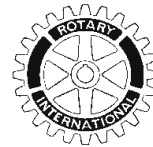


Global Polio Eradication Initiative (GPEI) Status Report

31 October 2017

Surveillance data as of 16 October 2017



Rotary
International

BILL & MELINDA
GATES *foundation*



Outline

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The boundaries and names shown and the designations used on these maps 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. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Topline Messages – Pakistan and Afghanistan

- The Pakistan and Afghanistan epidemiological block continues to demonstrate progress compared to all prior years.
- The number of WPV1 cases is declining— 5 and 7 cases of WPV reported from these countries respectively, to date in 2017. Progress is significant in Peshawar where no WPV cases have been reported in 2017 and no WPV has been isolated from environmental samples since June 2017.
- However, recurrent WPV1 isolates from environment and cases in Quetta-Kandahar block and Karachi indicate persistent indigenous transmission and is a major concern. Intermittent WPV1 isolation from Rawalpindi-Islamabad indicates establishment of transmission outside the core reservoirs in Pakistan. Recent WPV cases and environmental isolates from Kandahar and Helmand represent cross border transmission in the common corridor and evidence of ongoing local transmission in Kandahar and Helmand, with risk of continuation and further geographic spread. Recent detection of WPV1 from an AFP case and environmental samples of Nangarhar also indicate low level ongoing transmission. Genetic analysis of WPV1 isolates from this epidemiological block shows substantial genetic divergence implying multiple ongoing chains of transmission
- Government commitment remains high at national and provincial level in both countries. The Afghan government continues to play a strong stewardship role through the Steering Committee & High Council. The new Prime Minister of Pakistan chaired the Task Force meeting and stressed sustaining high government commitment at each level. Both governments focus on implementation of NEAPs, maintaining focus on core reservoirs and enhancing quality in under performing areas.
- Positive LQAS trend and decrease in proportion of missed children show that community-based initiatives continue to play pivotal role in improving quality of SIAs in most high-risk districts of both countries, but quality of SIAs in parts of Quetta-Kandahar block, Islamabad/Rawalpindi, and parts of Karachi remains below the level required to stop transmission.
- While vaccine acceptance remains high, nearly half of caregivers in Pakistan say there have been “too many” visits from vaccinators in the past year. There are pockets of refusals in Tier 1 districts of Pakistan and very high risk districts of Afghanistan. Parts of Kandahar are prone to deeply-rooted refusals, where hiring female frontline workers presents an ongoing challenge linked to established traditional beliefs and insecurity.
- Both countries organized coordination meetings in July-August to carry out joint risk assessment and plans for common corridors of WPV1 transmission. Implementation of High Risk Mobile Population (HRMP) plans started in September. HRMP strategy emphasizes vaccination of nomads, refugees, returnees, IDPs, straddling populations and districts with higher proportion of children recorded as “guest”.

Topline Messages – Nigeria and Lake Chad Basin

- No WPV or cVDPV cases or isolates in Nigeria to date in 2017.
- The last WPV1 reported from any source in Nigeria was in September 2016 from Borno, Nigeria. A series of SIAs using bOPV and mOPV2 were implemented in Nigeria and bordering areas of Lake Chad Basin; Borno State also conducted a state-wide round of IPV.
- Inaccessibility for vaccination and surveillance in the insecure areas of Borno is a major challenge. Reaching Every Settlement (RES) and Reaching Inaccessible Children (RIC) are the main innovative strategies initiated by the program to gain access to security compromised areas of Borno and parts of Yobe state with support of security forces. The percentage of partially and fully inaccessible settlements in Borno declined from 50% in July 2016 to 33% in July 2017, with more than 260,000 children immunized. However, getting back to these settlements multiple times is complicated and dangerous. To date, only 35% of partially accessible settlements in Borno have achieved the goal of five contacts. Ongoing efforts will be needed to gain access to the remaining unreached children (162,000-232,000), with continued improvements in surveillance to be confident that transmission is interrupted.
- Nigeria continues to implement all the major recommendations of independent surveillance reviews and also has undertaken innovative strategies to enhance sensitivity of the surveillance system in Borno. These include healthy children stool surveys in IDP camps, an environmental sweep, the expansion of community based Auto Visual reporting system (AVADAR) and ES sites expansion. Surveillance blind spots still persist in Borno, and data quality (e.g., estimates of perfect stool adequacy) remains an issue needing continuous assessment and maintenance.
- Sustaining political and financial support in Nigeria for polio is critical, despite the economic downturn facing the country. The program would benefit from quarterly engagements with the Presidential Task Force on Polio Eradication, which last met in April 2017. The support of State Governors and Local Government Area Chairmen – with some notable exceptions – is also declining.
- Improving vaccination and surveillance in hard to reach areas of Lake Chad basin countries, particularly the islands, are also among the main priorities to minimize risk to GPEI success in Africa in 2017. A task team based in N'Djamena is established to enhance coordination, provide oversight and improve surveillance to meet certification standards.

Topline Messages – Surveillance and Outbreaks

- Surveillance is meeting performance indicators at national levels, however, many subnational geographies do not meet surveillance goals. Surveillance indicators for most of the endemic, outbreak and high risk countries meet standards but the detection of long chain polioviruses with genetic evidence of prolonged circulation, particularly from access compromised areas is concerning and may have implications for the global certification timeline.
- Following the lessons learned from Borno, Nigeria—Lake Chad countries, Pakistan, Afghanistan, and other high risk countries are adopting supplemental strategies to improve poliovirus detection and overcome challenge of managing sensitive surveillance system in hard to reach areas by placing emphasis on enhanced environmental and community based surveillance. GPEI's Surveillance Task Team has compiled the lessons learned in different settings with the aim to provide guidelines to countries with access compromised areas.
- In the last 12 months, Pakistan and Afghanistan program have enhanced focus on surveillance for polioviruses at all levels to ensure early detection. In addition strategies have been used to strengthen AFP surveillance processes at district and sub-district levels; both countries expanded sites and increased the frequency of environmental sampling. Results of healthy children stools survey of 200 children from Karachi and Peshawar shows 4% positive samples from Karachi while no WPV was found in Peshawar samples.
- Since the May 2016 withdrawal of type 2 OPV, a total of six type 2 outbreaks (cVDPV2) have been reported from 4 countries (Nigeria, Pakistan, DRC and Syria). Most outbreaks reported from populations that are hard to reach either due to insecurity (Borno, Syria) or because of geographical barriers (DRC). GPEI responded to all the outbreaks using monovalent type2 OPV (mOPV2) and targeted IPV SIAs. No cVDPV2 has been reported from Pakistan since December 2016 and the last cVDPV2 from Borno and Sokoto were reported in August and November 2016, respectively. DRC reported a cVDPV2 case with a date of onset after the last mOPV2 round so additional rounds are planned for October and November, 2017.
- In Syria, outbreak response activities are being carried out under very complex security and conflict situation. Total of 52 cVDPV2 cases reported since the detection of first case with onset in March 2017. Most of the cases (49) are reported from 3 districts of Deir Ez Zor Governorate. Two mOPV2 rounds completed in Deir Ez-Zor and one in Al Raqqa. Risk of continued circulation and further geographic spread remains high due to population displacement and movement out of the conflict zones.

Topline Messages –Resources

- **Vaccine supply:**
 - IPV supply situation is projected to improve in 2018 and expected sufficient vaccine supply for those 36 countries which have either not introduced 1 dose of IPV since the switch, or which had supply interrupted for their national immunization programmes.
 - Tender for bOPV supply from 2018 through to cessation concluded which ensures access to sufficient production capacity for forecasted requirements as well as a buffer – but with increasing reliance on a single supplier due to announced market exits from other long term suppliers
- **Strengthening budgeting** and expenditure monitoring realized in 2016 is enabling more effective and responsive financial management by the GPEI. As per the results of the end of Q2 2017 expenditure review, the partnership is on track to implement the Objective 1 budget as planned. The EOMG is closely coordinating with the partnership’s Finance Management Team to adjust the Objective 1 budget throughout the year to ensure optimal performance of polio eradication work and increase value for money invested in the program. With the continued transmission of WPV and numerous VDPV outbreaks into the second half of 2017, resources will be further constrained in order to stay within the \$7B budget envelop in the outer years of the program— particularly since that budget was based on stopping transmission in 2016.

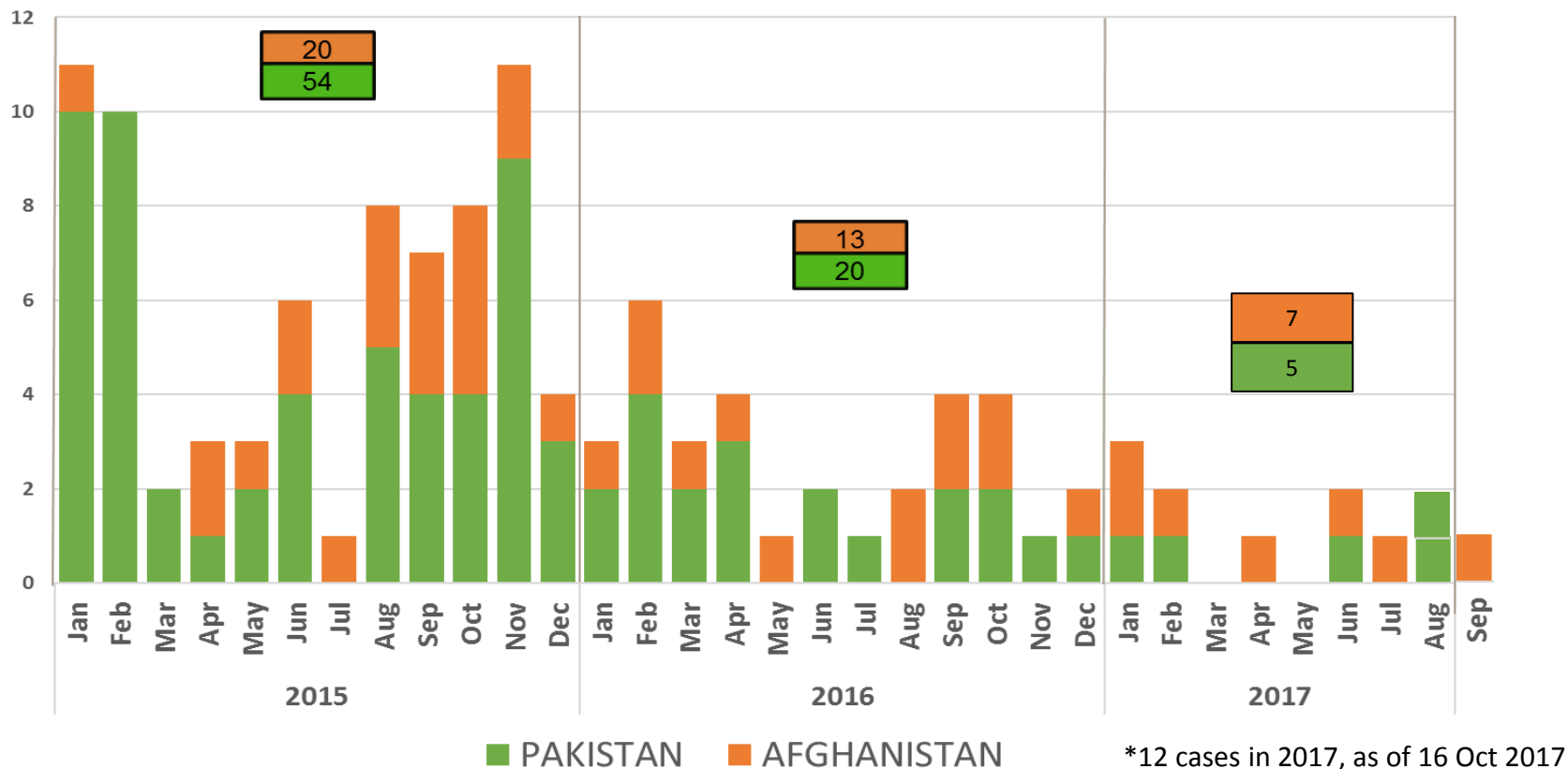
ENDEMIC COUNTRIES

Pakistan

Afghanistan

Nigeria

Pakistan and Afghanistan: Monthly case counts, 2015-2017*



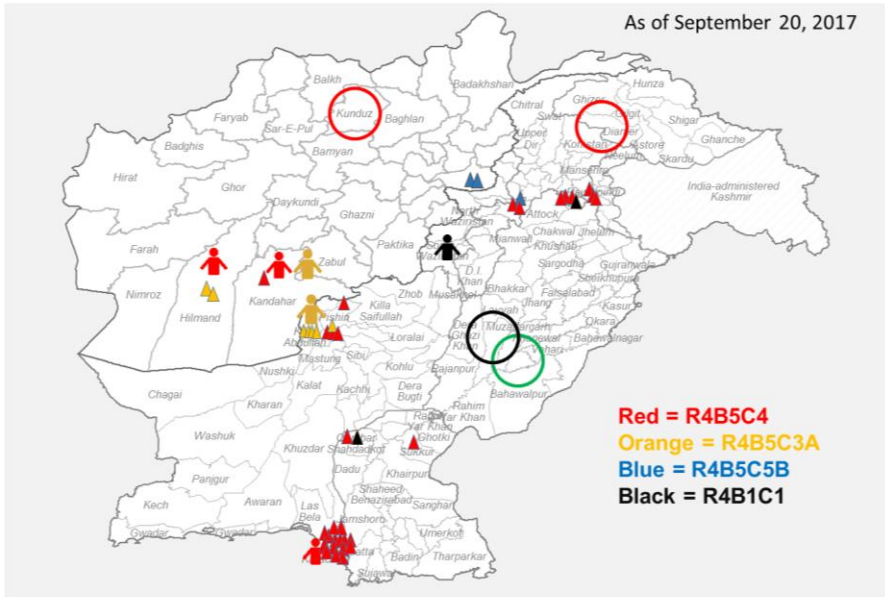
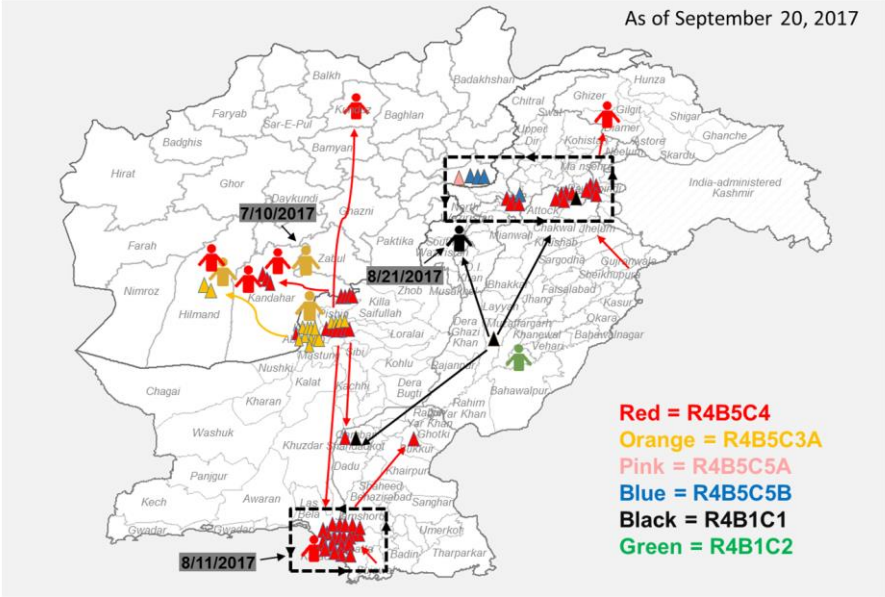
Continued progress towards zero

- 12 wild polio cases worldwide to date in 2017 (all from Pakistan and Afghanistan)
- Pakistan and Afghanistan programmes are improving coordination
- Special attention is given to Southern Corridor (Helmand/Kandahar—Quetta)

Pakistan and Afghanistan: One epidemiologic bloc with evidence of linked circulation

WPV1 Cases and ES positives, by virus genetic cluster (6 clusters total), Jan – Sep, 2017

- WPV1 Cases and ES positives, by virus genetic cluster (4 clusters in 6 month period*)
- Circles mark areas where previous outbreaks have ended.

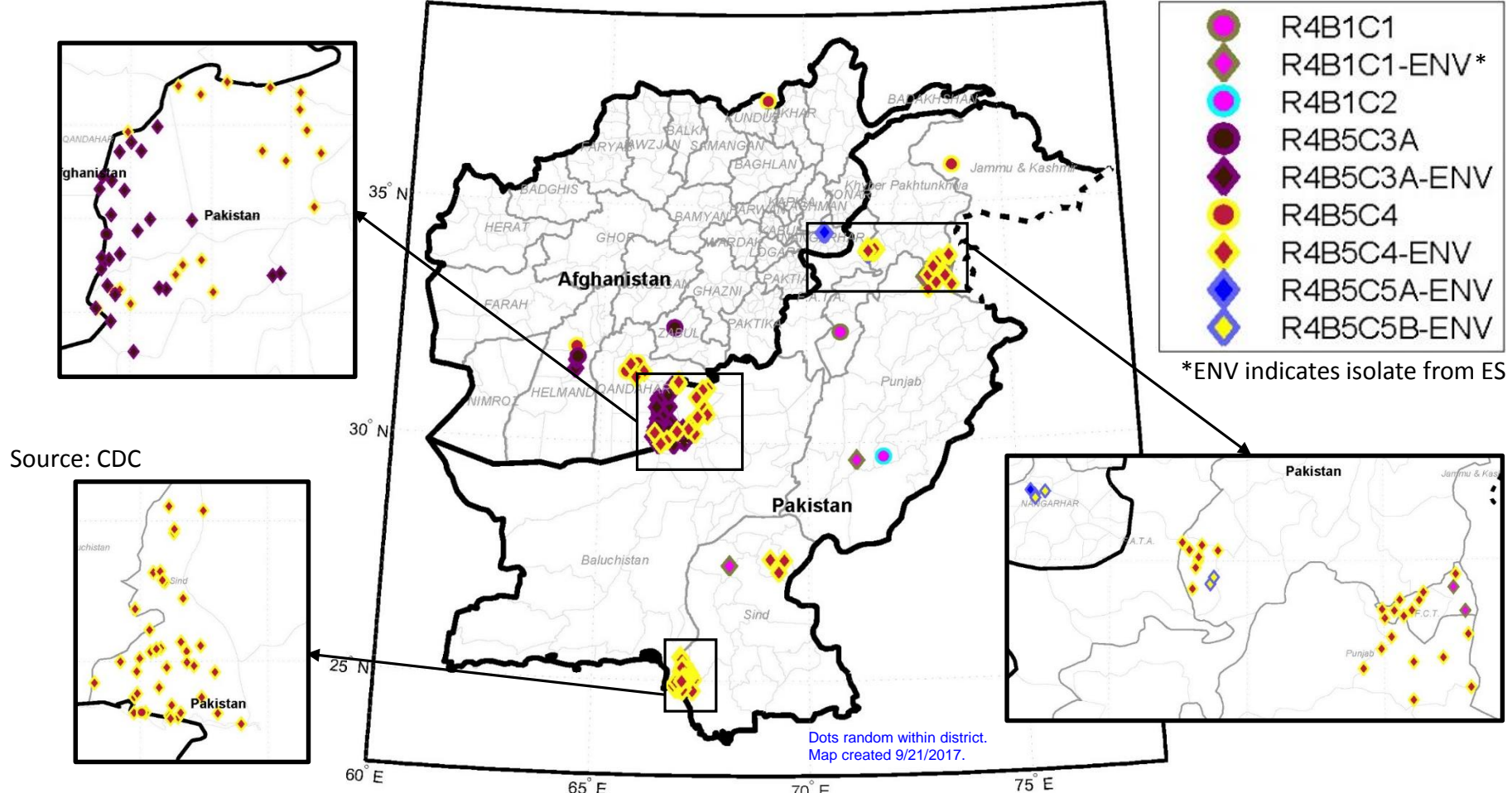


*21 March – 20 September, 2017

- Circulation in common reservoirs of Afghanistan and Pakistan → 3 zones of ongoing transmission
- Quetta Block is current amplifier; however, cVDPV2 outbreak in Quetta (Dec, 2016) was apparently contained
- Continued transmission in Karachi/Quetta to Southern Afghanistan corridor and spread to outside reservoir areas
- No cases in 2017 in the central corridor (SE AFG [Paktika] - FATA), site of outbreak in 2016
- Progress in Peshawar-Khyber, but WPV1 isolates detected repeatedly between Islamabad & Rawalpindi; the last case reported (onset 15 Sep, reported 10 Oct) is from high risk district within Nangahar.
- Positive environmental samples continue in Sindh (6 districts), Balochistan (3 districts), Punjab (1 district), Islamabad (1 district) and KP

Pakistan & Afghanistan: Evidence of linked transmission – genomic classification of WPV1 from AFP cases and environmental surveillance, Jan–Sep 2017

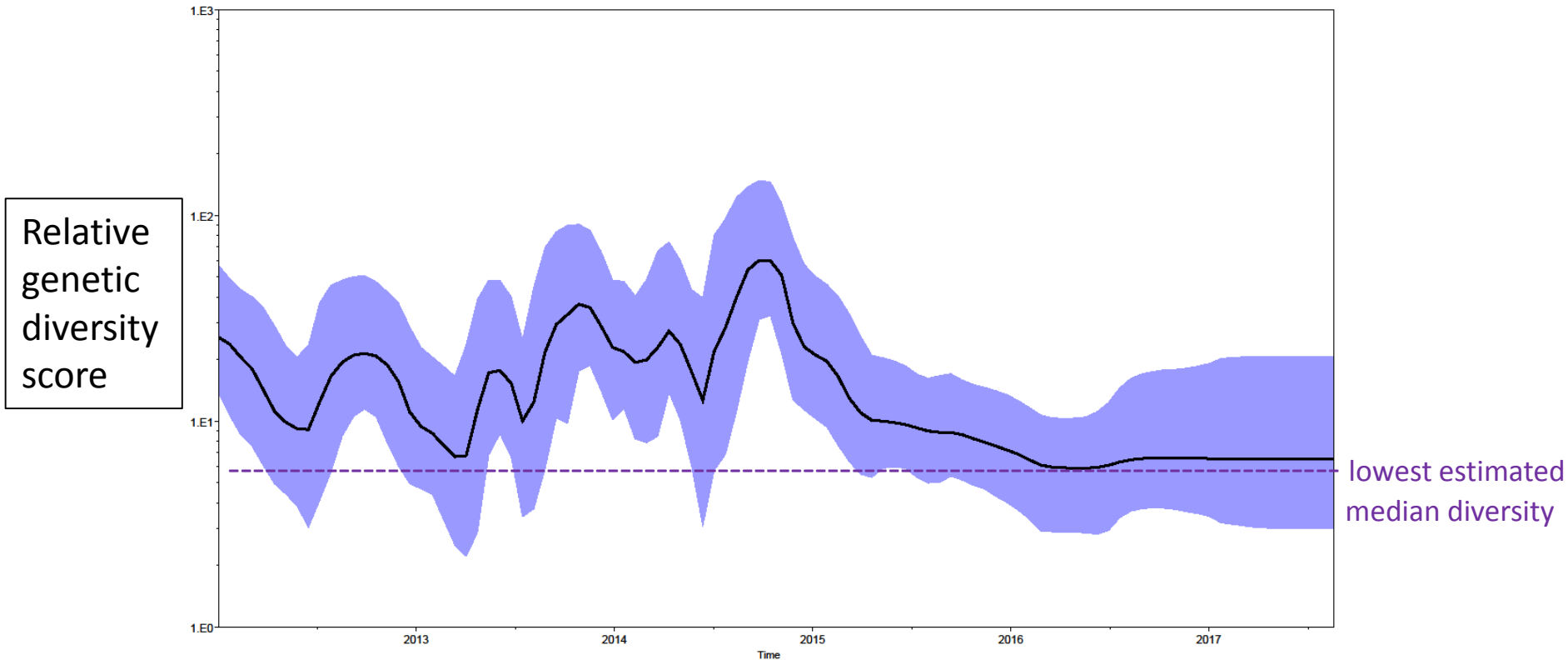
Wild PV1 in 2017 (through Sep. 21), Afghanistan and Pakistan, Cases and Environmentals



Source: CDC

- In 2016 there were 11 distinct WPV1 virus clusters (6 of which are also detected in 2017 to date).
- Intense circulation of genetic cluster C3A and C4 continue in Quetta-Kandahar block
- Detection of C4 in Karachi pointing toward continued transmission
- Distribution of genetic cluster C1 may potentially indicate circulation in the high risk mobile population (HRMP)
- Expansion of ES sites & increased sampling frequency are enhancing the sensitivity of surveillance system
- All 6 genetic clusters were found in isolates from environmental sampling and from AFP cases within 2016 to Sep 2017.

Pakistan & Afghanistan: Median genetic diversity of WPV1 from AFP cases, disease onset from 2012 – August 2017



Genetic diversity reached the lowest level during the 2015-2016 and increased slightly thereafter.

During the 2016 and early part of the 2017 high-seasons the median genetic diversity remained constant. (Note: wider confidence intervals in 2016-2017 reflect modelling based on fewer cases compared to previous years)

Source: CDC

(upper and lower plots show 95% confidence interval)

Pakistan: Overview

- GoP remains highly committed to polio eradication - new Prime Minister fully briefed on polio and has chaired National Task Force Meeting in August, and approved the revised NEAP for 2017-2018.
- Between July 2017 and June 2018, the programme plans to conduct nine high quality SIAs including five NIDs targeting 100% of <5 children with an emphasis on local, motivated, vaccinators.
 - Among sampled children, recent serosurvey shows that SIAs have achieved high type 1 immunity (~>90%) across the country but gaps remain in the reservoirs that are allowing the virus to survive.
 - Major focus on improving SIA microplanning (targeting moving populations and still missed children) and implementation with associated monitoring
 - 2017 KAP - Pakistan has built a strong communications and operations foundation that supports the understanding and attitudes critical to maintaining caregiver acceptance of OPV
 - The polio surveillance system has been enhanced, with dedicated surveillance officers, and a doubling of persons oriented to Acute Flaccid Paralysis (AFP), so indicators are met at the provincial level, however, several districts in Baluchistan, KP and other provinces continue to have stool adequacy below 80%.
 - Currently conducting environmental surveillance at 53 sites (compared to 41 sites in 2016)

Pakistan: Risks and strategies

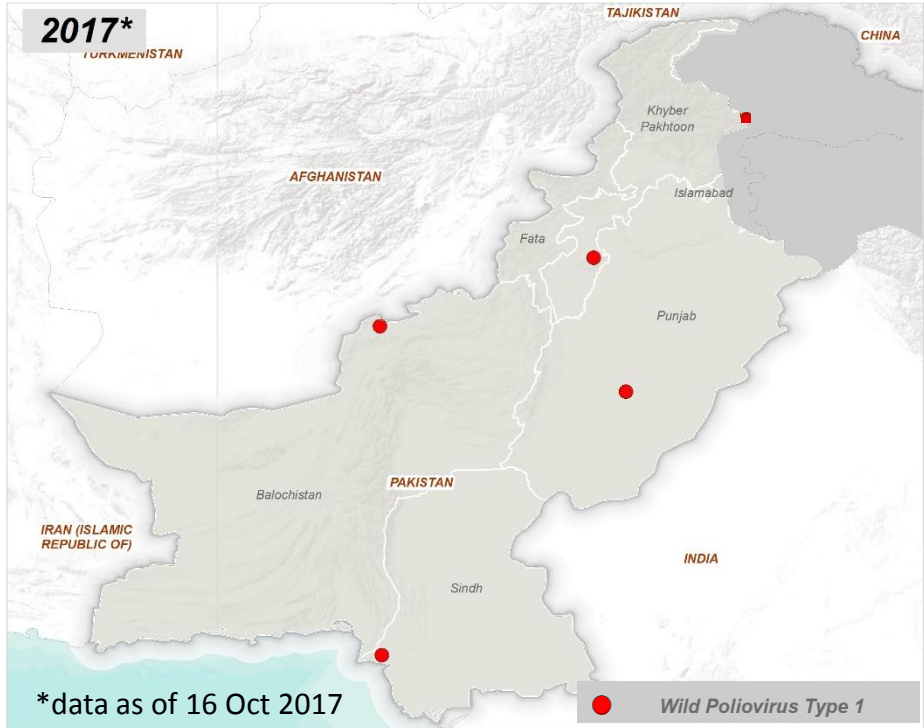
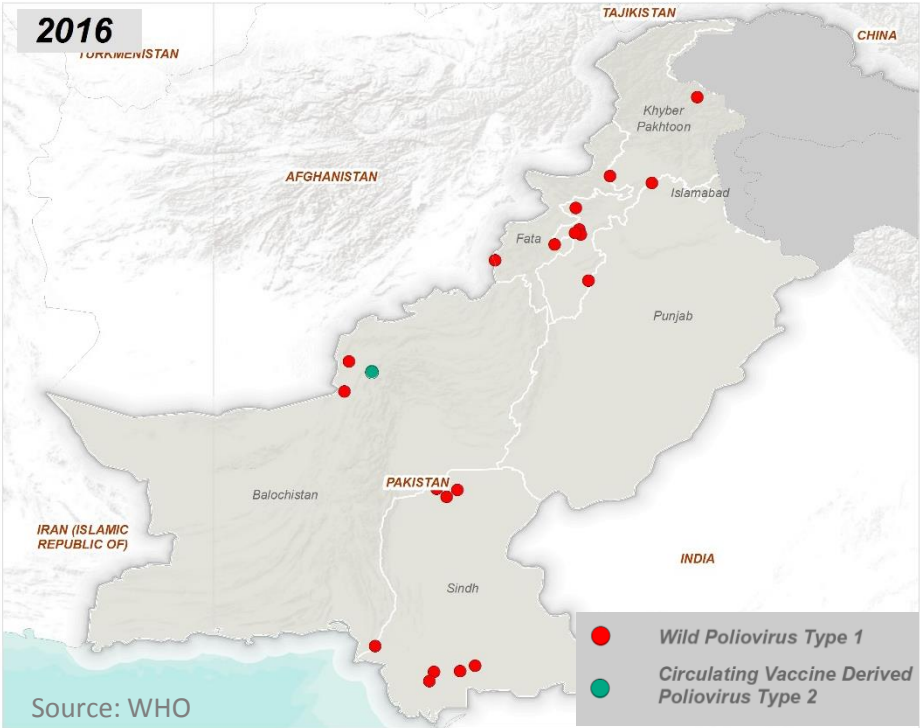
Persistent transmission in Quetta Block, Karachi, Rawalpindi-Islamabad, to be addressed urgently

- **Quetta block:** Continued enhancement of management and oversight system at all levels to address operational and accountability issues; address refusals and ensure strong HRMP programme with special focus on populations moving in from South Afghanistan, and interior Baluchistan. Security remains volatile.
- **Karachi:** Continued enhancement of management and oversight system at all levels to address the operational and accountability issues; address refusals and ensure strong HRMP programme
- **Rawalpindi-Islamabad:** Challenges of fragmented health system and high team turnover continue to affect campaign quality; inconsistent commitment by the administrative and health management
- **Peshawar and Khyber:** Maintain and continue improvements – the last cases detected in Afghanistan and in KP were in this transmission corridor

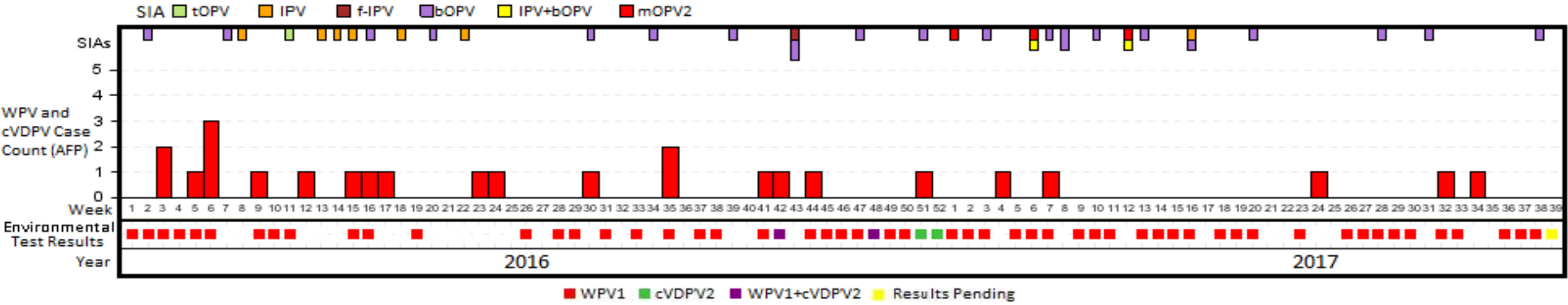
Programmatic challenges along the South FATA, South Khyber Pakhtunkhwa (KP) and South Punjab corridor

- **South FATA:** Lack of adequate supportive supervision and monitoring due to security challenges in SWA, FR Tank, Mohmand and Bajour
- **South KP:** Ongoing transmission in Islamabad-Rawalpindi and Karachi poses a major risk of re-introduction in South KP, Greater Peshawar, Mardan, and Swabi
- **South Punjab:** 2 cases last year linked to transmission in Punjab, the isolation of a very long chain in DG Khan last year - key focus on mobile populations and “high risk populations”

Pakistan: WPV1 and cVDPV2 cases, 2016 and Jan – Oct 2017*



WPV1 and cVDPV2 cases, environmental results by onset week and SIA, 2016 to Oct 2017

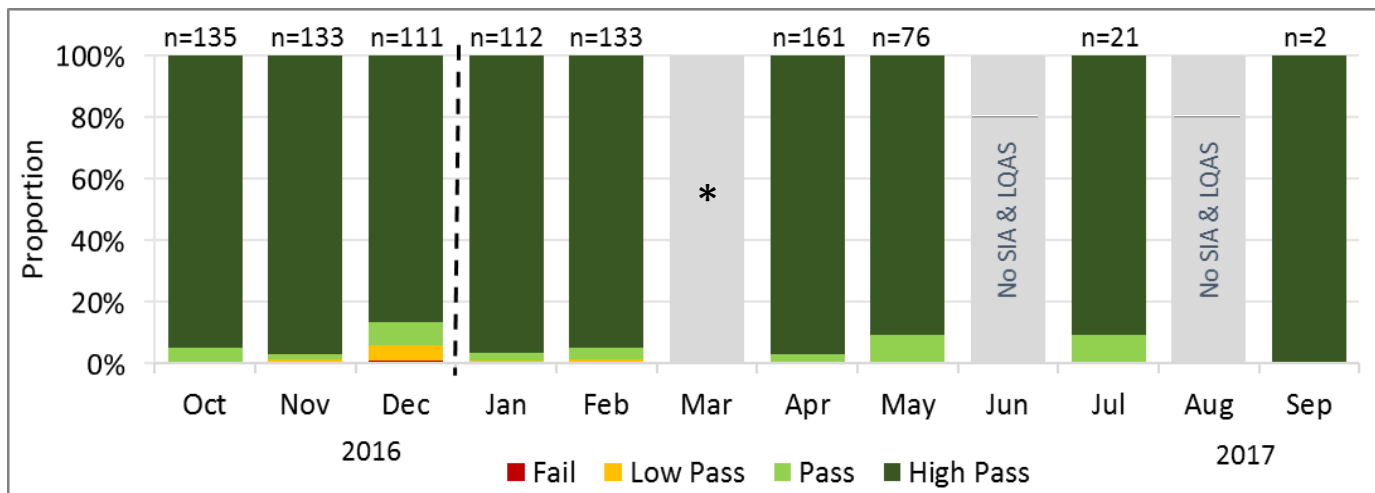


Source: WHO/POLIS; CDC

In 2016, Pakistan had 20 WPV1 cases. In 2017 (as of 16-Oct), there are 5 cases among 5 districts (5 provinces), compared to 15 cases among 11 districts (4 provinces) during the same period in 2016. 15

Pakistan: FATA Immunization coverage levels appears to be sustained at high levels

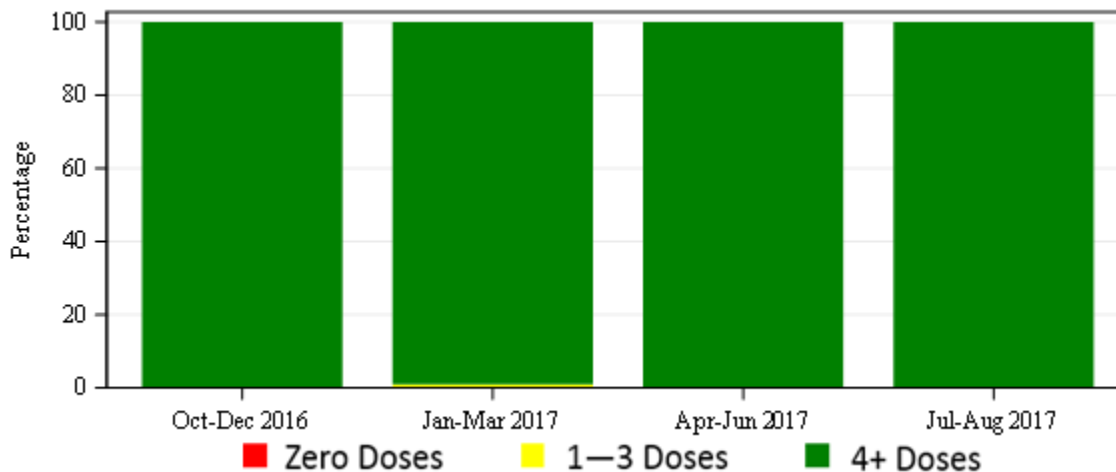
LQAS Survey Results by SIA, Oct 2016 –Sep 2017



LQAS categories for unvaccinated children based on samples of 60 children:

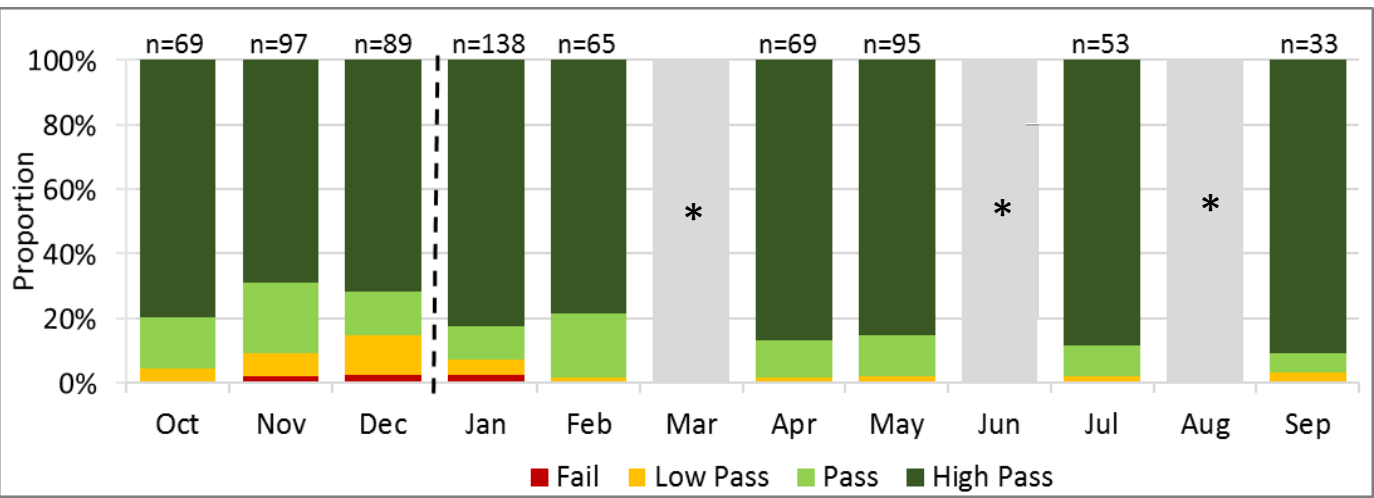
- 0-3 = High Pass (90%+)
 - 4-8 = Pass (80%-89%)
 - 9-19 = Low Pass (60%-79%)
 - ≥ 20 = Fail (< 60%)
- *SIA but no LQAS data in POLIS

NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017



Pakistan: KP Post-campaign coverage estimates are variable

LQAS Survey Results by SIA, Oct 2016 – Sep 2017

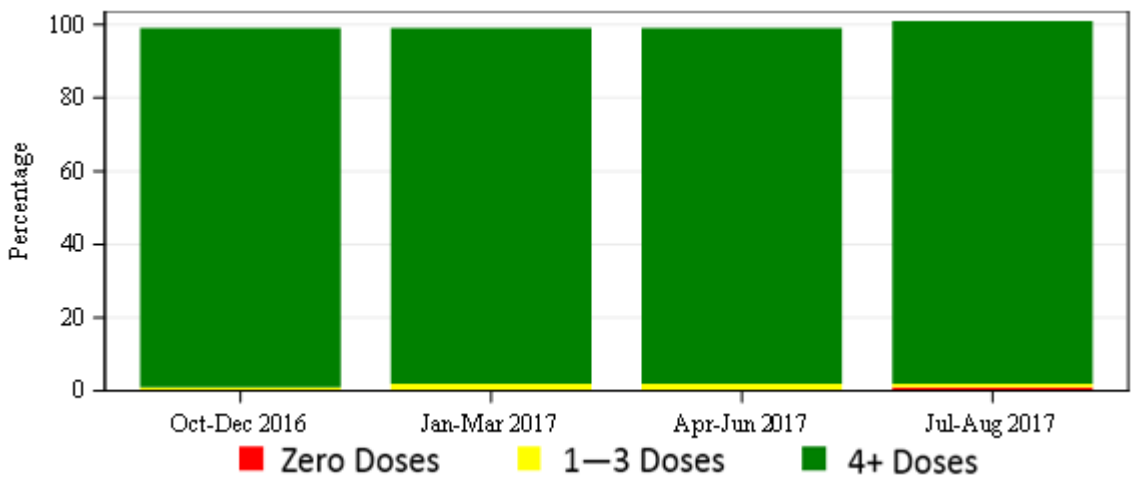


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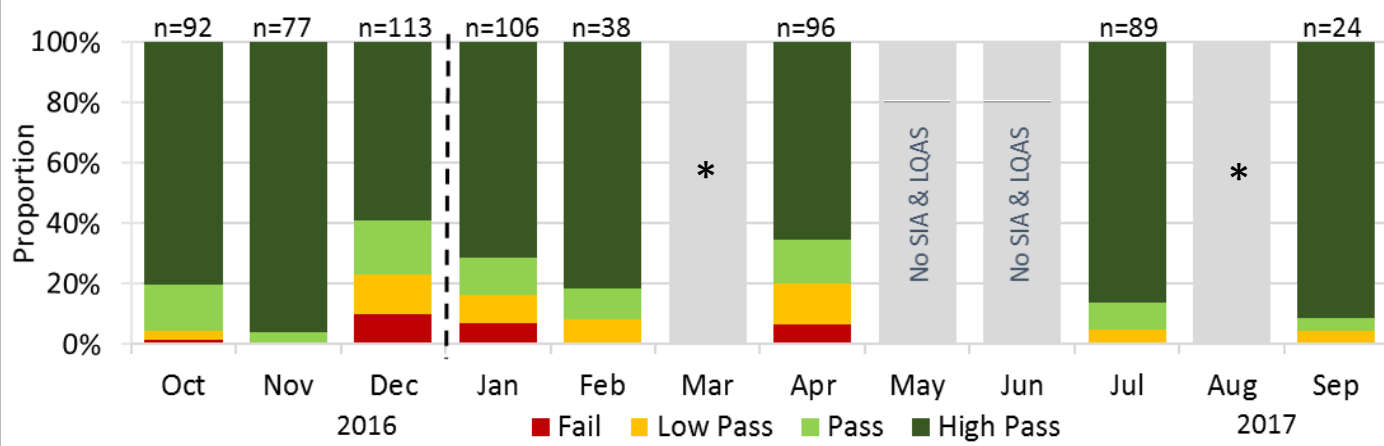
NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017



Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

Pakistan: Karachi SIA quality appears to be improving

LQAS Survey Results by SIA, Oct 2016 – Sep 2017

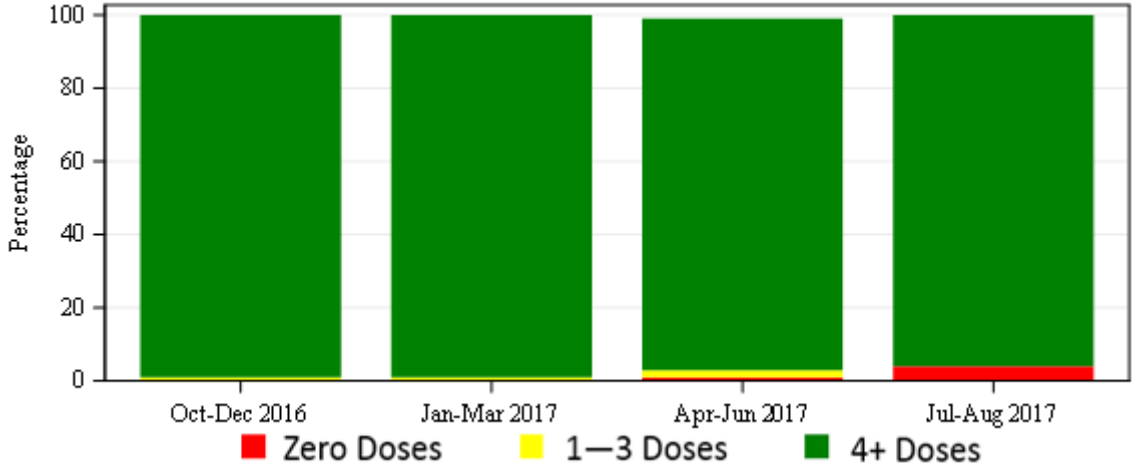


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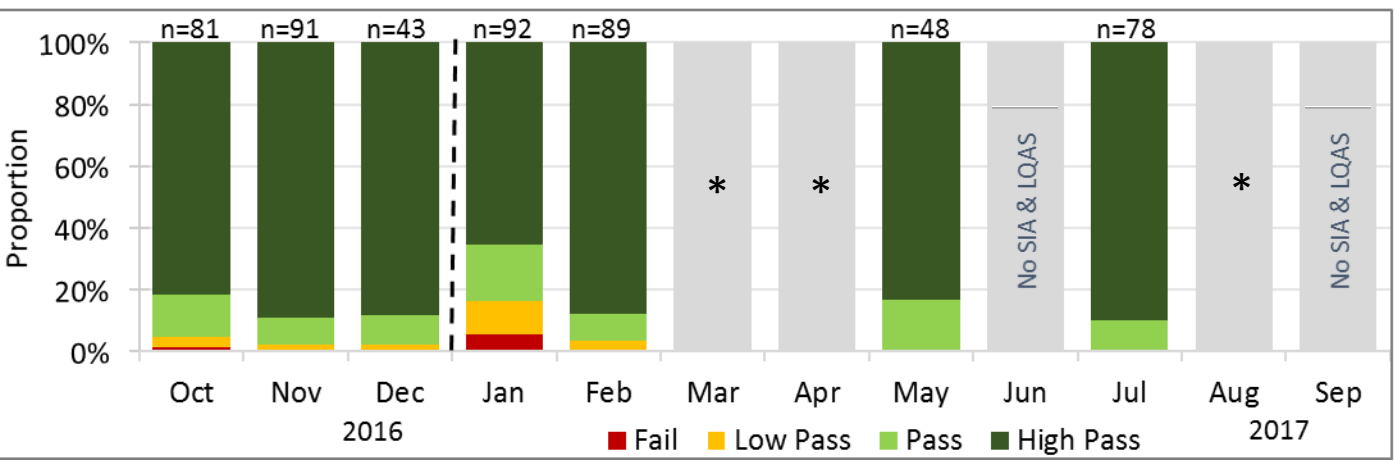
NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017



Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

Pakistan: Quetta SIA quality indicators appear slightly improved since early 2017

LQAS Survey Results by SIA, Oct 2016 – Sep 2017

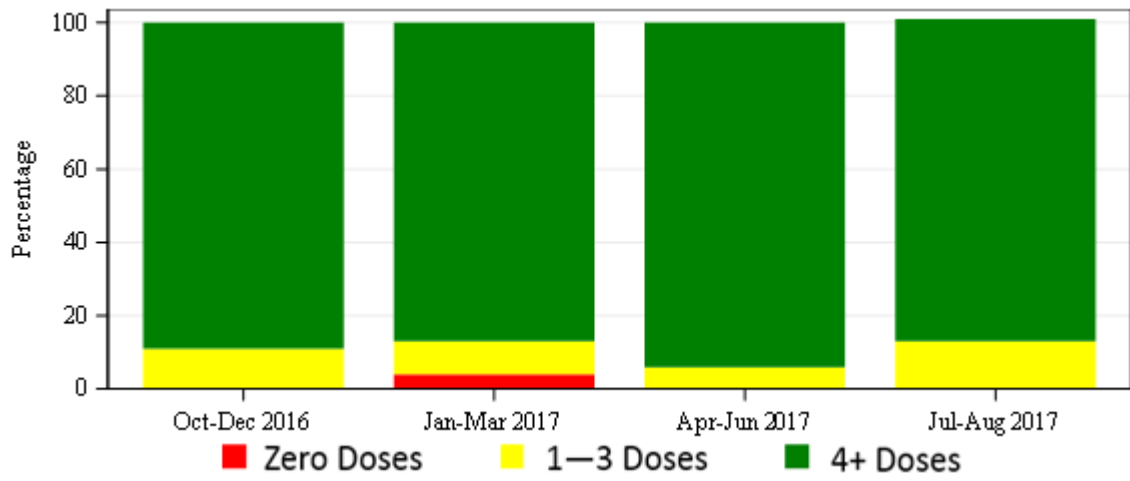


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NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017

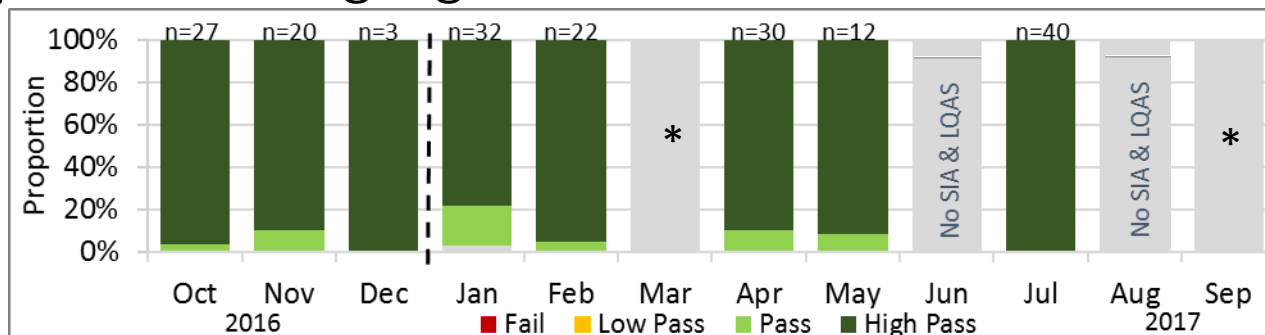


Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

Pakistan: SIA quality varies among high risk transmission areas

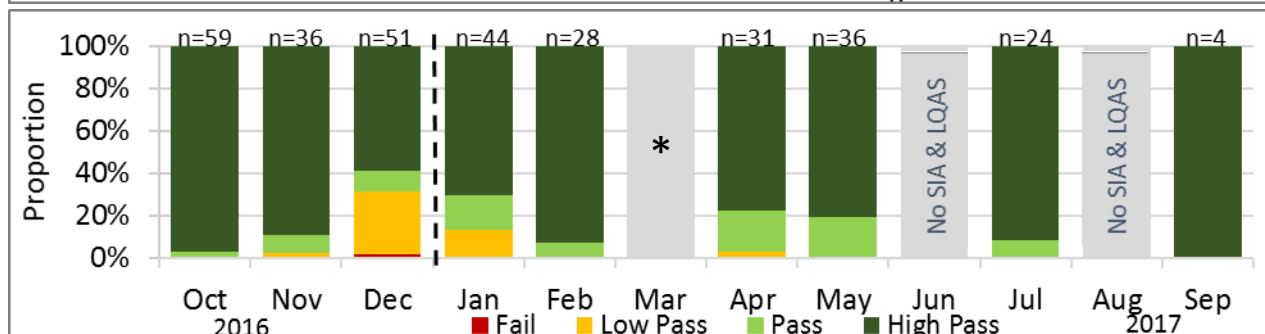
Oct 2016 – Sep 2017

Khyber



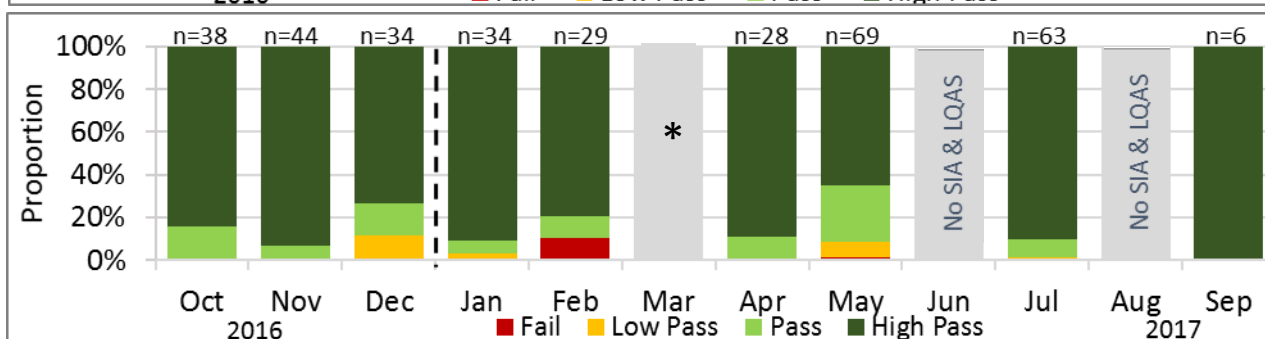
*SIA but no LQAS data in POLIS

Peshawar



Northern Sindh

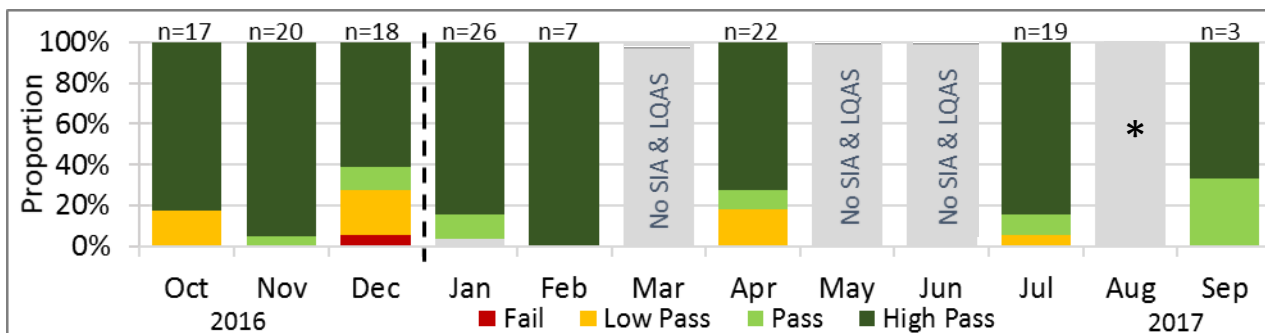
(Kambar, Larkana, Jacobabad, Shikarpur, Kashmore, Ghotki, Sukkur, Khairpur)



High Risk

Karachi Towns

(Baldia, Gadap, Gqbal)

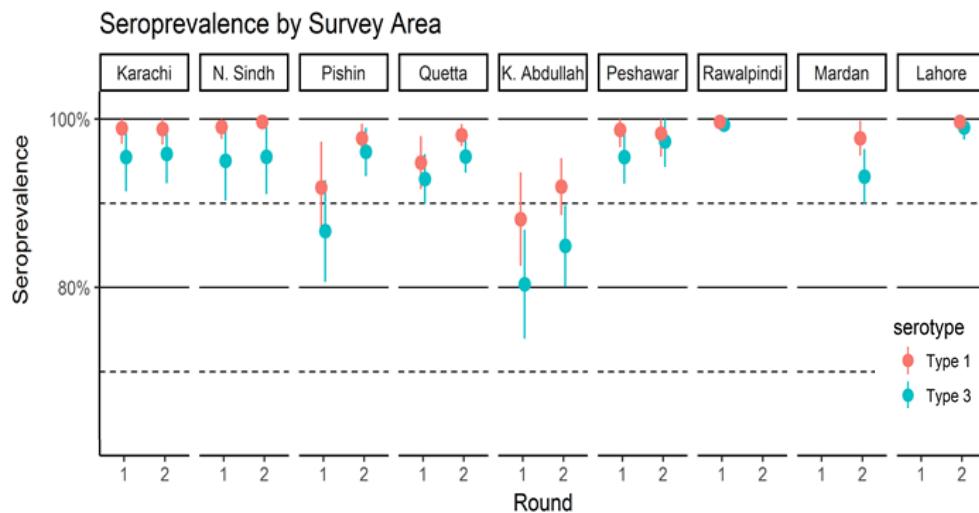


Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

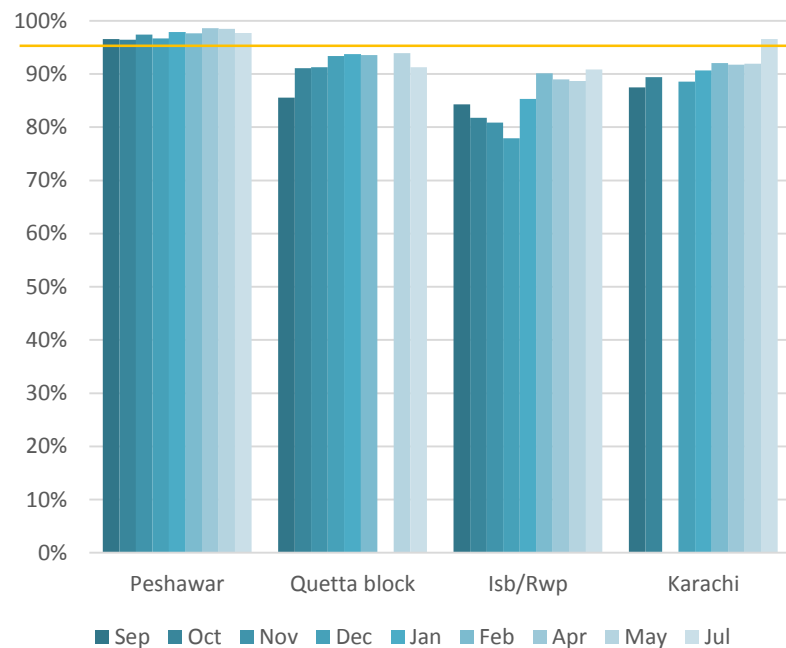
Pakistan: Overall High type 1 immunity, but suboptimal campaign quality in areas of ongoing transmission

Pakistan Serosurvey Rounds 1 & 2

- Household-based cluster survey of 6-11 month-old children
- Seroprevalence is high for Types 1 and 3
- Improvements in Quetta Block from Round I to Round 2
- Pockets of unvaccinated children persist (e.g., Kila Abdulla)
- Low immunity in Pishin in Round I appeared due to one or two 'pockets' of lower coverage.

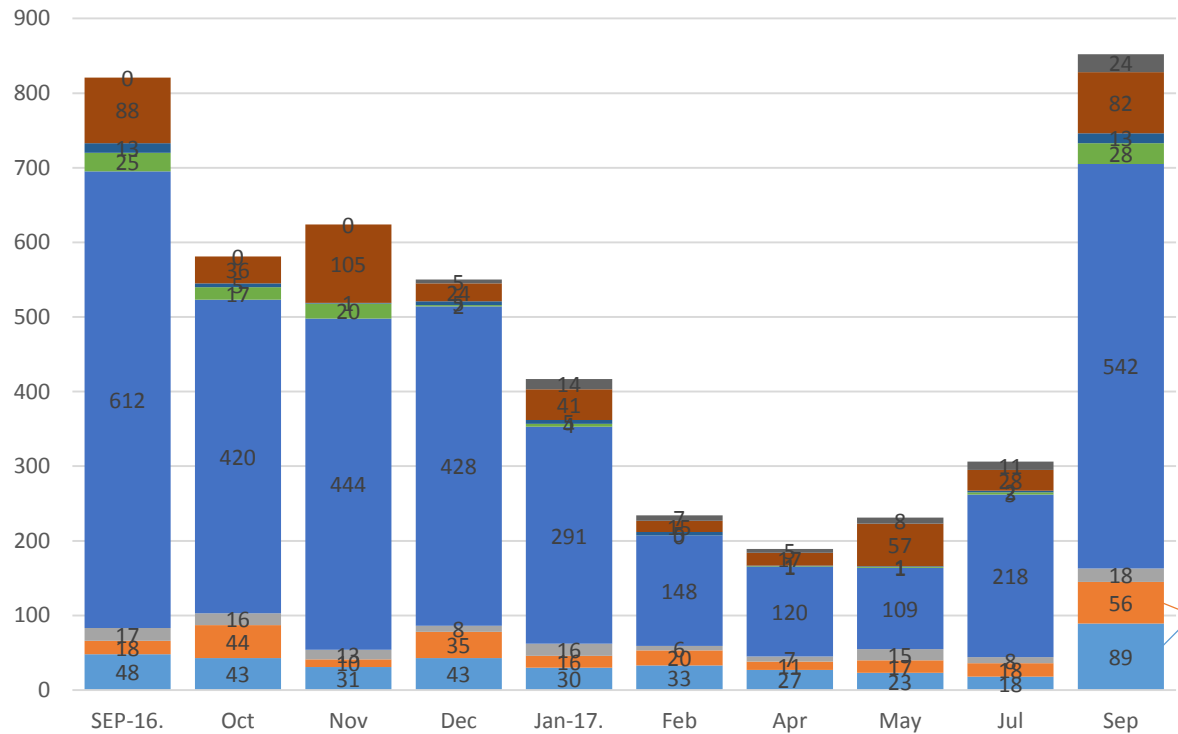


Post Campaign Monitoring Results Sept 2016 – July 2017



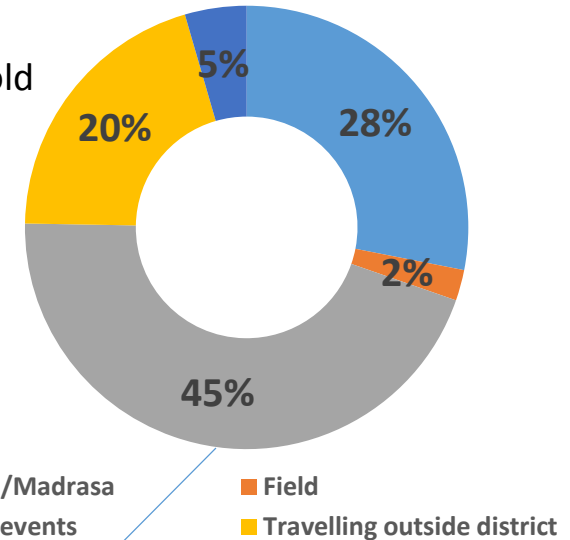
Pakistan: Children Still Missed* in Tier 1 Districts

- Major causes of missed children is either “not available” (absent) or “refusal”
- Another significant cause of missed children is “team didn’t visit” the household

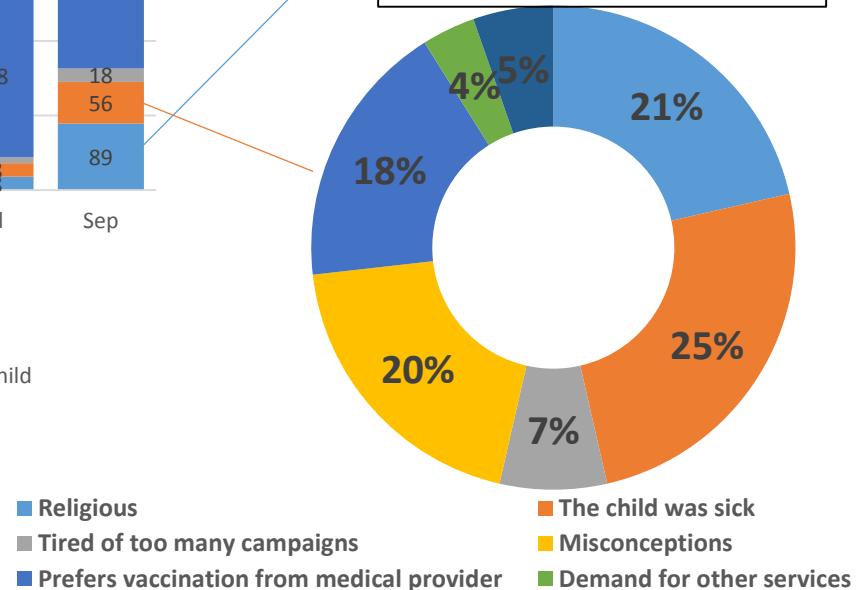


- Not Available
- Refusal
- New Born/New Migrant after team visited
- Vaccinated but not FM
- Team visited but missed the child
- Don't know /Other
- Child was sleeping
- Team didn't visit

Reasons for Absence, Sep-17 PCM (n=89)



Reasons for Refusals, Sep-17 PCM (n=56)

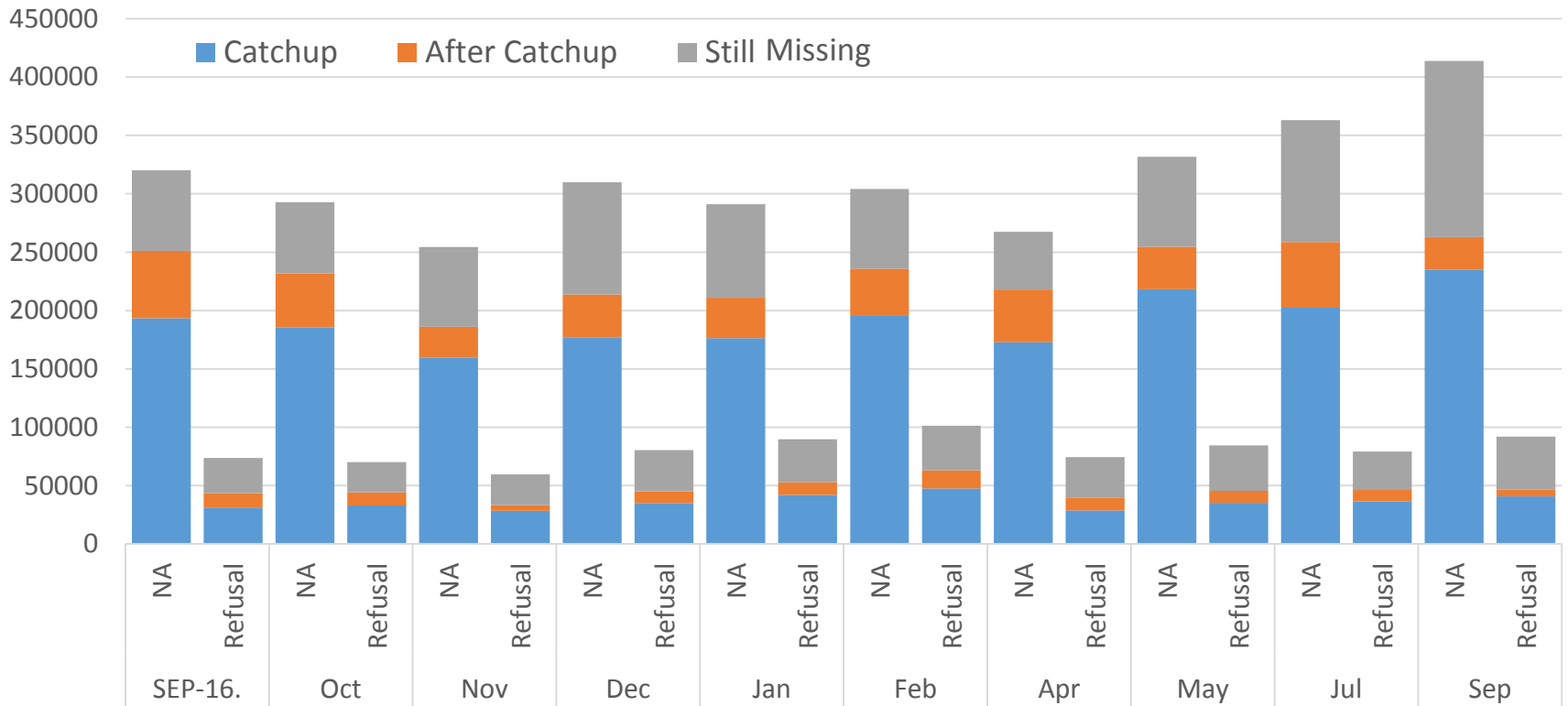


* Source = PCM (Post Campaign Monitoring)

Pakistan: Missed Children “Recovery” in Tier 1 Districts of Pakistan

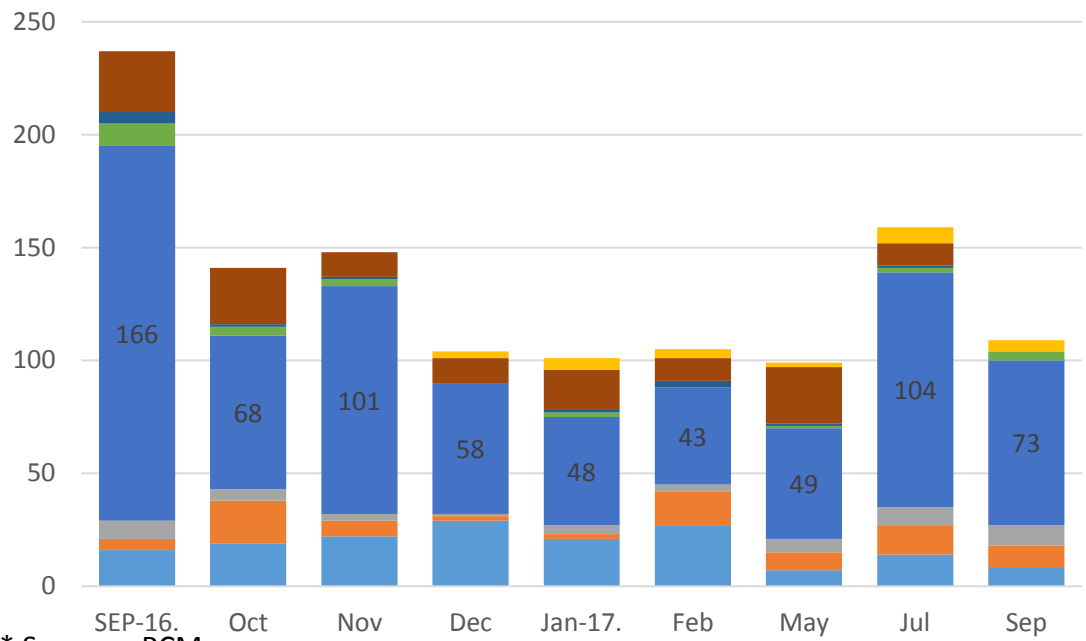
- Approximately 2 out of 3 children missed during NIDs due to absence (NA) at the time of campaign, were vaccinated at follow-up (recovery)
- Approximately 1 out 2 who refused vaccination during the campaign, were vaccinated at follow-up

Missed Children Catch Up (After Campaign) Tier 1



NA: Not Available (absent)

Pakistan: Recovery of Missed & HRMP Children in Quetta Block

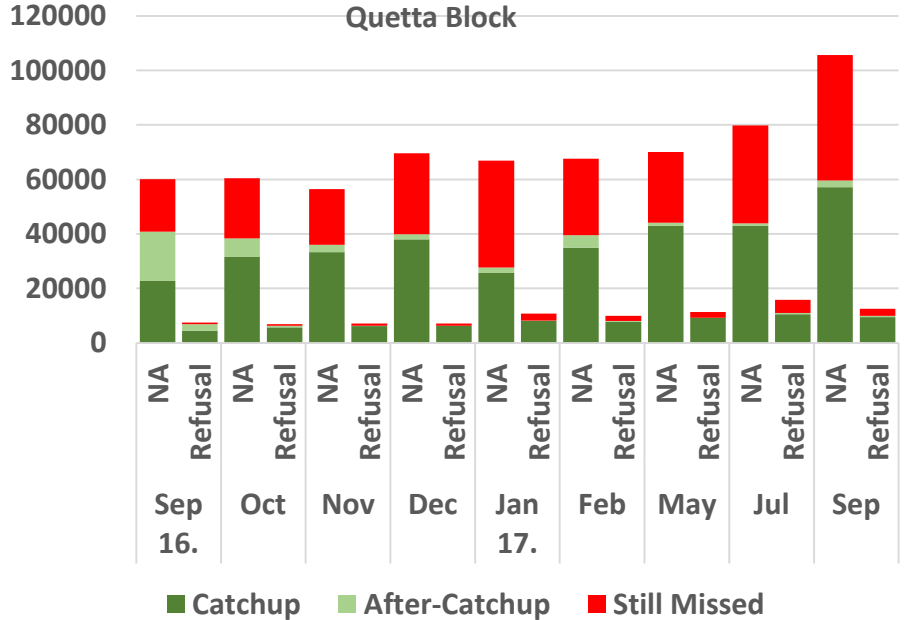


Half of children missed during campaign were refusals or absent

- Not Available
- Refusal
- New Born/New Migrant after team visited
- Vaccinated but not FM
- Child was sleeping
- Team visited but missed the child
- Team didn't visit
- Don't know /Other

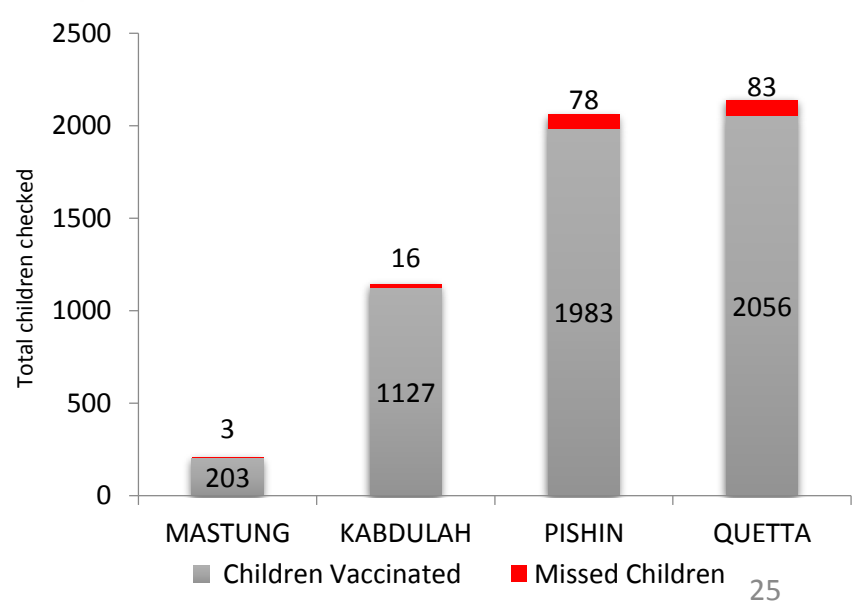
* Source = PCM

Missed Children Recovery (After Campaign) Quetta Block



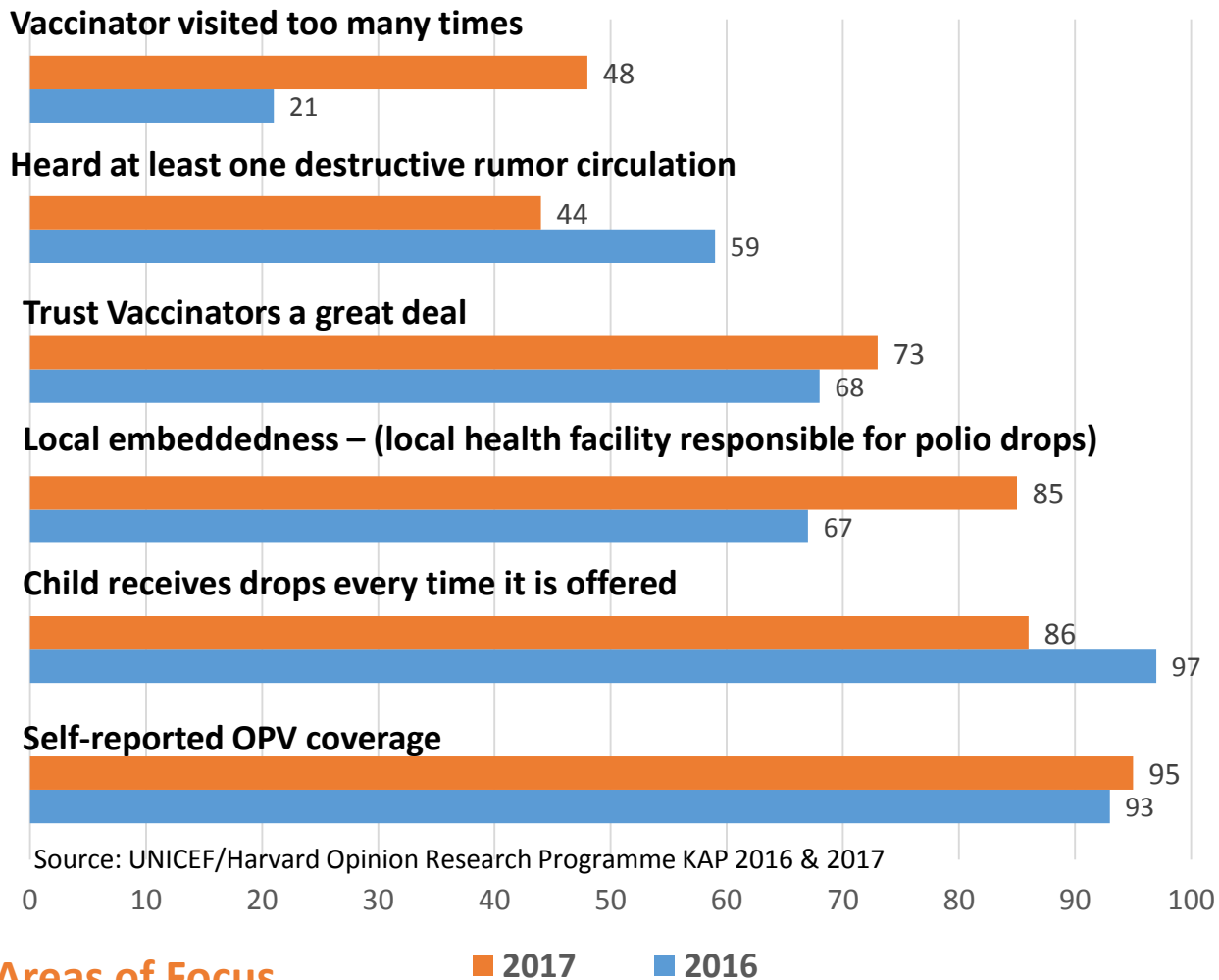
* Source = EOC Dashboard , Sep final data is still awaited

High Risk Mobile Population Survey Cluster Vaccination Status



* Source = HRMP Survey

Pakistan: Shifts in Knowledge, Perceptions, & Intentions to Vaccinate may suggest areas for improvement (2016-2017)



Definite Progress

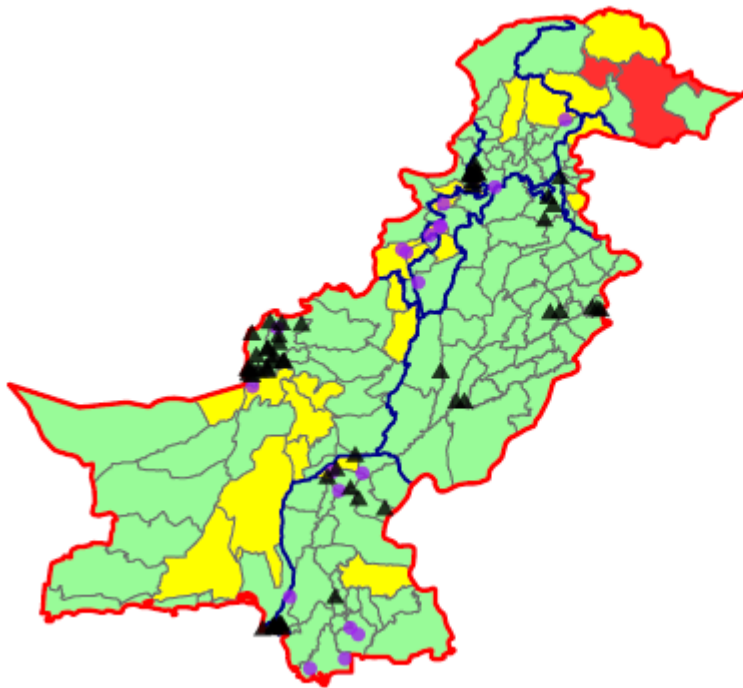
- Few hear and believe in rumors about OPV – engagement of Religious Support Persons, addressing misconceptions
- Increased trust in vaccinators – outcome of “Sehat Muhafiz” (Guardians of Health: strategy to portray front-line workers as local, knowledgeable and empathetic).
- Up to 50% of team members nationwide are females
- Programme perceived as being “local” – Government is leading, re-branding of the Polio programme in media
- More claim that they receive drops “every time”

Areas of Focus

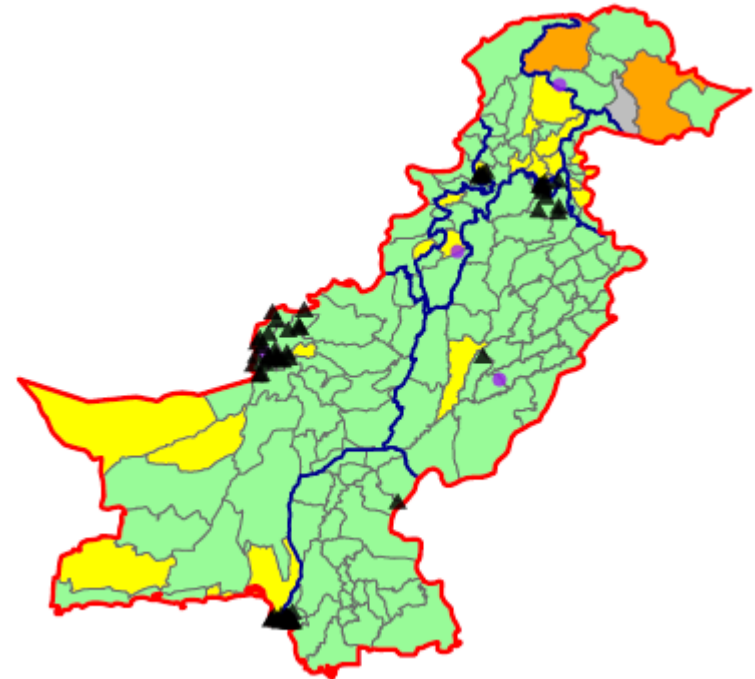
- Increasing campaign fatigue – “too many knocks” on the door potential for refusals and resistance
- Maintaining the sense of urgency in the context of almost no wild polio virus – implications to C4D content

Pakistan: Surveillance quality improving at the district, 2016 and 2017

2016



2017*



Composite Index
Missed Timely only
Missed both
Achieved both

Type/Source
WPV AFP
WPV ENV

*annualized data as of 1 Oct 2017

Source: WHO/POLIS, CDC

- Surveillance quality has improved overall
- Some variability at the district level is due to smaller population sizes, although timeliness may be more problematic within FATA and KP provinces (Peshawar) and Quetta
- More detailed surveillance review is provided in a separate report

Composite index: NPAFP $\geq 2/100,000$ under 15 year old population and stool timeliness $\geq 80\%$ (2 stools collected within 14 days of onset and arriving at lab in good condition.)

Afghanistan: Overview

- National Emergency Action Plan updated for remaining part of 2017 with new work-plan & working modality of EOC (June 2017)
- Operationalization of high-risk mobile population strategy, including guests, in coordination with Pakistan (August 2017)
- Surveillance:
 - Highly sensitive surveillance maintained with key indicators comparable across access categories. More than 3,500 reporting sites & 28,000 reporting volunteers part of network.
 - Expansion of environmental sampling – now in all regions with higher number and frequency in high-risk regions (20 sites in total)
- Special focus on very high-risk districts contributing to improved quality; gaps remain in the south contributing to virus circulation:
 - House-based microplan completed in secure districts (299 out of 399 districts)
 - New tally sheet with focus on guest and absent children was piloted in South and East; will be introduced country-wide in Nov 2017
 - Expansion of remote and third party monitoring
 - Southern corridor action plan: 15 districts of Helmand and Kandahar; district specific plans; special & staggered campaigns with national level monitoring
- Continued dialogue for access however parts of Kunduz are inaccessible again
- Multiple communication approaches working: New social data from Harvard poll shows overall high acceptance and intention to vaccinate

Afghanistan: Risks

South region:

- Risk of continued transmission and further spread
- Sub-optimal campaign quality in very high-risk districts of Kandahar, as well as insecurity problems
 - On-and-off bans/threat of bans;
 - Limited influence on selection of Front Line Workers
 - Limited ability to supervise/monitor implementation from national level
- Pockets of refusals, absent children
- Heavy population movement within southern corridor

East/Southeast region:

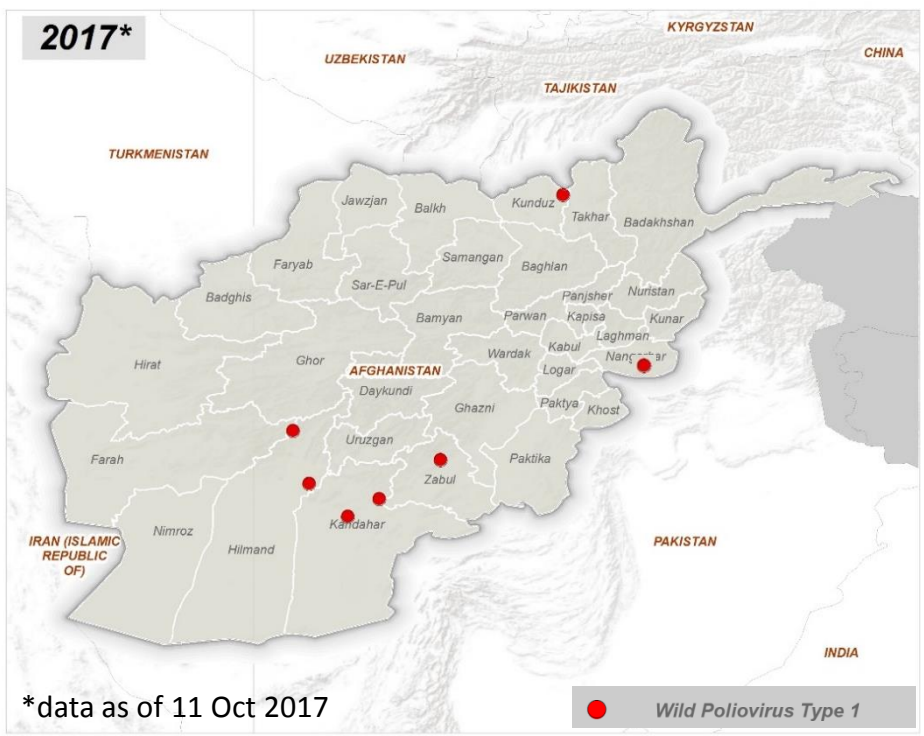
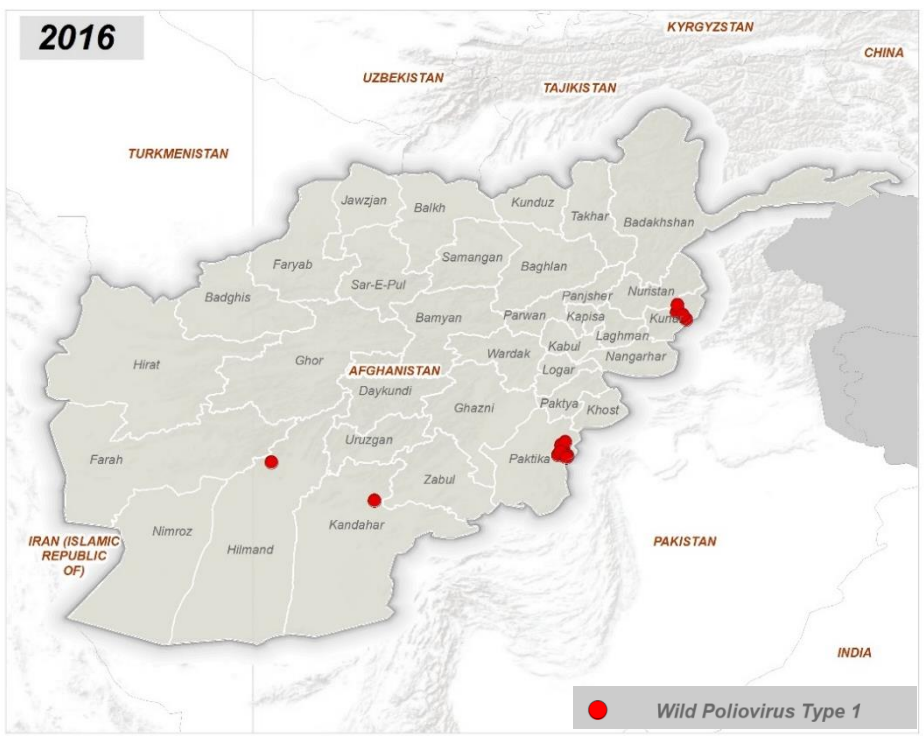
- Straddling populations and returnees
- Although small, pockets of scattered inaccessible populations

Other high risk mobile populations:

- Long distance travellers, nomads

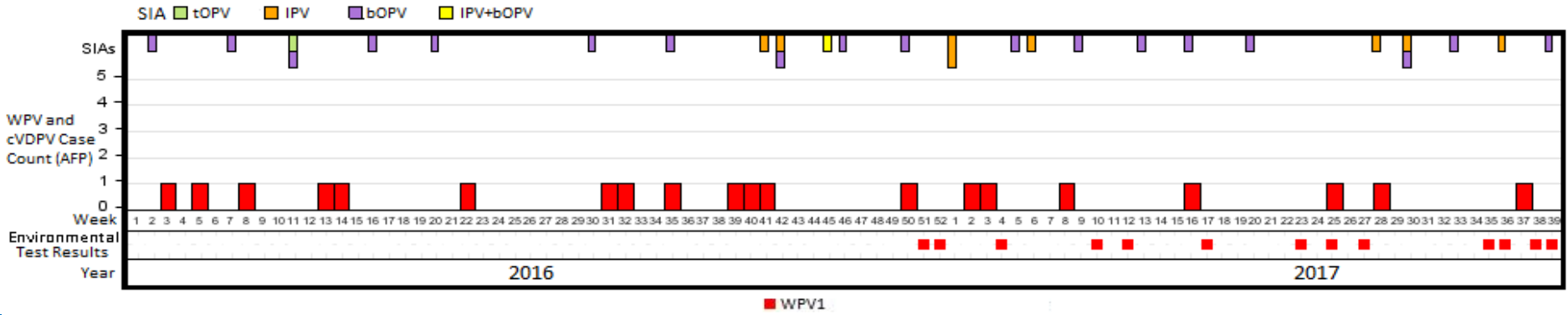
Changes in government oversight of the programme

Afghanistan: WPV1 cases, 2016 and Jan – Oct 2017



Source: WHO

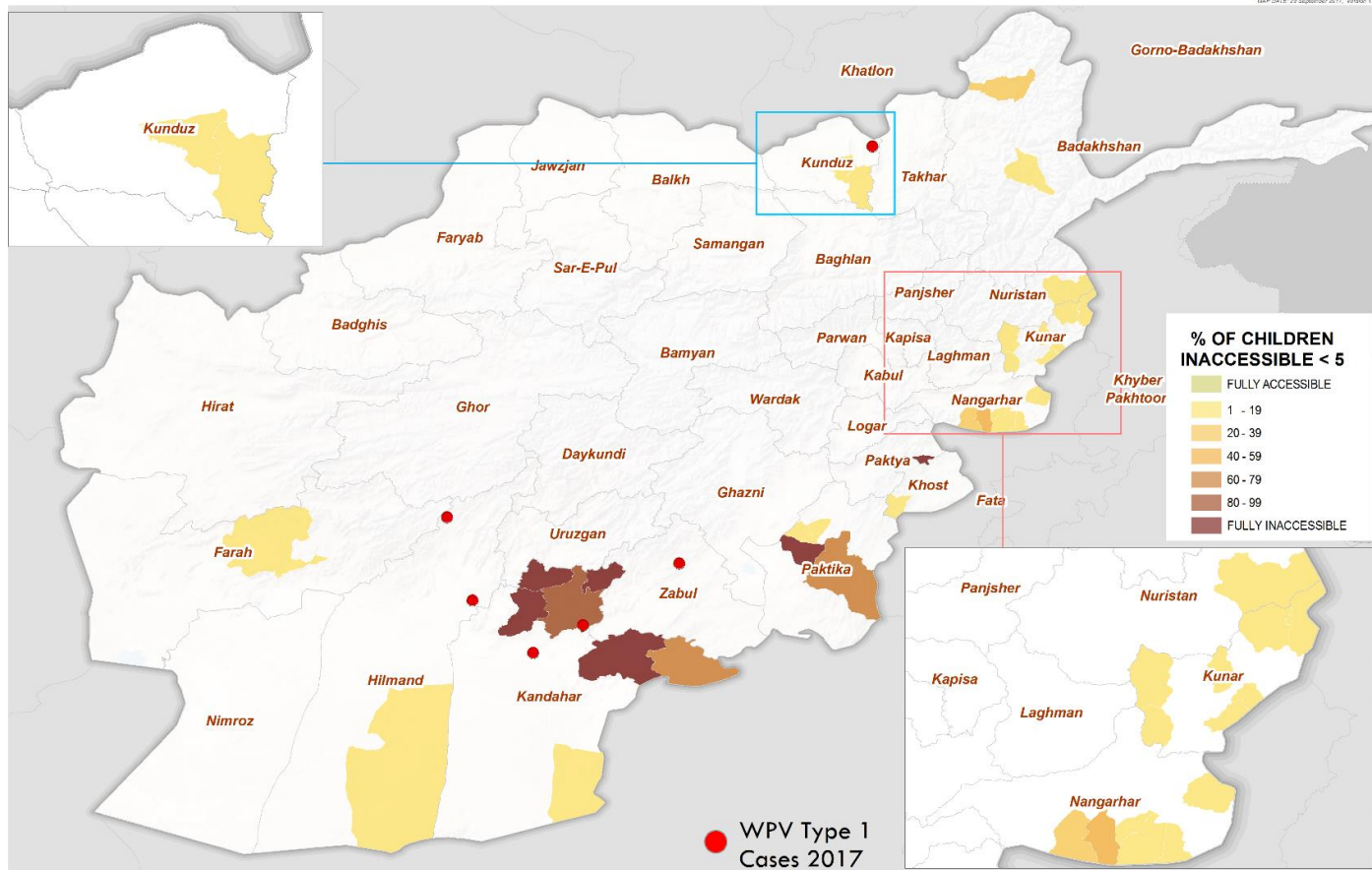
WPV1 cases, environmental results by onset week, and SIA, 2016 to Oct 2017



In 2016, Afghanistan had 13 WPV1 cases; YTD in 2017 there are 7 cases among 7 districts (5 provinces), compared to 8 cases in 4 districts (4 provinces) for the same period in 2016.

