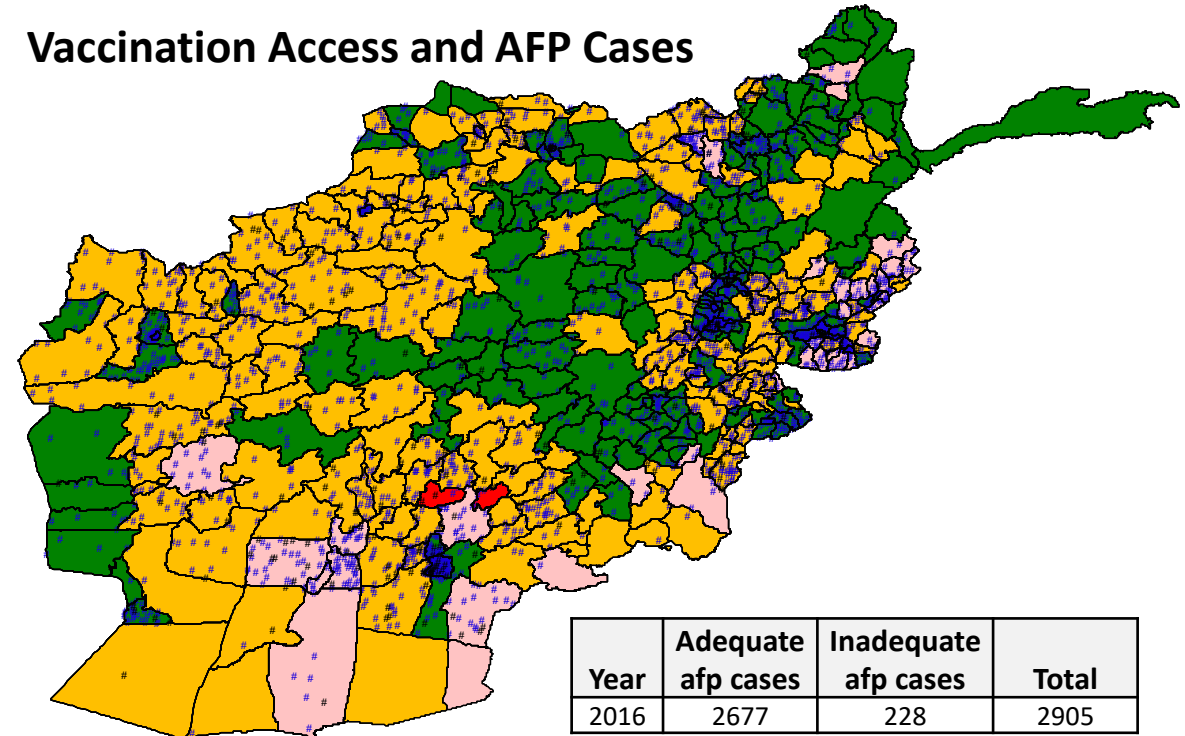
Strategies

- **Community Based Surveillance (CBS)**, with > 20k reporting volunteers
- **Environmental surveillance** expansion
- Regional Rapid Response Teams with defined TORs
- AFP case validation, starting in August 2017
- Large, neutral NGO hospital (Mirawias) supports surveillance in AGE and Gov't populations in the southern region

Performance

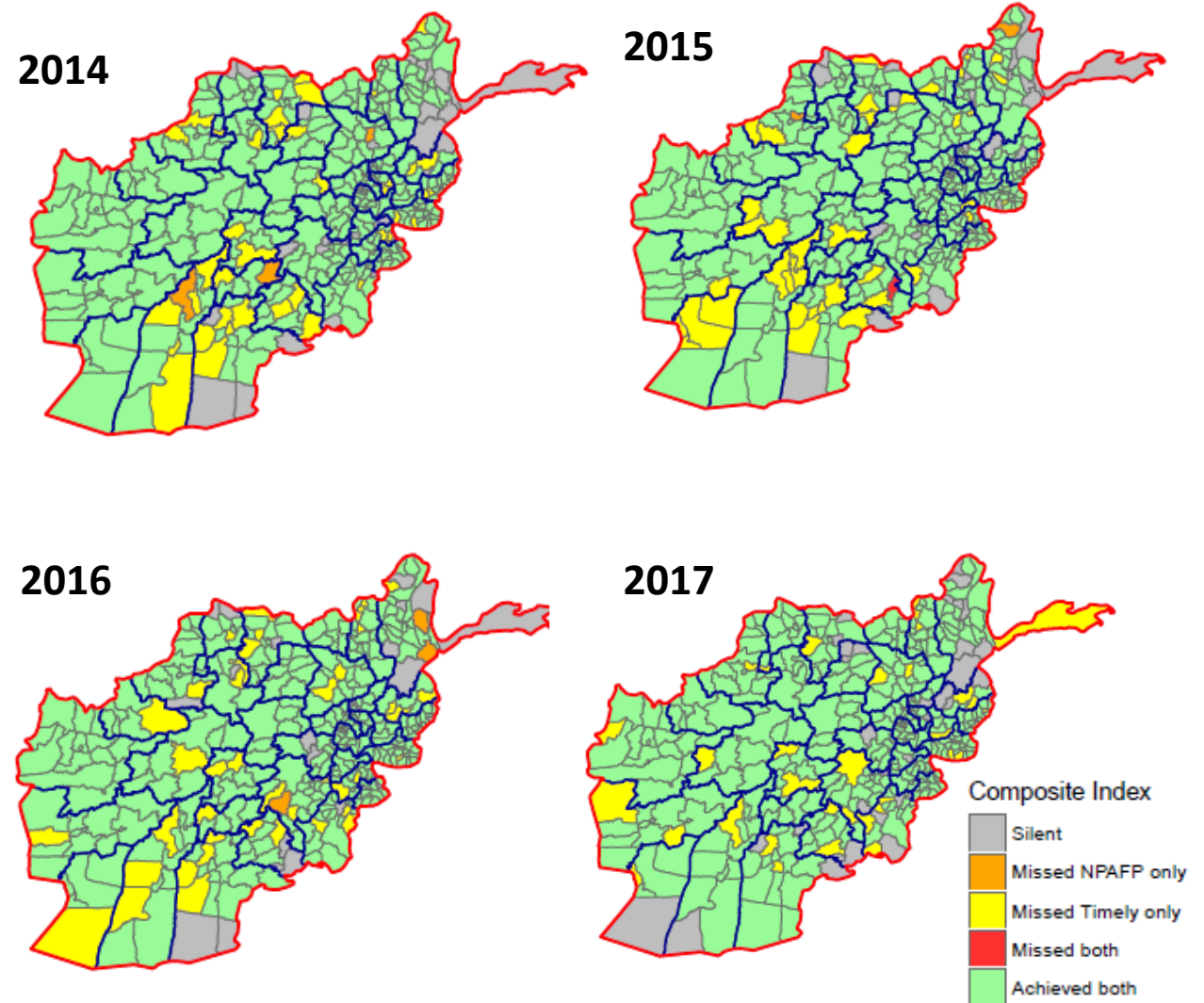
- High NP-AFP rate throughout country, supported by a large network of community volunteers
- Some delays in stool transportation in southern region
- History of orphan viruses, including 3 in Nangarhar and 1 in Hilmand in 2017, suggestive of missed transmission in either Pakistan or Afghanistan