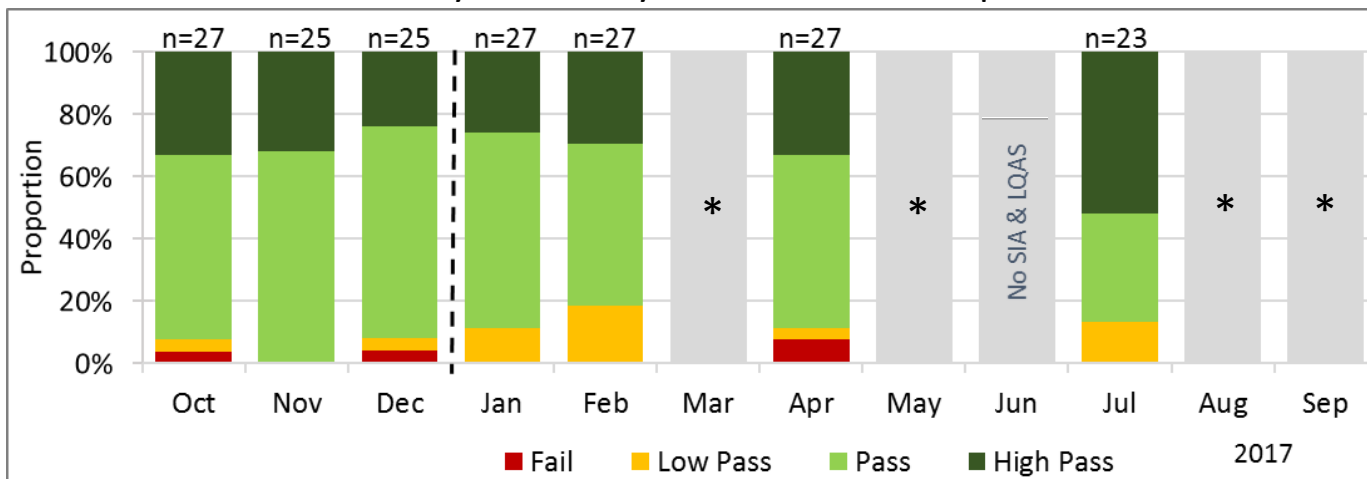
Afghanistan: Inaccessibility during August, 2017 SIAs

Access problems are increasing in parts of east and south, and have been of concern in parts of north.
A small number of children are inaccessible in Kunduz.



Eastern Afghanistan: SIA quality may have improved slightly, Oct 2016 – Sep 2017

LQAS Survey Results by SIA, Oct 2016 – Sep 2017



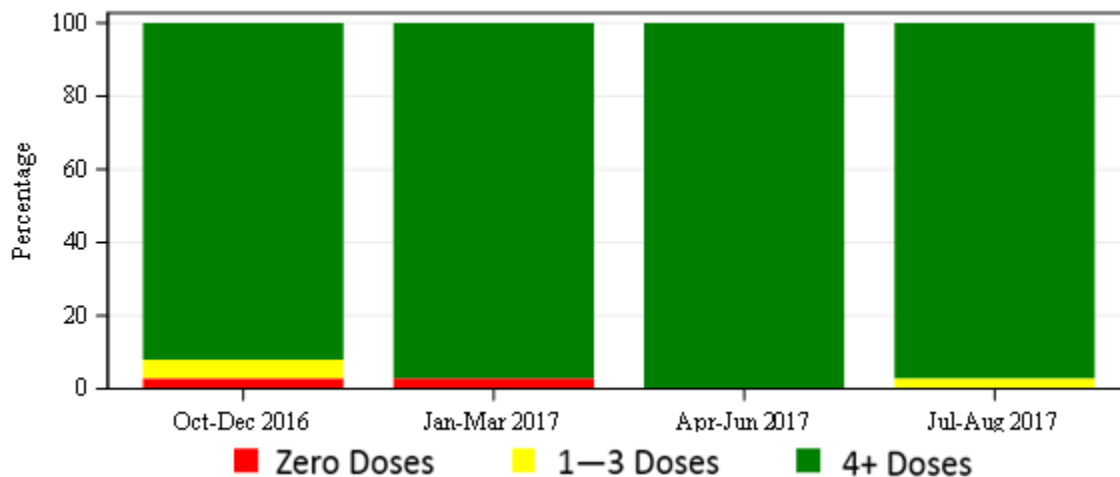
LQAS categories for unvaccinated children based on samples of 60 children:

- 0-3 = High Pass (90%+)
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- 9-19 = Low Pass (60%-79%)
- ≥ 20 = Fail (< 60%)

LQAS low pass (60%-79%) and fail (<60%) categories are combined

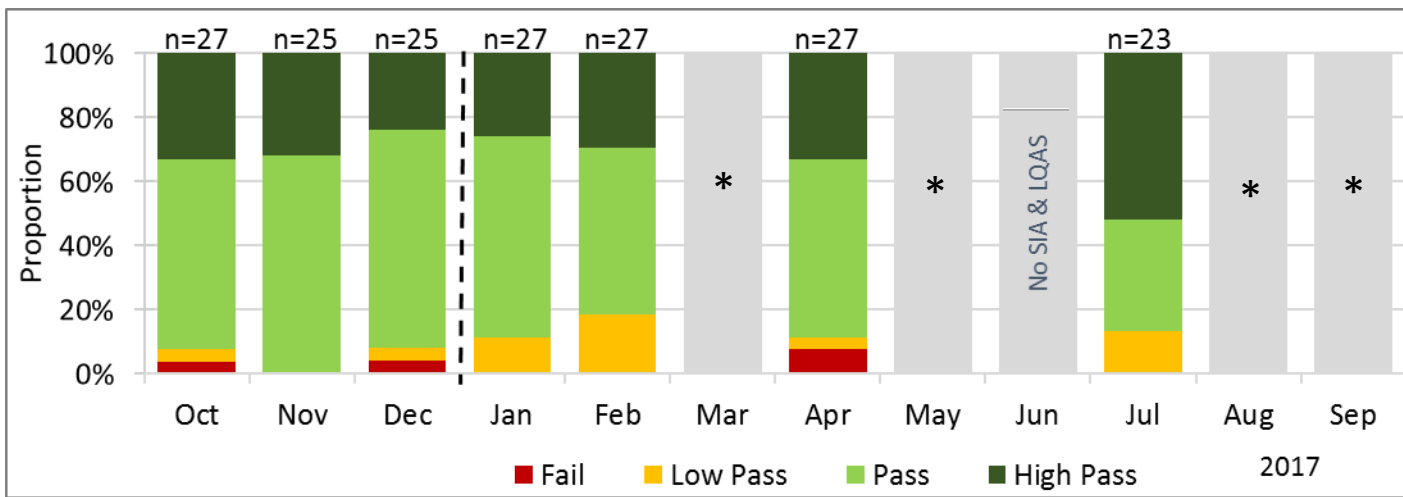
*bOPV SIA but no LQAS data in POLIS

NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017



Southern Afghanistan: SIA quality stalled with decreasing access, Oct 2016 – Sep 2017

LQAS Survey Results by SIA, Oct 2016 – Sep 2017



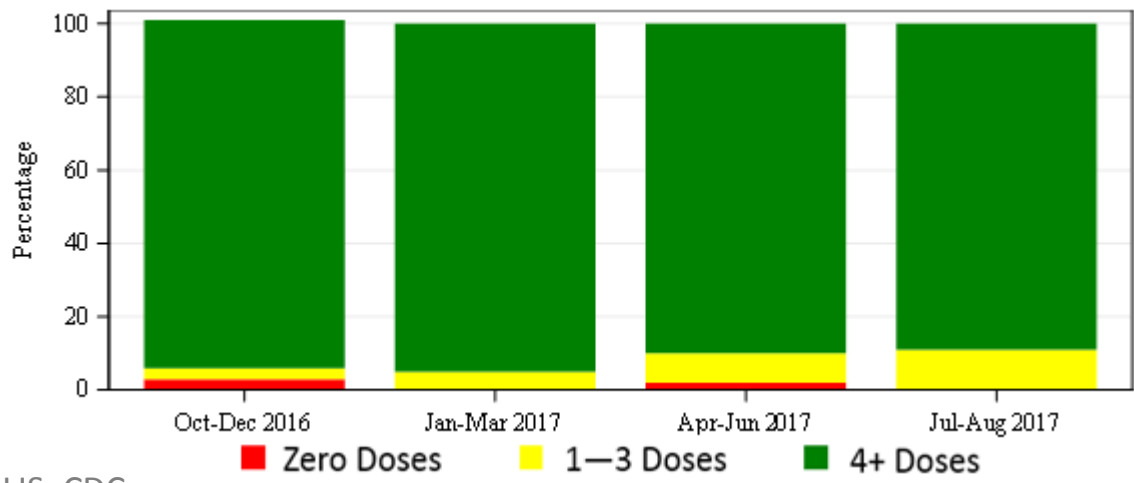
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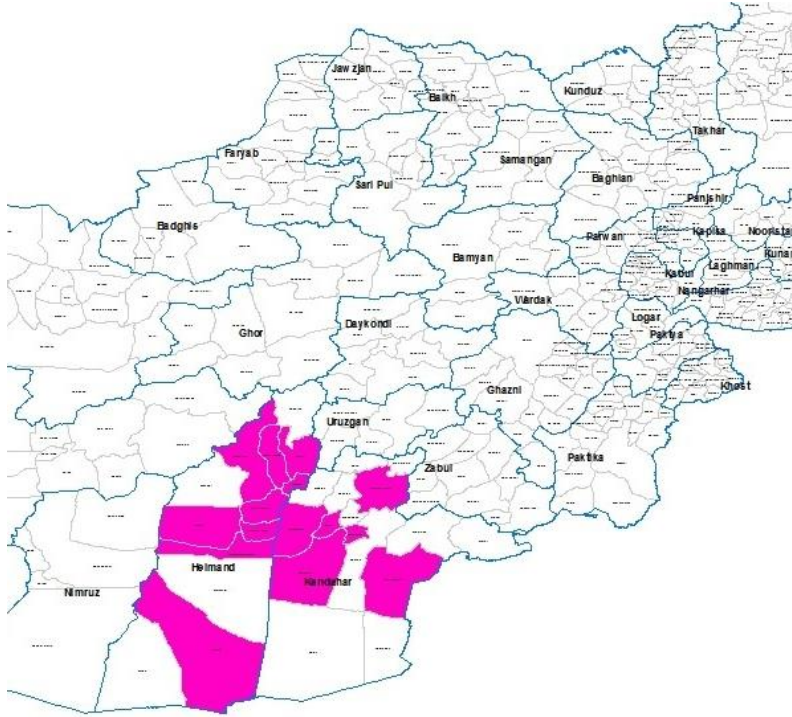
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NPAFP cases polio dose history at 6-35 months of age, by quarter, Oct 2016 to Aug 2017



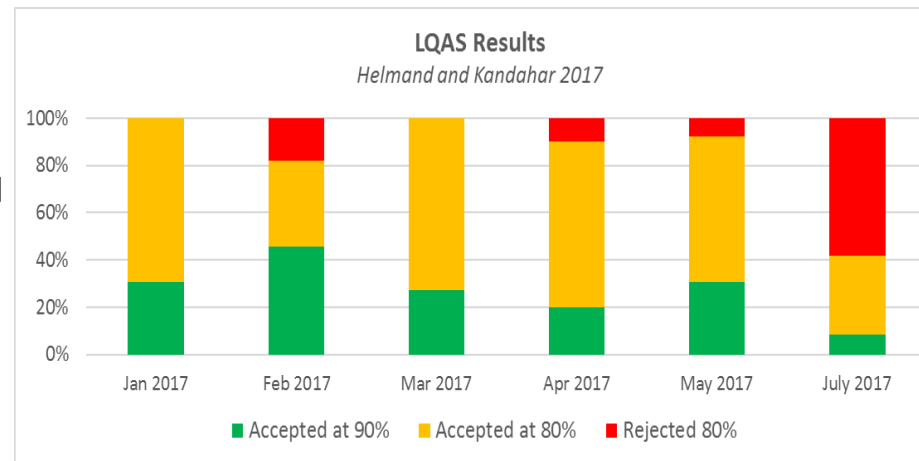
Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

Afghanistan: Renewed focus on highest risk 15 districts



- Focused plan developed for 9 districts in Helmand and 6 districts in Kandahar
- Since 2010, 15 districts account for:
 - 1.1M target population
 - 90% of cases in Southern Region
 - 50% of cases in AFG
 - All chains of transmission in AFG that have lasted >6 months
- Type 1 immunity:
 - Ranges 57% to 92% according calculations from NPAFP cases
 - >95% from recent Kandahar hospital-based serosurvey
- Long history of security/access issues and poor campaign quality

- Experienced GPEI staff deployed to Kandahar EOC to support planning and implementation
- Targeted expansion of transit teams & mobile health teams
- Identification and deployment of experienced, highly-skilled monitors from national EOC with capacity to freely travel in target districts
- The monitors will stay in the district for approximately 3 weeks (pre-, during, and post-campaign)
- The goal is to empower monitors to make concrete changes (e.g., replace vaccinators, change microplans)

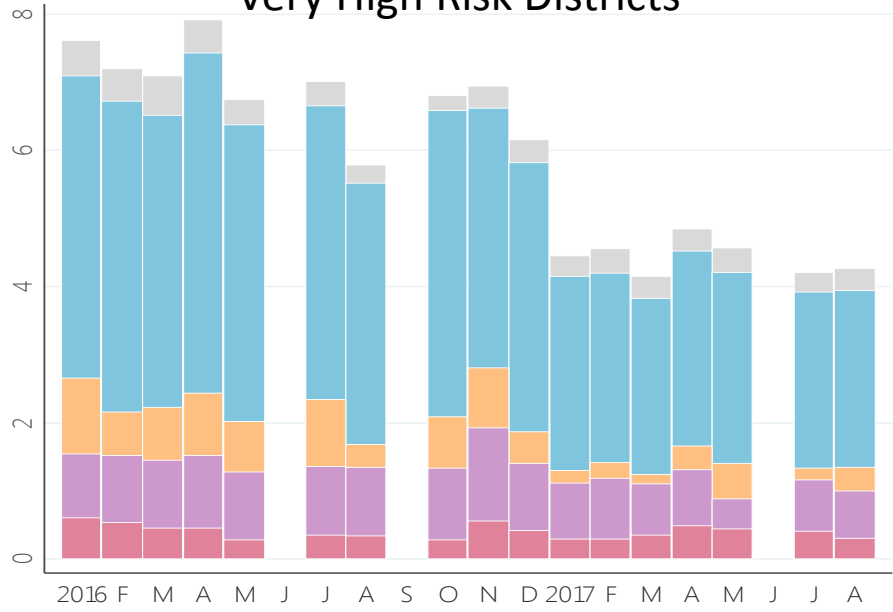


Afghanistan: Missed children decline to about 4% in Very High Risk Districts, 2016-2017

- Children are missed either due to absence at the time of vaccination, or refusal of vaccination
- Refusals are more prevalent in Southern regions.
- Child's non-availability due to Sick/Sleep/Newborn may represent covert refusals.

- Refusal (misconception; no decision maker)
- Sick/Sleep/Newborn
- No team visit
- Absence
- Others

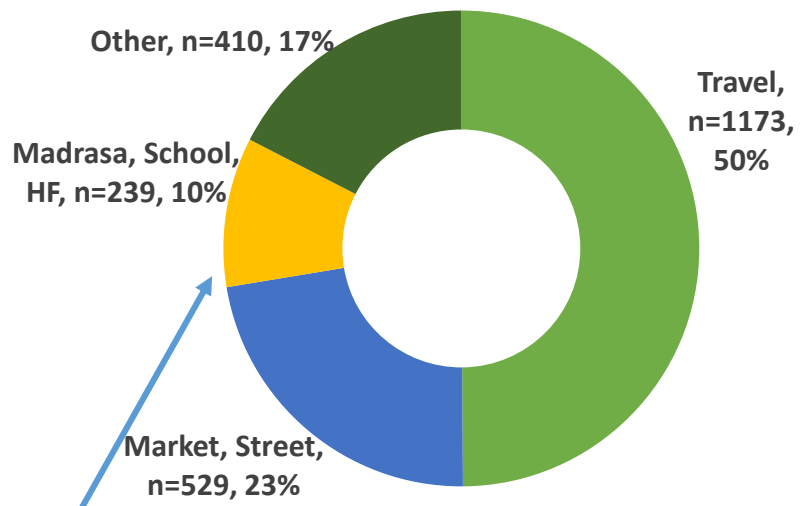
Very High Risk Districts



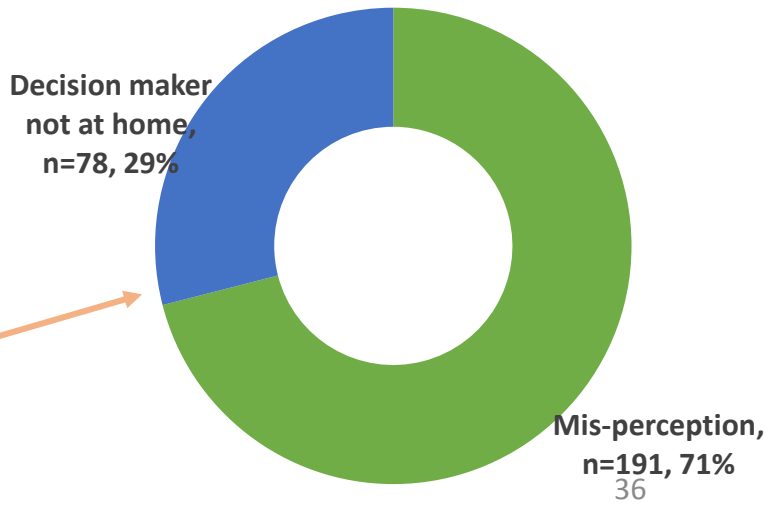
Source: Post Campaign Assessment

Source: PCA Data 2017

Reasons for Absence, Aug-17 PCA



Reasons for Refusals, Aug-17 PCA

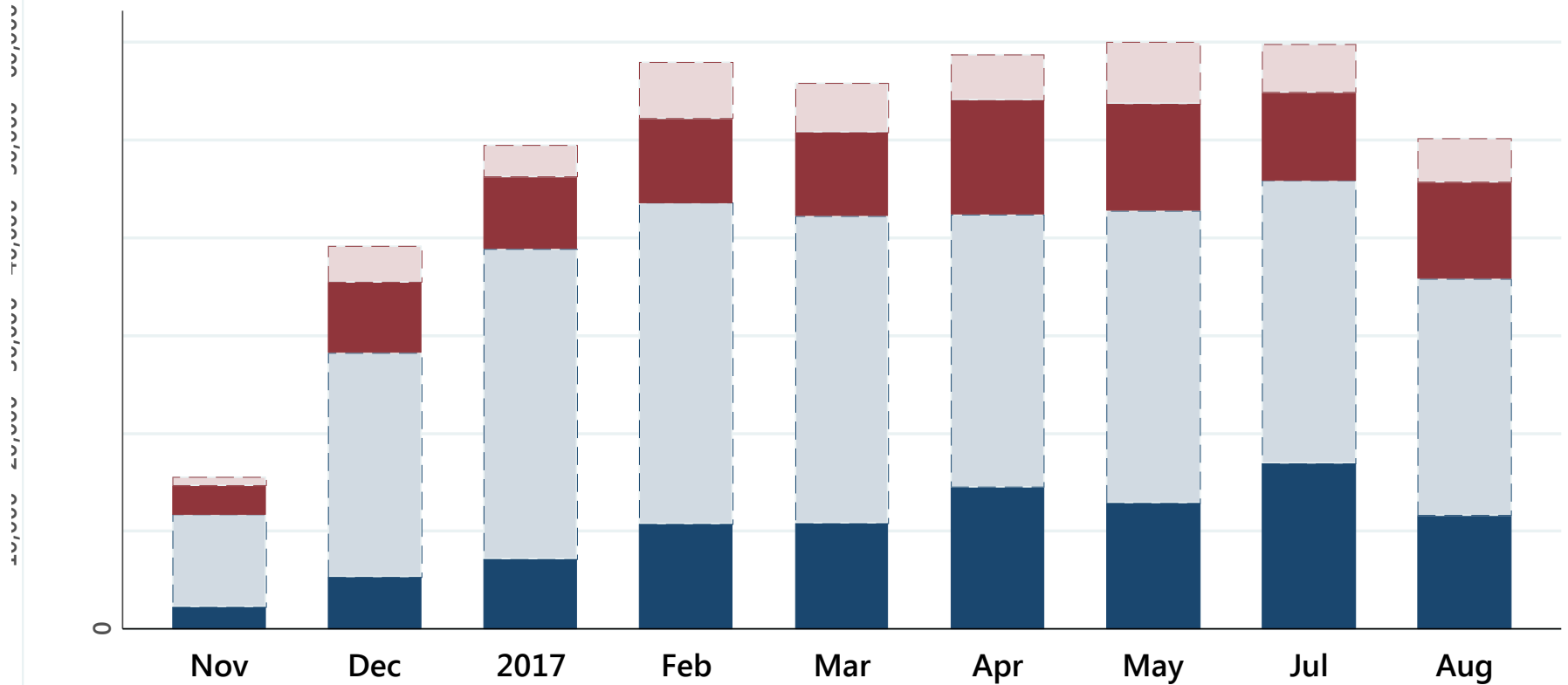


Afghanistan: Catch-up of Missed Children in Very High Risk Districts

- ICN* data represent a register of missed children who receive follow-up.
- Up to 75% of children missed during the campaign are vaccinated (recovered) during catch-up
- Proportionately more absent children were vaccinated at catch-up, compared to “refusal children”

Catching up missed children after campaign, Very High Risk districts aggregated

■ Absence Catch-up
 ■ Remaining Absences
 ■ Refusal Catch-up
 ■ Remaining Refusals



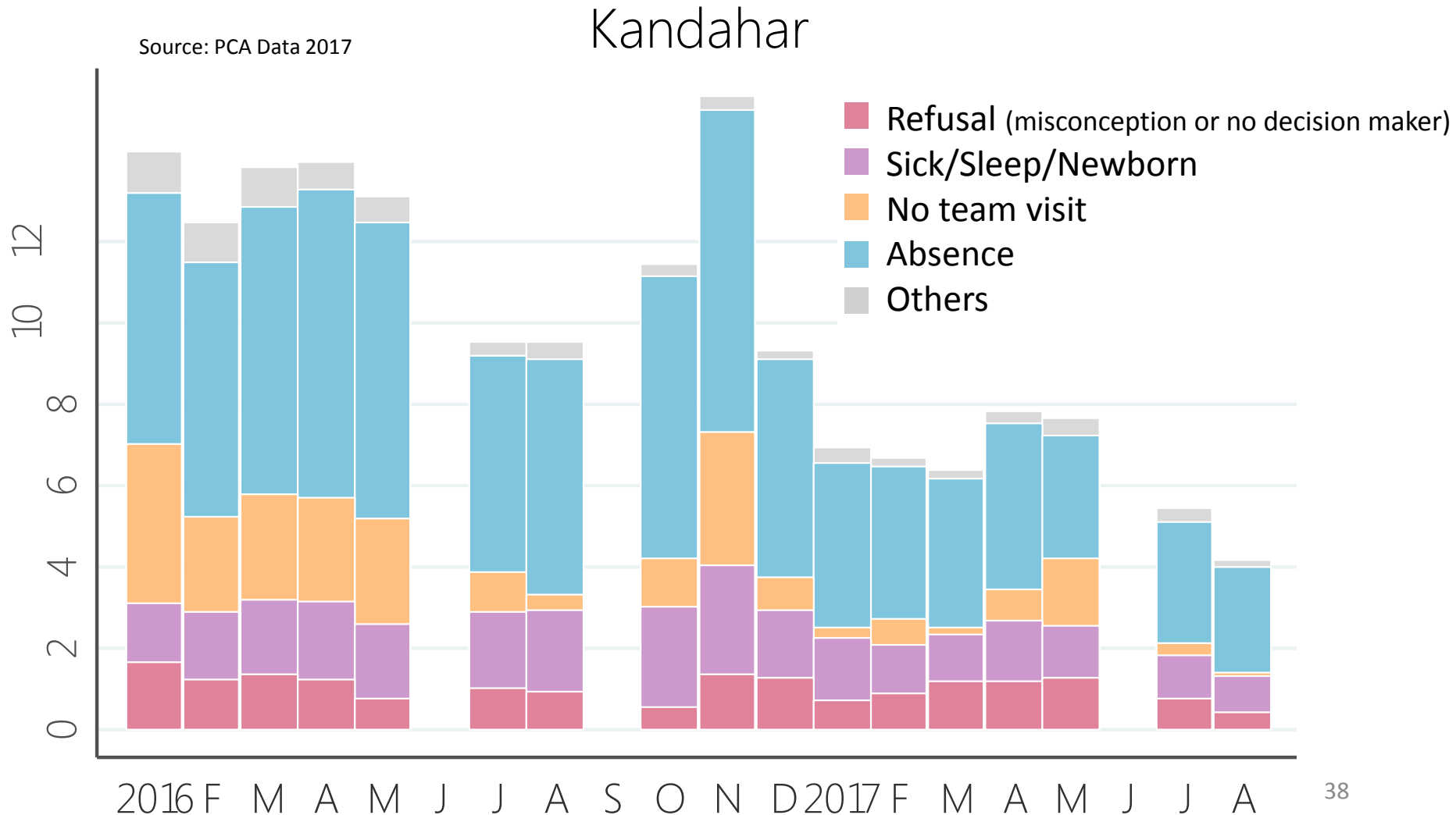
Source: Catch-up Data by ICN

Source: ICN Catch Up Data 2017

*ICN: Immunization Communication Network (mobilizers)

Afghanistan: Characteristics of missed children in Kandahar

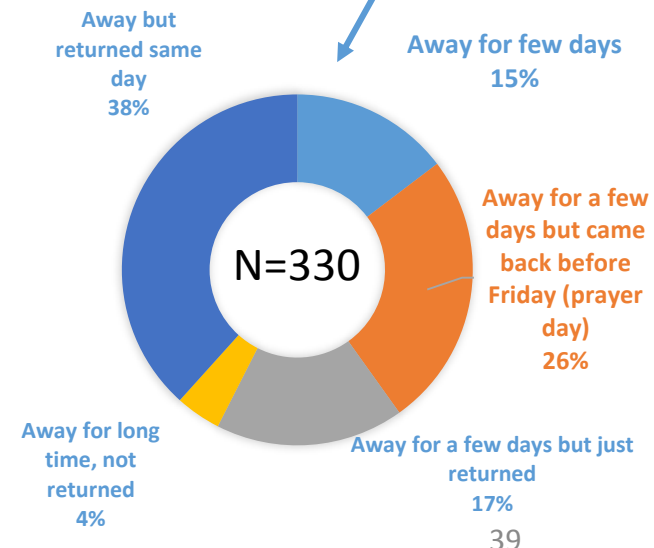
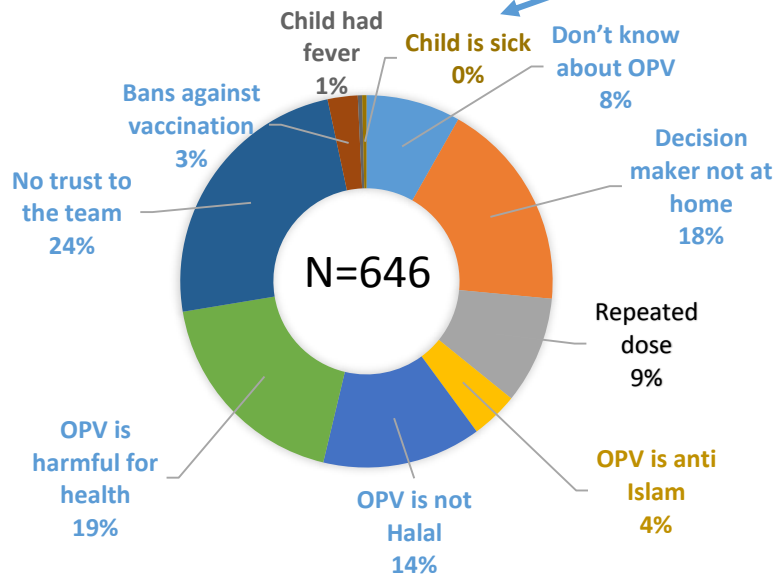
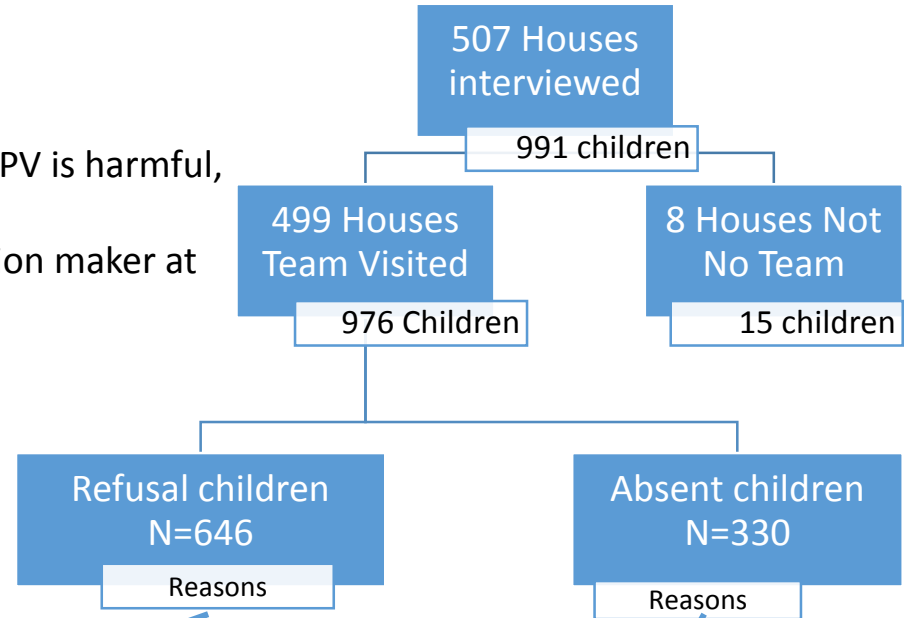
- Missed children in Kandahar range from 4 to 8%.
- The proportion of missed children was lowest in the July-August 2017 rounds.



Afghanistan: Survey of chronically missed children (507 households) in Kandahar City, 2017

- 2 out of 3 children are missed due to refusals
- 50% of refusals are due to lack of trust, belief that OPV is harmful, or not halal.
- Refusals are also linked to unavailability of the decision maker at home during the time of vaccination.
- Overall, 1 out of 3 missed children in Kandahar city are recovered and vaccinated (2 out of 3 in other areas of Afghanistan)*
- Among children missed due to absence, 2 of 3 were absent from home temporarily and returned either on the same day, or before the last day of catch up.

*Source: Immunization Communication Network Catch Up Data 2017



Source: Special Investigation of Missed Children 2017

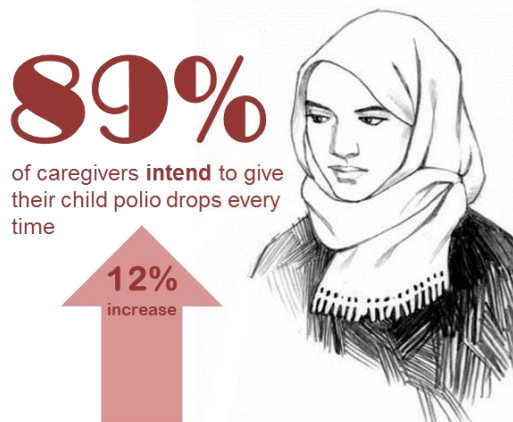
Afghanistan: Shifts in Knowledge, Perceptions, & Intentions to Vaccinate as measured by KAP surveys, 2017 compared to 2015

Definite Progress

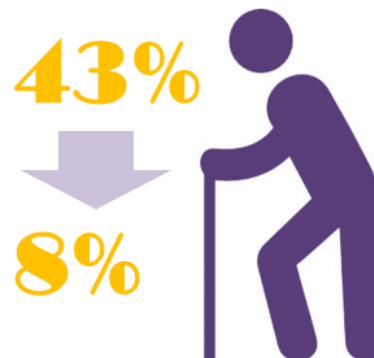
- Better knowledge & beliefs of transmission modes and incurable nature of paralysis
- Very few hear and believe in rumors about OPV – a decline since 2015
- High intentions to vaccinate – sizeable increase since 2015
- Programme perceived as being “local”
- Better perception of vaccination teams – over half of respondents reported “better” vaccinators during last round

Areas of Focus

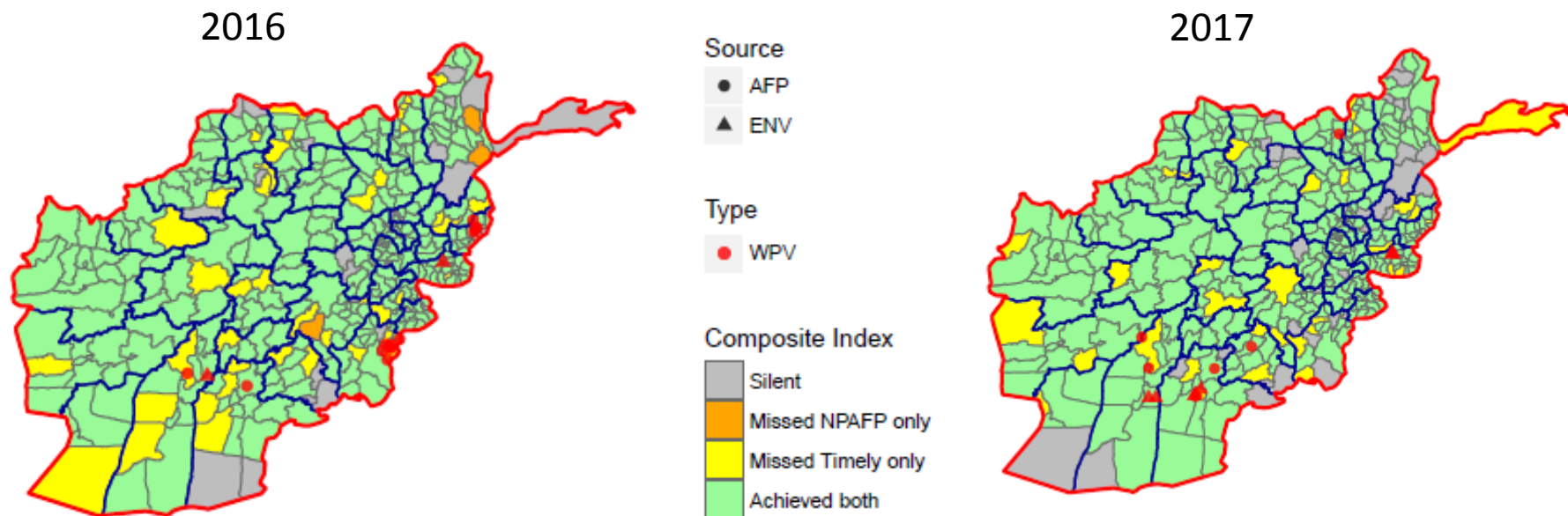
- Social norms and community dimension is limited – perceptions that neighbors oppose polio drops are sizeable (1 out of 4 reported)
- Nearly 1 out of 5 claimed missing drops “most of the time” - roughly half of them due to “child sick” or “child asleep”
- 73% prefer women on a vaccination team – only 27% reported seeing one
- Geographies: Farah and Uruzgan – lower social data indicators



caregiver **belief** that polio paralysis is curable declined dramatically



Afghanistan: Surveillance Composite Index by district, 2016 and 2017



- AFG increased the number of reporting volunteers in the AFP surveillance network
- 66% increase from 17,218 volunteers in 2015 to 28,543 in 2017
- Surveillance indicators are met at province level

Source: WHO/POLIS; CDC

Composite index: NPAFP $\geq 2/100,000$ under 15 year old population and stool timeliness $\geq 80\%$ (2 stools collected within 14 days of onset and arriving at lab in good condition.)

Nigeria: Overview

- WPV1: Cross-border movement, IDP/refugee populations, continued insecurity in the Lake region and SIA quality in Lake Chad basin countries may pose a risk of continued WPV circulation
- VDPV2: Multiple rounds of mOPV2 + 1 round of IPV used to respond to VDPV2 emergence in Sokoto. No cVDPV2 outbreak related virus is reported following 3 rounds of mOPV2 in Borno and Sokoto
- Northern Nigeria needs to be vigilant for cVDPVs

Borno State

- All LGAs reported AFP, except for Abadam and Marte, which are 100% inaccessible and thus have no ongoing surveillance
- 164 (50%) of wards have not reported a case to date this year (under 15 population ranges from 800 to 29,600)
- 20 AFP cases reported from security compromised areas in 10 LGAs; 107 cases from IDP camps
- 238 samples from 7 ES sites
- Innovations with environmental 'sweep' (47 samples collected from non-regular ES were negative for WPV and VDPVs. Sampled 345 healthy children coming from insecure areas; all samples tested negative for WPV or VDPV. Enhanced community-based surveillance supported by auto visual reporting system (AVADAR).

Nigeria: Risks and mitigation efforts

Operational

- 30-40% of settlements (162,000-232,000) children in Borno remain inaccessible (estimate based on 2 sources: Borno EOC, and CDC GRASP satellite imagery)
- Inaccessible children are unlikely to have received any response vaccine
- Surveillance is limited in inaccessible areas
- Political support: all Abuja Commitment indicators were under 50% in Q2-2017
- Variability in outbreak response quality among the Lake Chad basin countries

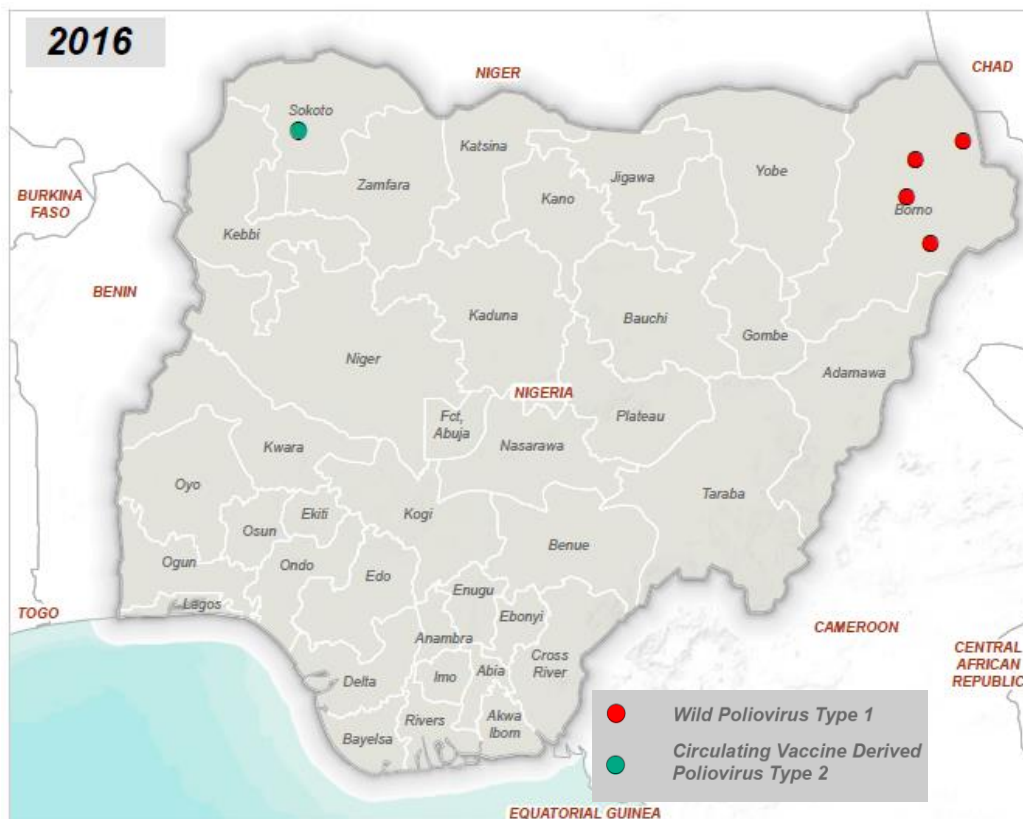
Plans for next 3 months in Borno

- Prioritize expansion of the Reaching Every Settlement and Reaching Inaccessible Children strategies into districts (i.e., LGAs) with most remaining children; Abadam and Marte LGAs; and 176 islands on the Nigeria side of Lake Chad
- Hold strategy session with the Governor and military to gain political and security support for a 'dry season' drive to reach the remaining 6,000 settlements
- Aim for all planned settlements having at least five OPV contacts by December, 2017 through the RES and RIC strategy

Nigeria: Questions needing answers

- What surveillance sensitivity is required and how many children must be reached in inaccessible areas to strengthen confidence that circulation has stopped?
- How many persons are living in Lake Chad islands, and what is extent of movement of islands populations among countries? Nigerian islands are essentially “no man’s land” and inaccessible; the islands belonging to Chad, Cameroon and Niger have yet to be mapped
- What is ability of Nigerian military to expand RIC activities to areas currently not reached? What is timeframe for expanding RIC activities? (currently immunization activities are dependent on military imperatives)
- What is public perception of the need for continued polio vaccination? (It’s been more than two years since the Harvard poll was conducted.)
- Can political support for polio be sustained in the face of a severe economic downturn and the political uncertainty around the Presidency?
- How can overall program costs in Nigeria in 2018 be contained/reduced while reaching children with needed vaccine and while closing surveillance gaps?

Nigeria: WPV1 and cVDPV cases



Source: WHO

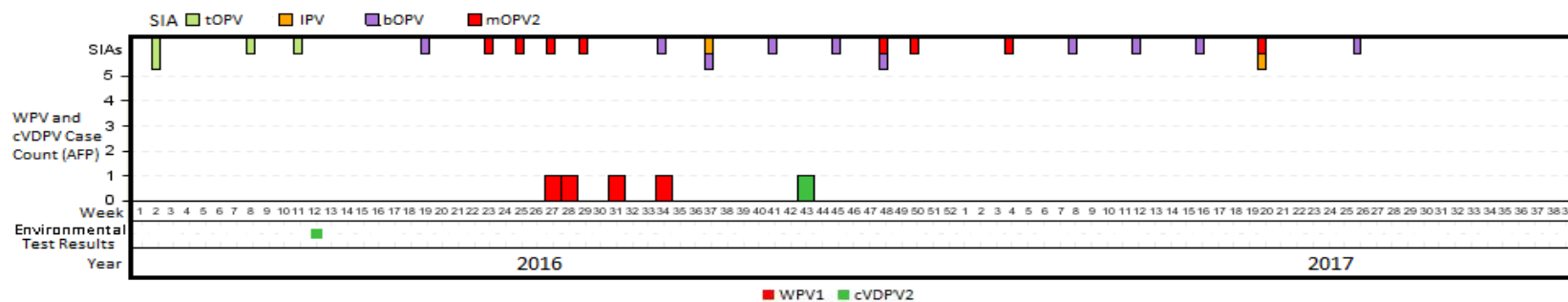
2016

- 4 WPV1 were under-immunized children from conflict-affected areas; last WPV1 onset 21 Aug 2016.
- 2 cVDPV2 isolates in Borno (healthy contact of WPV1 case and ES)
- Last reported cVDPV2 case had onset on 28 Oct 2016 in Sokoto

2017

- No WPV1 or cVDPV2 cases (or ES isolates)
- 10 aVDPV2s reported from ES in four states in 2017 (Sokoto:6, Katsina:1, Bauchi:1, Gombe:2)
- 5 compatible cases reported as of 6 Oct (Kano:2, Borno:1, FCT:1, Ebonyi:1 [weekly Nigeria bulletin]), compared with 25 cases in 13 states in 2016

WPV1 and cVDPV cases, environmental results by onset week, and SIAs, 2016 to Oct 2017

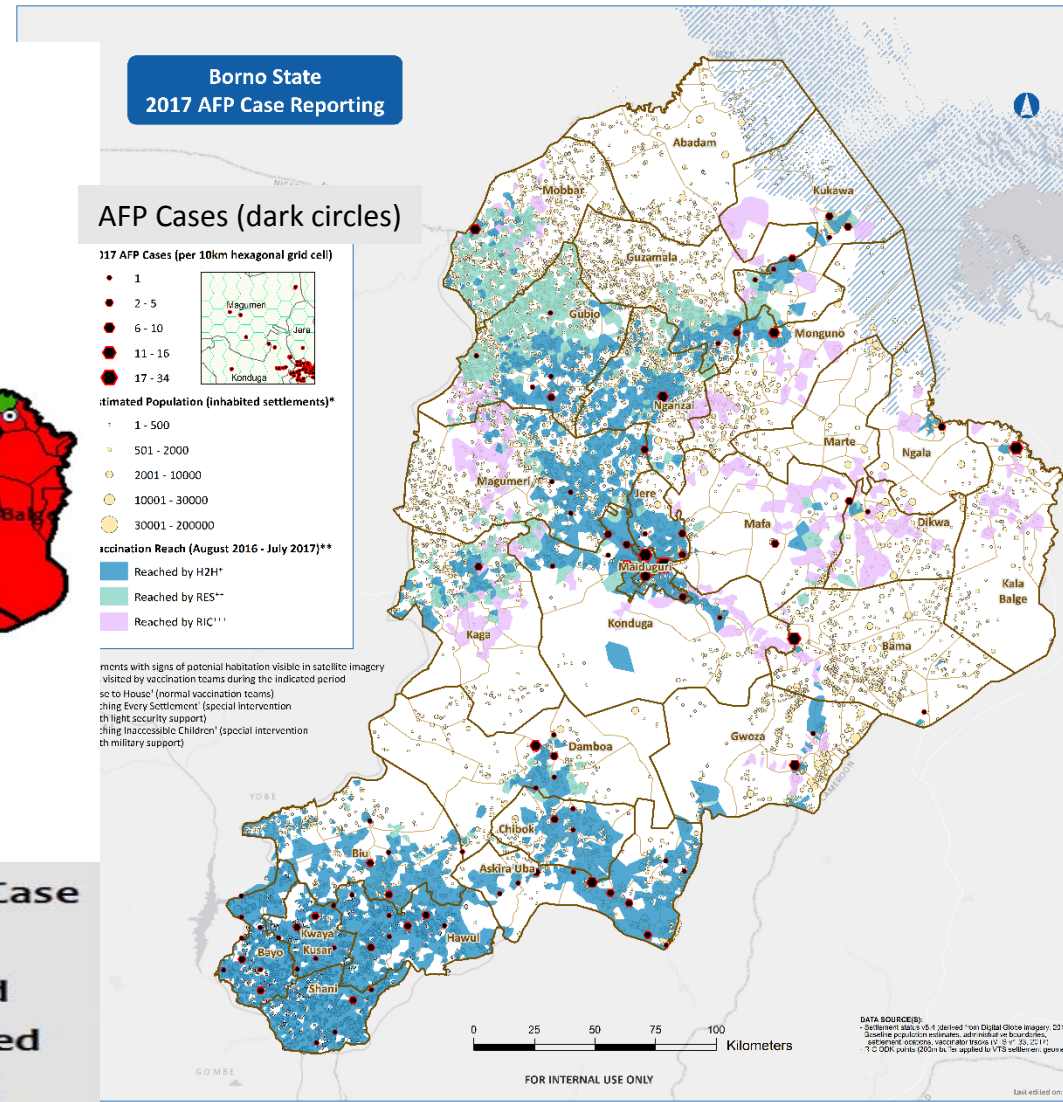
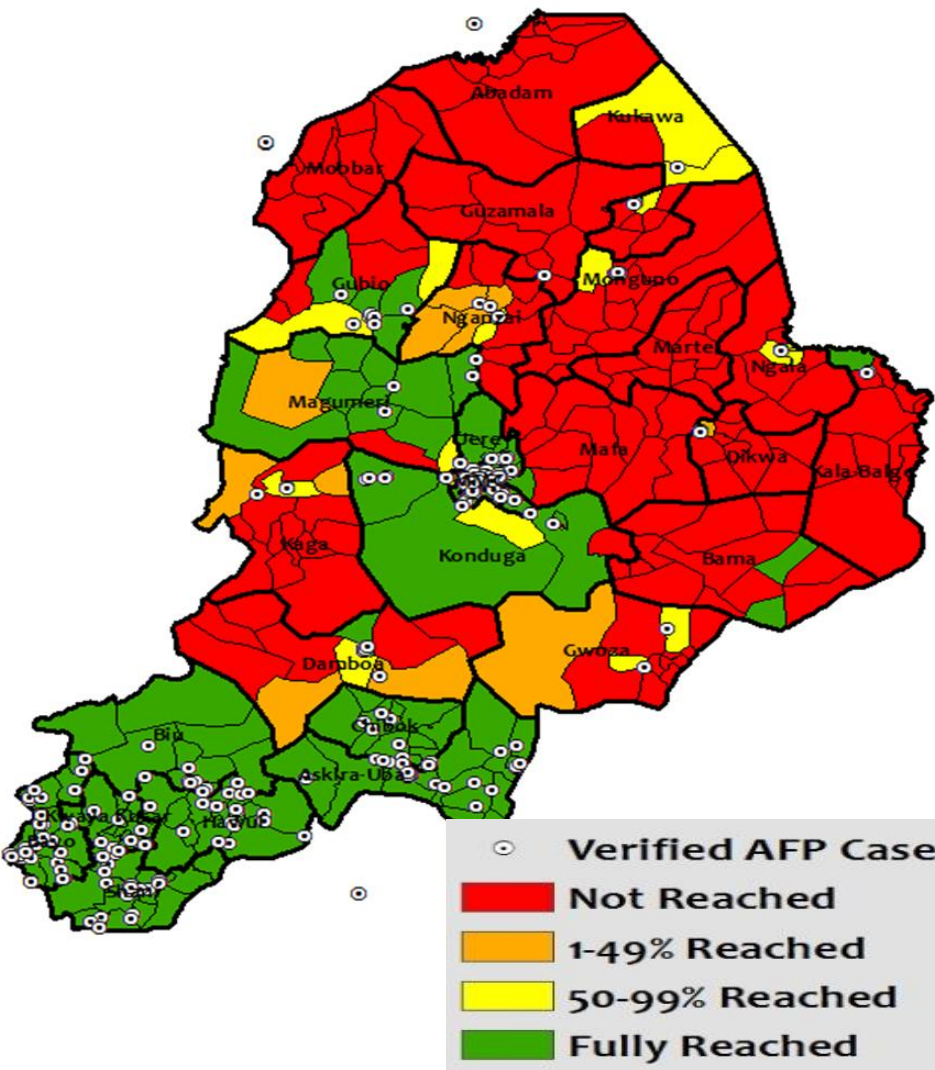


Source: WHO/POLIS; CDC

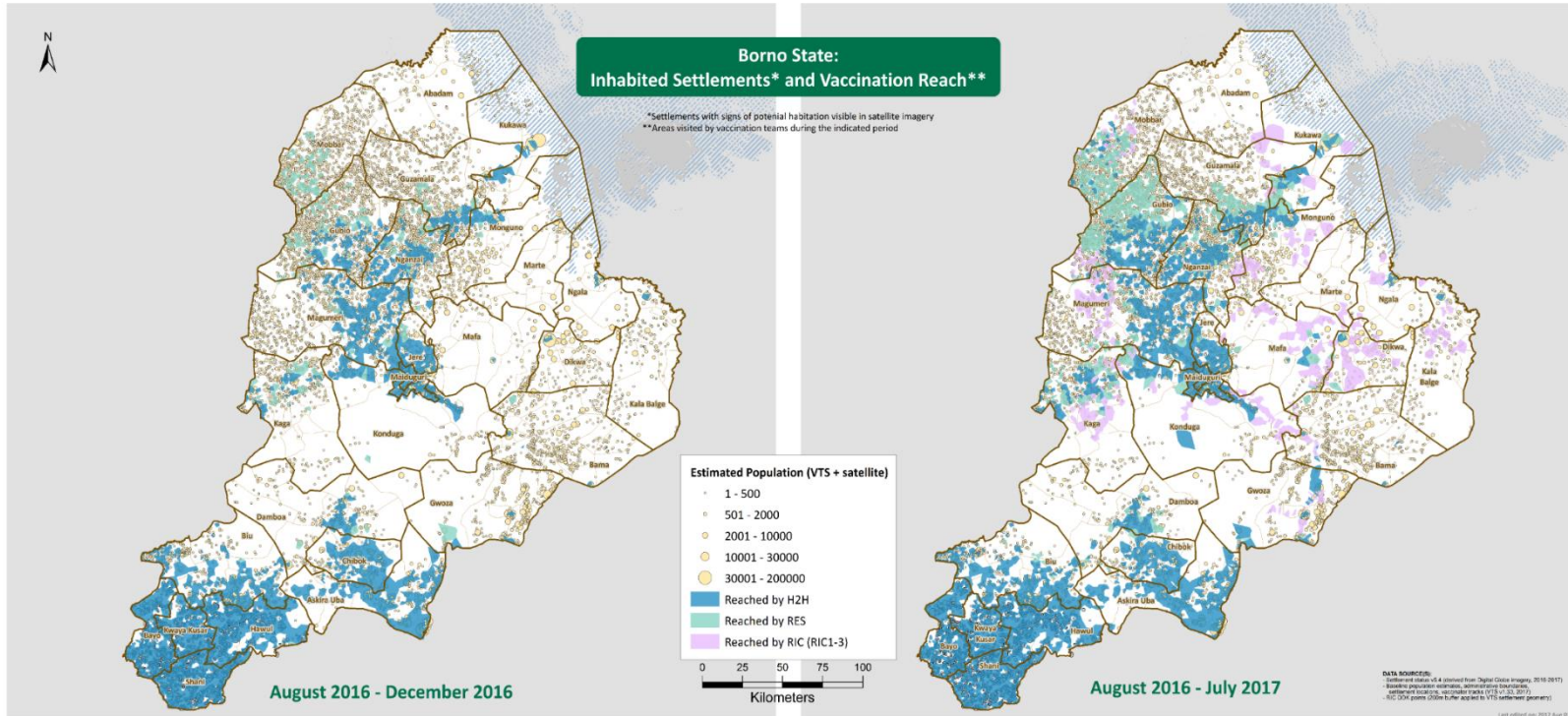
Nigeria: Borno State AFP cases 2016—2017

Coordinates of AFP cases, Jan-Aug, 2016

Coordinates of AFP cases, Jan-Aug, 2017



Nigeria: Improving access in Borno State, but still high risk due to inability to reach all children, 2016 to 2017



Reaching Every Settlement (RES) Initiative supports **civilian vaccinators** to reach partially accessible settlements, w/ support of paramilitary, such as the civilian joint task force (CJTF). This commenced in October 2016

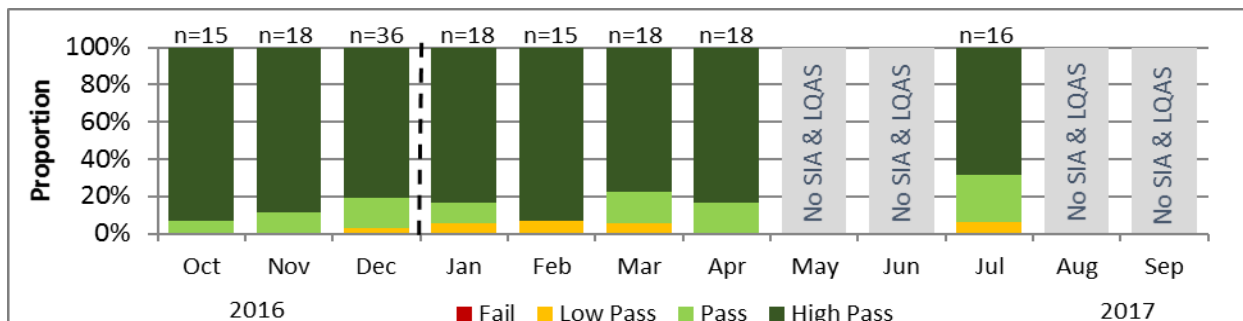
Reaching Inaccessible Children (RIC): a specialized operation between the State gov & military to vaccinate children in inaccessible settlements through **trained military personnel**. This commenced in April 2017

As a result, more than 268,780 eligible children have been reached with OPV from insecure regions

Although support from military and security forces has improved access, 162,000 to 232,000 children <5 are still unreached.

Nigeria: Quality of immunization activities in 4 high risk states, Oct 2016 – Sep 2017

Borno



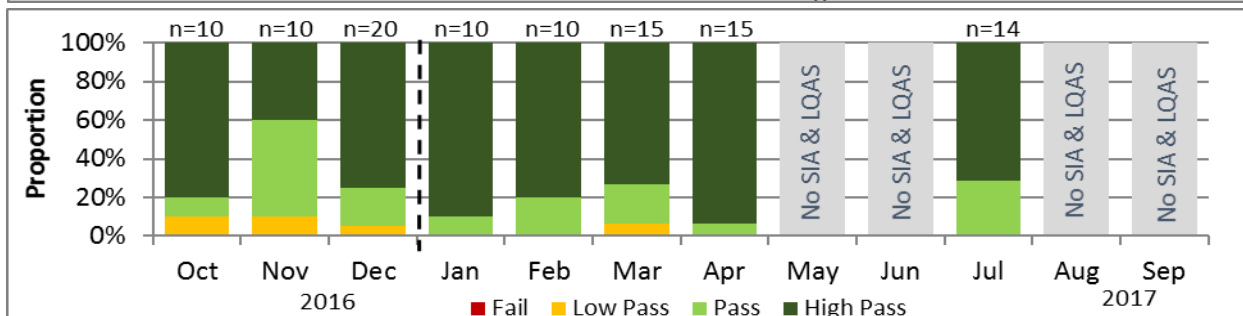
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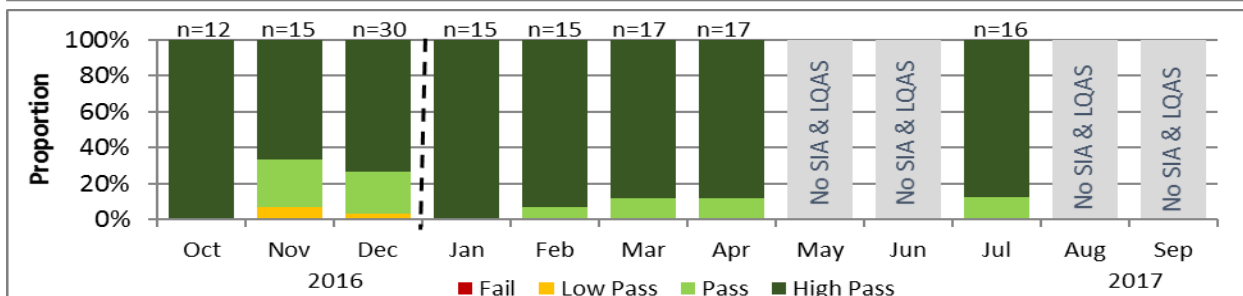
Note: lower performance in Sokoto in Aug 2017 is due to improved process for conducting LQAS

Source: WHO/POLIS; CDC (based on LQAS data in POLIS)

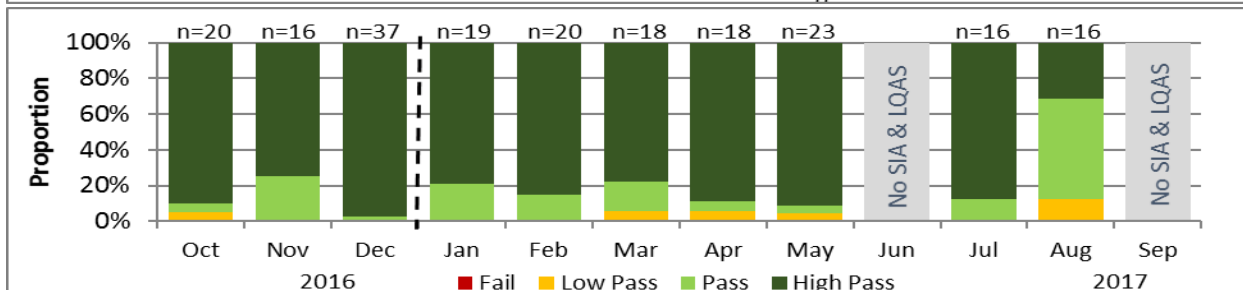
Adamawa



Yobe



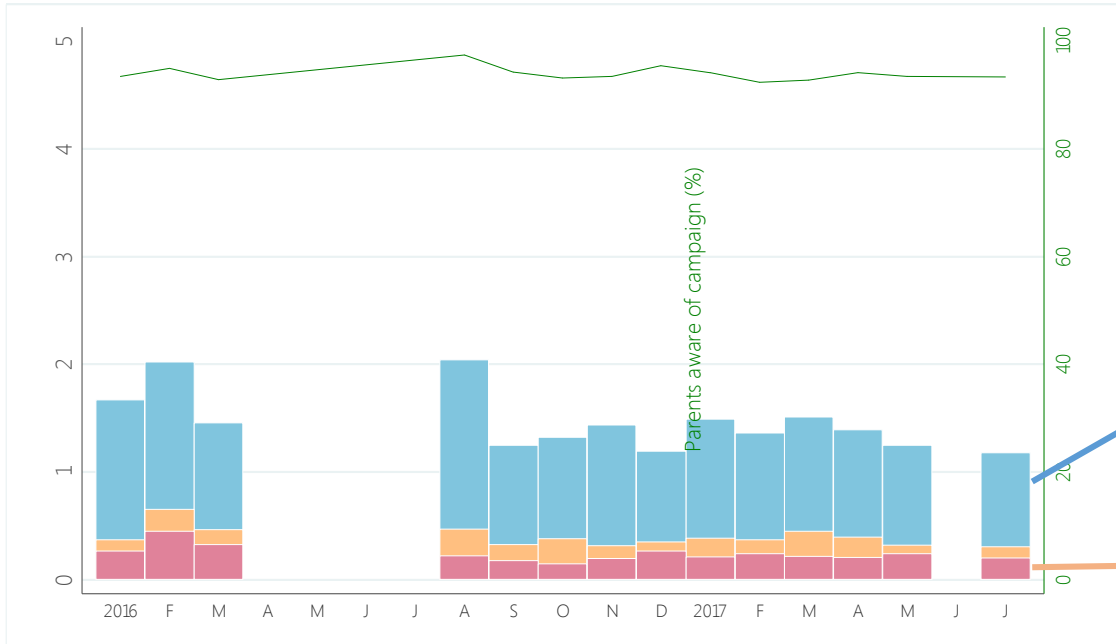
Sokoto



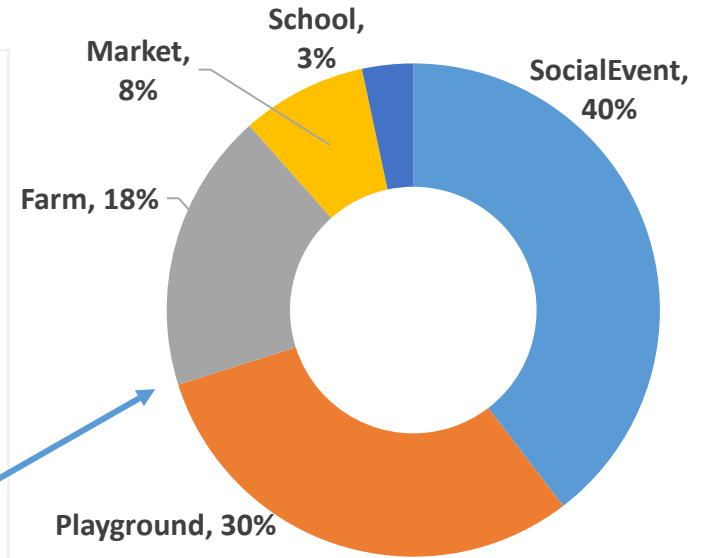
Nigeria: Analysis of Missed Children in High Risk States*

Reasons for Absence

Source: PCA Data July 2017

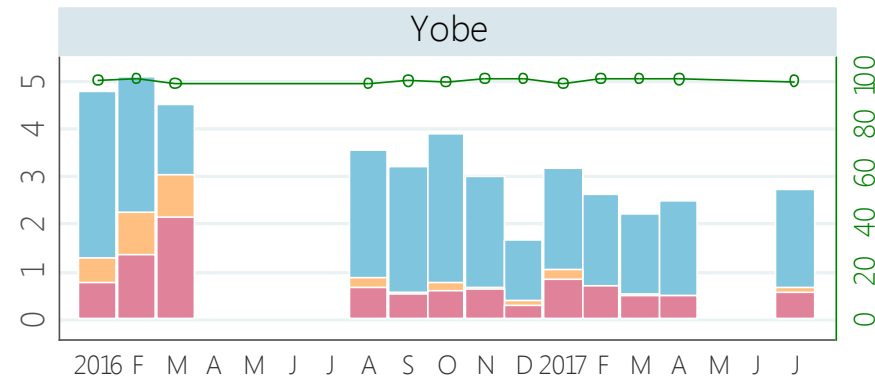
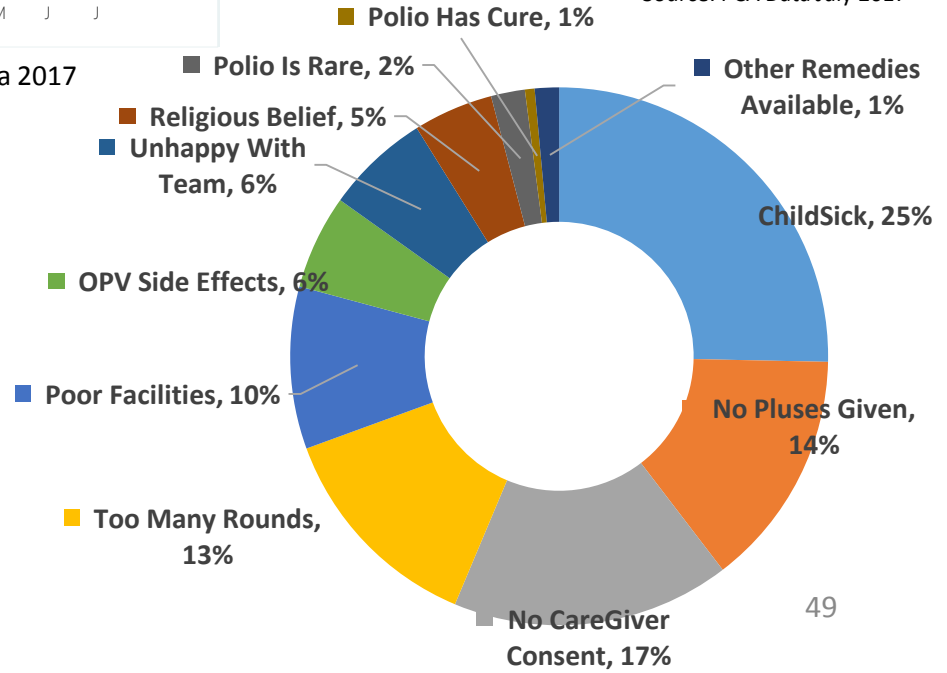


Source: PCA Data 2017



Reasons for Refusals

Source: PCA Data July 2017

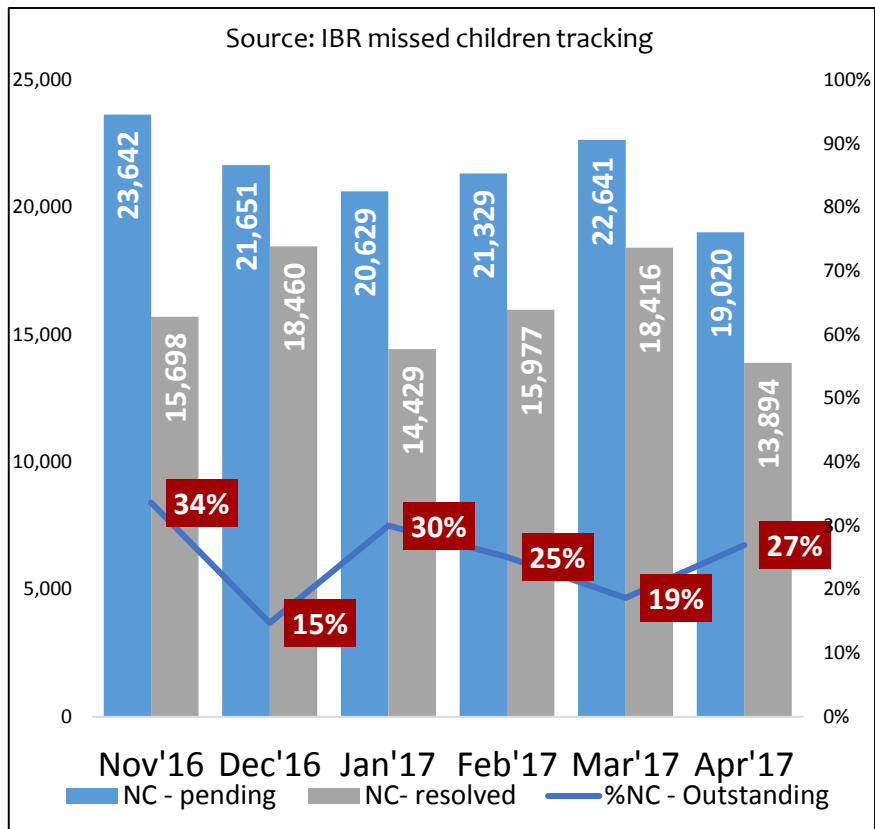


*12 HR States: Kaduna, Katsina, Kano, Kebbi, Sokoto, Niger, Bauchi, Yobe, Borno, Jigawa, Zamfara and Taraba

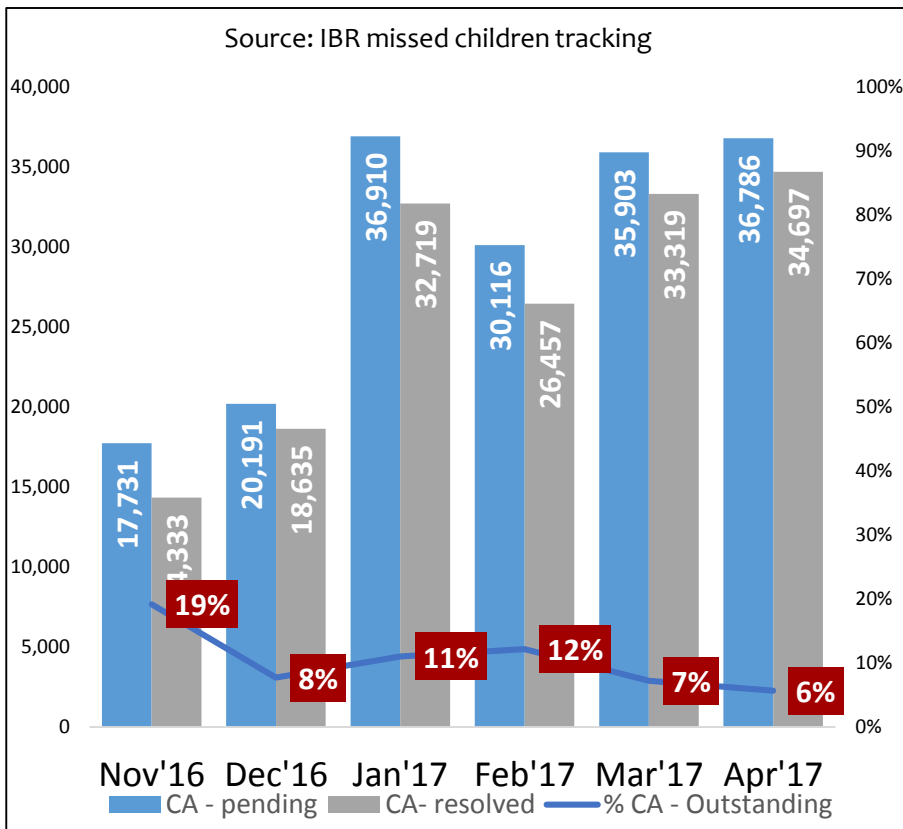
Nigeria: Focus on 12 High Risk States - Recovery of Missed Children

12 HR States: Kaduna, Katsina, Kano, Kebbi, Sokoto, Niger, Bauchi, Yobe, Borno, Jigawa, Zamfara and Taraba

Recovery of Missed due to Refusal



Recovery of Missed due to Child Absent

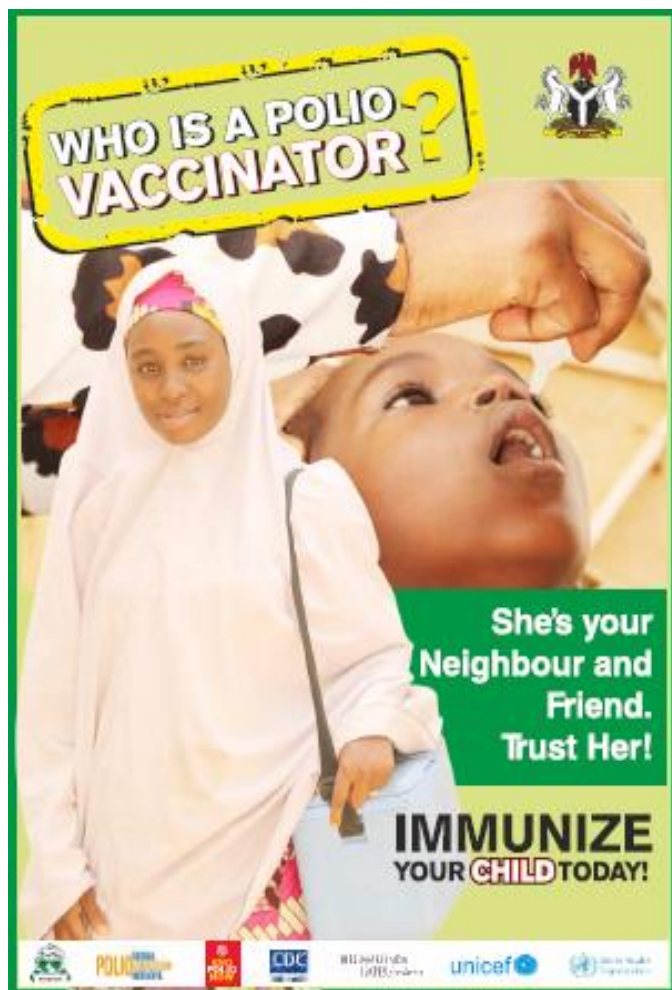


131,409 (73%) out of the 180, 740 children recorded as NC were resolved during IBR. Kano resolved 93% of missed children through the end game strategy.

227,702 (90%) out of 251,870 children missed due to child absent were tracked and vaccinated during IBR. Kano resolved 95% of missed children through end game strategy

IBR: in between rounds; NC: non-compliant; CA: child absent

Nigeria: ASSESSMENTS Snapshot of Knowledge, Perceptions, & Intentions to Vaccinate (2017)



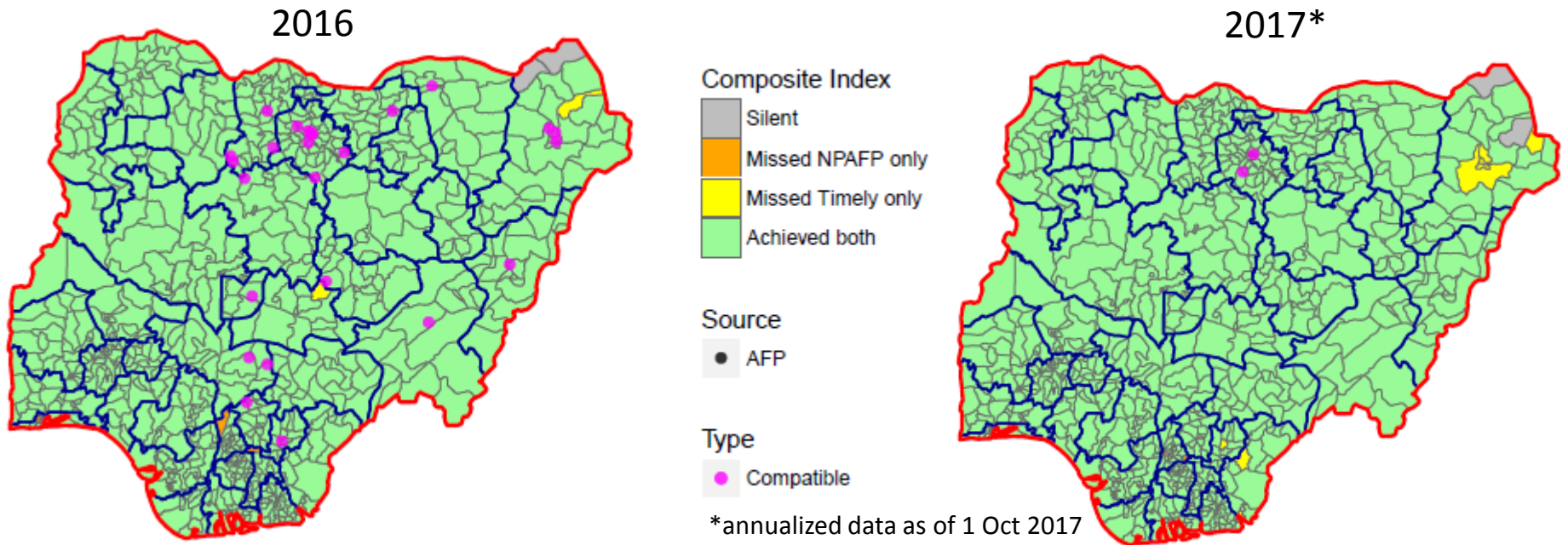
Definite Progress

- 36% increase (from 66% to 90%) in caregivers perceiving immunization of their children as their responsibility and not that community or the Government.
- 12% increase (from 60% to 72%) in caregivers' intention to give polio vaccine every time it is offered, overcoming fatigue of “too many rounds”.
- 88% said polio is preventable, 90% responded that OPV prevents polio.
- Fear of side effects is the most commonly reported (51%) potential barrier to routine immunization.

Areas of Focus

‘too many rounds’ and ‘fear of side effects’ still persist as reasons for non vaccination

Nigeria: Surveillance Composite Index by district, 2016 and 2017



- Nigeria uses NPAFP incidence of 3/100,000 population
- Two silent and 100% inaccessible districts in Borno State; timeliness is also problematic in Maiduguri area
- Innovations include: environmental 'sweep', sampling of health children coming from insecure areas; AVADAR-assisted AFP surveillance
- More detailed surveillance review is provided in a separate report: data quality issues include incorrect classification of AFP leading to inflated NP-AFP and stool adequacy, and incorrect investigations dates

Composite index: NPAFP $\geq 3/100,000$ under 15 year old population and stool timeliness $\geq 80\%$ (2 stools collected within 14 days of onset)

Detect, Respond and Prevent:

keeping the rest of the world polio-free

Lake Chad Basin: Enhanced Coordination

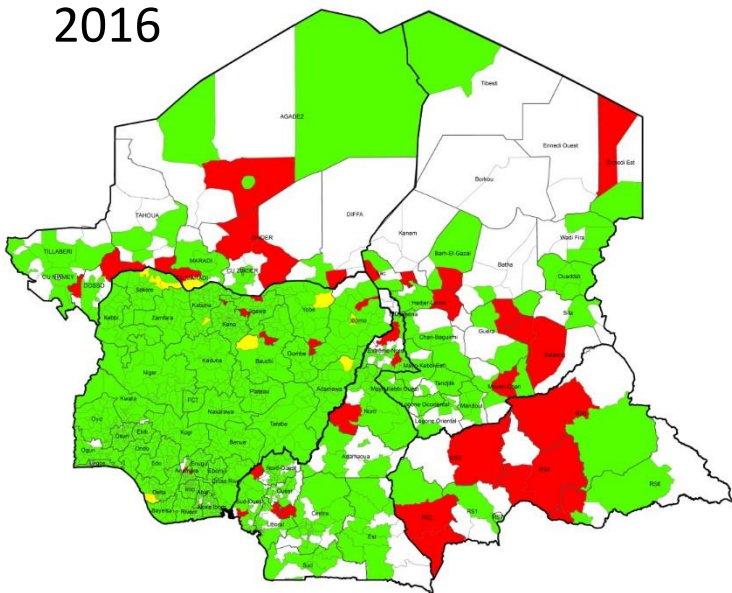
- Task Team includes WHO, UNICEF, e-Health Africa, CDC, Country Reps (based in N'Djamena)
- Meetings with partners and countries to agree on priorities, strategies and activities (May 2017):
 - Improve country outbreak plans
 - Target high-risk areas and populations (Refugees, IDPs, Nomads)
 - Routine Immunization Strengthening meeting, June 2017
 - 1st Cross Border meeting (districts around lake Chad), July 2017
 - GIS Settlement Mapping workshop, July 2017 (improve microplans)
 - 2nd Cross Border meeting (district around extreme north of Cameroon), Sept 2017
 - Funds available to countries early August 2017

Special/Additional Activities:

- Special interventions for high-risk populations started in August 2017, data shared weekly:
 - Market and car park vaccinations
 - Vaccination in Refugee/IDP camps
 - Vaccination of nomads
 - Focused vaccination of islands populations
- Community based approach started in 2016 in 31 high risk districts, pending further expansion
 - Use messaging to stimulate awareness on polio and routine immunization
 - Improve vaccination demand & equity in target communities during and between SIAs
- Additional surveillance measures:
 - Contact stool sampling of AFP cases with “zero dose”
 - Contact stool sampling in silent districts
 - Stool sampling of healthy children among migrant populations
- AVADAR project: strengthening community detection and reporting

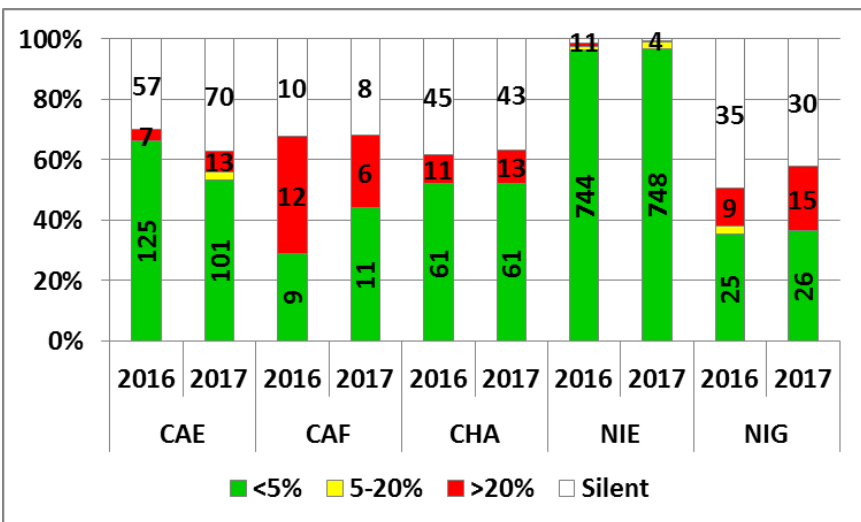
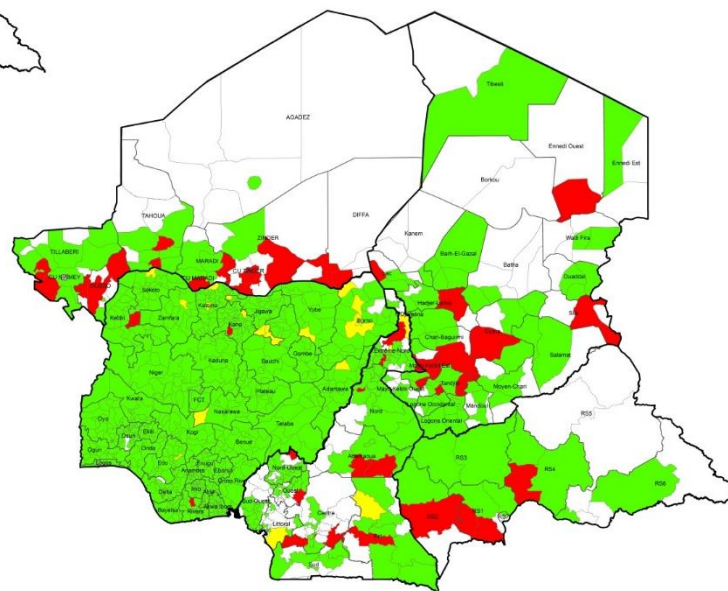
Lake Chad Basin: Proportion of 6-59 months AFP cases with zero doses of polio vaccination, reported by district (wk 1-33, 2016/2017) shows slight progress in accessed areas

2016

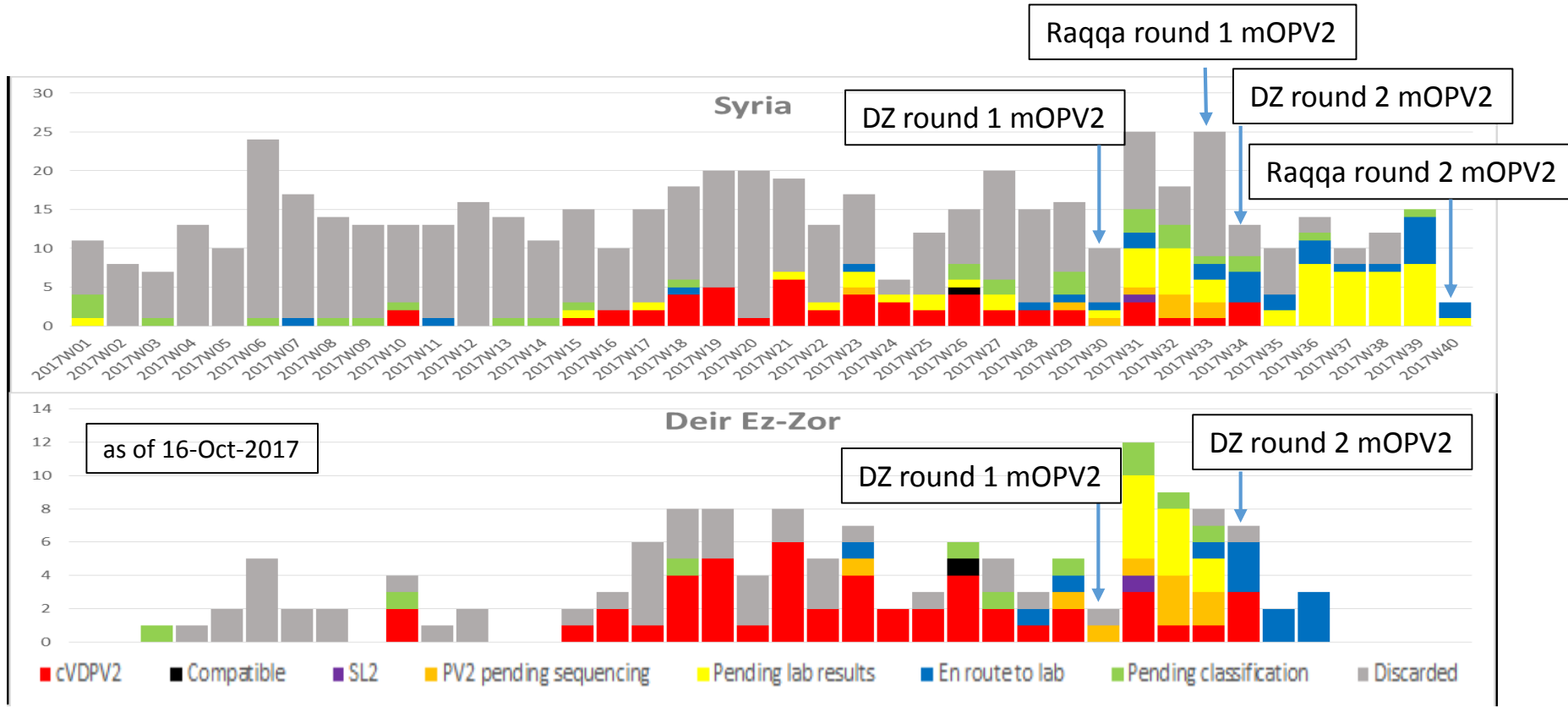


Zero Dose cases to be investigated as per shared guidelines

2017



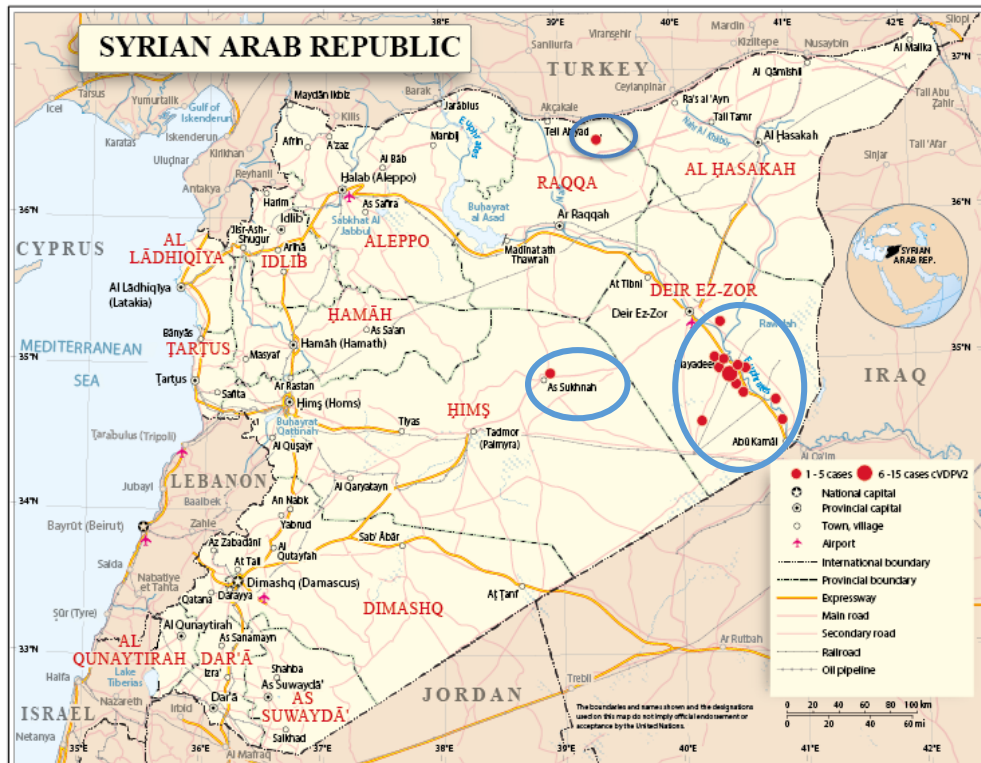
Syria: cVDPV2 Outbreak: cVDPV2 and AFP cases by classification, 2017



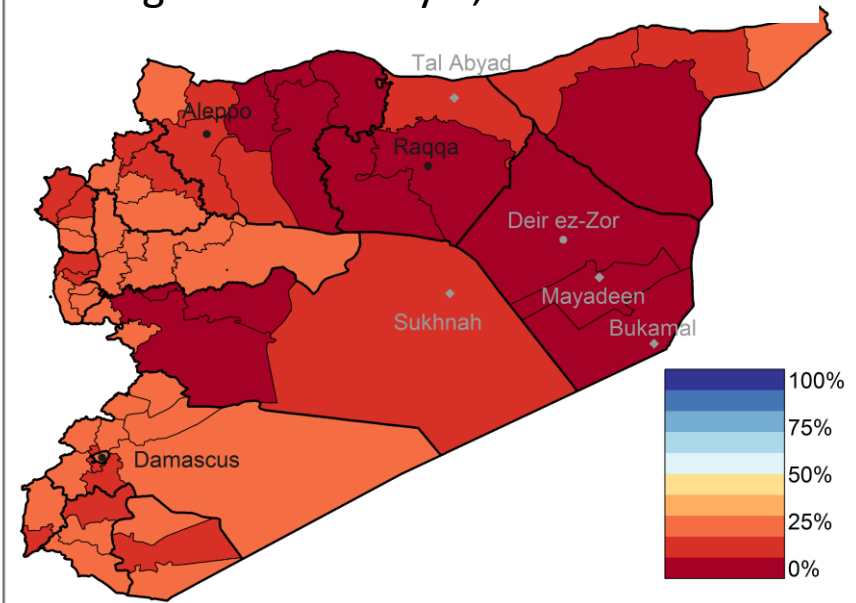
- Outbreak detected in March, 2017; sequencing of isolate suggests 2 years of circulation
- 52 confirmed cases as of 16 Oct (49 from Deir Ez-Zor [DZ] governorate, 2 from Raqqa, 1 from Homs)
- Transmission appears geographically limited, however, recent cVDPV2 virus detection among Deir Ez-Zor IDPs in Damascus highlights risk of spread
- Samples delayed in reaching lab (note yellow on graph) and no AFP reports in recent weeks from Deir Ez Zor shown in recent situation report.