Vaccination Access and AFP Cases



Afghanistan: Surveillance Composite Index, 2014-2017

- Composite surveillance index (NP-AFP rate > 2 and Stool Adequacy $> 80\%$) consistently met at the district level
- Silent districts in 2017 are all very small ($< 50k$)
- Missed **Stool adequacy** is main reason for missed composite index (yellow districts)

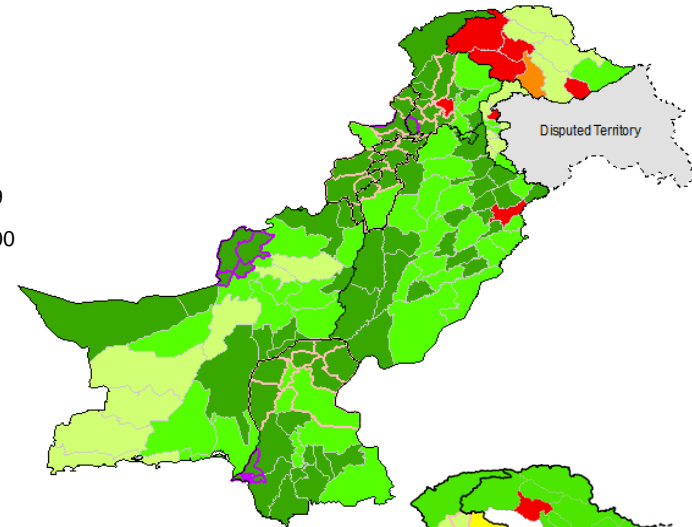
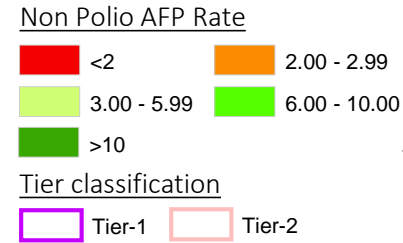
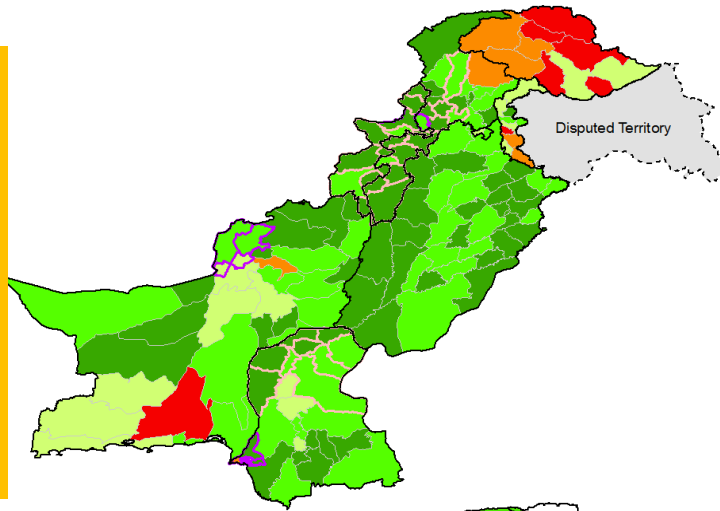


Pakistan: Positive progress on surveillance indicators

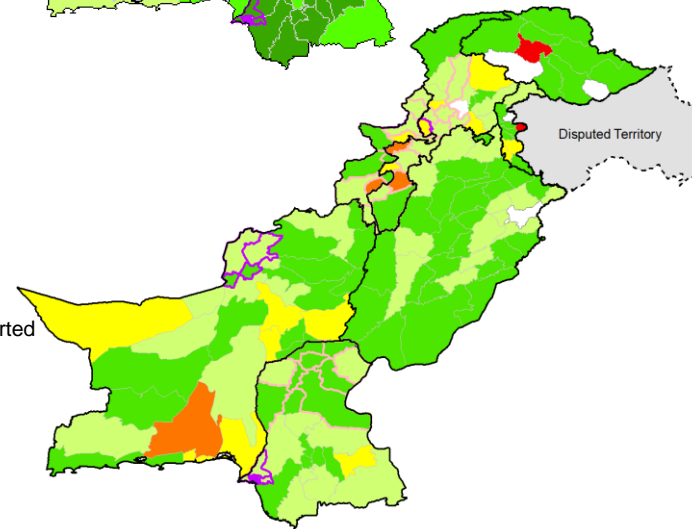
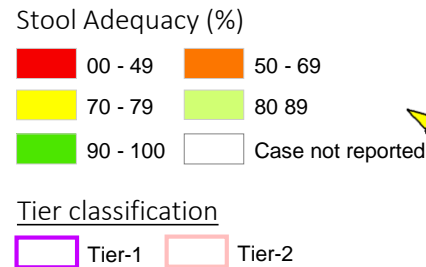
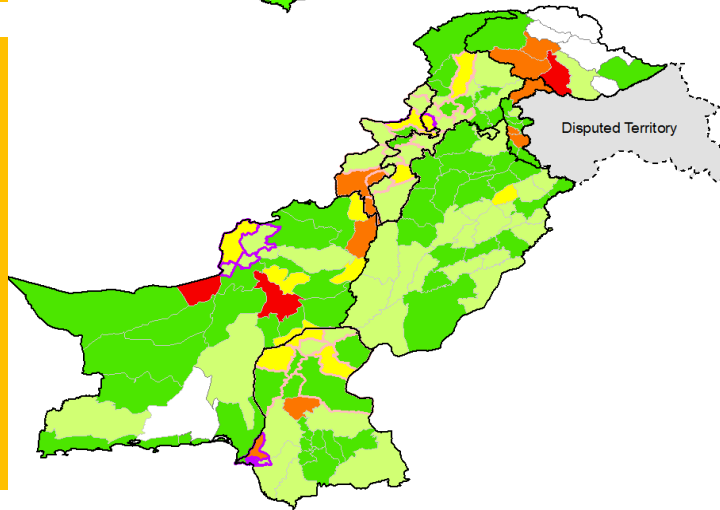
July 2015 – June 2016

July 2016 – June 2017

Non-polio AFP rate



Stool adequacy



- Scale up of surveillance program human resources started in late 2016
- Increased sensitization of healthcare workers
- New AFP database developed by Novel-T
- New mobile phone app for reporting of AFP by private practitioners rolling out in Sindh
- Stool adequacy remains sub-optimal in southern KP/FATA and rural areas of Balochistan

Appendix – Surveillance in Conflict Affected Countries

Yemen

Conclusion: Surveillance system is not sensitive in conflict affected areas. Community-based surveillance and environmental surveillance planned, but not yet implemented