Syria: Significant immunity gap due to conflict and limitation of services are the main cause of the outbreak

- Conflict started in 2011
- Routine immunization interrupted in many areas since 2013; access to IPV in some areas of the North limited since 2015
- Limited tOPV rounds prior to outbreak, particularly in Deir-Ez-Zor and Raqqa Governorates



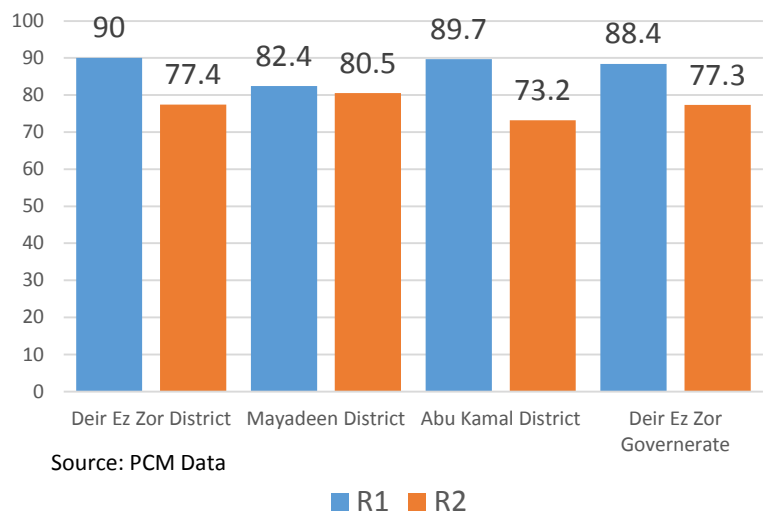
Modeling shows very low PV2 immunity among children < 2 yrs, Mar-2017



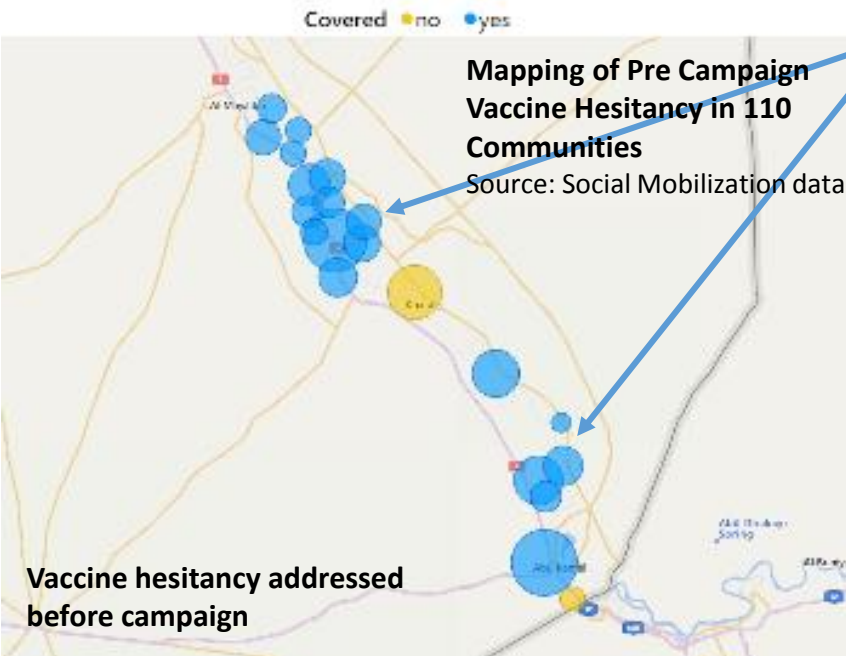
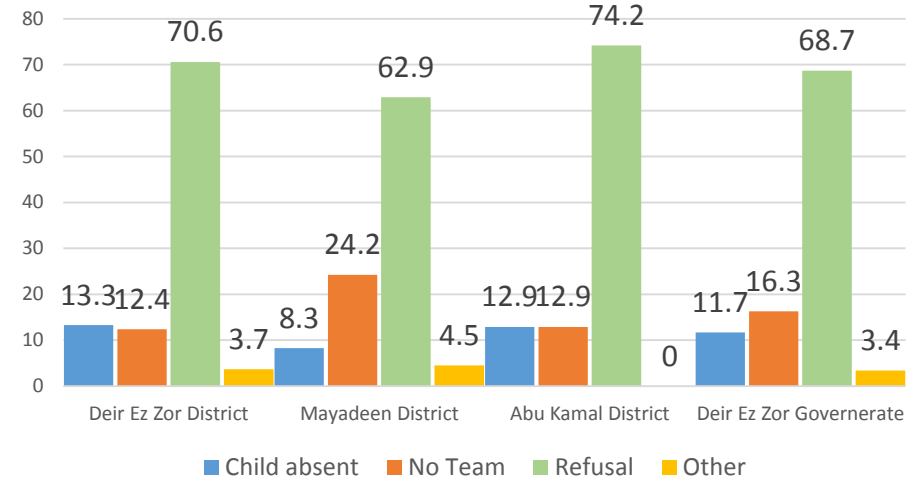
Institute for Disease Modelling

Syria: Recovery of missed children in Deir Ez Zor Governorate

Reported Coverage



Missed Children Round 1 (R1)



83% (2,242) of reported vaccine hesitant cases mapped, tracked and convinced to accept vaccination prior to campaign by 350 social mobilizers in 110 communities

R1 Still Refusals After Campaign N=283
R2 Still Refusals After Campaign N=202

Source: PCM Data

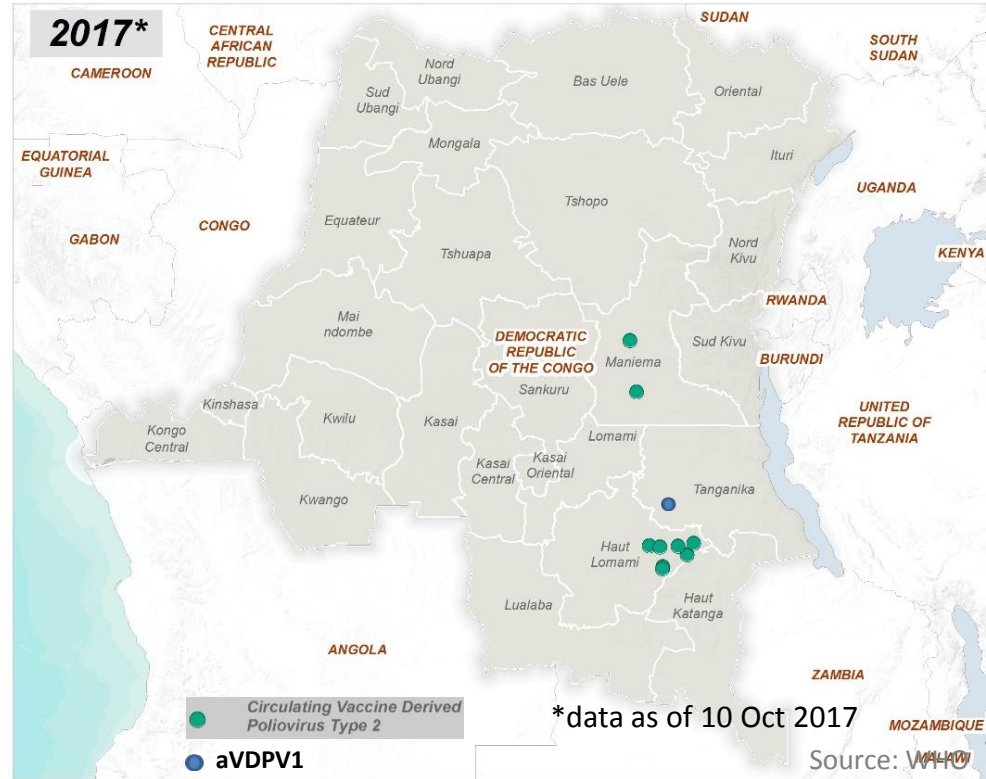
On-going challenges

- Access, security and issue of trust
- Data collection & data fidelity
- Quality assurance, supervision & accountability

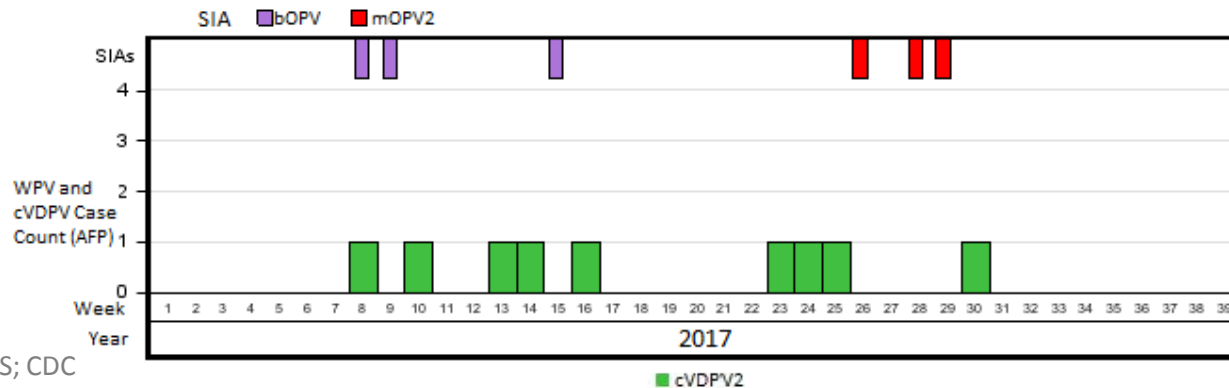
Democratic Republic of the Congo: cVDPV2 Outbreak

- Two outbreaks of vaccine derived poliovirus type 2 are ongoing
 - 2 cases detected in Maniema Province, Mar-Apr
 - 7 cases detected in Haut Lomami Province, Feb – July
- 3 rounds of response campaigns have occurred, but breakthrough transmission occurred, 2 additional rounds are planned
- 1 aVDPV1 case detected in Tanganika Province, 1 April 2017

Distribution of cVDPV2 and aVDPV1 cases

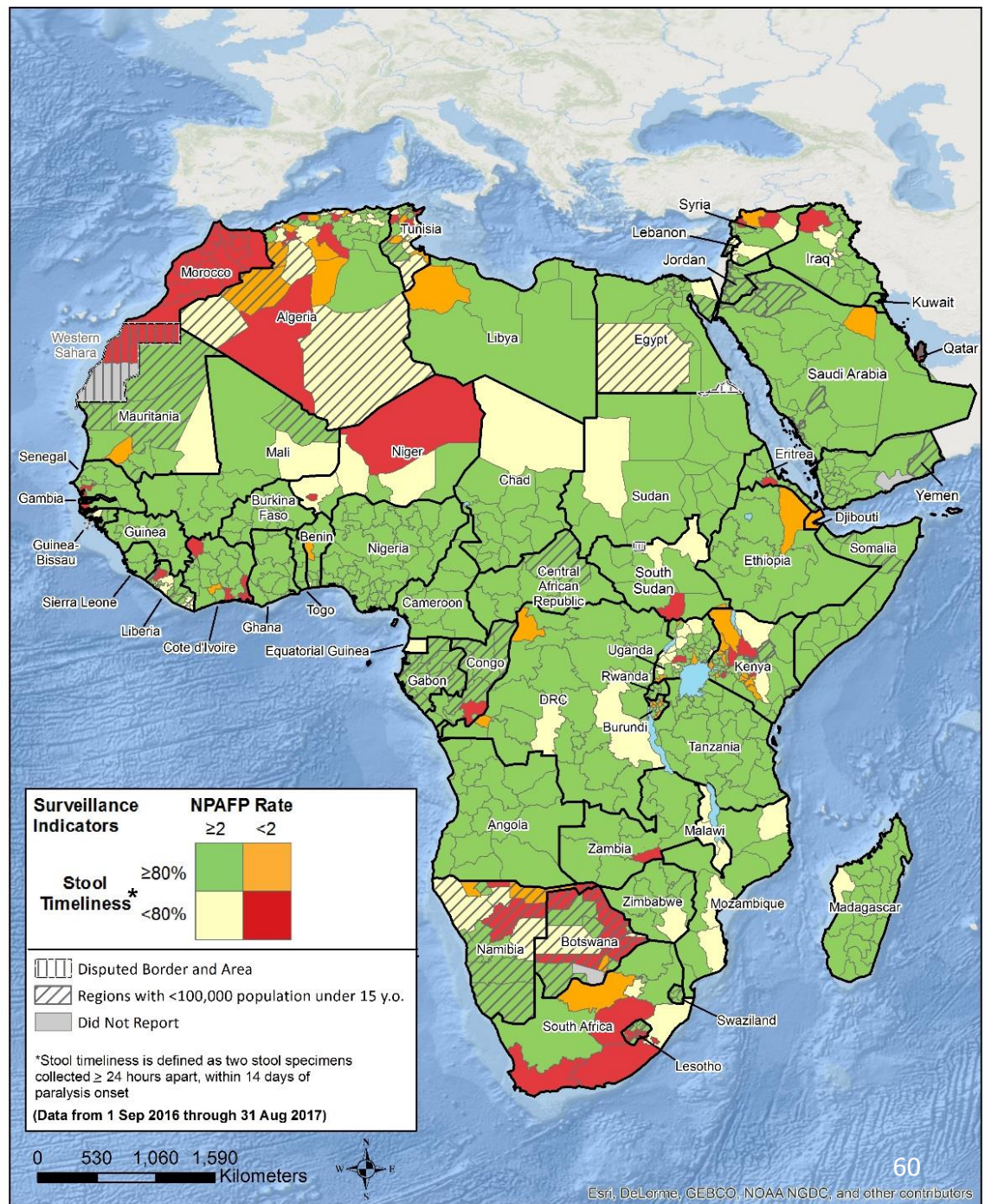


cVDPV2 cases by onset week and SIA, 2017



Africa and selected Middle East countries: Surveillance quality by country and province, state, or region, Sep 2016 – Aug 2017

Most countries have achieved surveillance indicators at the national level, however, not all provinces met both indicators.



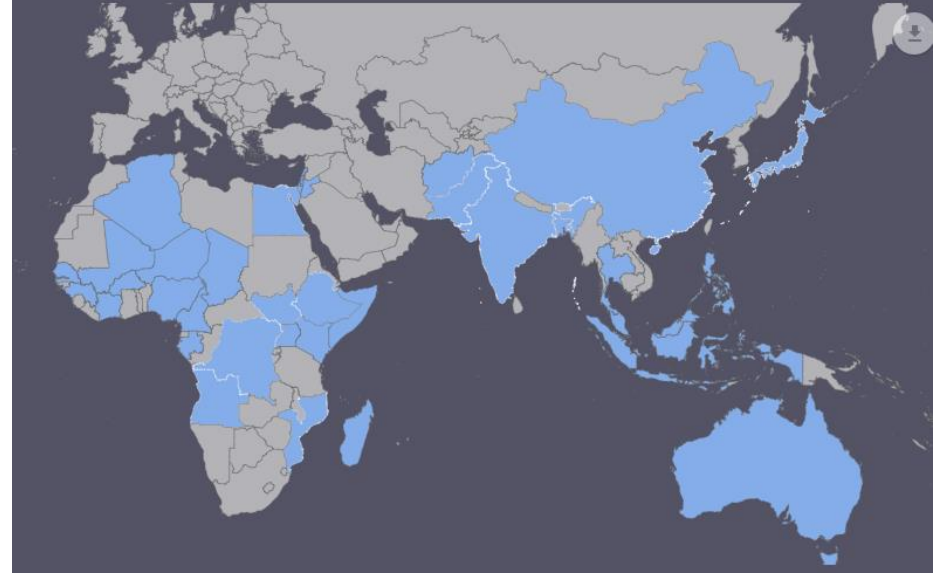
Source: WHO/POLIS; CDC

Environmental Surveillance under GPEI: SEAR, WPR, AFR, and EMR Countries covered prior to 2017 and countries added in 2017

Countries with ES prior to 2017



Countries currently with ES (Oct 2017)



- 2014: seven GPEI funded countries (Nigeria, PAK, AFG, India, Angola, Egypt and Kenya). Support also for China
- 2015-16: Phase 1 expansion to highest risk countries for WPV1 importation and cVDPV emergence – six new countries added
- 2017-2018: phase 2 expansion targeting 34 countries commenced
 - Current status: 55 new sites in 18 countries added in 2017, including DRC, Somalia, South Sudan, Mali, Jordan
 - Additional priority countries for establishment of ES: Myanmar, Iran, Equatorial Guinea, Iraq, CAR, Yemen, Syria, Sudan, Vietnam
- Other countries also conduct ES outside GPEI (e.g., Brazil, some European countries; data are not routinely available to GPEI)

IPV Vaccine Supply: Current status of IPV roll out to 80 countries procuring through UNICEF

IPV vaccine supply for routine programs

- Finally have enough supply to roll out first dose for routine requirements in all 80 countries procuring through UNICEF
- Tier 1 countries continue to receive uninterrupted supply of IPV to meet the needs (stock level information required prior to next shipment)
- Tier 2 countries experienced interruption in supplies in Q1, but this did not lead to programme interruptions, and were resupplied Q2
- Tier 3 & 4 countries not currently receiving IPV
 - 18 countries have yet to introduce a dose of IPV
 - highest risk Tier 3 (Iran, Egypt, Sudan, Tanzania) have been offered supply starting Q4 2017; remaining 32 countries are requested to plan for re-introduction during Q1 2018
- 2 countries have implemented fIPV (India, Sri Lanka)
- 2 countries planning to implement fIPV: Bangladesh (Q4 2017), Nepal (Q1 2018)
- Per PAHO TAG recommendations, 15 PAHO countries likely will implement fIPV

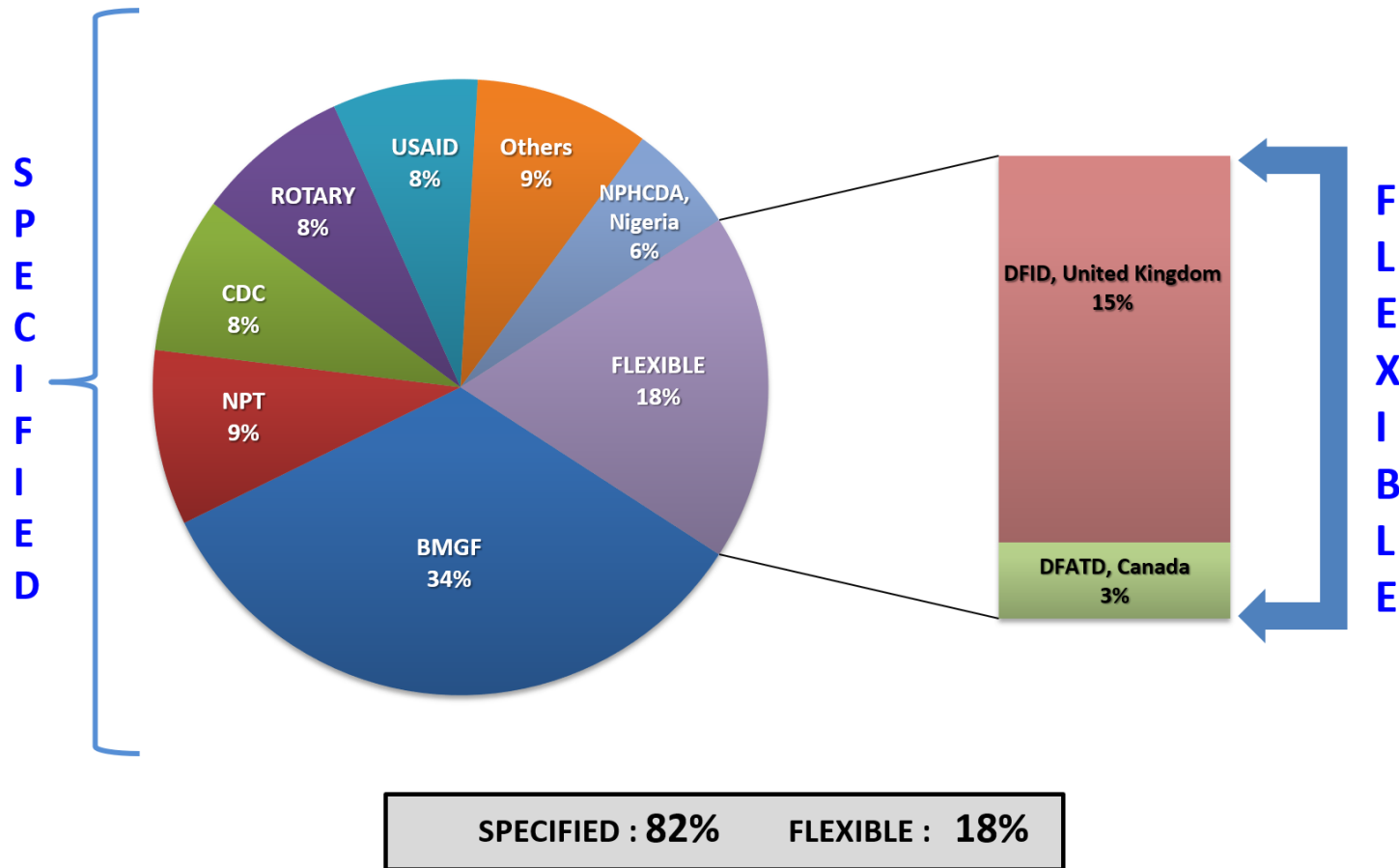
Outbreak Response Stock (managed by EOMG)

- For 2018, 2 million doses will be set aside for requirements beyond routine (similar to Q3-Q4 2017)

bOPV Vaccine Supply: Key challenges for bOPV moving forward

- While offered quantities meet forecasted demand including buffers, there remains to be **risks to supply**:
 - Additional market exits
 - Phasing in new entrants
 - Production of biologicals
 - Demand reductions bringing additional uncertainties to the supply market (budget, birth cohorts, pre-cessation)
 - Cold chain constraints, planned production stops and issues related to restart
 - Registration portfolio declining
 - Timing of cessation....
- Continued close monitoring and management required to keep suppliers committed to offers
- **Strong dependence on Bio Farma moving forward, and close partnership to be ensured - shift in senior management posts not expected to change commitment to polio!**

GPEI Financing: sources and reduced flexibility in moving funds



- The proportion of flexible funding raised by the GPEI fell from 21% to 18% since May 2017.
- Reduced ability to move funds to address acute needs could limit the effectiveness of GPEI (e.g., inability to shift funding constrained mOPV2 supply for about 6 months in 2017).

Annex 1 - STT Plan of Support

	Type of support	Requirements	Who	Names	Tentative dates	Ressources	CDC-AFRO focal	WHO'HQ Focal	AFRO Coordination
CAR	Strategic & Technical Data Management Develop a surveillance plan to strengthen surveillance Initiate implementation and follow up on the plan (+ STOPers) Review data management system and analysis	French speaker	STT member for 7-10 days (initial visit) consultant to follow up	STT - Ondrej mach Senior consultant - Karen Wilkens	Initial visit -18-27 Sept STT Consultant 18 Sept-19 oct Desk review - 15 Sept (completed)	CDC contractor (June-Dec) STOP 6 (incl 1DM) Brazza II	Fabien Diomande; Louie Rosencrans (7-14 August in country)	Karim Djibaoui	Lake Chad TT - IST CA
Niger	Strategic & Technical Data Management -Specific support to Diffa, incl. developing strategies for HtR population. -Follow up on plan -Data management support	French speaker	STT member for a week Consultant? DM support (STOP?)	STT	Initial Visit - Postponed	STOP 10 (incl 1DM) STOP briefing 10-11 July	Aissata Diaha	TBC	Lake Chad TT - IST WA
Chad	Strategic & Technical -technical support to Bol district, lake Chad, incl. develop strategies for HtR population.	French speaker	STT member – 1 week/10 days	STT (Zainul)	Initial Visit - field visit postponed. Lake Chad coordination meetin attended (Zainul)	STOP 15 (incl 1DM) STOP briefing 6-7 July	Dhoud Samba; Aissata Diaha	Melinda Mailhot	Lake Chad TT - IST WA
Guinea Bissau	Strategic & technical -Develop a plan to strengthen surveillance & initiate its implementation -Follow up -identify additional needs	French Speaker	Focal point + Consultant for 1 month	STT senior consultant	Sept-Oct: Consultant identified. Deployemnt in process Desk review - In process		Dhoud Samba	TBC	IST WA
SL, LIB, GUI	Assessment -Assess implementation status of plan at country level & potential issues	English	Focal point	Focal points	N/A	STOP; Brazza II	Jeevan Makam		IST WA
DRC	Assessment , Strategic & technical -Build on/update desk review & Participation in program review -Develop surveillance strengthening plan -op support	French English	STT member for 7-10 days (initial visit) + Focal point + Consultant	M. Alleman (FP) Sue Gerber (STT) Senior consultant - Jovita Fernandez	Initial visit: 7-11 Aug (completed) STT Consultant: 1 October - 1 Nov Desk review - Aug (completed)	CDC- Koko (June-Aug) STOP 50 -16 (1 DM) Brazza II	Mary Alleman	M.E Burny	IST CA
South Sudan	Assessment Participation/lead in the surveillance review	English; with security Clearance	STT member		Participate in External surv. review postponed	STOP 50 -13 (1DM) Brazza II	N/A (security) - Jeevan	William	HOA - IST E/S
Kenya	Assessment Participation/lead in the follow up of the surveillance review	English		Sue Gerber (STT)	Participate in June follow up surv review - postponed	STOP 50 – 9 (5 ISDS) Brazza II	Victoria Gammino	William	HOA - IST E/S

Annex 2 - MOUs

Islamic Republic of Afghanistan Ministry of Public Health National EOC

STANDARD OPERATING PROCEDURE

For

INVOLVEMENT OF BPHS NGOS IN POLIO PROGRAM AND PEI SUPPORT TO EPI

Standard Operating Procedure No.	001
Original Date of Issue:	24-Aug-2016
Prepared by:	National EOC, Kabul, Afghanistan
Endorsed by	National EOC, BPHS implementer NGOs and GCMU

Background: This Standard Operation Procedures defines key roles and responsibilities of PEI team support for routine immunization as well as the key role of BPHS implementer NGOs in planning, implementation and monitoring of polio campaigns. The SOP is developed between the National EOC, GCMU and BPHS implementer NGOs of the 5 polio high risk provinces namely Kandahar, Helmand, Farah, Nangarhar and Kunar.

Purpose: The purpose of having this SOP is to clarify roles and responsibilities of Polio Eradication Team and BPHS implementer NGOs in successful implementation of polio campaigns and strengthening of routine immunization in Kandahar, Helmand, Farah, Nangarhar and Kunar.

Responsibilities:

BPHS Implementer NGOs of five high risk provinces

1. PEI Support to EPI in 5 high risk provinces

BPHS Implementer NGOs of five high risk provinces

- BPHS NGOs will develop micro-plans at health facility level for all districts in their respective provinces.
- The micro-plan should clearly outline plans of all out-reach and mobile sessions specified by date and place at health facility level.

- NGOs will share these micro-plans with the REOC/REMT or PEMT/PCU and PHD of the respective province and National EOC.
- Micro-plans will be shared on quarterly basis
- If any change occurs in the date and area of outreach or mobile sessions, NGOs should communicate that as soon as possible with REOC/PCU, and PHD of provinces and National EOC.
- NGOs representative at national level should attend monthly review meeting to jointly assess the implementation of this SOP at field level and take corrective actions.

Roles and Responsibilities of National and Regional EOCs and PCUs.

- National EOC is responsible to communicate and clarify content of this SOP with all regional EOCs and Provincial Coordination Units.
- National EOC should ensure that all EOCs and Provincial Coordination Units develop district level monitoring plan in coordination with BPHS implementer NGOs for supporting and monitoring of outreach and mobile session conducted at health facility level.
- District level team including DHO, DPO and DCO should have close coordination with NGOs at district level to ensure that outreach and mobile sessions are happening at the right place and right time.
- DCO with support of ICN, where available, should help in community based social mobilization to maximize the impact of outreach and mobile sessions.
- District polio team should provide report of all outreach and mobile session conducted in their districts to provincial team
- REOCs and PCUs should provide compiled reports of the whole province and share it with National EOC on monthly basis.
- Implementation status of this SOP will be assessed at provincial level in monthly meetings of EPI and BPHS implementers.
- National EOC jointly with national teams of NGOs and GCMU will conduct a monthly review and assessment of the implementation of this SOP, and will develop an action plan for improvement.

2. NGOs involvement in Polio SAIs

Roles and Responsibilities of NGOs:

- NGOs will remain part of the EOCs and Provincial Coordination Unit and should have a representative attending all meeting in these structures and will have a decision making authority as an implementing partner

- NGOs should take part in the planning and implementation of polio campaigns at the EOC and PCU level
- NGOs will be involved in district level planning and implementation phases as well as assessment phase of polio campaign
- NGOs will introduce their district focal point for every districts to the relevant EOC/REMT or PCU/PEMT
- This district level focal point will be part of district coordination committee involved in the planning, selection, implementation of SIAs and then post-campaign assessment.
- Representative of NGOs at provincial level will introduce the list of active CHWs in the community for each district.
- At the end of the selection process, the list of those CHWs hired as Frontline Workers and those not hired will be shared with the national EOCs by representatives of NGOs at national level

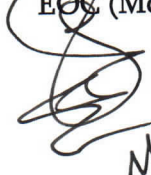
Roles and Responsibilities of EOCs

- National EOC will officially communicate with REOCs and PCUs that NGOs should be involved in the planning, selection, implementation, monitoring and assessment of polio campaigns
- Regional EOCs and PCUs will ensure that district coordination committees comprising DHO, DPO, DCO and NGO district level representative, are formed in all 47 VHR districts.
- In the selection of frontline workers, REOCs and PCUs should prioritize active and local CHWs from the list provided by NGOs representative.
- REOCs and PCUs should give special priority to local female CHWs in selection process
- National EOC will have close follow up of the CHWs selection with REOCs in every round of SIAs.


This SOP is effective from 1st of September 2016, will be valid for two years and can be revised if needed.

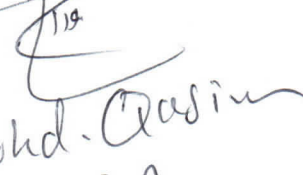
Endorsement of SOP

Representatives of National
EOC (MoPH and Partners)

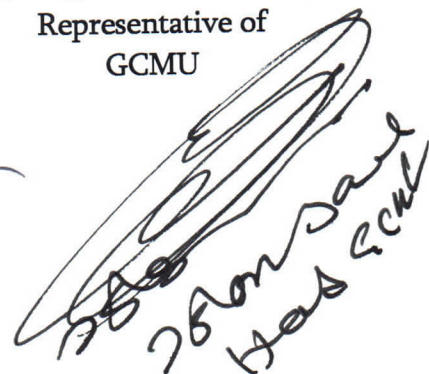

Mehman

Representative of NGOs


Dr. Izzatullah
PU-AMI


Mohd. Qasim
AADA

Representative of
GCMU


Mehman
Head SCW


Sayeed ul Haq
ACTD


Dr. Iqbal
CHA


Dr. Rashmi
ARAI

EPI-PEI convergence: Coordination with BPHS NGOs

Please read this in conjunction with SOP

Areas of coordination:

As outlined in the NEAP 2016-2017, the polio program has defined key roles and responsibilities of the PEI team in support of routine immunization as well as the key role of BPHS implementing NGOs in planning, implementation and monitoring of polio campaigns. This is also further expanded in an SOP which has been developed between the National EOC, GCMU and BPHS implementing NGOs of the 5 polio high risk provinces namely Kandahar, Helmand, Farah, Nangarhar and Kunar. The intention of the SOP is to strengthen and streamline this coordination.

BPHS NGOs role in polio eradication

NGOs will remain part of the EOCs and Provincial Coordination Units and should have a representative attending all meeting within these structures. The representative should be empowered and enabled to make decisions on behalf of their organization. They should take an active part in the planning and implementation of polio campaigns at the EOC, PCU and district level.

NGOs will also provide human resources to be engaged as ICMs and frontline workers, wherever feasible, without disturbing the ongoing EPI program. NGOs will also provide list of committed CHWs to be engaged in the polio program, and be part of the selection committee at provincial level. NGOs will intensify its focus in area which becomes inaccessible to polio campaigns only.

The role of the PEI in EPI

The PEI structure provides support in following key areas:

- Revision of outreach and mobile sessions plans using microplans of polio program, and demarcation of white areas. Identification of areas where there are no EPI sessions planned and sharing this information to ensure they are included in the EPI microplan;
- Monitoring of EPI sessions (fixed and outreach) and provide feedback at provincial and national level for corrective action;
- Support in community based social mobilization through ICN, including defaulter tracking
- Support in Measles and NT surveillance through AFP surveillance network
- Support in organization of other non-polio SIAs (training, microplanning, social mobilization, monitoring, etc.)

Coordination mechanism

All BPHS NGOs will be part of National and regional EOCs; and relevant members of the PEI structure will continue to participate in PHC (Provincial Health Coordination) meetings to ensure strong coordination and feedback.

A PEI-EPI task team has been formed within the national EOC with membership from Government (National EOC and National EPI), UNICEF, WHO and a representative from GCMU (the department responsible for contract management of BPHS NGOs).

This task team is responsible for implementing and tracking the activities as outlined in the NEAP and SOP, compiling information from the field on findings and corrective actions taken on feedback and sharing with National EOC/National EPI and GCMU. The task team will be responsible for reporting on the role of the polio infrastructure in EPI and ensuring any EPI performance issues are raised through the appropriate channels of government and partners.

This task team meets regularly with minimum frequency of once per week and reports directly to the strategy working group of the National EOC.

Annex 4

Sub-National Advocacy Efforts in the Lake Chad Region

High level advocacy with key Government officials is critical for the success of any outbreak response effort. Most often however, sub-national advocacy with local administrators, local government officials, community and religious leaders, other health and humanitarian actors, including security forces are equally important, sometimes even more effective, especially to improve campaign quality and coverage. Below is an update on some of the more recent sub-national advocacy initiatives undertaken for the Lake Chad outbreak response.

The Lake Chad Coordinator, with the Coordination team members, met with the **Multi-National Task Force (MNTF)** in N'Djamena on 2 June to better understand the security situation in the Lake Chad islands. Agreement was reached that the Coordination would advise the MNTF of any upcoming missions to the Lake and the MNTF would provide support as needed.

The Lake Chad Coordinator met **OCHA's Humanitarian Country Team** on 14 June to present an overview of the polio situation in the Lake Chad basin and to request assistance from these agencies, particularly on information sharing (GIS mapping information for the islands, population data, security updates), participation in inter-agency meeting, and possibly joint activities such as immunisation campaigns for nomads' children and cattle, multi-intervention campaigns (vaccination and distribution of mosquito nets).

On 15 June, Lake Chad Coordination team and the WHO-Chad focal point for nomads met with the Director of the **National Programme for the Health of Nomad, Insular and Difficult to Access Populations** to explore ways of working together for nomad populations in and around the islands.

A joint Lake Chad Coordination and WHO mission went to CAR in early July. **Meetings were held with key partners including MINISCA** to advocate for continued support of polio eradication activities.

From 3-8 July, representatives from **BMGF, Dangote Foundation, UNICEF-Chad including the UNICEF Representative, WHO-Chad, and the Task Team** visited Bagasola, Bol and Liwa Districts in Lac Region and assessed the situation on the ground, met with regional and district officials, and offered recommendations to jump start activities aimed at improving immunity and AFP surveillance.

On 23 July a field visit to Mani District in Hadjer Lamis, Chad took place. Staff from WHO, CDC and the Lake Chad Task Team held a **meeting with 12 nomadic community leaders** to seek their support for immunization activities.

Rotary International committed to providing logistics and advocacy support to the October and November synchronized campaigns, including by contacting key local administrative leaders in Chad, Niger, Nigeria and Cameroon and asking for their direct oversight to improve campaign coverage and quality.

The **CAR Country Representative to the Lake Chad Coordination, Dr Roch, visited RS3 to participate in an advocacy meeting with local authorities and other partners** to request their help with polio eradication and immunisation in general.

A forum of administrative, traditional and religious authorities, parliamentarians, local elected officials and other activists from Logone and Chari Departments took place in **Kousseri, Cameroon** from 6-7 July 2017. The theme of the forum was "**Advocacy for leadership and partnership for the eradication of polio**, vaccination, birth registration, combating child marriages and prevention of Ebola Virus Disease

ENVIRONMENTAL SURVEILLANCE SWEEP

One time collection of sewage samples for environmental surveillance (ES Sweep) from partially accessible and inaccessible areas in Borno state from the 15th of March to the 10th of April 2017: a pilot experience

REPORT PREPARED BY WHO NIGERIA

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Summary

Although acute flaccid paralysis (AFP) surveillance is the gold standard for surveillance as per the Global Polio Eradication Initiative, environmental surveillance provides essential information on the circulation of poliovirus not only from cases but from healthy persons as well. This makes it complementary to AFP surveillance. In the security challenged state of Borno where up to about 40% of the areas were inaccessible in February and March 2017, novel initiatives are essential to understand the dynamics of the poliovirus.

We decided to carry out a one-time sewage collection from potential environmental sites identified from security compromised areas in Borno state, except Jere and Maiduguri Municipal Council local government areas (LGA) where there is ongoing routine environmental surveillance. The main objective of the environmental surveillance sweep was to ascertain whether poliovirus transmission is still ongoing in security compromised areas of Borno state.

One litre of sewage sample was collected per site from 17 of the 27 LGAs in Borno state by 4 sanitary technicians from the Ministry of Environment from the 15th of March to the 10th of April 2017. Collected samples were transported in reverse cold chain to Ibadan National Polio laboratory where they were analyzed as per WHO standard operating procedure for environmental surveillance samples.

A total of 47 samples were collected over the 4 weeks period. Of the 47 samples neither Wild Poliovirus (WPV) nor circulating Vaccine Derived Poliovirus (cVDPV) was detected. A total of 35(74.5%) of the samples were negative, 6(12.8%) Non Polio Enterovirus (NPENT) and 4(8.5%) Sabin3. We also noted that there was 1(2.1%) Non Enterovirus (NEV) and 1(2.1%) sample with NPENT+ Sabin 3.

One time collection of sewage samples for environmental surveillance is feasible in security challenged settings and has the potential to give valuable information to guide the program. In our case no WPV or cVDPV was detected but at the same time does not rule out poliovirus transmission in this security challenged areas. It is important to ensure that proficient sites are chosen in the process of sweep site selection and where feasible, sewage sample collection should be supervised.

1. Background

Environmental surveillance is used as a complementary method to AFP surveillance which is the gold standard for the Global Polio Eradication Initiative. Nigeria started environmental surveillance in Kano state in July 2011, and since then many Wild Poliovirus (WPV) and Vaccine Derived Poliovirus (VDPV) have been detected. The most recent outbreak from a virus detected from the environment in Borno state dates back in 2016 with the detection of circulating Vaccine Derived Poliovirus (cVDPV) on the 23rd of March from Maiduguri Municipal Council LGA. As at May 2017, Nigeria has 63 environmental collection sites in 16 states and the Federal Capital territory.

Insecurity remains a major challenge in the eradication of polio in Nigeria. The country was faced with an outbreak of WPV type 1 in 2016, 23 months after the detection of the last WPV. All of the four WPV cases detected were from children coming from inaccessible areas. Although the country mounted a robust response, it will be difficult to say the country is polio free if we do not have information on what is going on in the inaccessible or partially accessible areas. In this light the country is implementing novel strategies to indirectly obtain information from these areas where health workers cannot go on the ground to implement polio eradication strategies.

One of the innovative methods, recommended by the Expert Review Committee to the Nigeria Polio Eradication program in its session of January 2017 was to implement environmental surveillance sweeps in inaccessible and partially inaccessible areas of Borno state. This involves a one-time collection of sewage sample from many sites in many cities, preferably security challenged settings, around IDP camps and in cities where environmental surveillance is not presently being undertaken within a short time interval. The progressive liberation of new areas and new arrivals of populations to safer places was used as an opportunity.

2. General objective

The main objective of the environmental surveillance sweep is to ascertain whether poliovirus transmission is still ongoing in security compromised areas of Borno state.

3. Specific objectives

- Identify, validate and document sweep sites in partially accessible and inaccessible areas in Borno state;
- Train sanitary technicians on sweep sample collection, reverse cold chain and transportation of specimen;
- Collect one sewage sample from identified sites in partially accessible and inaccessible areas of Borno state and transport specimen to Ibadan polio lab;
- Analyze collected sewage samples in Ibadan national polio Laboratory for poliovirus
- Respond to any isolation of WPV/VDPV according to outbreak response guidelines
- Document experience and share findings with stakeholders.

4. Methods

4.1 Proposal writing and operationalization

Initial proposal for the sweep was prepared by Bill and Melinda Gates foundation with the identification of about 30 sites with geo-coordinates in November 2016. By the time the national Emergency Operations Centre completed the operationalization of the sweep in February 2017, there was need to revisit these initially selected sites if they were still viable as we were in the dry season. In the same month of February 2017, Borno state team was briefed on the operationalization of the sweep which was also endorsed by the state EOC.

4.2. Selection and validation of site

After the endorsement by the state Emergency Operations Center (SEOC), a team was set up in March 2017 by the SEOC to visit the initially selected sites so as to determine if they were still viable for sewage collection. During this process only 7 of the initial 30 sites were validated. These were Kidisa (Askira-Uba LGA, Uba ward), Lawanti (Gubio LGA, Gunio 1-2 ward), Mandarari (Konduga LGA, Konduga ward), Doron Baga (Kukuwa LGA, Doro ward), Balamari (Nganzai LGA, Gajiram ward), Galdimari (Biu LGA, Galdimari ward). The same team proceeded with the identification of new sites in LGAs other than Jere and MMC especially in security challenged areas (partially accessible or inaccessible areas). At the end of the initial selection, only 25 sites were selected for specimen collection but the identification process continued with the initiation of sample collection as new areas were being liberated by the Nigerian Military. Geo-coordinates were collected for the 30 initial selected sites while for the newly selected sites, geo-coordinates were collected alongside sample collection.