Background

- Civil war with large humanitarian crisis: conflict restricts high-quality access to all communities for immunization and surveillance
- Negative impact on already fragile health system and disruption of delivery of basic health services including immunization across the country
- History of both cVDPV2 and cVDPV3 outbreaks in 2011 and 2012-2013 respectively. Last cVDPV3 case reported on 12 July 2013.
- Transportation of Stool and/or ES samples through Djibouti is logistically challenging

Strategies

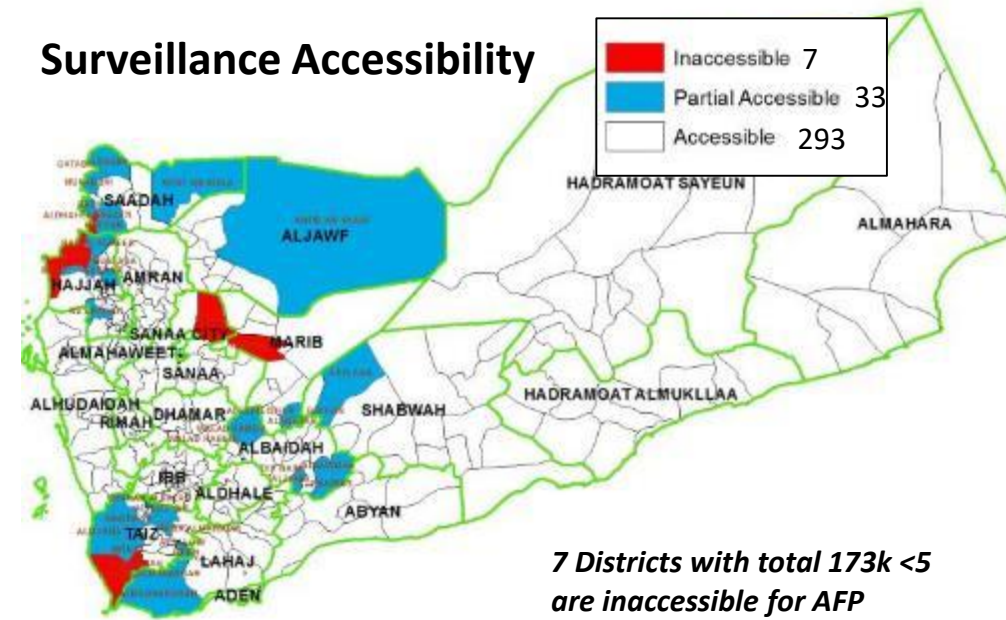
- **Planned but not implemented:** Community Based Surveillance in high risk / inaccessible regions: 350 VPVs in 51 districts
- **Planned but not implemented:** Stool samples collected from healthy children in silent districts
- **Planned but not implemented:** Environmental Surveillance, Q4 2017 with Bag-Mediated Filtration System (BMFS)
- Enhance sensitivity and quality of the standard AFP surveillance system with special focus on districts that have not reported AFP:
 - Tracking Health Facility functioning and Recruiting additional Focal Points
 - Continuing leveraging vaccination teams to ask about AFP
 - Involvement of local authorities and community figures to facilitate case detection and investigation.

Performance

- **Deteriorating surveillance in inaccessible areas**

External surveillance review in November 2017

Surveillance Accessibility



Inaccessible districts	pop15	NPAFP rate		
		2014	2015	2016
HARAD	60914	5.1	1.6	1.6
MEIDI	10891	9.5	0.0	0.0
SARWAH	12536	0.0	0.0	0.0
ALDHAHER	15440	6.7	0.0	0.0
NEHAM	24326	8.4	0.0	12.1
ALMUKHA	38057	8.1	2.6	0.0
THUBAB	11075	9.3	0.0	26.4
	173239			

Syria

Conclusion: Despite conflict, the AFP surveillance system appears sensitive. Reaching notified cases and stool shipment are difficult. Coordination between Damascus and EWARN needs to be improved.

Background

- Major conflict, population movement, larger humanitarian crisis
- Coordination across multiple controlling forces: AFP Surveillance run by ACU in Northern Syria, and by Syrian Government elsewhere

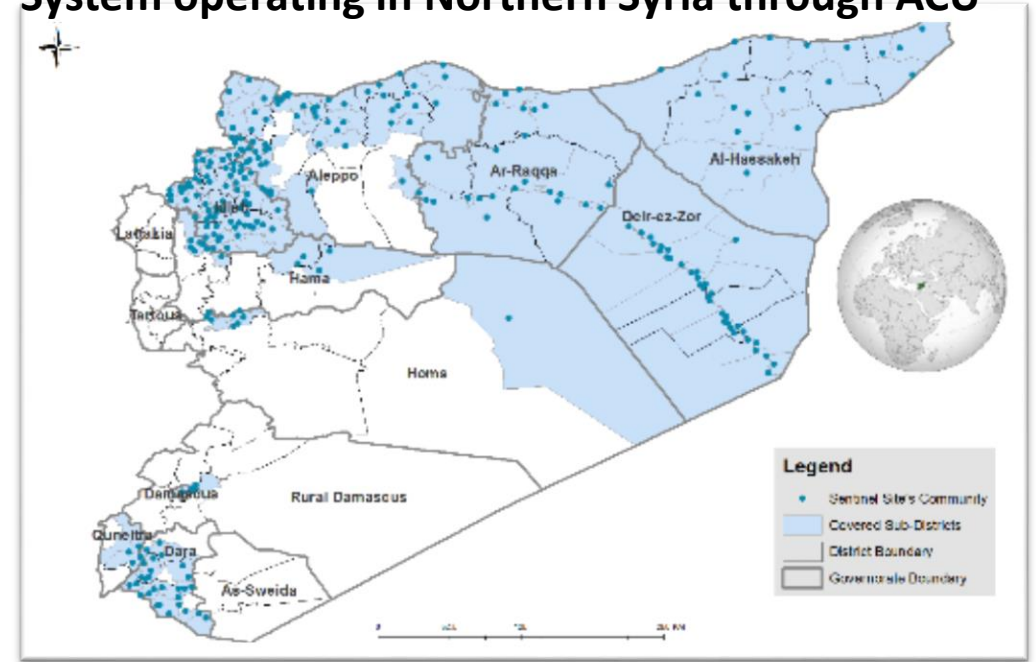
Strategies

- **Corner-stone:** Well-trained surveillance staff inside conflict-affected areas
- Indirect communication with controlling forces
- Assign **focal points inside IDP camps** from operating NGO
- **Community based surveillance** in IDP camps and new population settlements (large number of cases reported from camps)
- New **transportation plans** for stool shipment, including transfer through alternate labs (e.g. Turkey)
- **Environmental surveillance** in both Damascus and N. Syria following cVDPV outbreak (ongoing)
- **Contact samples:** 1-3 contact specimens for every AFP case
- **Electronic case investigation forms.** Using videos for most AFP cases to help final classification of inadequate cases

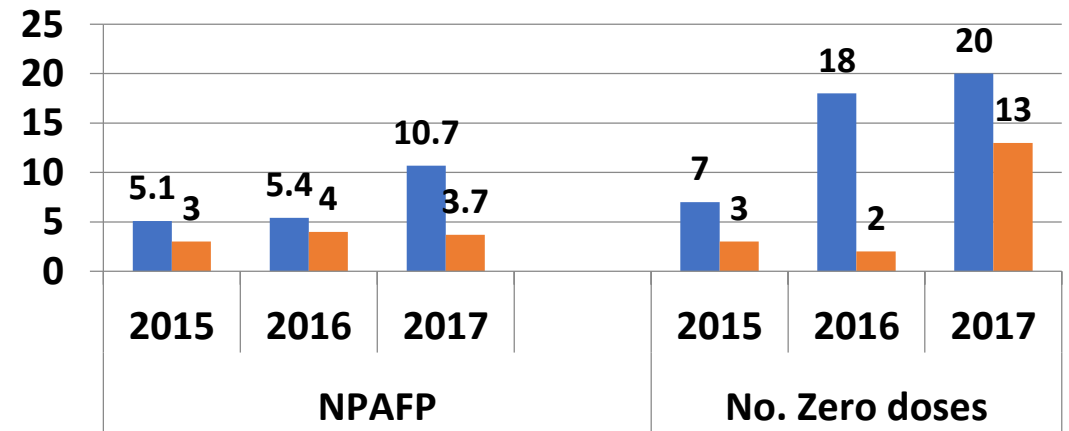
Performance

- cVDPV2 detected amid conflict. However, the genetics (22nt different from Sabin) suggested prolonged low-level transmission was not detected
- Indicators met/surpassed in both ACU and Gov't areas. Effective supplemental strategies in place, but coordination and data sharing could be improved.
- Stool shipment **delays** confirmation of cases
- Dynamic situation requires close monitoring, but made difficult by conflict. Movement of even national staff is limited

Early Warning and Reporting Network (EWARN) System operating in Northern Syria through ACU



■ EWARN ■ DAMASCUS



EWARN system covers ~50% of the country. Reports higher NP-APP rates than 'accessible' areas

Iraq

Conclusion: Robust immunization and surveillance in most of the country, but worse performance noted in inaccessible areas, complicated by difficult sample transportation, may lead to delayed detection of cVDPV2 spread from Syria

Background

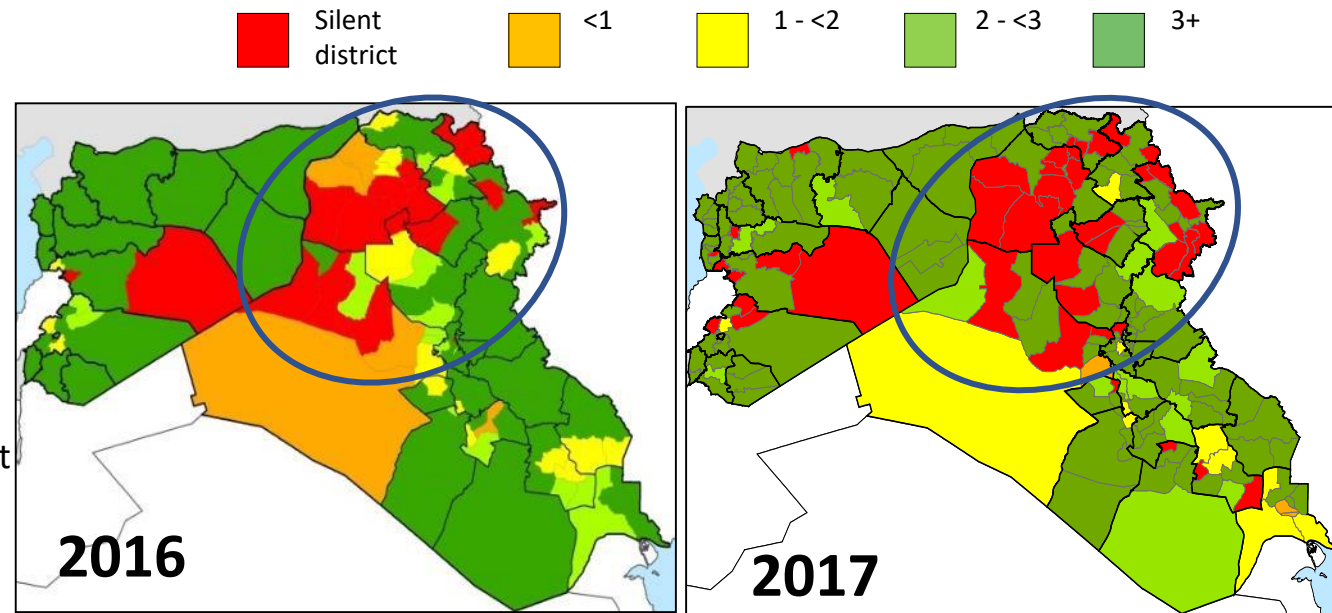
- 2015: >1/4th of population was IDP – 3.7 Million & 1.7 M living in areas out of the Govt.'s full control
- >250,000 Syrian Refugees, largely in two governorates
- Sample transportation from anti-state group-controlled areas was not possible
- Robust primary health care set up with adequate staff for surveillance – maintained by Govt. despite war & economic situation

Strategies

- Intensify surveillance in areas with high population movement
- **Contact sampling** for all AFP cases
- Coordination with EWARN in Northern Syria
- Tracking populations & analysis with adjusted populations (OCHA reports)
- Plans for **ES expansion** in Baghdad and Karbala

Performance

- Weaker performance in Northern Areas, near cVDPV2 outbreak in Syria



Access most difficult in Ninewa and Anbar provinces, which have low NP-AFP rates (1.4 and 2.3 in 2016, respectively)