Was considered a site:

Flowing or stagnant water contaminated with household sewage essentially faeces in cities which are inaccessible or partially accessible or close to LGAs known to have reported a WPV/cVDPV case during the 2016 outbreak or formal or informal IDP camps excluding Jere or MMC where routine surveillance is ongoing

4.3. Logistics

The logistics necessary for the collection of sewage samples from the identified sites as well as the transportation of these to the Ibadan laboratory was provided by WHO. This included transport cost for site identification, selection and validation, materials for sample collection and transportation, allowances for transporters and 4 chest freezers for Ibadan polio lab. The estimated cost for the sweep was about 2 082 800 Naira (6 612 USD)

4.4. Capacity building

Four sample collectors different from those involved in routine environmental surveillance were identified from the Ministry of the Environment and trained by the SEOC. They were responsible for all the sample collection irrespective of the LGAs. The identified sites were shared amongst them and

they were asked to continue with new identification and selection as they proceed with specimen collection.

4.5. Specimen collection

The grab method was used to collect specimen from selected sites by trained personnel from the Ministry of environment. One specimen was collected per validated site. The very first sample was collected on the 15th of March 2017 and the last specimen on the 10th of April 2017. We initially planned to collect 3 to 4 samples from Tuesdays to Friday per week for four weeks, this was influenced by the availability of sites, the security situation and availability of transport and escort to and from the cities where sites were found. It was difficult to respect the planned collection frequency due to security challenges. From each site, 1 litre of sewage sample was collected, stored in an appropriate container, transported in a specimen carrier with frozen ice packs to the WHO state office. One person was designated each week to transport specimen to Ibadan Polio laboratory. The first 33 samples were batched at the WHO state office before being sent to the lab, transported by two collectors whereas the next samples were sent on weekly basis for the next three weeks. A total of 47 samples were collected from 47 sites distributed in 17 LGAs in Borno state.

4.6. Laboratory Analysis

The laboratory was informed during the planning of the sweep and their request in terms of chest freezers to accommodate the samples yielded to before onset. On arrival at the Ibadan polio lab, samples were received by lab teams and treated in the same way as routine environmental surveillance samples. The final results presented in this report were shared by the Ibadan Polio lab, the only polio lab in the country with a WHO accreditation to do environmental sample testing.

4.7. Data collection and Analysis

The routine environmental surveillance data collection tool was used to document information for the sweep. The same procedure for the allocation of EPID numbers by LGA was used for the sweep except for the fact that "SWP" for SWEEP was added to the EPID Code. Example SWP-NIE-BOS-BAY-TKN-17-001 for specimen 01 of 2017 collected from Tundun Kaka New site in Bayo LGA, Borno state.

All hard copies of forms were kept in a folder at the WHO state office. At the level of the lab, a separate Microsoft Excel sheet was used to document results for subsequent data analysis. The results were analyzed using frequency tables as per epidemiologic information, lab results and mapping of geo-coordinates.

5. Results

A total of 17 LGAs were visited and 47 specimens collected. Figure 1 shows that samples were effectively collected from inaccessible and partially accessible LGAs. Some accessible LGAs without routine environmental surveillance were also included in the sampling with respect to inclusion criteria for site selection.

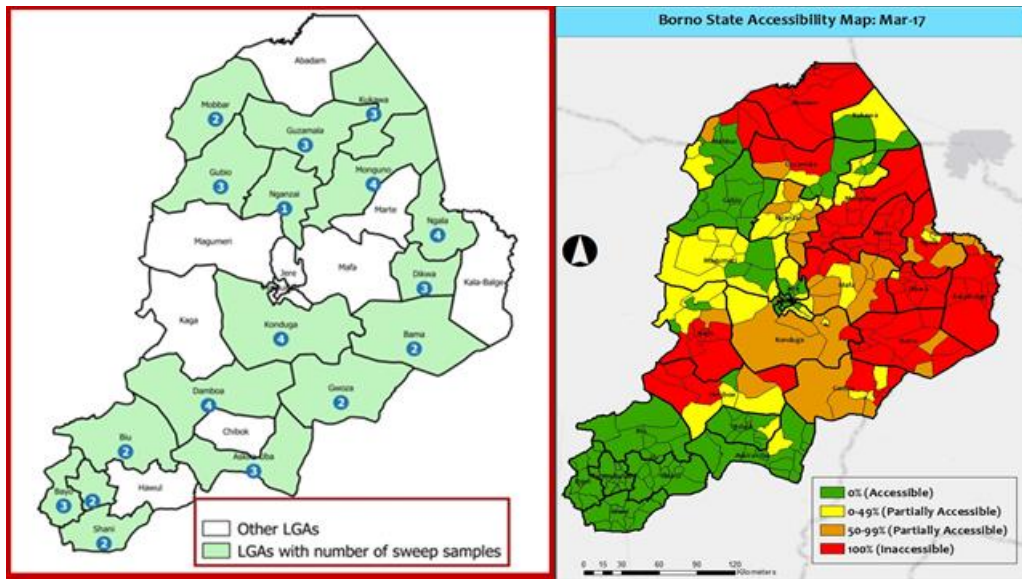


Figure 1: Map showing LGAs where sweep samples were collected, with number of samples indicated therein (left) and March accessibility status for Borno state (right)

The geo-coordinates of the selected sites are represented in the map below

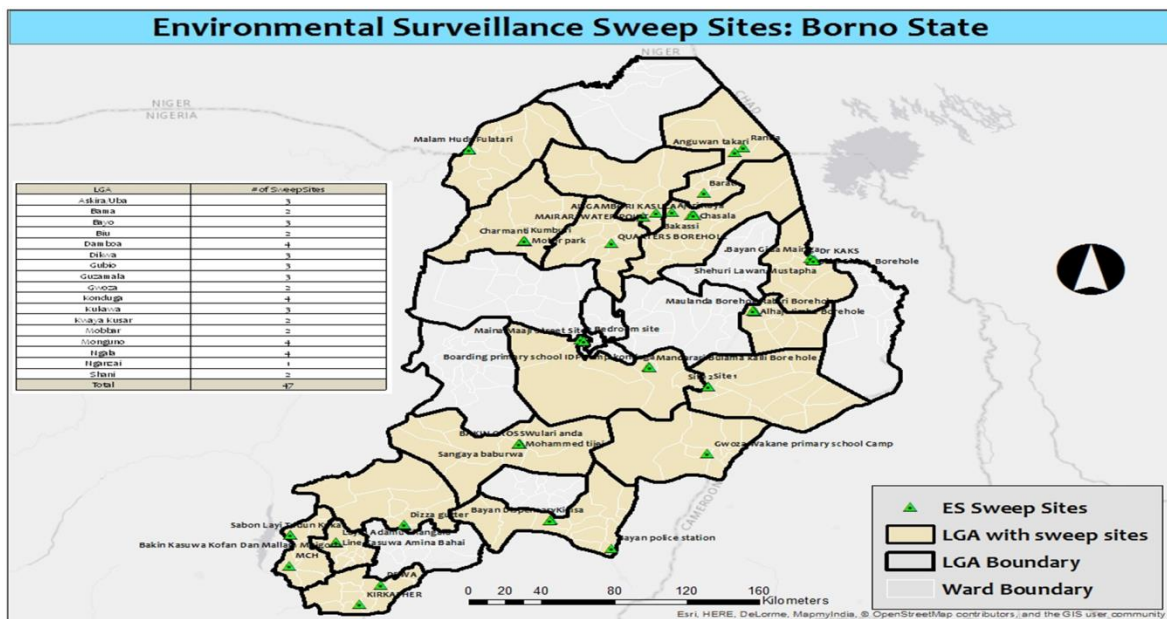


Figure 2: Map showing geo-coordinates of sweep sample collection sites

Of the 47 samples neither WPV nor cVDPV was detected. A total of 35(74.5%) of the samples were negative, 6(12.8%) Non Polio Enterovirus (NPENT) and 4(8.5%) Sabin3. We also noted that there was 1(2.1%) Non Enterovirus (NEV) and 1(2.1%) NPENT+ Sabin 3

Table 1: Sweep sample collection results by collection site

SN	LGA	WARD	Name of site	Date specimen collected	Date specimen arrived lab	Number of days from collection to arrival at lab	Results						
							Negative	NPENT	NEV	Sabin 3	Sabin 3 + NPENT	WPVc	VDPV
1	Konduga	Konduga	Ahmod Jaha Mosque	27-Mar-17	29-Mar-17	2	1						
2	Konduga	Konduga	Boarding Primary School IDP Camp	23-Mar-17	25-Mar-17	2		1					
3	Konduga	Mandarari	Maina Maji Street	27-Mar-17	29-Mar-17	2	1						
4	Konduga	Auno	Mandarari Bulamkali Borehole	23-Mar-17	25-Mar-17	2				1			
5	Shani	Shani	Diwa	16-Mar-17	25-Mar-17	9	1						
6	Shani	Burgu	Kirkatha	16-Mar-17	25-Mar-17	9	1						
7	Biu	Galtimari	Dizza	15-Mar-17	25-Mar-17	10	1						
8	Biu	Dugja	Zonal Edu. Int Duplex camp	15-Mar-17	25-Mar-17	10	1						
9	Dikwa	Dikwa	Alhaji Gimba Bohole	22-Mar-17	25-Mar-17	3		1					
10	Dikwa	Dikwa	Mauland	22-Mar-17	25-Mar-17	3	1						
11	Dikwa	Dikwa	Rabiri Bohole	22-Mar-17	25-Mar-17	3					1		
12	Nganzai	Gajiram	LG Staff Quarter Borehole	30-Mar-17	02-Apr-17	3		1					
13	Bayo	Fikayel	MCH	16-Mar-17	25-Mar-17	9	1						
14	Bayo	Fikayel	Tundun Kaka New	15-Mar-17	25-Mar-17	10	1						
15	Bayo	Briyel	Tundun Kuka	15-Mar-17	25-Mar-17	10	1						
16	Mobbar	Damasak	Fulatari	21-Mar-17	25-Mar-17	4	1						
17	Mobbar	Damasak	Mallam Hudu	21-Mar-17	25-Mar-17	4	1						
18	Monguno	Monguno	Ajari	23-Mar-17	25-Mar-17	2	1						
19	Monguno	Monguno	Bakasi	23-Mar-17	25-Mar-17	2	1						
20	Monguno	Monguno	Chasala	23-Mar-17	25-Mar-17	2	1						
21	Monguno	Monguno	Kuya	23-Mar-17	25-Mar-17	2	1						
22	Kwaya Kusar	Kwaya Kusar	Abdullahi bula	15-Mar-17	25-Mar-17	10	1						
23	Kwaya Kusar	Kwaya Kusar	Ibrahim Baidu	15-Mar-17	25-Mar-17	10				1			
24	Guzamala	Mairari Ajari	Ali Gamboru Kasula	24-Mar-17	29-Mar-17	5			1				
25	Guzamala	Mairari	Lingir Lawanti	24-Mar-17	29-Mar-17	5	1						
26	Guzamala	Guaram	Mairari Ajari	24-Mar-17	29-Mar-17	5		1					
27	Dambo	Nzuda/W	Bakin Croos	17-Mar-17	25-Mar-17	8	1						
28	Dambo	Nzuda	MOH'D Tijie Street	17-Mar-17	25-Mar-17	8	1						
29	Dambo	Dambo Central	Samgaya Baburwa	17-Mar-17	25-Mar-17	8	1						
30	Dambo	Dambo Central	Wulari Anda	17-Mar-17	25-Mar-17	8	1						
31	Ngala	Gamboru C	Bayan Gidan Mairiga	30-Mar-17	02-Apr-17	3	1						
32	Ngala	Gamboru C	Dr Kaks	30-Mar-17	02-Apr-17	3	1						
33	Ngala	Gamboru B	Goni Gidoni Gidau Borehole	30-Mar-17	02-Apr-17	3	1						
34	Ngala	Gamboru A	Lawan Mustapha	30-Mar-17	02-Apr-17	3	1						
35	Askira Uba	Askira East	Bayan Disp	16-Mar-17	25-Mar-17	9				1			
36	Askira Uba	Zadawa	Kidisa	16-Mar-17	25-Mar-17	9		1					
37	Askira Uba	Uba	Police Station Bridge	16-Mar-17	25-Mar-17	9	1						
38	Gubio	Gubio 1	Gubio Lawanti	21-Mar-17	25-Mar-17	4	1						
39	Gubio	Gubio Lawanti	Hausari	21-Mar-17	25-Mar-17	4	1						
40	Gubio	Gubio Lawanti	Motor Park	21-Mar-17	25-Mar-17	4	1						
41	Kukawa	Doro	Bakin Kulata	23-Mar-17	25-Mar-17	2	1						
42	Kukawa	Baga	Anguwan Takari	23-Mar-17	25-Mar-17	2	1						
43	Kukawa	Barwati	Bulamari	23-Mar-17	25-Mar-17	2	1						
44	Gwoza	Gwoza wakani	IDP Camp Gwola Wakani 1	10-Apr-17	12-Apr-17	2	1						
45	Gwoza	Gwoza wakani	IDP Camp Gwola Wakani 2	10-Apr-17	12-Apr-17	2	1						
46	Bama	Shehuri	IDP Camp Site 1	07-Apr-17	12-Apr-17	5				1			
47	Bama	Shehuri	IDP Camp Site 2	07-Apr-17	12-Apr-17	5							
Total							35	6	1	4	1	0	0

Laboratory results show sewage samples from 5(29.4%) LGAs (Bama, Dikwa, Askira Uba, Konduga and Kwaya Kusar) had Sabin 3 virus

Table 2: Number of samples collected, processed and outcome by LGA with results

SN	LGA	Number collected	Number processed	Results						
				Negative	NPENT	NEV	Sabin 3	Sabin 3 + NPENT	WPV	cVDPV
1	Askira/Uba	3	3	1	1		1			
2	Bama	2	2	0	1		1			
3	Gwoza	2	2	2						
4	Bayo	3	3	3						
5	Biu	2	2	2						
6	Dambo	4	4	4						
7	Dikwa	3	3	1	1			1		
8	Gubio	3	3	3						
9	Guzamala	3	3	1	1	1				
10	Konduga	4	4	2	1		1			
11	Kukawa	3	3	3						
12	Kwaya Kusar	2	2	1			1			
13	Mobbar	2	2	2						
14	Monguno	4	4	4						
15	Ngala	4	4	4						
16	Nganzai	1	1	0	1					
17	Shani	2	2	2						
TOTAL		47	47	35	6	1	4	1	0	0

6. Discussions

In all, 47 sewage samples were collected from 47 partially accessible or inaccessible areas from 17 LGAs and analyzed in Ibadan Polio laboratory. A total of 5 Sabin 3, 7 NPENT and 1 NEV were detected. No WPV or VDPV was found in the samples. The 5 LGAs with Sabin virus were Bama, Dikwa, Askira Uba, Konduga and Kwaya Kusar.

The first and last sweep samples were collected on the 15th of March 2017 and the 10th of April 2017. Sample collection started 18 days after the February SIA held from the 25th to the 28th. From January to April there has been a monthly polio campaign using oral polio vaccine in Borno state covering the entire state with respect to accessibility. Apart from the January campaign that was done with mOPV2, the other three campaigns were done with bOPV. The March campaign was done from the 25th to the 28th (10 days after the onset of sweep sample collection) while the April campaign from the 22nd to 25th (12 days after the last sample collection). It is worth mentioning that polio campaigns in most of the LGAs usually starts 1 or 2 days before the official date with Directly Observed OPV administration.

Only one of the 14 samples collected from the 24th of March to the end of sweep sample collection had Sabin. Three samples were collected from Guzamala LGA [Mairari (2) and Guaram wards] on the 24th of March, one of which had NPENT and the others Negative, two samples collected on the 27th of March from Konduga LGA (Konduga and Mandarari wards) both negative, one sample with NPENT from Nganzai LGA (Gajiram ward) on the 30th of March, four negative samples from Ngala LGA [Gamboru A, Gamboru B and Gamboru C (2) wards] on the 30th of March, two samples from Bama LGA [Shehuri(2) ward] on the 7th of April: one NPENT and one Sabin 3 and lastly two samples from Gwoza LGA (Gwoza Wakani ward) on the 10th of April both negative. It is therefore likely that the campaign did not influence the outcome of collected samples.

Over the same period of time, routine environmental surveillance in Maiduguri Municipal Council LGA (5 sites) and Jere LGA (2 sites) was ongoing. The frequency of collection of samples from these sites is weekly. A total of 21 samples were collected from the 15th of March to the 10th of April 2017. The results as at the 11th of May 2017 shows 3 Sabin 1, 5 Sabin 2, 7 Sabin 3 and 6 negatives. Hence, about 57% of Sabin in routine environmental surveillance compared to 10.6% in sweep samples over the same time interval, in different geographic areas in the same state under different conditions. Several factors might explain the low detection rate of Sabin from the sweep samples: quality of the site identified by the collectors (sewage or non-sewage water, peak of dry season, stagnant or flowing, stool contaminated water or not), number of persons living around the area where the samples were collected, quality of the cold chain from point of collection bearing in mind that collectors had to stay with samples at times for as much as three days to get to Maiduguri because of accessibility issues and the absence of supportive supervision during most of the collection.

Concerning routine immunization, apart from Mungono with 1st trimester 2017 OPV 3 coverage of 98%, all the other LGAs from which sweep samples were collected have OPV 3 coverage < 50% (11 LGAs) or above 100% (5 LGAs). LGAs with coverage >100% OPV 3 coverage from January to March 2017 are Askira Uba, Damboa, Konduga, Kwaya Kusar and Shani. Sabin 3 virus was detected in 3 LGAs with > 100% OPV 3 (Askira Uba, Konduga and Kwaya Kusar) and two with OPV 3 coverage < 50% (Bama and Dikwa).

Sweep samples were batched in a chest freezer at the WHO state office Borno and transported to the lab on 4 trips: The very first batch of 33 samples arrived the Ibadan polio lab on the 25th of March 2017, two to ten days after they were collected. Of these samples, 26 were negative, 4 Sabin 3 and 4 NPENT. The second batch of 5 samples arrived the lab on the 29th of March, 2 to 5 days after samples were collected, the 3rd batch arrived the lab on the 3rd of April, three days after collection and the last batch on the 12th of April 2017, two to five days after collection. Results of the samples from the 2nd to the 4th batch (14 samples) that arrived the lab relatively early showed that 9 were negative, 3 NPENT, 1 NEV and 1 Sabin 3. It is therefore unlikely that batching of the samples in a chest freezer at WHO Borno state office might have affected the lab results. In the unlikely event of a reverse cold chain problem, this might have occurred before the arrival of the sample in Maiduguri.

The results did vary with respect to collectors. Four collectors were used for the process each collecting: 9 samples (from 3 LGAs: Monguno, Mobbar and Bayo), 12 samples (from 5 LGAs: Nganzai,

Bui, Konduga, Shani and Dikwa), 13 samples (from 4 LGAs: Ngala, Damboa, Guzamala and Kwaya Kusar) and 13 samples (from 5 LGAs: Bama, Gwoza, Kukawa, Gubio and Askira Uba). All 9 samples collected by the collector from Monguno, Mobbar and Bayo were negative whereas the outcome of NPENT, Sabin 3 and NEV results were distributed amongst the other collectors. It is likely that the collector with 9 negative results might have had some issues with sample collection as even his geo-coordinates for Bayo LGA were outside the state when initially mapped. After cross verification, the collector with 9 samples was seen in the field by other surveillance actors.

7. Challenges

The main challenges in the implementation of the environmental sweep in Borno were related to specimen collection. These were:

- Insecurity due to insurgency making it difficult to respect initial schedule ;
- Irregular availability of transport and limitation in the number of vehicles allowed to access certain LGAs;
- Availability of escort to certain LGA influences collection dates. Military escort required to access some areas;
- Collectors had to spend more than a day in the field (at times 3 days), either to access sites or to leave with collected sample. This at times leads to collecting, throwing and recollecting specimen;
- Logistic difficulties: carrying of 3 to 4 specimen carriers along;
- Incoherent geo-coordinates : some coordinates are out of the LGA or state;
- Collected sewage sample batching at onset;
- The sweep was done in the heart of the dry season when most of the sewage flow sites were dry. We initially planned to collect 48 to 64 samples but were able to collect 47. It was difficult to find viable site during this period.

It is also worth noting the increase workload to the environmental surveillance lab as the country is on a dynamic of increasing the number of routine environmental surveillance sites

8. Conclusions

A total of 47 environmental sewage samples were collected from 47 previously identified and validated sites in partially accessible and inaccessible areas distributed in 17 LGAs with geo-coordinates captured over a period of one month using 4 trained sample collectors. From the lab analysis, Sabin, Non-Enterovirus and non-polio enterovirus were detected but no WPV nor cVDPV were identified. There was no need to carry out any specific response activity.

9. Recommendations

- a) An experienced technician or supervisor should be involved in sweep site selection and validation to ensure that potent sites are chosen and that training of collectors is of good quality
- b) Identify ES sweep collectors ahead of time and involve them in site selection and validation process
- c) Ensure maximum of 12 samples collection planned per week for future sweeps
- d) Ensure that sweep sample collection is supervised by the LGAF assigned to that LGA where feasible
- e) Planned sweeps should be done within a four weeks period in collaboration with the lab from planning through implementation and evaluation
- f) Plan future sweeps with the lab, taking into consideration work load, reagents availability, routine ES expansion
- g) Use ODK to collect geo-coordinates of sweep sites
- h) Implement future ameliorated ES sweeps as follows:
 - a. Do an ES sweep in Sokoto state once site selection is feasible
 - b. Do an ES Sweep Repeat in Borno state in the last quarter of 2017
 - c. Do an ES sweep in at least one of the southern states



Site in Shani LGA



Site in Dikwa LGA



Site in Mungono



Mairari site, Guzamala LGA



Aligambori site Guzamala LGA



Lingiri site Guzamala LGA

Figure 3: Pictures of some sweep sites

Annex 6

Stool sample collection from healthy children entering IDP camps, arriving from inaccessible and partially accessible LGAs of Borno State: a pilot experience

Final Report

Executive Summary

Nigeria had a wild poliovirus (WPV) outbreak in 2016 with four cases of WPV from three security challenged Local Government Areas (LGAs) of Jere 1, Gwoza 1 and Monguno 2, all in Borno state. The last WPV case had onset of paralysis on 21st August 2016. In addition, a case of circulating Vaccine Derived Poliovirus type 2 (cVDPV2) from environmental sample collected on 23rd March 2016 and another from a healthy contact of one of the WPV cases from Monguno LGA were also confirmed from Brono.

As part of efforts to improve surveillance sensitivity in the security challenged areas and to indirectly have an idea whether poliovirus is still circulating in inaccessible and partially accessible areas, several innovative ways have been introduced by the government supported by partners. These strategic approaches included collection of three contact samples from every AFP case, increasing the number of samples collected from healthy children during outbreak investigation, expansion of environmental sample collection sites and frequency of sample collection; and implementing environmental surveillance sweep. In the same light, a pilot experience was mounted by the national and state Emergency Operation Centers (EOC) to collect one stool sample from healthy children within the Internally Displaced Persons (IDP) camps coming from 12 inaccessible or partially accessible LGAs of Borno and from one LGA each from Yobe (Gujba) and Adamawa (Madagali) states and one stool sample was collected from a healthy child coming from Niger Republic. The main aim of the healthy children stool sample collection from new arrivals into IDP camps is to ascertain whether poliovirus transmission is still ongoing among the population of these security challenged areas of Borno state.

A total of 242 stool samples taken by trained health workers from as many children were collected from healthy children that are under 10 years of age coming recently into 24 selected IDP camps located in six LGAs (Maiduguri, Jere, Konduga, Bama, Dikwa, Monguno) of Borno. The sample collection was done from the 17th February to 16th May 2017. Laboratory results showed that none of the samples was positive for WPV or VDPV; but Sabin and non-polio enterovirus isolation rates were 19% and 12% respectively.

The result of this activity though promising does not rule out completely the absence of poliovirus transmission in the inaccessible and partially accessible areas of Borno state. It is strongly recommended that this activity continues for as long as trapped populations continue to be liberated by the Military and are received into IDP camps. This activity should also be expanded to include all IDP camps in all LGAs that are receiving new arrivals from inaccessible areas. The Maiduguri polio laboratory should also be supported to be able to effectively shoulder this additional burden.

1. Background

After 23 months without any case of Wild Poliovirus (WPV), Nigeria witnessed a setback in its bid to eradicate polio with the confirmation of 4 WPV cases from three Local Government Areas (LGAs) of Jere (1), Gwoza (1) and Monguno (2) all in Borno state. The date of onset of paralysis of the last WPV case was on 21st August 2016. All the WPV cases came from security challenged areas of the state and the viruses have been shown to be circulating for a number of years without being detected. A healthy contact of one of the Monguno WPV cases was positive for circulating Vaccine Derived Poliovirus type 2 (cVDPV2).

The security-challenged state of Borno has been the main sanctuary of the Boko Haram insurgency in Nigeria. This has led to the killing of health workers, destruction of health facilities, and displacement of huge populations with the declaration of state of emergency in the state as a whole. Despite huge gains by the Nigerian military lately, accessibility in Borno state was estimated to be at 64% as at March, 2017. This makes routine surveillance and immunization strategies difficult to implement to ensure that the WPV of the recent outbreak is no longer circulating.

The government and partners have engaged in several innovative ways to indirectly have an idea whether the poliovirus is circulating in the inaccessible or partially accessible areas by enhancing Acute Flaccid Paralysis (AFP) surveillance sensitivity. Some of these are collection of three contact samples from every (AFP) case, increasing the number of samples collected from healthy children during outbreak investigation, expansion of environmental sample collection sites and frequency of sample collection; and implementing environmental surveillance sweep. In the same light, a pilot experience was mounted by the national and state Emergency Operation Centers (EOC) to collect one stool sample from healthy children within the Internally Displaced Persons (IDP) camps coming from inaccessible or partially accessible areas as detailed in this report.

2. Purpose

The aim of collecting and analyzing stool samples from newly arriving children in IDP camps coming from inaccessible or partially accessible areas is to ascertain whether poliovirus transmission is still ongoing among the population of these security challenged areas of Borno state.

3. Objectives

- Determine the profile of participating children (age and sex)
- Collect one stool sample from children less than 10 years coming from inaccessible/partially accessible areas of Borno state within the first seven days of their stay in an IDP camp using trained health workers.
- Analyze collected stool samples in Maiduguri National Polio Laboratory (for the presence of Poliovirus-WPV/VDPV/Sabin and NPEV)

- Respond to any isolation of WPV/VPV according to outbreak response guidelines
- Share feedback to stakeholders on the results of the activity

4. Methods

4.1. Proposal writing and operationalization

Initial proposal for the healthy children sample collection was prepared by the surveillance working group, presented and endorsed by the National EOC in February 2017. In the same month, Borno state team was briefed on the operationalization of the healthy children sampling pilot experience which was also endorsed by the state EOC in the same month of the same year.

4.2. Procedure and sample size

One stool sample was collected from randomly selected IDPs who are < 10 years coming from inaccessible and partially accessible areas into some selected IDP camps of Borno state. Stool sample collection was done by trained health personnel working in the IDP camps under the coordination of the LGA Disease Surveillance and Notification Officers (DSNOs) and LGA Facilitators (LGAFs) of the concerned LGAs. The stool samples were collected from these children within their first 7 days of arrival at the camp. Initially we set out to collect 240 stool samples from 4 LGAs at a frequency of 40 stools per LGA for 6 weeks. Due to a reduction in the number of new arrivals in IDP camps leading to a delay in the number of samples collected from the initially selected 14 IDP camps from 4 LGAs (Maiduguri, Jere, Konduga, Mongu), we had to add 10 more camps and 2 more LGAs (Dikwa, Bama) after a mid-term evaluation to finally collect the 242 samples.

4.3. Selection of IDP camps

Initially 14 IDP camps (13 formal and 1 informal) from 4 LGAs (Jere, Maiduguri Municipal Council, Konduga and Monguno) were selected for this pilot experience. These were IDP camps with the highest population where new arrivals were still being accommodated. After 6 weeks of initiation of stool collection, 10 more IDP camps were added to the list with 2 new LGAs (Bama and Dikwa) being added. Table 1 below shows the list of IDP camps selected for the sampling of healthy children coming from security challenged areas.

4.4. Rational for choosing children under the age of 10 years

- They constituted approximately 38% of the population in the 14 camps in the initial list;
- It gave us more flexibility to have newly arriving children from whom we could collect specimen on weekly basis;
- There is almost equal probability of harboring a poliovirus as a healthy carrier before and after 5 years
- About 99% of confirmed poliovirus cases in Nigeria are <10 years of age.

4.5. Capacity building

Sixteen health workers providing clinical services in the selected IDP camp clinics were trained for a day on the objectives of the project, eligibility criteria, administration of questionnaire, demonstration of stool sample collection, storage and transportation. A total of six LGA DSNOs (Jere, Konduga, MMC, Monguno, Bama and Dikwa) and their assistants were trained along with the health workers to support the health workers in stool collection, maintenance of reverse cold chain and documentation. In addition, 16 IDP camp coordinators were sensitized on the rationale for the healthy child stool sample collection as well as the selected IDP camps during the monthly IDP camp Coordinators' meeting.

4.6. Logistics and specimen collection

One stool sample per child, the equivalent of adult thumb size (8-10g) was collected from 242 children <10yrs of age. Each sample was placed in clean screw-capped universal container. The sample was labeled with the name, epid number, and age of the child, using a water-resistant pen. The specimen was placed in a specimen carrier at a temperature < 8°C between frozen ice packs.

The logistics for routine AFP surveillance was used for this pilot experience, from human resources, stool collection as well as transportation to Maiduguri Polio laboratory. The estimated cost for the healthy children sample collection was about 3,000 USD. This included briefing meeting, materials for sample collection and transportation allowances for transporters and provision of 1 chest freezer for Maiduguri polio lab.

5. Laboratory Analysis

Maiduguri Polio laboratory was identified to receive samples from this pilot experience. It's worth noting that it is the same laboratory that analyses routine AFP surveillance stool samples from Borno and nine other states of northern Nigeria. The laboratory was informed during the planning of the healthy children sampling pilot experience, they were in agreement with the 242 samples to be collected and requested for one chest freezer to improve their storage capacity. Samples were treated in the same way as routine AFP stool samples with respect to WHO standard operating procedures. Samples requiring ITD were sent to Ibadan Polio laboratory due to the malfunction of the two PCR machines in the Maiduguri laboratory during the period of the pilot.

6. Data collection and Analysis

The routine AFP case investigation form was used to document information for healthy children sampling. This was supplemented with a questionnaire which gave special

attention to profiling the child with respect to LGA of origin. The same procedure for the allocation of EPID numbers by LGA was used for the healthy children sampling except for the fact that “HC” was added to the EPID Code for sampled children. The management of the case investigation forms followed the same procedure as the routine forms. Lab results were entered in the regular lab database and profiled data in Microsoft Excel. Results were analyzed using Epi Info version 3.2.1 and Microsoft Excel and presented in the form of frequency tables and plots.

7. Results

The figure below shows the accessibility map of Borno state as at March 2017. In addition, the figure also depicts that virtually all the healthy children were coming from the inaccessible LGAs of the state into IDP camps located in relatively secure areas.

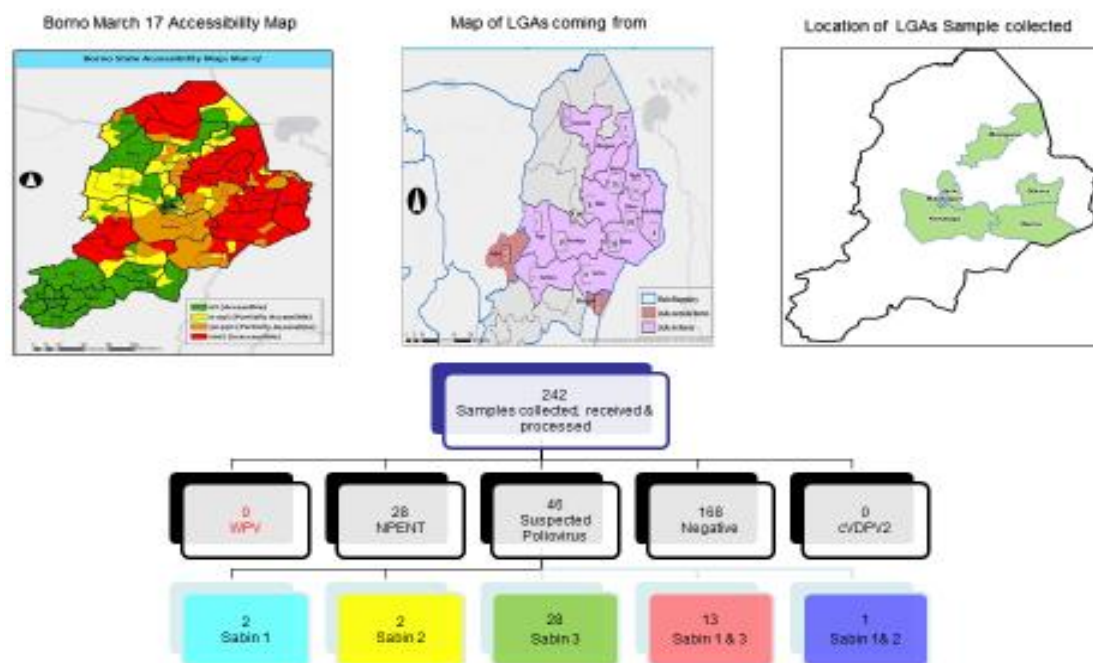


Figure 1: Accessibility map of Borno as at March 2017, LGAs of origin of healthy children and locations of sample collection.

Table 1 below shows the distribution of the 24 IDP camps used to recruit participants for this activity and the LGAs where the IDP camps are situated. Ten of the IDP camps were not part of initial selection at the conception of the activity but came on board much later when it was realized that influx of IDPs into the initially selected IDP camps had waned significantly.

Table 1: List of IDP camps selected for the pilot exercise

SN	LGA	Name of IDP Camp	Initial selection	2nd selection	Approx total population
1	Jere	Muna IDP Camp	Yes		136030
2	Jere	Dalori camp	Yes		41560
3	Jere	Farm Centre	Yes		27455
4	Jere	Fariya IDP Camp	Yes		
5	Jere	Custom House IDP camp		Yes	1371
6	Jere	Lambu IDP camp		Yes	2800
7	Maiduguri	Bakasi	Yes		44230
8	Maiduguri	Kawar Maila	Yes		
9	Maiduguri	CBN IDP Camp	Yes		
10	Monguno	Government Girls Secondary School (GGSS)	Yes		22300
11	Monguno	Government Secondary School (GSS)	Yes		15500
12	Monguno	Water board	Yes		3915
13	Monguno	Government Day Secondary School (GDSS)	Yes		9745
14	Monguno	Charamari IDP camp		Yes	4310
15	Monguno	Mune IDP camp		Yes	8410
16	Monguno	Veterinary IDP camp		Yes	2529
17	Monguno	Ngurno IDP camp		Yes	25554
18	Konduga	Mandari IDP Camp	Yes		
19	Konduga	Gubio Road	Yes		16872
20	Konduga	Kofa (Dalori 2)	Yes		10247
21	Bama	General Hospital Bama town IDP camp		Yes	11739
22	Dikwa	Sangaya IDP camp		Yes	11150
23	Dikwa	Shehu Sanda IDP camp		Yes	1750
24	Dikwa	Mohd Kyari Dikwa Islamiya IDP		Yes	6040

In Table 2 below, of the 242 samples taken during the activity, 168 (69%) were negative, 28 (12%) showed non-polio enteroviruses and 46 (19%) were Sabins. There was no WPV, VDPV or cVDPV isolation.

Table 2: Distribution of laboratory results by LGA of the IDP camps

LGA	No of IDP Camps involved	Number (%) Laboratory results						No(%) samples collected
		Negative	NPEVs	WPV	cVDPV	VDPV	Sabin	
Bama	1	6(46)	2(15)	0(0)	0(0)	0(0)	5(39)	13(100)
Dikwa	3	18(52)	8(24)	0(0)	0(0)	0(0)	8(24)	34(100)
Jere	6	24(68)	3(9)	0(0)	0(0)	0(0)	8(23)	35(100)
Konduga	3	19(70)	3(11)	0(0)	0(0)	0(0)	5(19)	27(100)
Maiduguri	3	53(84)	6(10)	0(0)	0(0)	0(0)	4(6)	63(100)
Monguno	8	48(69)	6(8)	0(0)	0(0)	0(0)	16(23)	70(100)
Total	24	168(69)	28(12)	0(0)	0(0)	0(0)	46(19)	242(100)

NB: NPEV: Non Polio Enterovirus; WPV: Wild Poliovirus; cVDPV: circulating Vaccine Derived Poliovirus; VDPV: Vaccine Derived Poliovirus

Based on the LGAs of origin of the healthy children, those from Gujba (7) Kaga (1), Kalabalge (4) and Madagali (1) LGAs had negative results in all the samples. LGAs with the highest non-polio enterovirus and Sabin isolation rates are Guzamala (38%) and Dikwa (26%) respectively. Other results are as depicted in Table 3 below.

Table 3: Distribution of samples and laboratory results by LGA of origin of healthy children

LGA of Origin	Number (%) Laboratory results						No(%) samples collected
	Negative	NEPVs	WPV	cVDPV	VDPV	Sabin	
Bama	26(67)	3(8)	0(0)	0(0)	0(0)	10(25)	39(100)
Dambo	5(72)	1(14)	0(0)	0(0)	0(0)	1(14)	7(100)
Dikwa	20(51)	9(23)	0(0)	0(0)	0(0)	10(26)	39(100)
Gujba	7(100)	0(0)	0(0)	0(0)	0(0)	0(0)	7(100)
Guzamala	2(67)	1(33)	0(0)	0(0)	0(0)	0(0)	3(100)
Gwoza	9(82)	2(18)	0(0)	0(0)	0(0)	0(0)	11(100)
Kaga	1(100)	0(0)	0(0)	0(0)	0(0)	0(0)	1(100)
Kalabalge	4(100)	0(0)	0(0)	0(0)	0(0)	0(0)	4(100)
Konduga	25(81)	2(6)	0(0)	0(0)	0(0)	4(13)	31(100)
Madagali	1(100)	0(0)	0(0)	0(0)	0(0)	0(0)	1(100)
Mafa	6(75)	0(0)	0(0)	0(0)	0(0)	2(25)	8(100)
Marte	52(66)	9(11)	0(0)	0(0)	0(0)	18(23)	79(100)
Monguno	6(86)	0(0)	0(0)	0(0)	0(0)	1(14)	7(100)
Ngala	3(75)	1(25)	0(0)	0(0)	0(0)	0(0)	4(100)
Niger Republic	1(100)	0(0)	0(0)	0(0)	0(0)	0(0)	1(100)
Total	168(69)	28(12)	0(0)	0(0)	0(0)	46(19)	242(100)

NB: NPEV: Non Polio Enterovirus; WPV: Wild Poliovirus; cVDPV: circulating Vaccine Derived Poliovirus; VDPV: Vaccine Derived Poliovirus

Most (67%) of healthy children were under five years of age, but the sex ratio is almost 1:1. There seems to be no sex difference in terms of isolation of non-polio enterovirus and Sabins, but the non-polio enterovirus and Sabin isolation rates are highest in the under five years age group as depicted in Table 4 below.

Table 4: Distribution of laboratory results by Age and gender

Biodata	No(%) of Negative samples	No(%) of positive for WPV	No(%) of positive for cVDPV	No(%) of positive for VDPV	No(%) of positive for Sabin	No(%) of positive for NPEVs	No(%) of participants
Gender							
Male	89(53)	0(0)	0(0)	0(0)	23(50)	15(53)	127(53)
Female	79(47)	0(0)	0(0)	0(0)	23(50)	13(47)	115(47)
Total	168(100)	0(0)	0(0)	0(0)	46(100)	28(100)	242(100)
Age (years)							
<1 yr	11(6)	0(0)	0(0)	0(0)	8(17)	4(14)	23(10)
1-<5yrs	112(67)	0(0)	0(0)	0(0)	26(57)	18(64)	156(64)
5-10yrs	45(27)	0(0)	0(0)	0(0)	12(26)	6(22)	63(26)
Total	168(100)	0(0)	0(0)	0(0)	46(100)	28(100)	242(100)

NB: NPEV: Non Polio Enterovirus; WPV: Wild Poliovirus; cVDPV: circulating Vaccine Derived Poliovirus; VDPV: Vaccine Derived Poliovirus

8. Discussions

A total of 242 stool samples were collected from healthy children from 12 inaccessible/partially accessible LGAs of Borno and from one LGA each from Yobe (Gujba) and Adamawa (Madagali) states. In addition, one stool sample was collected from a healthy child coming from Niger Republic. Most 70(29%) samples were collected from the selected eight IDP camps in Monguno LGA whereas the highest proportion of the sampled children originated from Marte LGA 79(32.6%). Laboratory results showed that of the 242 samples collected, 28(12%) were NPEVs, 46(19%) were Sabins and 168(69%) were negative. There was no WPV, cVDPV or VDPV isolated in any of the samples.

This laboratory result is comparable to the routine AFP surveillance result in the state in which of the 1104 stool specimens collected from AFP cases and their contacts from 25/27 LGAs during the same period as the healthy children sample collection, 69% were negative, NPEVs was 13% and Sabin isolation was 18%. There was no WPV, cVDPV or VDPV isolated in any of the AFP/contact samples.

Samples collection started on 17th February, 2017 and the last sample was collected on 16th May 2017. Two Polio immunization campaigns were conducted (March and April, 2017) in the state using bivalent Oral Polio Vaccine (bOPV) during the period from the start of sample collection and the date the last sample was collected. Prior to this, there was an mOPV2 and a bOPV immunization campaigns in January and February 2017 respectively in Borno state. This is in addition to the special intervention of vaccination at the entrance of all IDP camps in the state. A total of 180/242 (74%) of the healthy children were exposed to at least one round of these immunization campaigns in March and April 2017, a situation which may have accounted for the relatively high Sabin isolation rates from samples in most of the IDP camps.

Of the 46 Sabin isolates from the healthy children, only 2 were Sabin type 2; and the rest Sabin type 3 (28), Sabin type 1 (2), mixtures of Sabin type 1 and 3 (13) and Sabin type 1 and 2 (1). Results of routine AFP surveillance however shows four Sabin type 2 during the same period. Nonetheless all these sabin 2 were detected within 4 months after the last mOPV 2 SIA organized in January in the state. The average NPEV rate of 12% in the healthy children is indicative of good reverse cold chain and is typical of most tropical countries (\Rightarrow 10%) even though it is influenced by a number of factors, including the season of the year, elevation, humidity, or population hygienic levels. This rate is also a useful indicator of laboratory performance.

Samples from healthy children originating from Gujba, Kaga, Kalabalge, Madagali and Niger Republic did not yield any isolate (negative) probably due to small sample size. There was no gender bias in terms of the number of healthy children recruited and the laboratory results; however, we observed dramatic difference in the isolation of Sabins and NPEVs in favour of children aged <5yrs probably because they are the primary targets of polio

immunization campaigns and routine immunization as well as being at risk of infection with enteroviruses. This finding should however be interpreted against the back ground that the number of <5yrs age group is more than three times greater than those in the 5-10 years age group.

9. Challenges

- Reduction in the number of eligible children arriving into the selected IDP camps thereby prolonging sample collection duration from the initial planned 6 weeks to 10 weeks. Samples were collected from 17th February to 16th May, 2017. In addition, sample collection had to be extended to Bama and Dikwa LGAs where there are high number of new arrivals to be able to get the required sample size for the pilot.
- The sample collectors were constantly demanding for their payment even before the conclusion of the pilot in contrast to the initially agreed payment modalities
- The supplementary questionnaire that was meant to give other vital information on the healthy child did not carry vital information such as the epid number and OPV status of children at arrival. This made data analysis tedious trying to link the laboratory results by the names of subjects and a missed opportunity of knowing the OPV status of the children upon arrival
- ITD machine malfunction at Maiduguri national polio laboratory further prolonged the duration of obtaining complete results as samples had to be shipped to Ibadan polio laboratory.

10. Conclusions

A total of 242 stool samples were collected from healthy children from 12 inaccessible/partially accessible LGAs of Borno and from one LGA each from Yobe (Gujba) and Adamawa (Madagali) states. In addition, one stool sample was collected from a healthy child coming from Niger republic. Sample collection was done during the period from 17th February to 16th May 2017. None of the samples were positive for WPV or VDPV; but Sabins and NPEVs were isolated.