Lake Chad Basin

Background

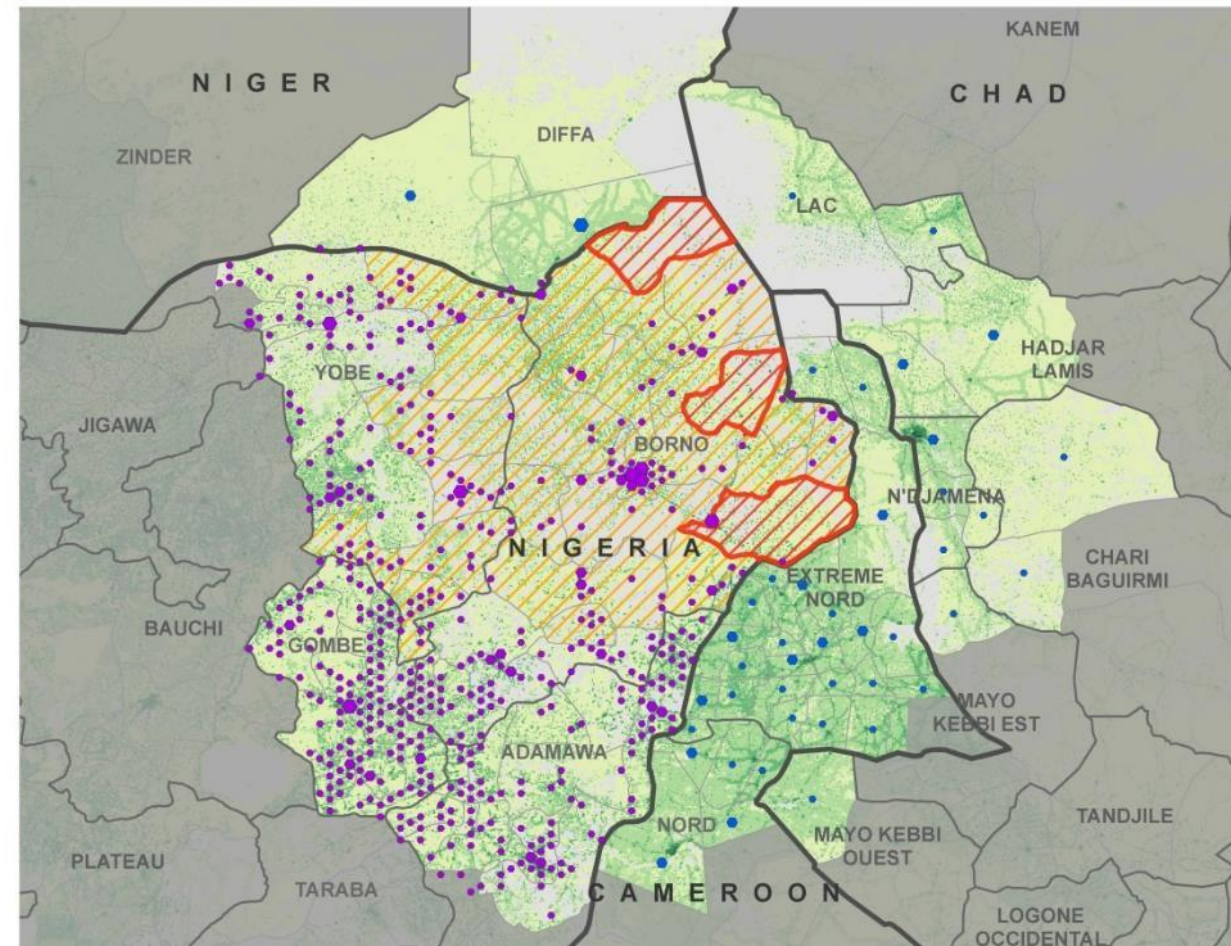
- Common epidemiological block with Borno: inaccessible populations to both vaccination and surveillance contiguous with those in Nigeria
- > 200k refugees from Nigeria residing in Niger, Chad, and Cameroon
- Difficult terrain, and often long-distance transportation to lab

Strategies

- **Validate at least 80%** of AFP cases
- Collect contact samples for **zero dose children** (1 sample from 3 children < 5 years)
- Targeted Health child stool surveys:
 - Districts that have been **silent for at least 3 months** (1 sample from 30 children < 5 years)
 - **Nomad healthy children** when a new group is met (1 sample from up to 10 children < 10 years)
- Other supplemental strategies in individual countries (e.g. electronic case investigation and active case search supervision in Cameroon)
- **Data sharing via Lake Chad Coordination**
- **ES sampling** in Diffa, N'Djamena, Extreme Nord

Performance

- Noted gaps in inaccessible areas of Borno, but apparently good performance elsewhere in the country
- Uncertain ES quality in Chad, Niger and Cameroon (rare isolation of enteroviruses)
- Small populations: Need more consolidated information on process indicators, particularly in Niger, Chad, and Cameroon



Accessibility

- ▨ Inaccessible
- ▨ Partially accessible

Aggregated Cases

- Purple Points** = Actual location of cases aggregated to a 10km hexagonal grid
- 1 - 5
- 6 - 15
- 16 - 43
- Blue Points** = Cases aggregated to district centers because actual locations are unknown

Population Density

- Ppl/Sq Km
- 0
- 1 - 10
- 10.1 - 100
- 100.1 - 1,000
- 1,000.1 - 10,000
- > 10,000

Population estimates are derived from Landsat; a product of Oak Ridge National Lab.

DRC

Conclusion: No evidence of increased surveillance sensitivity following the detection of the outbreak. Gaps remain at province and district levels. Inadequate cases may lead to delayed detection of outbreaks and/or spread of VDPVs.

Background

- Large country, multiple conflicts, difficult terrain, and weak immunization systems
- Two ongoing cVDPV outbreaks – **outbreak and response zones do not coincide with major conflict areas**
- Surveillance Task Team mission in August 2017

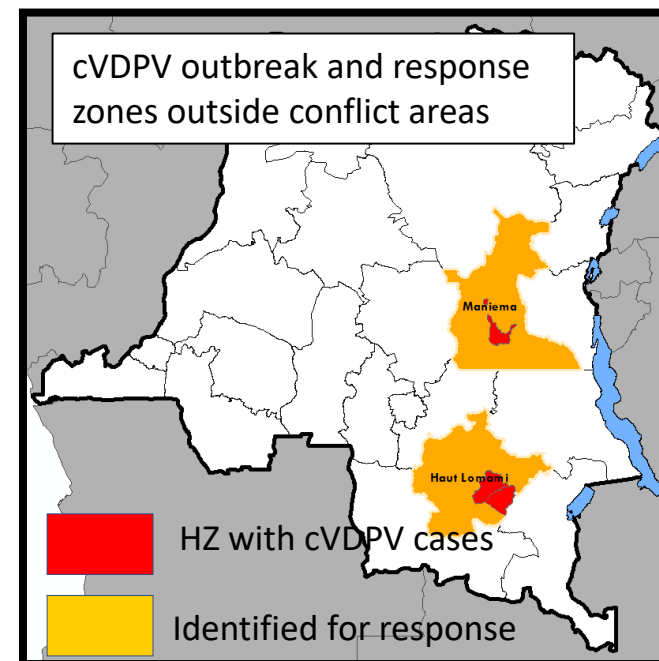
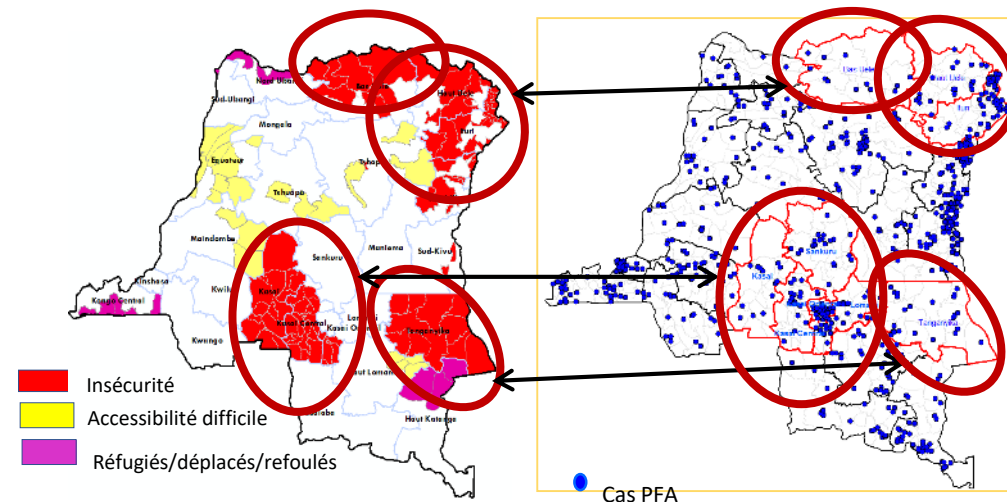
Strategies