11. Recommendations

- a) Continue with intermittent healthy children sample collection for as long as there are new arrivals into IDP camps and in agreement with the lab;
- b) Expand the number of IDP camps and LGAs to include all LGAs and IDP camps receiving new arrivals from inaccessible/partially accessible LGAs
- c) Support Maiduguri polio laboratory with necessary logistics to continue health children sample collection
- d) Support Maiduguri Polio laboratory to ensure repair of the ITD machines and effective maintenance schedule of the machines
- e) Review the supplementary questionnaire to take into account such vital information as the epid number and OPV status of healthy children

12. Annex

Interview guide for new arrivals at the IDP camps

EPID Number ____/____/____/17____/____

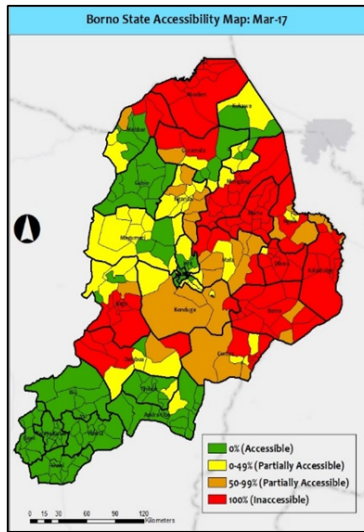
Date _____ LGA _____ Ward _____

Name of IDP camp _____ Address _____

Total new arrivals on day of sampling Men _____ Women _____ Children U5 _____

1. Age of respondent
2. Gender of respondent
3. Name of settlement the respondent comes from.
4. LGA of home settlement
5. Ward of home settlement
6. When did you leave your home? Date: _____
7. When did you arrive the Camp? Date: _____
8. Why did you leave your home?
9. Where else did you live before coming to your present location?
10. What route did you take to reach your present location?
11. Did you leave family members behind? Yes, or No
 - a. If yes, how many, where are they living and what plans do you have to reunite the family?
12. Have any of your family members been killed in the conflict? **Yes or No**
 - a. If yes, how many and what was the cause of death?
13. Do you know of others from your settlements that have been killed? **Yes or No**
 - a. If yes, how many and what was the cause of death.
14. Have any of your family members died of starvation as a result of the conflict?
 - a. If yes, how many and what was the cause of death?
15. Do you know of others from your settlement who have died of starvation or illness as a result of the conflict?
 - a. If yes, how many and what was the cause of death?
16. Is your home settlement still inhabited? **Yes or No**
 - a. If yes, how many people are living there?
17. Are any health services available in your home settlement? **Yes or No**
 - a. If yes, please describe.
18. Is it possible to send messages to your home settlement? **Yes or No**
 - a. If yes, please describe how
19. What are the main illnesses affecting people in your home settlement? **Yes or No**
20. Have you seen any AFP cases in your home settlement or other places you stayed on your way to your present location? **Yes or No**
 - a. If yes, give details including number of cases, location,
21. Do you know the status of other settlements in your LGA? **Yes or No** If yes, please list name and ward of each.
22. Do people listen to radio in your home settlement or in the LGA you come from?
 - a. If yes, which stations? **Yes or No**

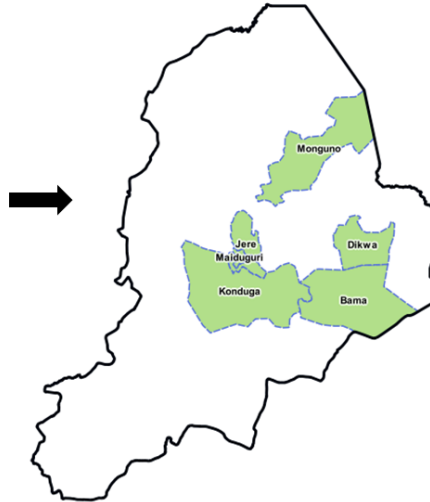
Borno March 17 Accessibility Map



Map of LGAs coming from

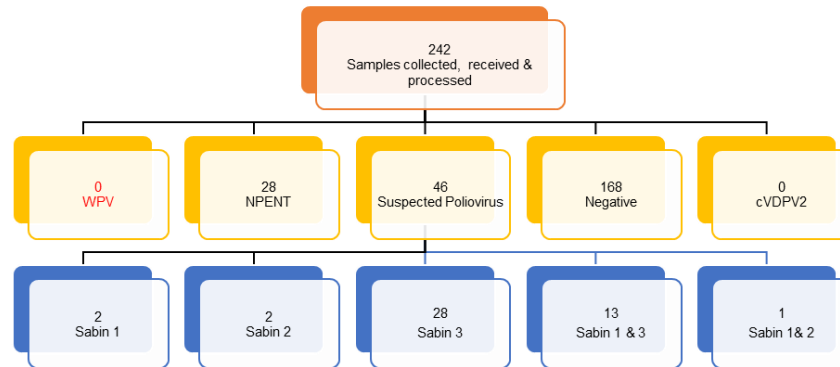


Map of LGAs Sample collected



Summary of LGA migrated from

State From	LGAs From	# of Samples Collected	
Borno	Bama	41	
	Damboa	6	
	Dikwa	39	
	Guzamala	1	
	Gwoza	10	
	Kaga	1	
	Kala Balge	4	
	Konduga	32	
	Mafa	9	
	Marte	79	
	Monguno	7	
	Ngala	4	
	Adamawa	Madagali	1
	Yobe	Gujiba	7
Non-Nigerian	Niger Republic	1	
Total		242	



Annex 7

HEALTHY CHILDREN SAMPLING IN KARACHI, AUGUST 2017.

SUMMARY:

As per recommendation of the March 2017 TAG, National EOC decided to utilize existing protocol to take additional healthy children stool samples in highest risk areas and areas draining the environmental sites in Karachi to further localize the remaining chains of virus transmission. In order to achieve this it was planned to take 100 stool samples of healthy children's in selected high risk areas UCs of Karachi and during activity 60 samples were collected from children aged 12-59 months and 40 samples from children aged 60-119 months. Activity was jointly carried out by National & Provincial EOCs. Samples were collected and shipped to Regional Lab.

Among the 60 samples collected from children between 12 – 59 months, 4 (6.7%) were positive for WPV1. Among the 40 samples collected from children between 60 and 119 months, 0 (0%) were positive for WPV1. Positive samples were detected in three separate sampling clusters – Gadaap (2), North Karachi (1), and Gulberg (1). Genetic sequencing data shows close relationship to WPV1 detected in Karachi.

The detection of WPV1 among healthy children in Karachi is not surprising considering the extensive evidence available from the environmental surveillance data showing persistent circulation of WPV1 of various lineages in Karachi since December 2016. However, the detection of 4 WPV1 positive healthy children from three sampling clusters representing all circulating lineages in Karachi highlights the intensity and geographic span of transmission within the city. Transmission in Karachi once again poses a major threat to WPV1 interruption in Pakistan. Urgent concerted action is needed to address the gaps that have allowed the re-establishment of circulation across Karachi especially in the critical belts in Gadaap, North Karachi, Gulberg, G.Iqbal, Landhi, Korangi and Bin Qassim since the beginning of winter.

Key Objective:

- In line with TAG recommendation, to enhance understanding of the transmission dynamics in areas with persistently positive environmental samples.

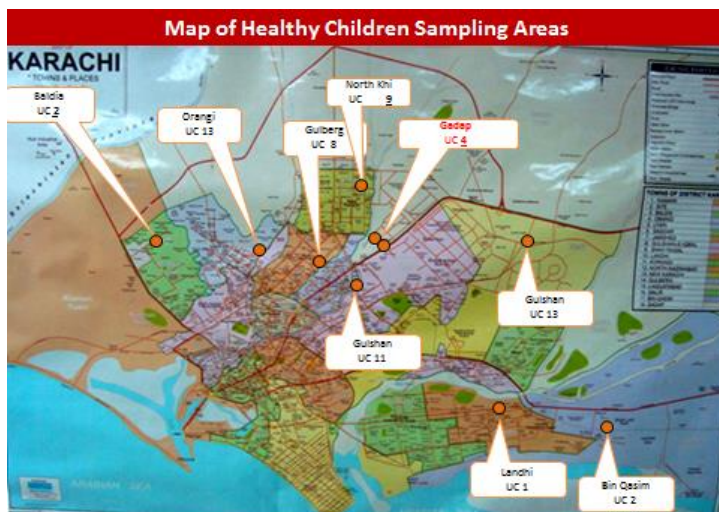
Methodology:

- Clusters were selected from the specified area by team, giving special attention to areas with priority population
- Target population: two age groups
 - Age group 1: 12 – 59 months (1 to <5 years)
 - Age group 2: 60 – 119 months (5 - <10 years)

- In each cluster a 30-household survey was conducted, whereby only houses with eligible children were included in the survey sample.
 - A total of 10 clusters were taken (total 300 households)
 - 6 clusters from Age group 1 and 4 clusters from Age group 2
 - From each cluster 10 eligible children were sampled (100 children in 10 clusters in 300 households).
- Eligible children: Samples were collected from total 100 children as per following age groups.
 - 60 children from Age group 1 (12 – 59 months)
 - 40 children from age group 2 (60-119 months)

Selection of areas Karachi

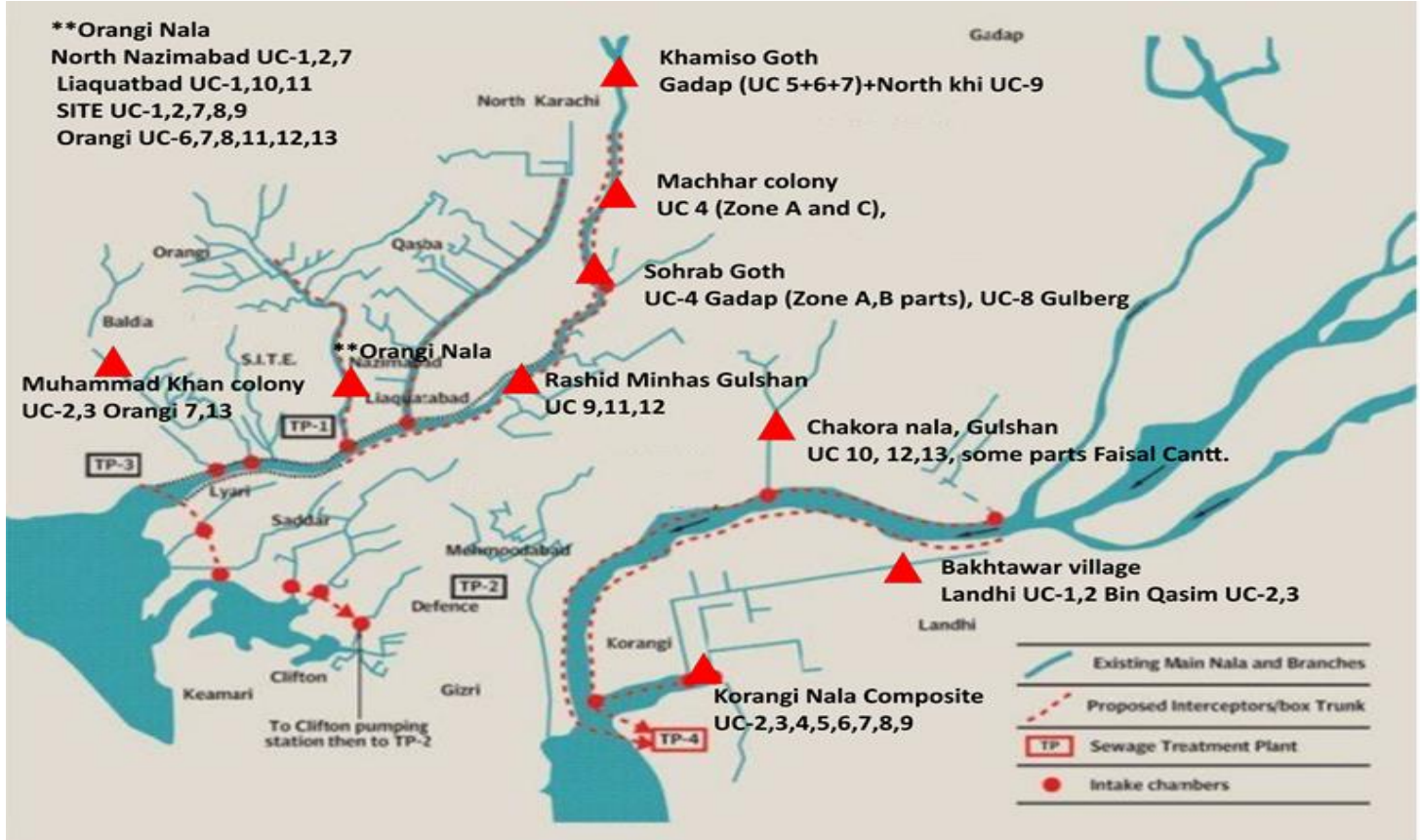
- Gadap (UC 4-Macher Colony), Orangi, Baldia, Gulberg
 - Likely priority population Afghan/Quetta block population
- Gulshan-e-Iqbal, Bin Qasim North Karachi
 - Likely priority population: Sindhi and Pashtun population with linkages to South Sindh



Selection criteria of areas for Sampling

UCNAME	Areas for clusters	Team Type	Total samples	Area Description
ITTEHAD TOWN – 2	Etihad town	CBV(FCV)	1	Mainly Pashtun population belongs to Mehsood and Afridi tribes +pockets of Afghanis Highly Mobile Draining into Env sites Of Mohammad Khan colony
REHRI – 2	Bakhtawar village	CBV(CHW)	1	Pockets of Pashtun population +Sindhi population on one side having movements from KPK and South Sindh Specially From Thatta and Sujawal Draining into Bakhtawar village ENV sites Positive since December
MUZAFARAB AD – 1	Gulsahn-e-Buner	CBV(FCV)	1	Mostly Pashtun population highly security compromised Draining into Bakhtawar village ENV sites Positive since December
KHAMISO GOTH - 9	Khamiso Goth (Afghan Basti)	CBV(CHW)	1	Mixed population mostly Sindhi and Baloch Draining in Khamiso goth ENV site recently positive in June 2017
Baloch Goth UC 13	Baloch goth	CBV(CHW)	1	MIXED WITH Sindhi, Baloch , URDU and Pashtun population in slum areas draining both Orangi Nala and Mohammad khan colony sites
GUJRO – 4	Zone A and Zone C	CBV(FCV)	2	Mostly Pashtun and afghan population plus pocket of Sindhi speaking population in ZONE C draining in both Macchar colony and Soharb goth ENV sites
Shafiq colony UC 8	Shafiq Colony	CBV(CHW)	1	Mostly Pashtun population Draining into Soharb goth ENV site
METROVILLE – 11	Quid-e-Azam Colony	CBV(FCV)	1	Mixed population with some Pashtun dominant areas and draining into the Rashid Minhas ENV sites
Safora -13	Bhittaiabad	CBV(FCV)	1	Mixed With Sindhi and Pashtun population draining into Chakor Nala ENV site

WPV environmental Sites and isolates, Karachi 2017



Child selection for Stool Sample

- Only one child of appropriate age group was selected from each 3rd surveyed house from alternate clusters.
- Survey was conducted from the head of the household or a caregiver by asking about all children in the specified age group from the house, including guest.
- After completing survey the family was asked to provide a stool sample for one of the children in the specified age group.
- Every third household surveyed was selected for stool sampling.
 - 10 children between specified age group for the cluster from 10 different households were selected for stool sampling.
- Surveyors handed over the stool collection kits, stool carrier, and frozen ice packs to the parents and provided appropriate guidance to the parent or caretaker.

30 HOUSE CLUSTER Analysis

30 House Clusters summary 12-59 Month	
Non-local households	11/180 6%
Total no. of 12 -59 months children	249
3 routine OPV doses	132/249 53%
3 Routine OPV doses verified through Card	68/249 27%
< 5 years received OPV in last 3 round	242/249 97%
Households with travel history	37/180 21%
30 House Clusters summary 60-119 Month	
(1.1.1) % Non-local households	8/120 7%
Total no. of 60 -119 months children	174
% 3 routine OPV doses	86/174 49%
% 3 routine OPV doses verified through Card	13/174 7%
Households with travel history	29/120 24%

Analysis of Children sampled

Sampled healthy children between 12-59 months	
Non-local households	0/60
Total no. of children	60
3 routine OPV doses	31/60 52%
Received 3 routine OPV doses	19/60 32%
< 5 years received OPV in last 3 round	59/60 98%
Households with travel history	4/60 15%

Sampled healthy children between 60-119 months	
Non-local households	3/40 8%
Total no. of children <5 years seen during survey	40
Received 3 routine OPV doses	23/40 56
3 Routine OPV doses verified EPI card	0/40 0%
Households with travel history	3/40 8%

Laboratory Results

Among the 60 samples collected from children between 12 – 59 months, 4 (6.7%) were positive for WPV1. Among the 40 samples collected from children between 60 and 119 months, 0 (0%) were positive for WPV1. Positive samples were detected in three separate sampling clusters – Gadaap (2), North Karachi (1), and Gulberg (1). Genetic sequencing data shows close relationship to WPV1 detected in Karachi.

Genetic sequencing of the four WPV1 isolates identified from four healthy children in Karachi, August 2017

DISTRICT	EPID	SEX	AGE (M)	SAMPLE COLLECTION	CLUSTER	HOMOLOGUS ISOLATES
KHI.NORTH	SD/73/17/H08/F008	M	36	1-Aug-17	R4B5C4	99.33% with PAK17-ENV324E2 PAK/SD/KHI/GP-2/17/007 KHIGADAAP 99.33% with PAK17-ENV329E5 PAK/SD/KHI/GP-3/17/007 KHIGADAAP
KHI.GADAP	SD/63/17/H08/A003	M	30	1-Aug-17	R4B5C4	99.55% with PAK17-ENV324E2 PAK/SD/KHI/GP-2/17/007 KHIGADAAP 99.55% with PAK17-ENV329E5 PAK/SD/KHI/GP-3/17/007 KHIGADAAP
KHI.GADAP	SD/63/17/H08/A004	M	24	1-Aug-17	R4B5C4	99.55% with PAK17-ENV324E2 PAK/SD/KHI/GP-2/17/007 KHIGADAAP 99.55% with PAK17-ENV329E5 PAK/SD/KHI/GP-3/17/007 KHIGADAAP
KHI.GULBERG	SD/64/17/H08/E10	F	48	2-Aug-17	R4B5C4	99.33% with PAK17-ENV184RD PAK/SD/KHI/LD-1/17/004 KHI LANDHI 99% with PAK17-ENV-BMS020E3 PAK/SD/SUK/NS-1/17/004-BMS SUKKUR

Pictorial Highlights of the activity



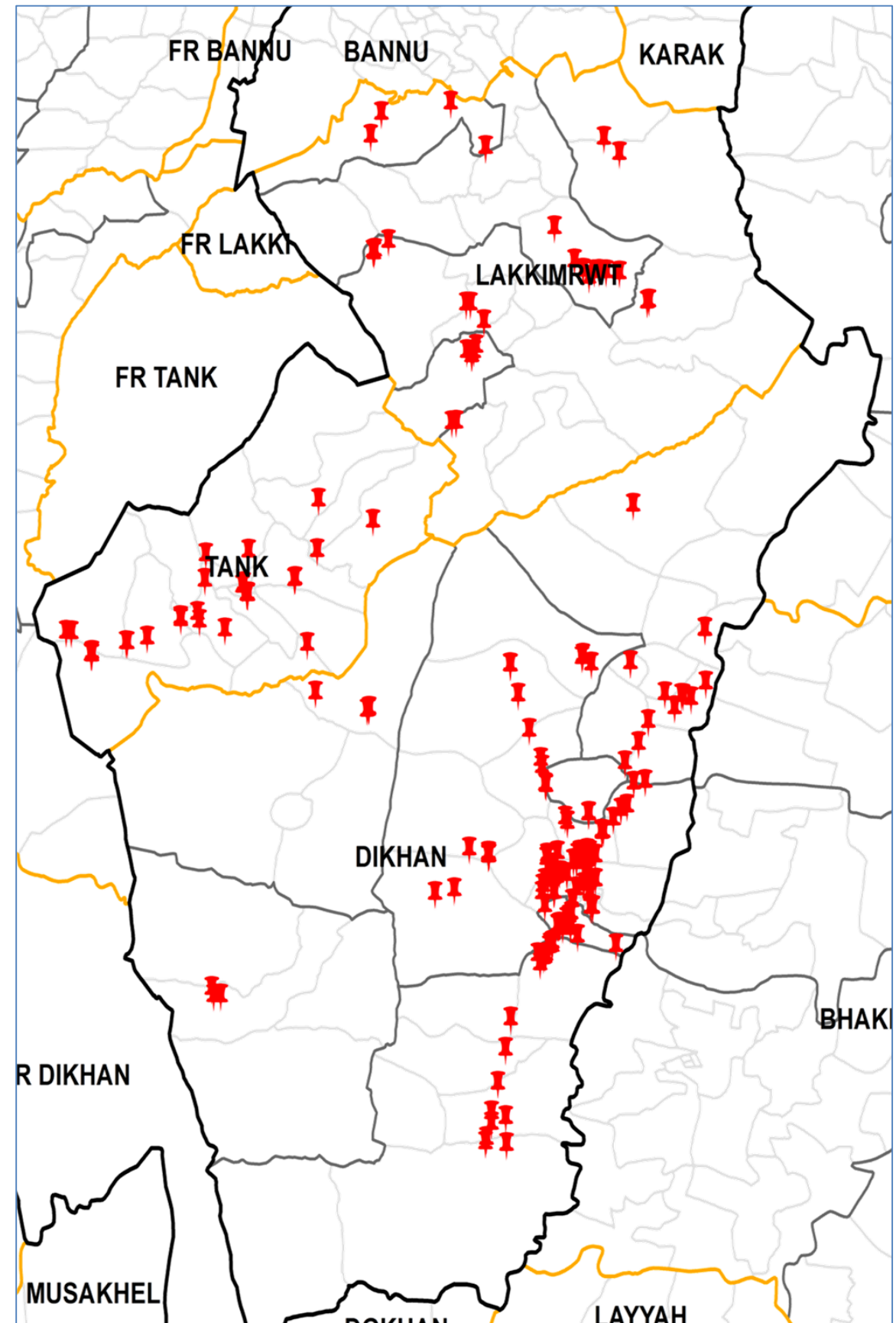
Annex 8

HRMP ASSESSMENT SURVEY KPK

September, 2017

KPK HRMP Survey Location - UC Wise

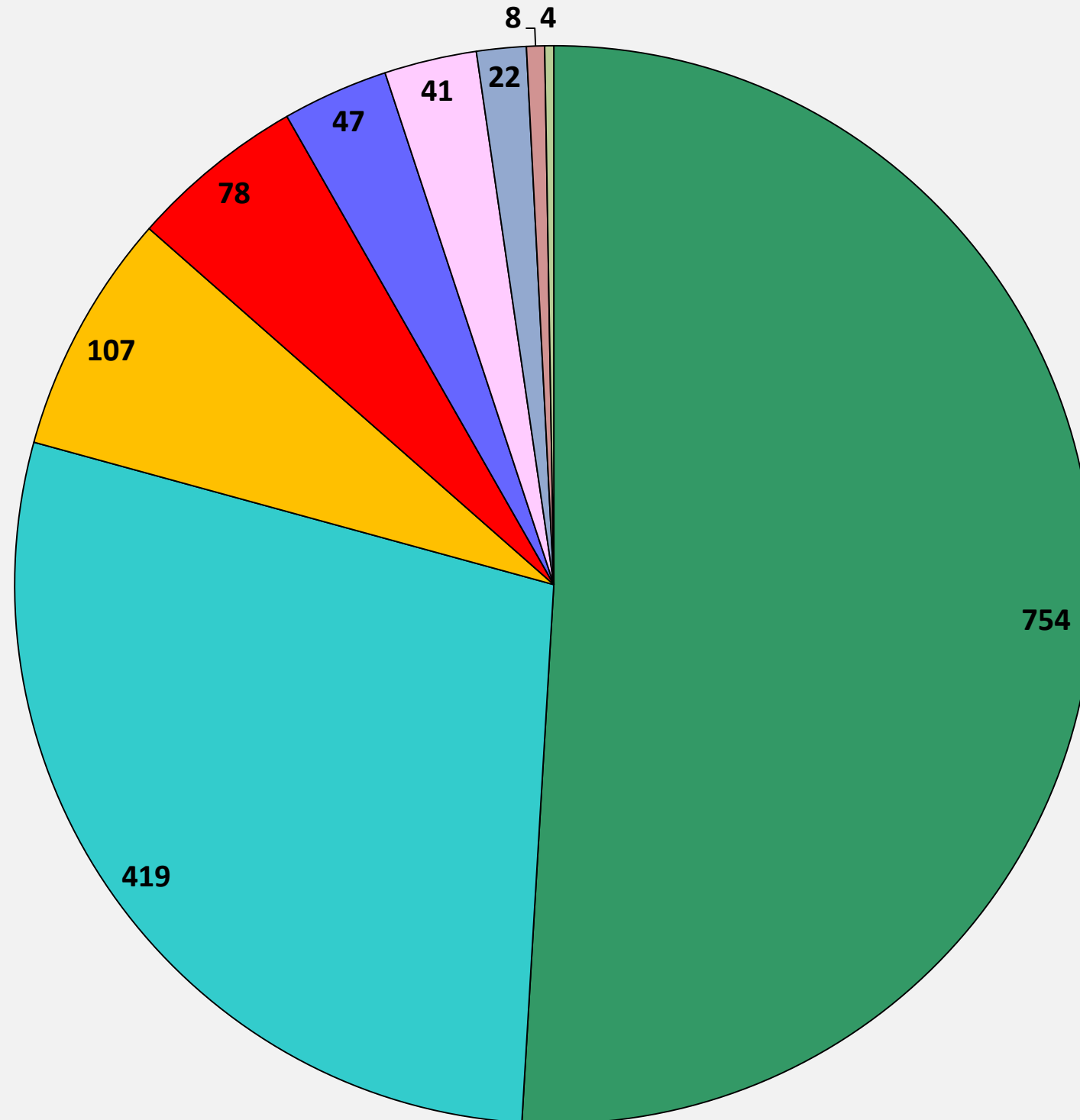
District	UC	No
DIKHAN	1. MURYALI	5
	2. HATHALA	4
	3. LUNDA	1
	3. MUSAZAI	4
	5. NAIWAILA	1
	7. PAHARPUR	3
	DERA CITY-II	1
	DERA JAAT I	6
	DERA JAAT II	3
	DEWALA	7
	HASSAM	4
	KEICH	6
	KOTLA SAIDAN	31
	RAKH MANDHRAN	6
	RATTA KULACHI	13
	SHORE KOT	8
	YARIK	4
	ZANDANI	2
	2. MALANA	10
	KURAI	14
	11. LAAR	6
	3. MADDI	10
	6. PAROA	7
	4. MAHRA	6
	5. KOTJAI	2
	9. DHAP SHUMALI	3
	8. BANDKORAI	3
	WANDA KHAN MUHAMMAD	1
	Lachra	39
	Rakh mandhra	6
	Korai	1
	Chehkan	2
	Jhok kanera kacha	1
Nil	1	
TANK	GARA BALOCH	6
	GUL-IMAM	4
	PAI	1
	SARANGZOONA	4
	GOMAL BAZZAR	8
	WARASPOON	4
	JATTATER	4
	SHAH AALAM	3
	RANWAL	4
	DABARA	6
	MULAZAI	1
	Tatta	6
	LAKKIMRWT	12. PEZO
6. TAJAZAI		5
6. THAKHTIKHEL		3
CITY 2		5
9. BAKHMAL AHMAD ZAI		2
15. BEHRAM KHEL		2
16. TITERKHEL		5
11. PARKHEL TALL		3
20. TAJORI		1
9. BEGOKHEL		2
13. GHAZNIKHEL		2
1. LAKKI		4
7. KOTKASHMIR		1
17. LANDIWA		1
12. SALAMANKHEL		1
GHAZNI khel		2
Kaza mada khel		1
Dk	1	
Grand Total		321



Legend

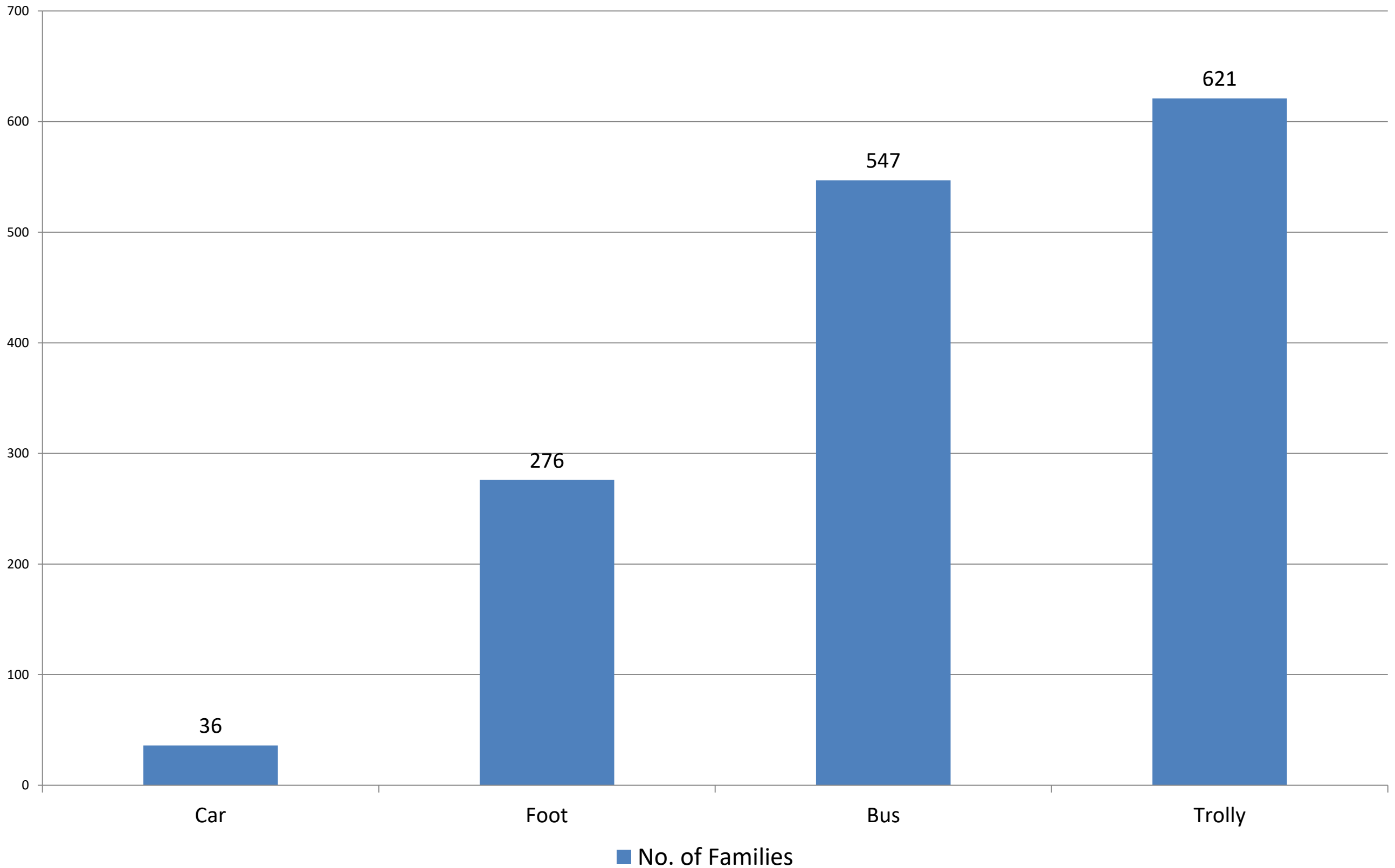
- Province
- District
- Tehsil
- UCs

HRMP Group Type

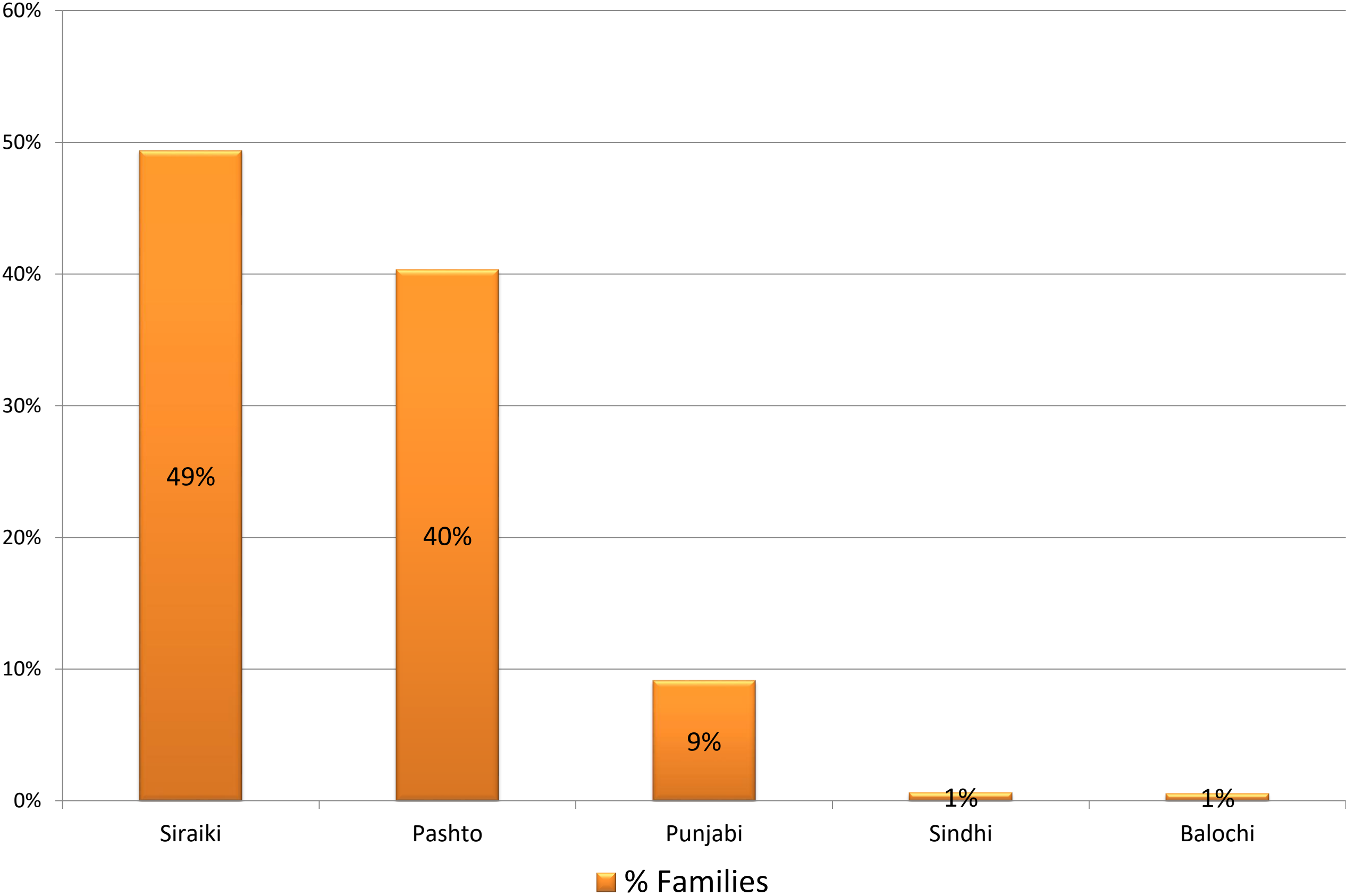


■ Nomads ■ Brickkiln Worker ■ Econmigrant ■ Seasonal Migrant ■ IDP ■ AFG_Refugee ■ Agricultural ■ Returnee ■ Other

Mobility Means Used By HRMP Groups

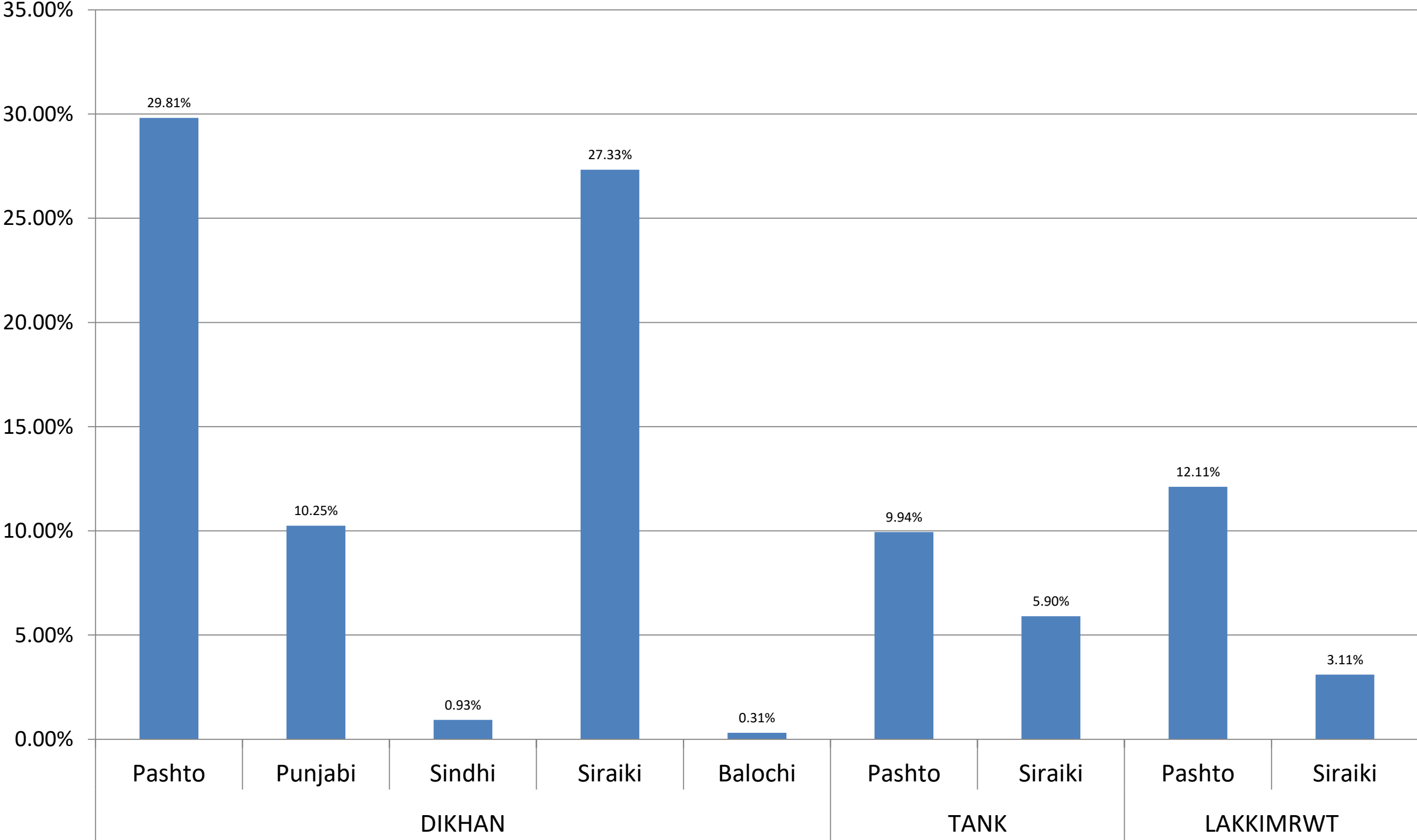


Ethnicity of HRMP



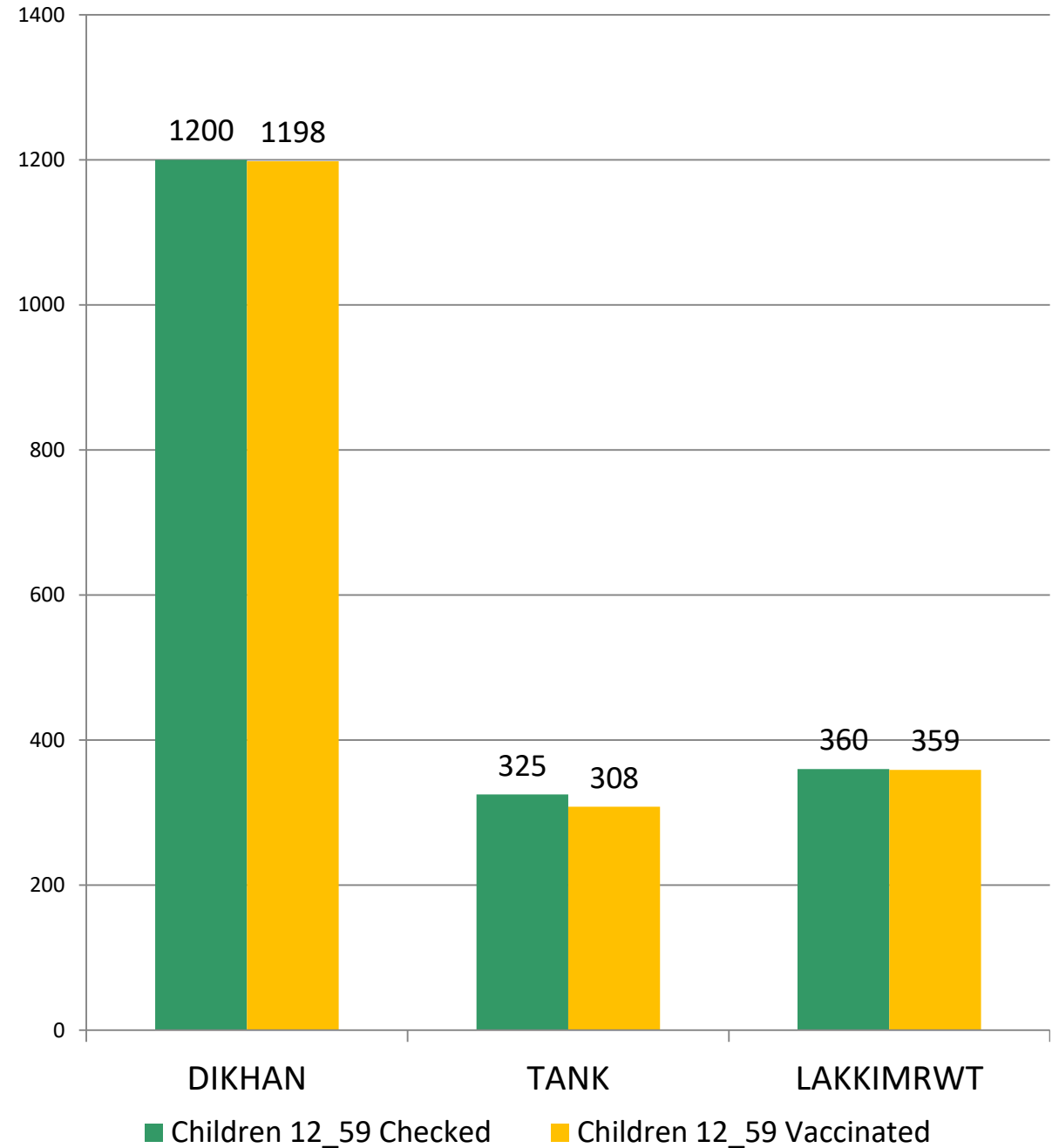
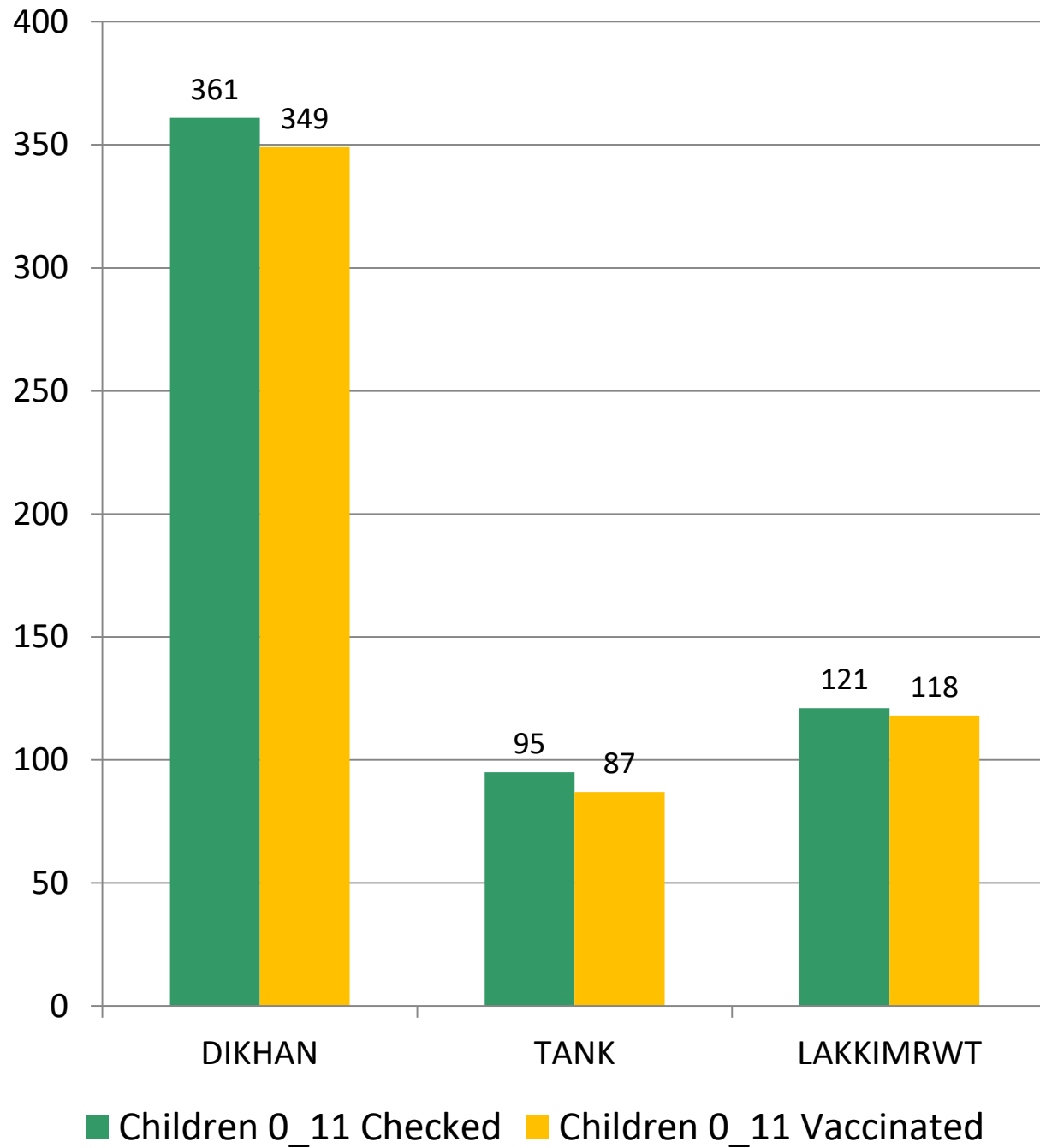
Ethnicity of HRMP by District