- Contact sampling of inadequate cases
- Sampling of recent arrivals to IDP camps (Recommended but not implemented)
- Active case search (recommended, but limited documentation of implementation)
- Environmental surveillance started in Q3 2017

Performance

- Finding VDPV cases, but high number of inadequate AFP cases: 42/210 stools in Haut Lomami were in 'bad condition' on arrival at lab in 2016-17
- Long delay in stool transportation in some areas
- Analysis of internally displaced population – not detailed
- Surveillance strengthening plan developed but limited impact due to operational issues (OB zone far away from capital)

NP-AFP Cases found across conflict areas in 2017



Appendix – Surveillance Flag Methods

Timeliness Flag (part a)

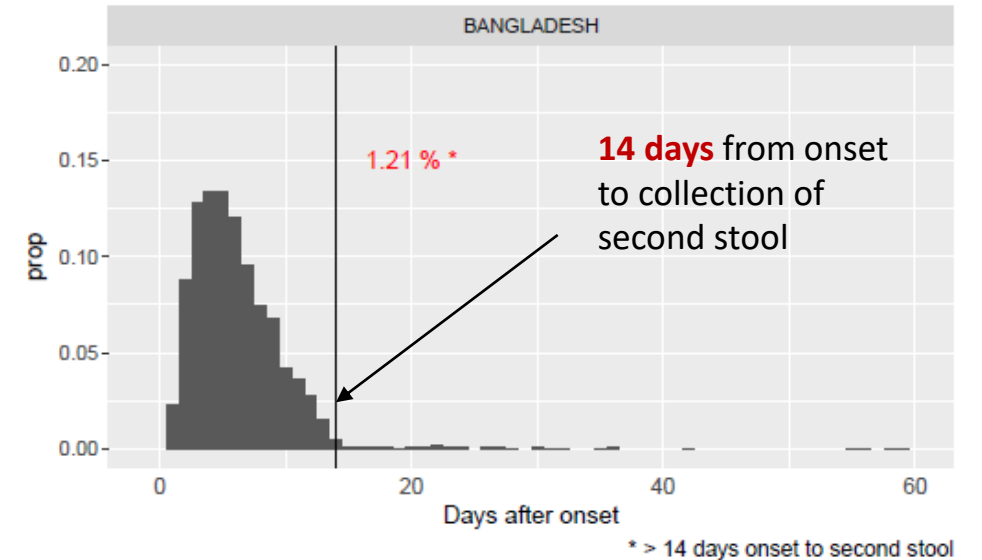
Concern: Stool adequacy indicators may not be accurate

- **Possible reasons:** inadequate cases not investigated, not included in the database, or given inaccurate dates of onset

Method: To detect countries with **unexpected patterns**, we flagged countries where $\leq 3\%$ of AFP cases have 2 stools collected after 14 days

Rationale: We would expect some cases to be identified late, making collection of 2 stools within 14 days of onset difficult

Example: **Bangladesh**
Distribution of cases from onset to collection of **second stool**, 2014 – 2016



Why flagged: This is an unexpected pattern. Based on distribution patterns seen in other countries, we would not anticipate only 1.2% of cases with onset to second stool > 14 days.

Timeliness Flag (part b)

Concern: Stool adequacy indicators may not be accurate

- **Possible reasons:** Cases found > 60 days after onset are not included in the AFP database or not investigated

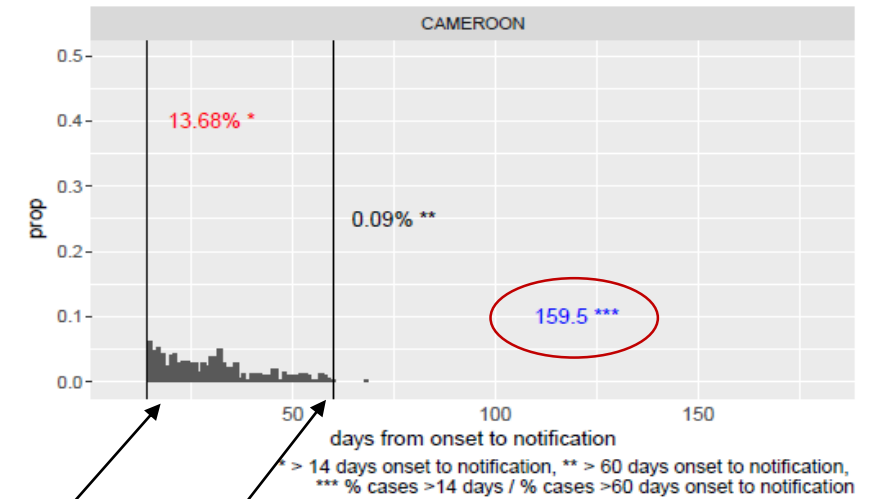
Method: To detect countries with **unexpected patterns**, we flagged countries with **less than 1 in 30 cases** notified > 60 days after onset, among cases notified > 14 days after onset.*

Rationale: In system reporting **late cases** (notification > 14 days after onset), we would anticipate some of these to be reported **very late** (notification > 60 days after onset). Using a rule-of-thumb based on observed 'typical' AFP surveillance systems, we would **expect at least 1 in 30 late cases to be very late**.

* Technical note: this corresponds to **proportion ≥ 30.0** (cases with onset to notification > 14 days / cases with onset to notification > 60 days)

Example: **Cameroon**

Distribution of cases from onset to notification > 14 days and > 60 days, 2014 – 2016



14 days from onset to notification **60 days** from onset to notification

Why flagged: This is an unexpected pattern. In Cameroon, **14%** of cases from 2014 – 2016 were **notified late** (> 14 days) but only **0.1%** of these late cases were notified **very late** (> 60 days). Given patterns seen in other countries, we would anticipate finding more very late cases.

Missing Stool Flag

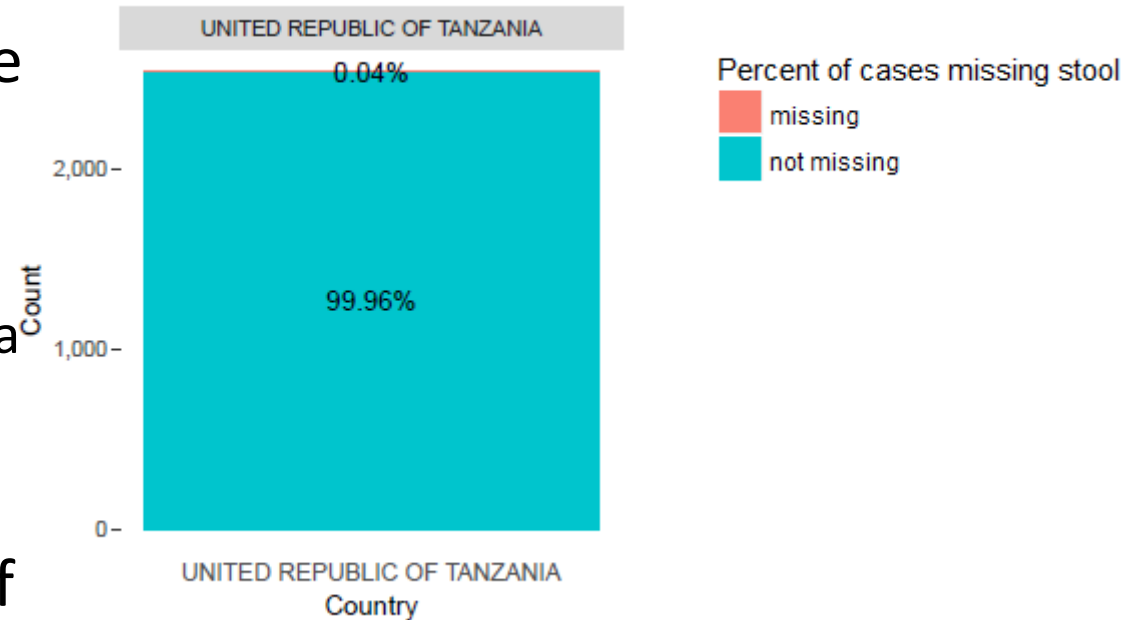
Concern: Stool adequacy indicators may not be accurate

- **Possible reasons:** Cases missing a stool are not included in line lists. Two stools are not collected > 24hrs apart, but were recorded as such by either splitting a single specimen or substituting a specimen for a different individual.

Method: To detect countries with unexpected patterns, we **flagged countries** with $\leq 0.30\%$ of cases missing any stool among cases ≤ 60 days from **onset** to **notification**.

Rationale: Some cases will be lost to follow up, or refuse a second stool collection. Field reviews have suggested that split samples and alternate specimens have been used to falsify data

Example: **Tanzania**



Why flagged: This is an unexpected pattern. We would anticipate that of the **2539** AFP cases (≤ 60 days from onset to notification) reported in Tanzania between 2014 – 2016, **more than 1 case** (or 0.04%) would have a missing stool collection, due to factors beyond the system's control (e.g. death of child, severe illness, parent refusal, etc.)

Age Flag

Concern: The surveillance system does not capture all AFP cases under 15 years of age

- **Possible reasons:** Training of surveillance officers focuses on <5s. With high rates of AFP, indicators can be met without considering paralysis among older children

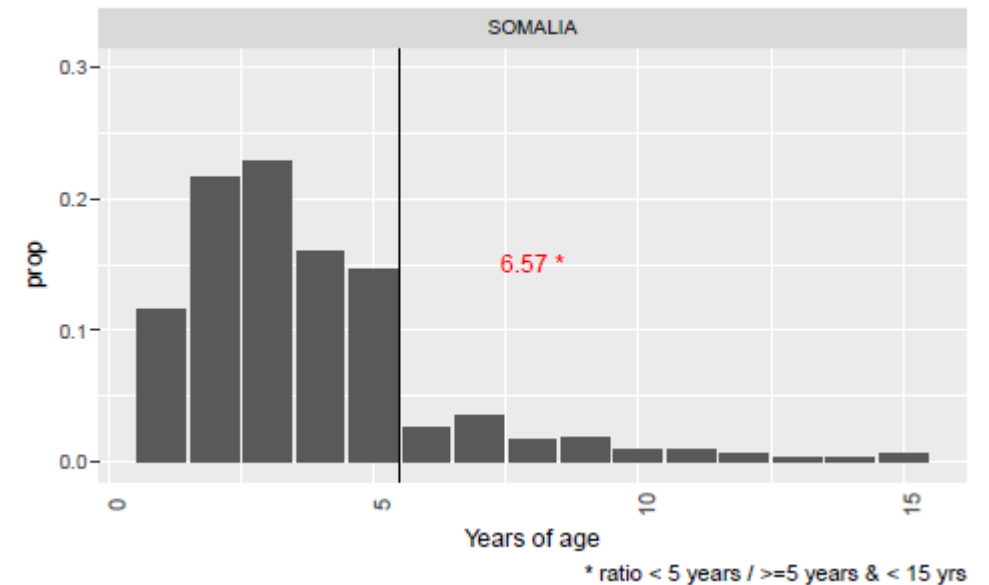
Method: We flagged countries with **less than 1 in 5** AFP cases aged > 5 years old.*

Rationale: AFP are primarily under-5s, but some cases should occur among 5-15 year olds. Field reviews have suggested that older demographics are de-emphasized in routine surveillance.

* Technical note: this corresponds to a ratio ≥ 4.0 (age in years at onset of paralysis < 5 years : 5 – 14 years).*

Example: **Somalia**

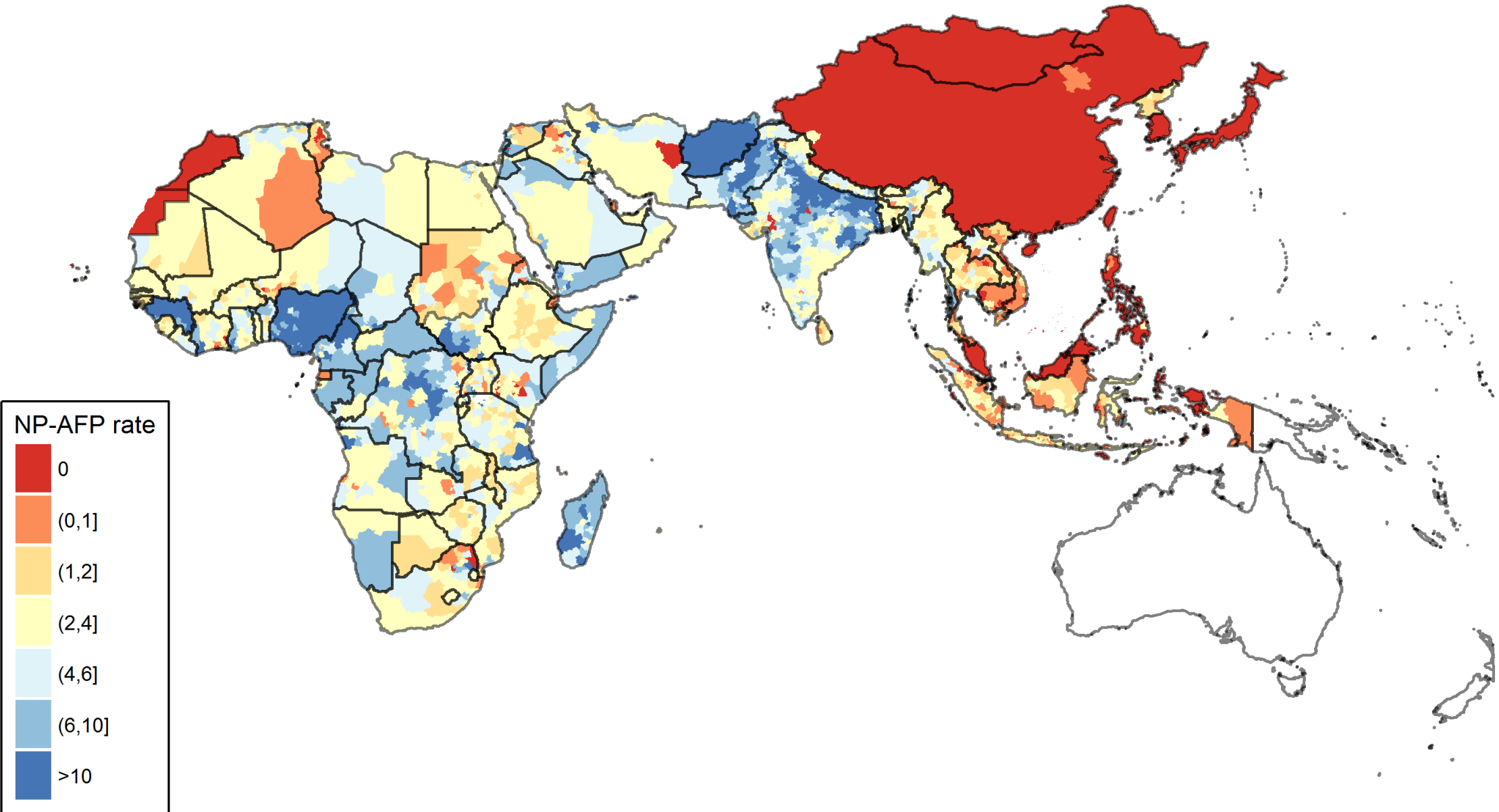
Age of cases at onset of paralysis in years, 2014 – 2016



Why flagged: This is an unexpected pattern. Given the number of cases reported in children < 5 years of age, we would anticipate more cases reported in children ages 5 – 14 years.

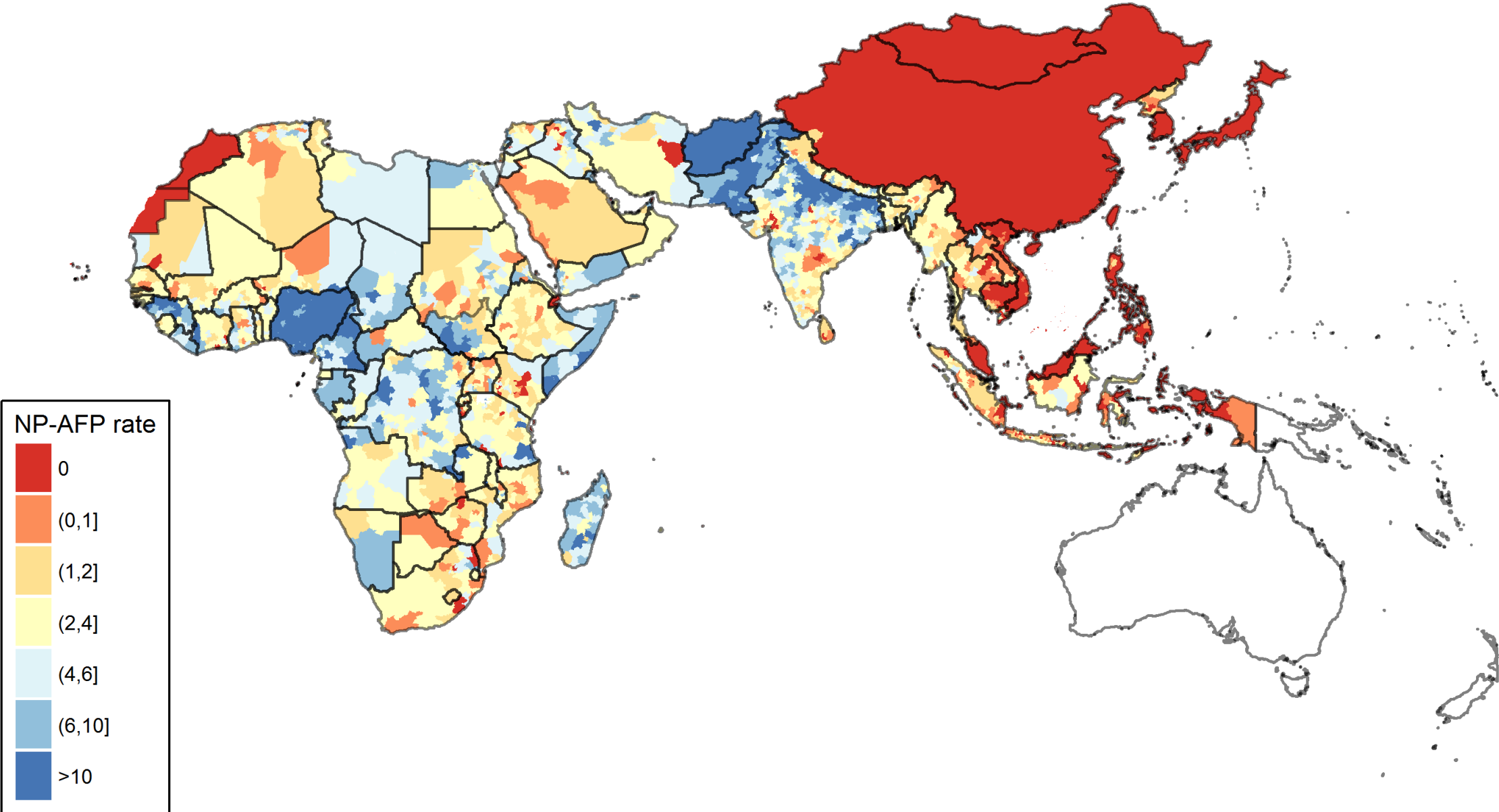
Appendix – Subnational Surveillance Indicators

NP-AFP Rate 2016, Aggregated Districts



Does not include data for N. Syria

NP-AFP Rate 2017, Aggregated Districts



Annualized as of Sept 3 2017. Does not include data for N. Syria