% Families

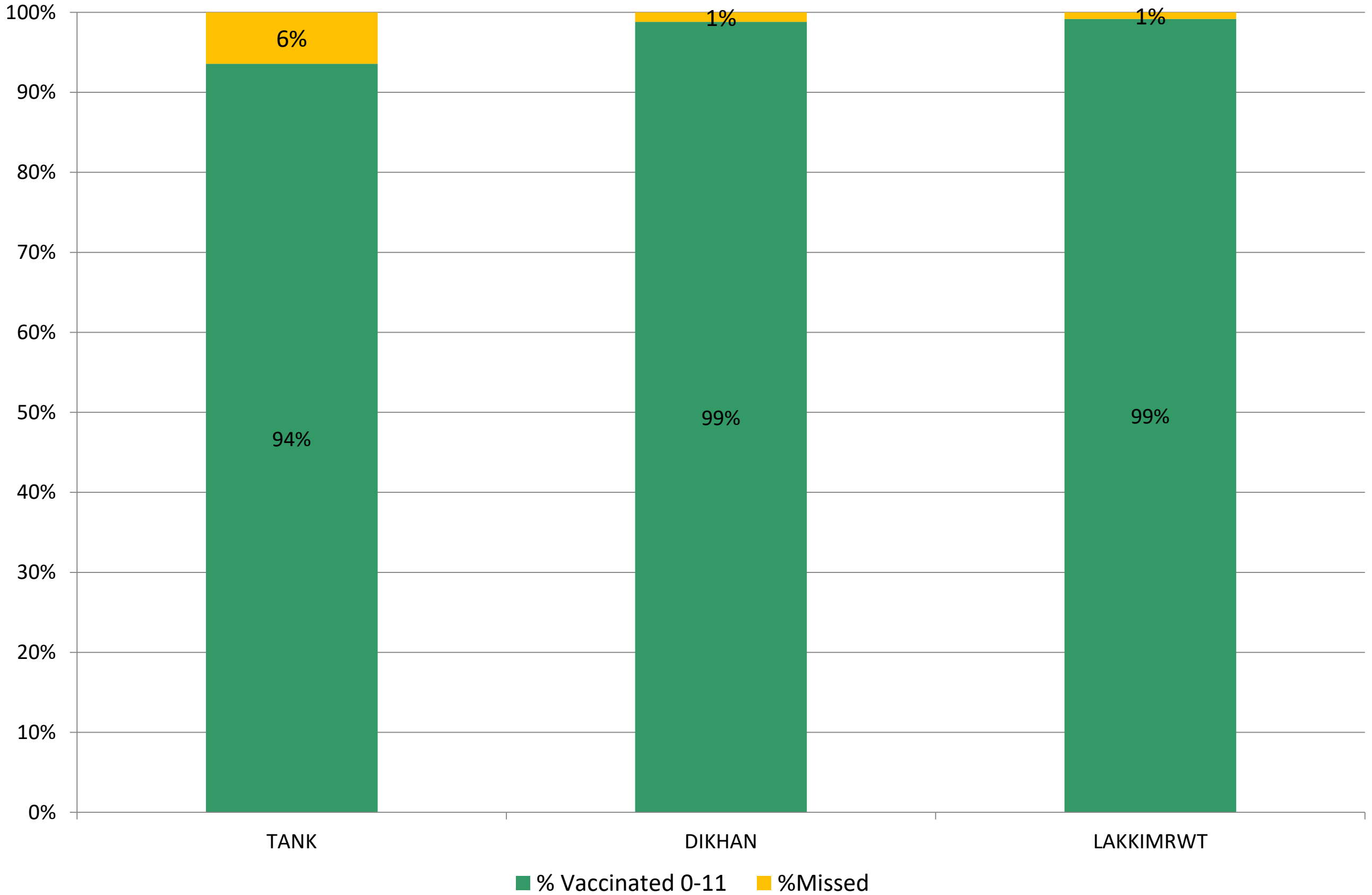


■ % Families

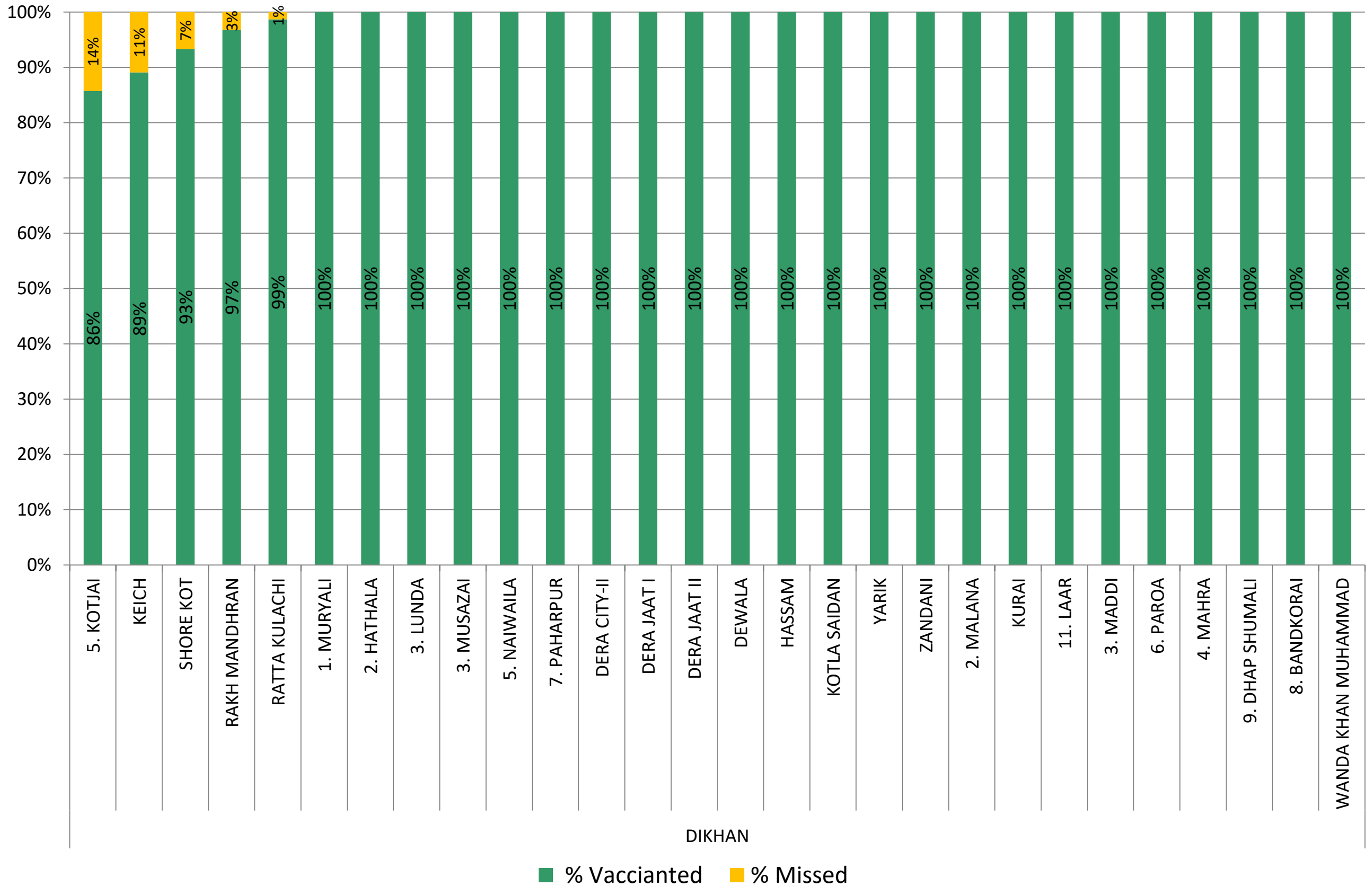
Vaccination Status



% Vaccination Status



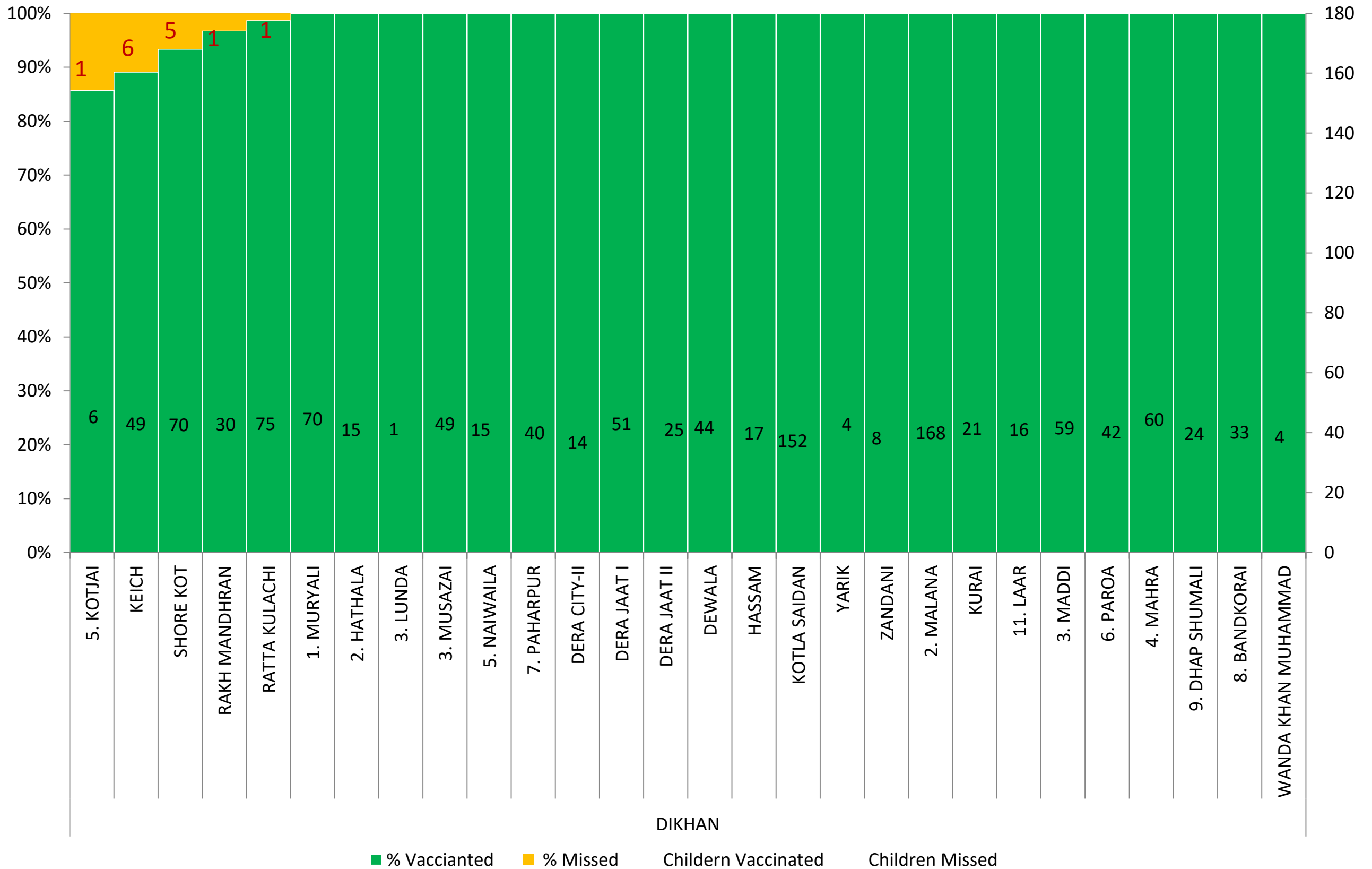
District DI-Khan Vaccination Status – UC wise



DIKHAN

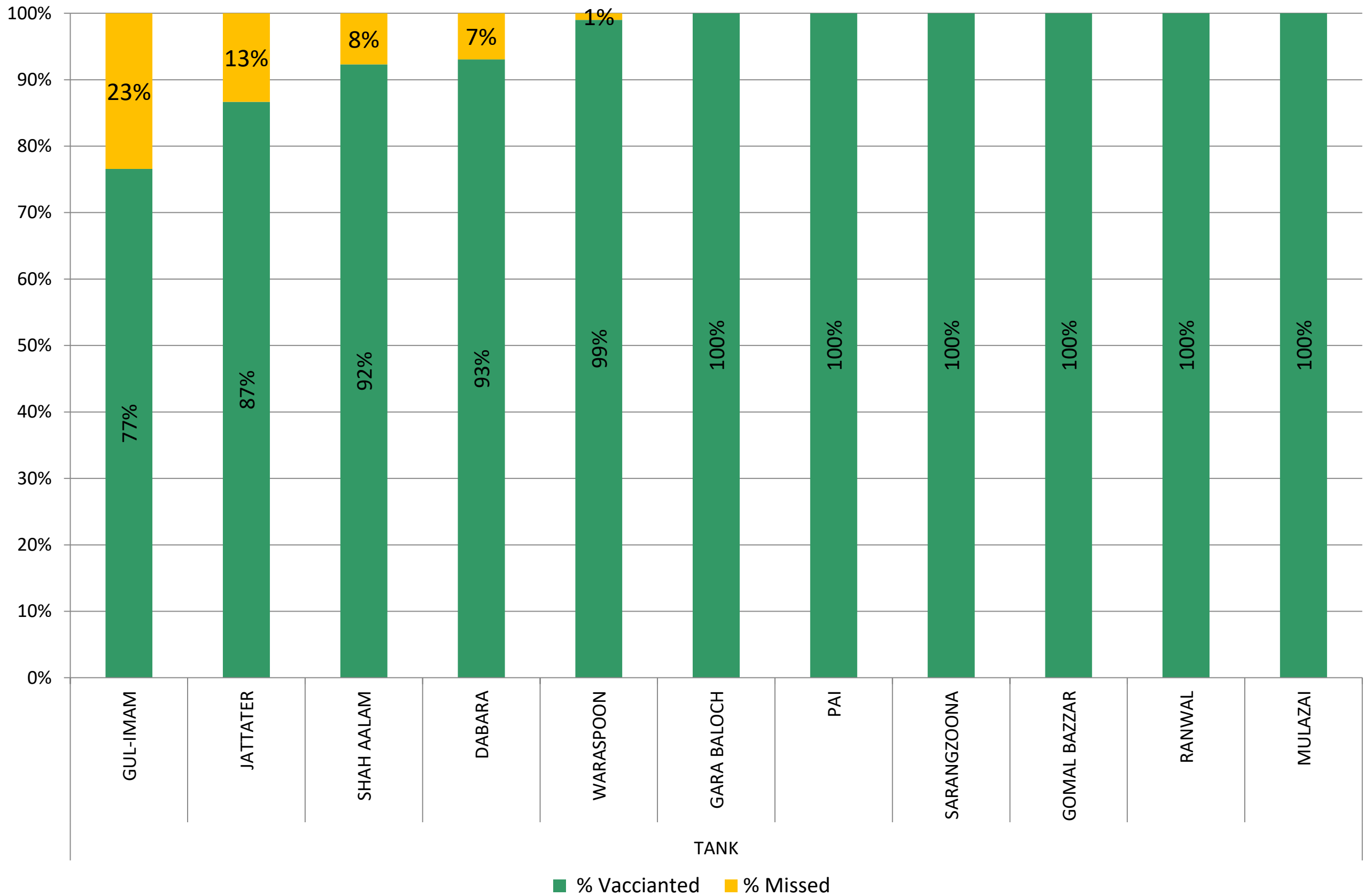
■ % Vaccianted ■ % Missed

District DI-Khan Vaccination Status – UC wise

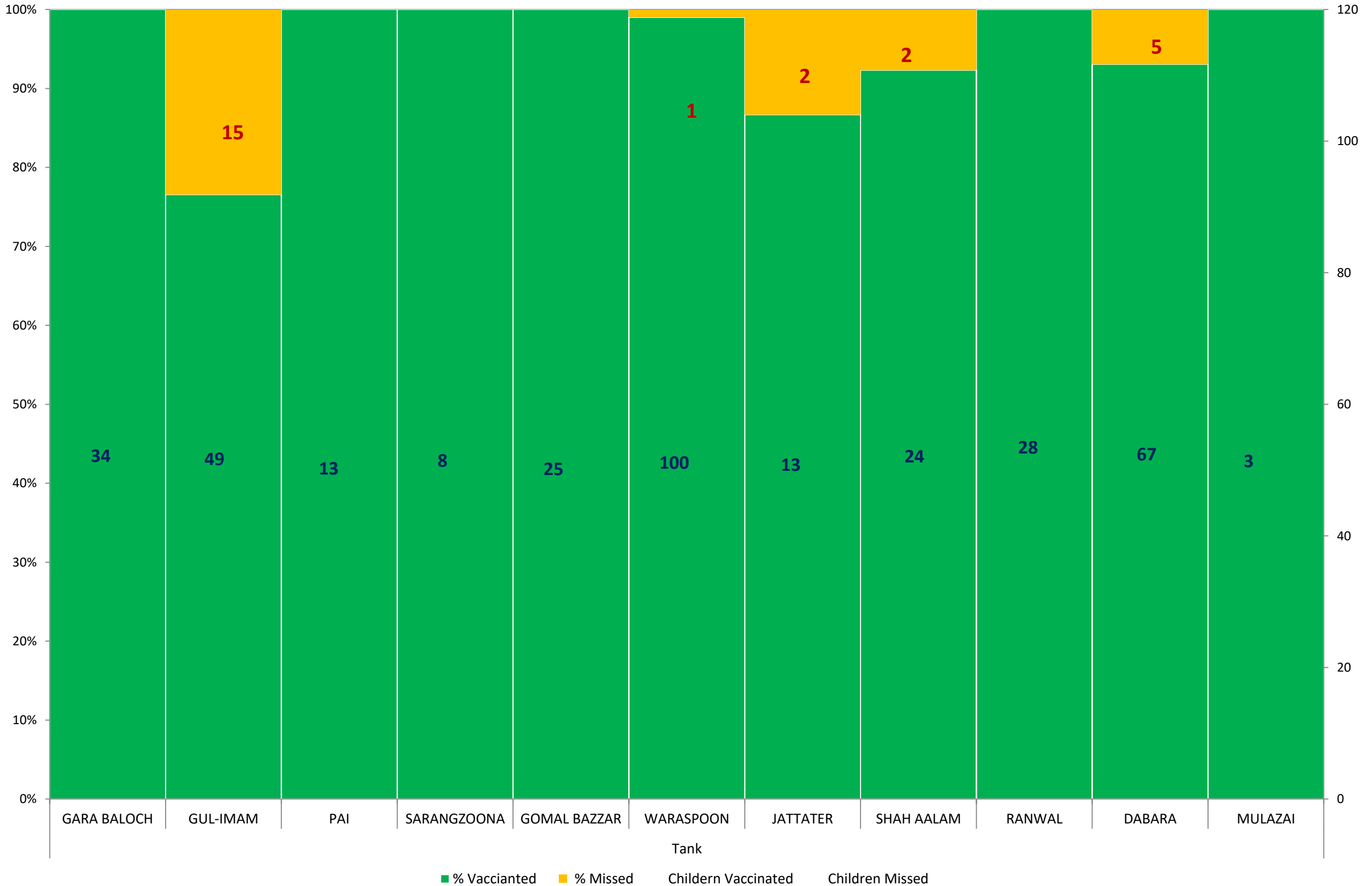


*Number of children vaccinated and missed are shown in the green and orange bar respectively.

District Tank Vaccination Status – UC wise

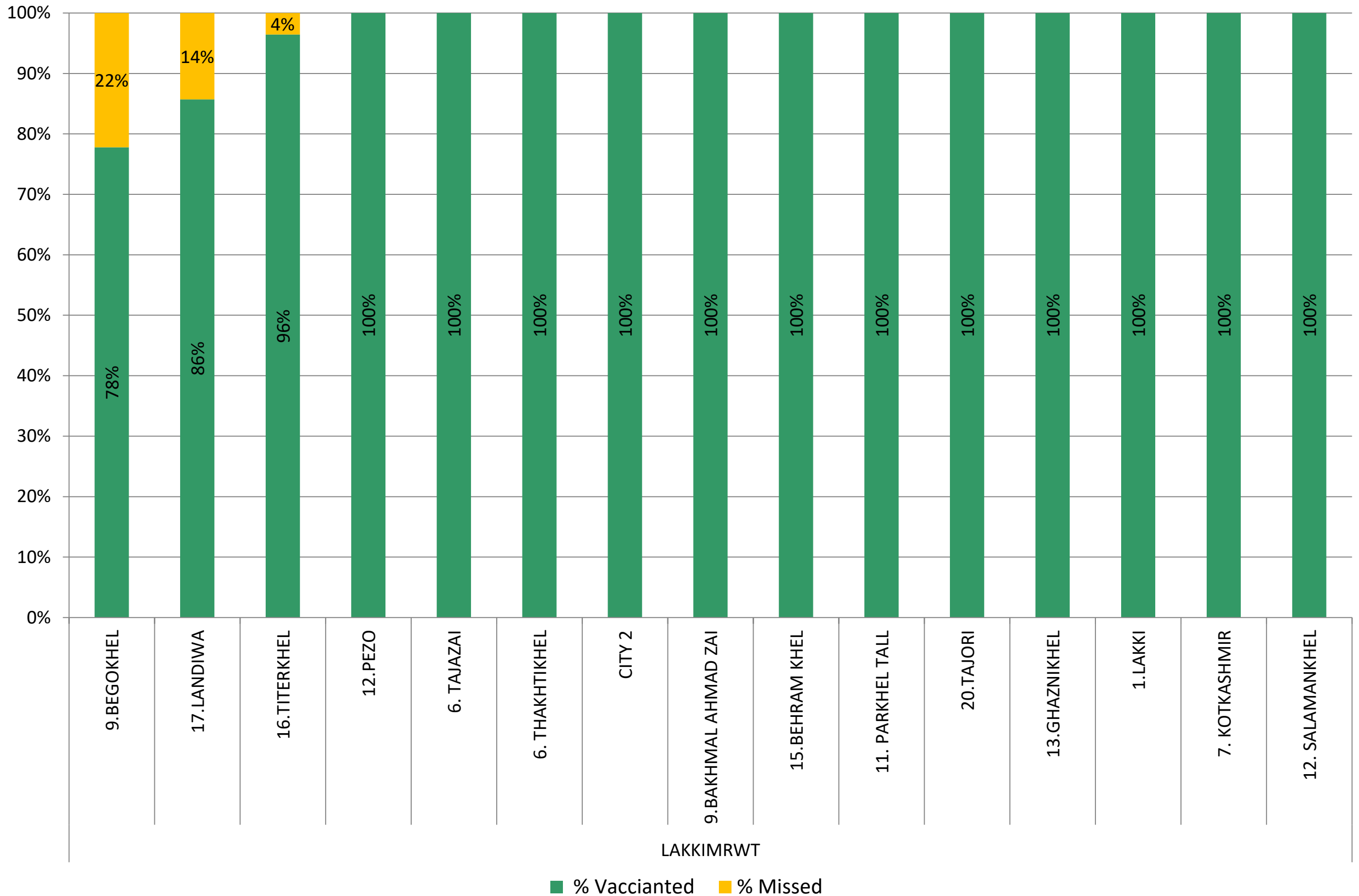


District Tank Vaccination Status – UC wise

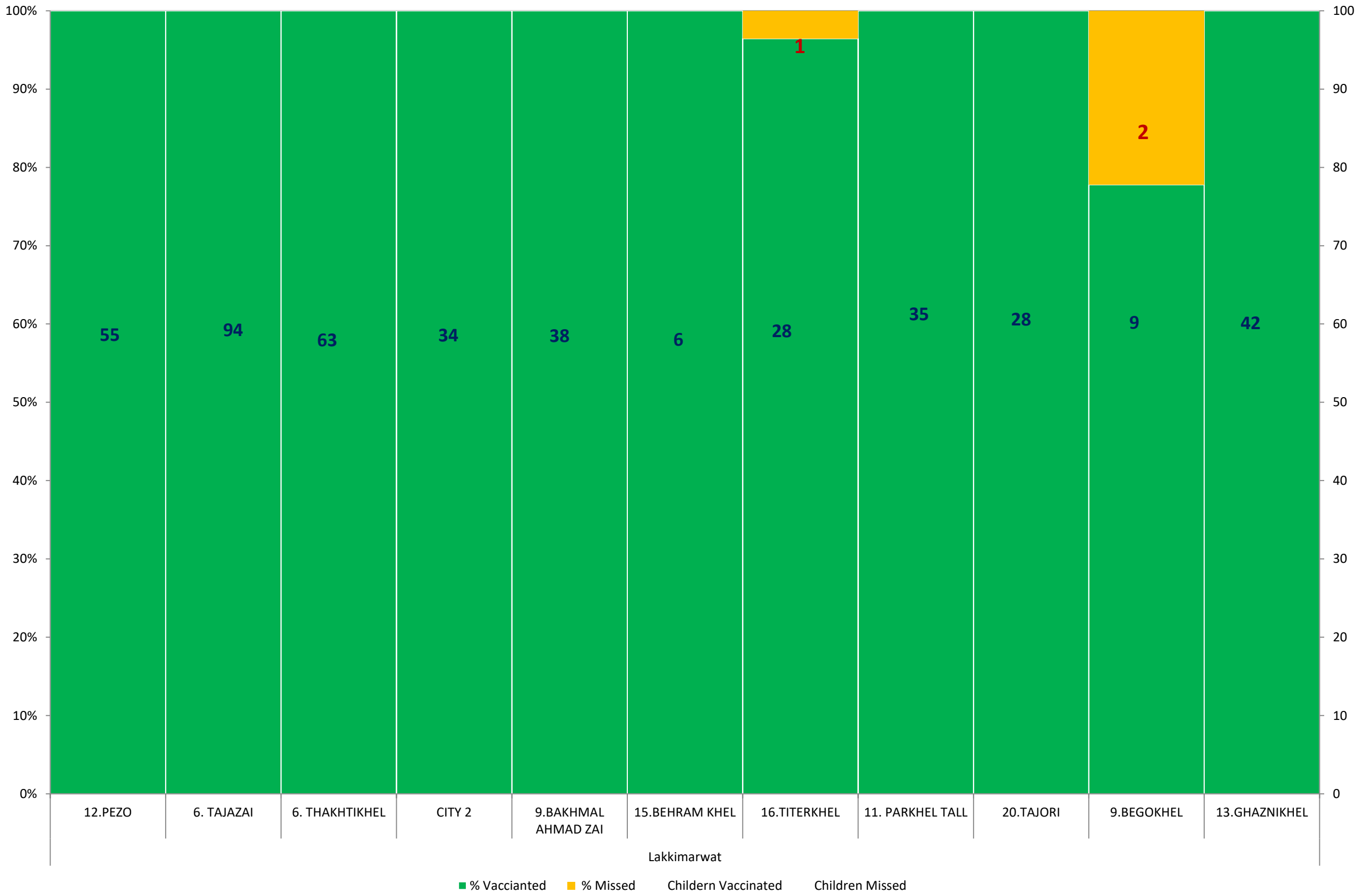


*Number of children vaccinated and missed are shown in the green and orange bar respectively.

District Lakkimarwat Vaccination Status – UC wise

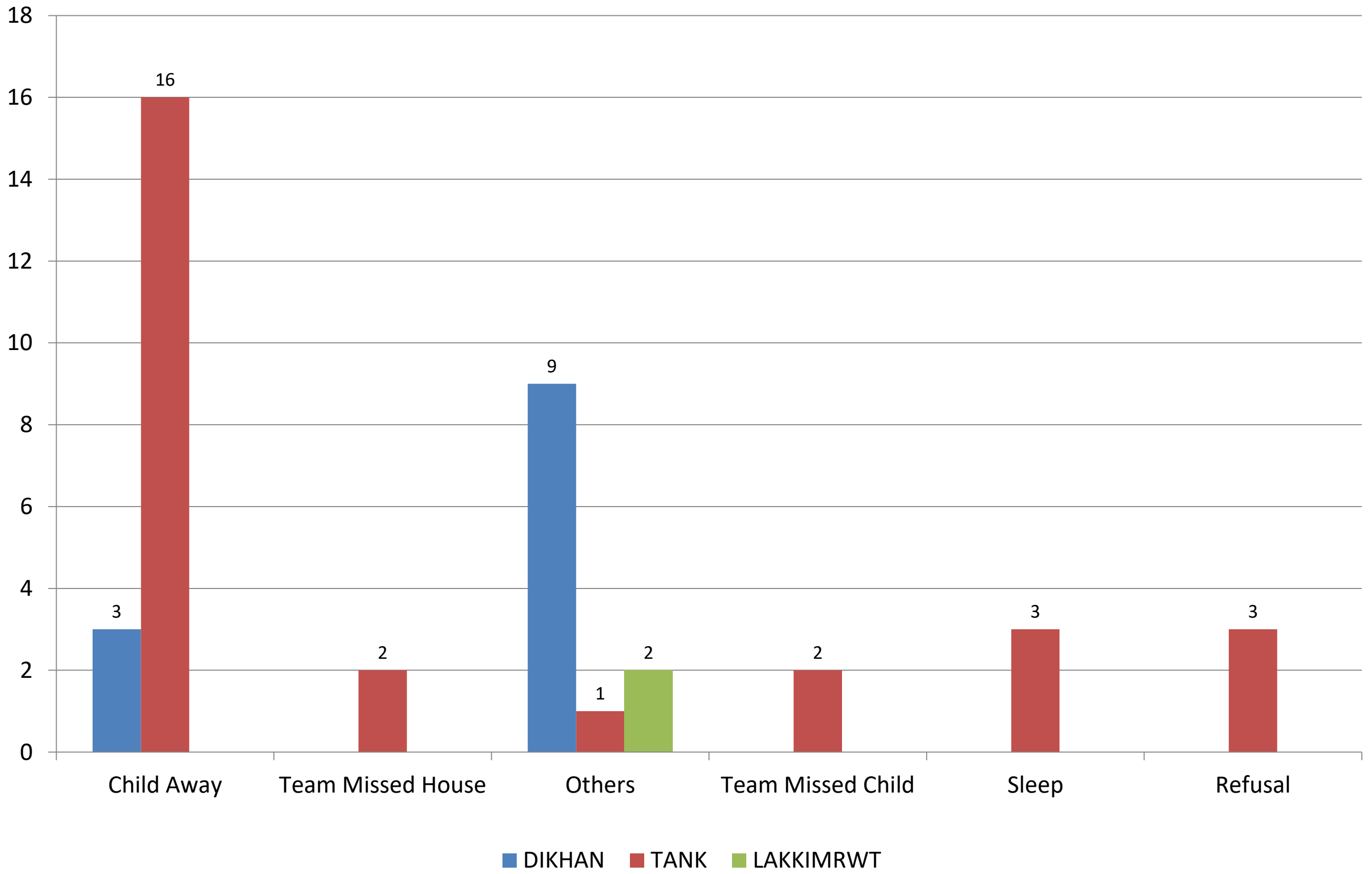


District Lakkimarwat Vaccination Status – UC wise



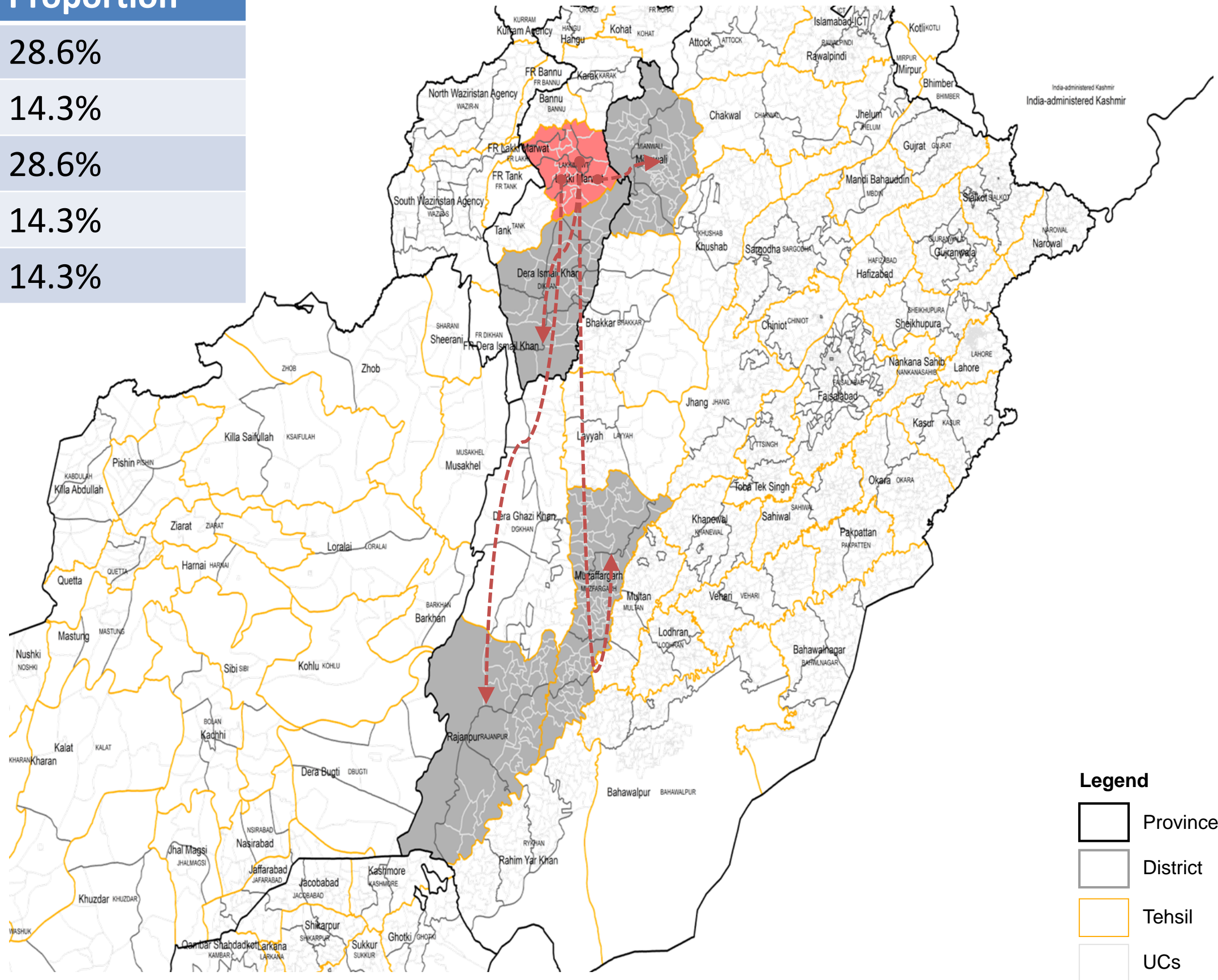
*Number of children vaccinated and missed are shown in the green and orange bar respectively.

Analysis - Reason for being Missed



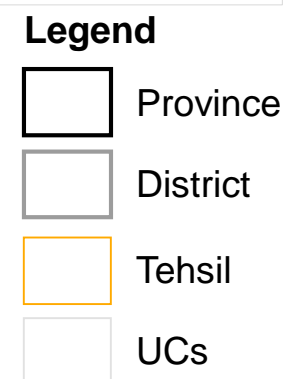
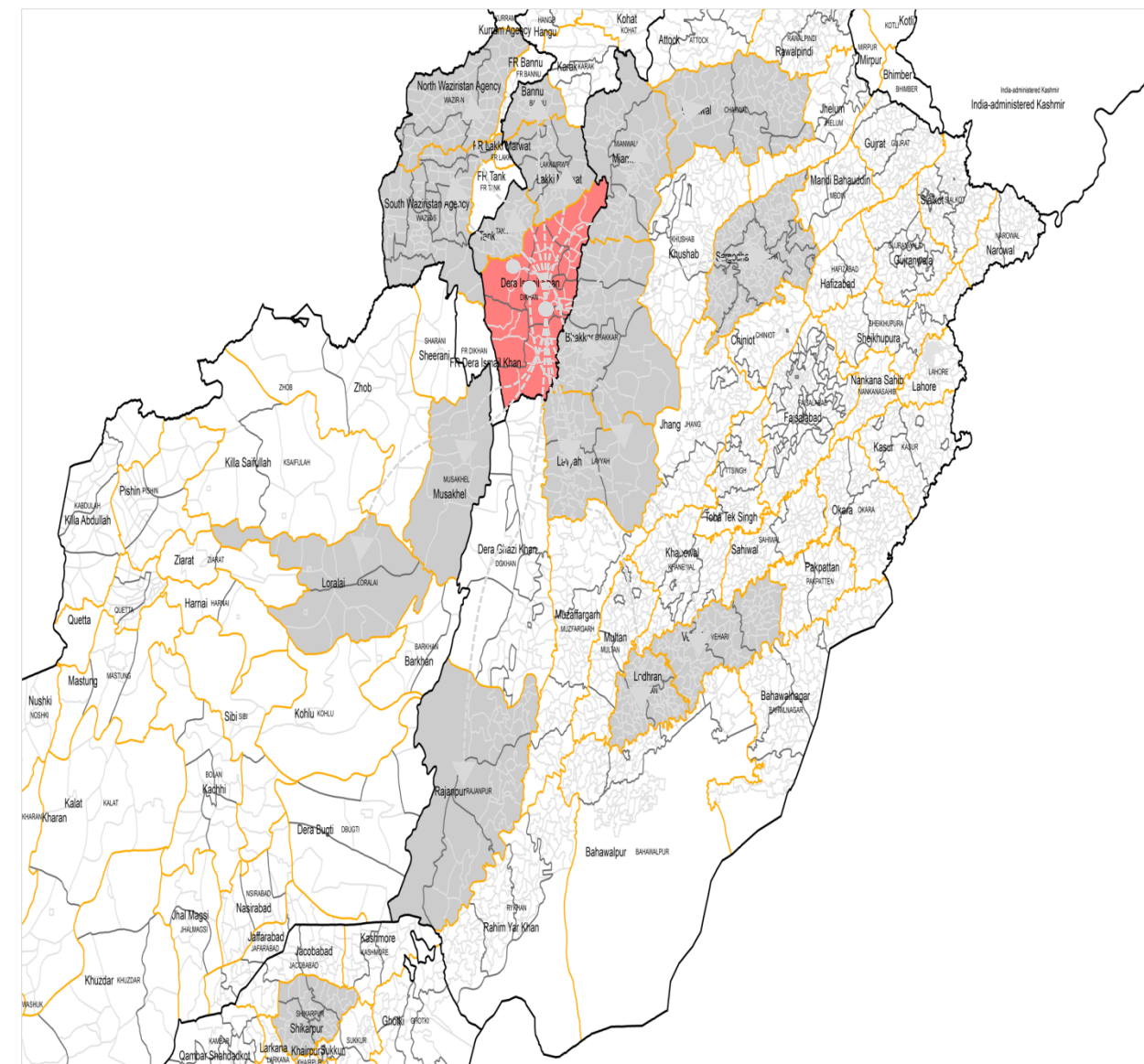
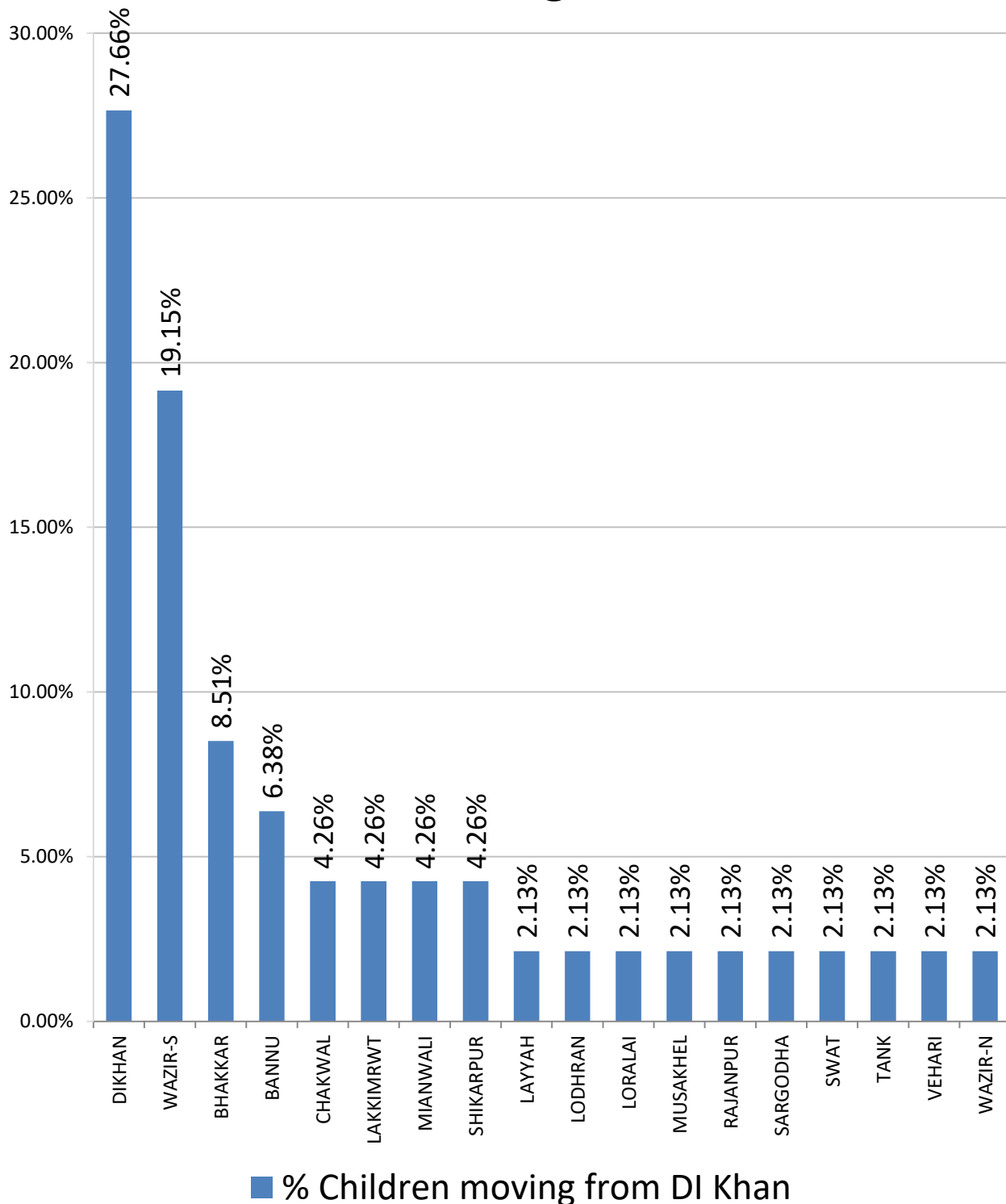
Map of Movement Trends: Next Destination - % Children moving from Lakkimmarwat

Where to	Proportion
Within district	28.6%
DI Khan	14.3%
Mianwali	28.6%
Muzafargarh	14.3%
Rajanpur	14.3%



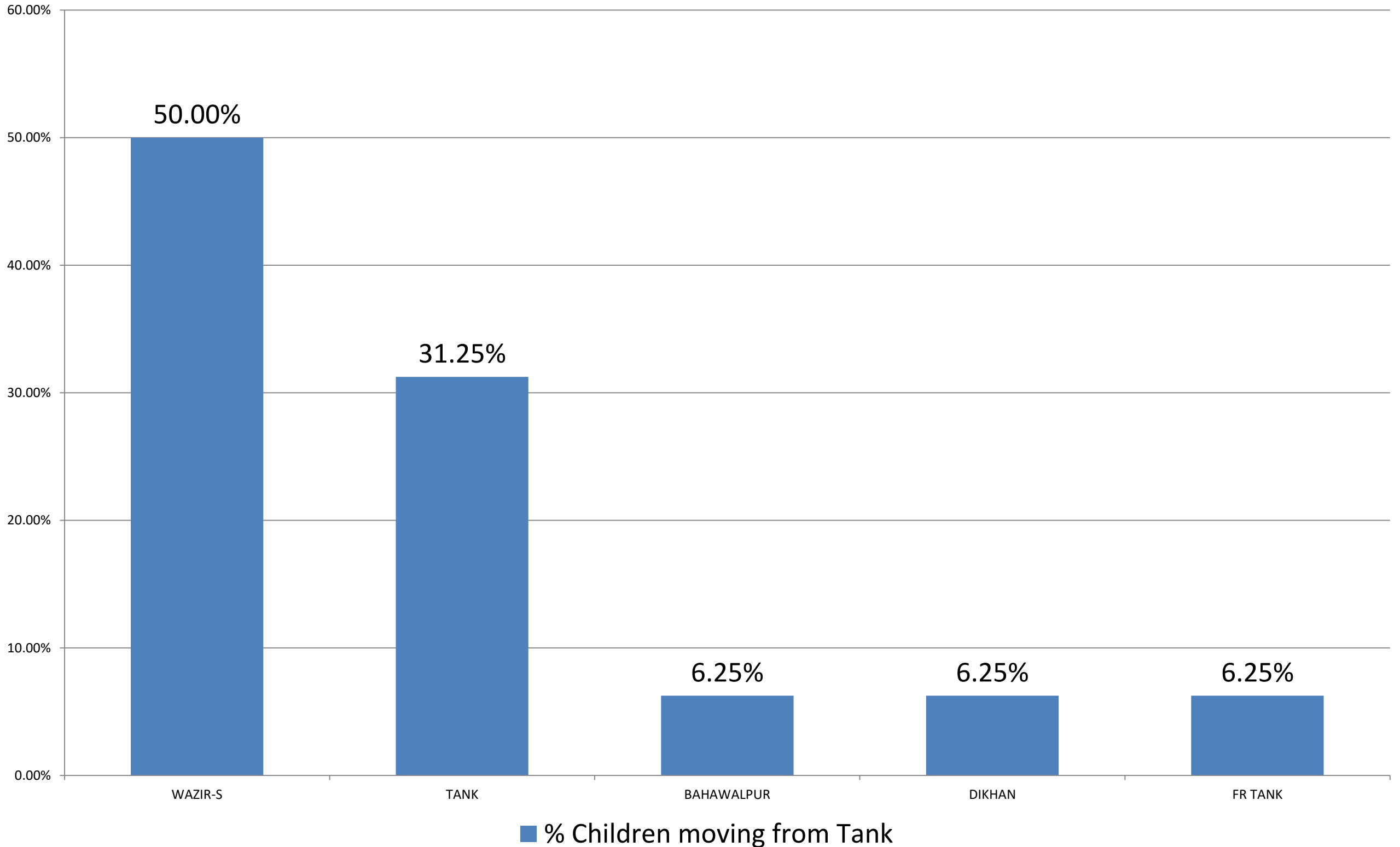
Map of Movement Trends: Next Destination - % Children moving from DI Khan

% Children moving from DI Khan



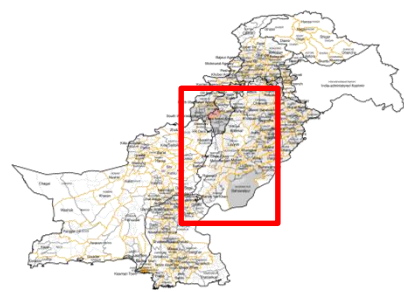
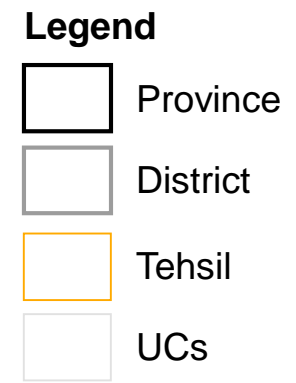
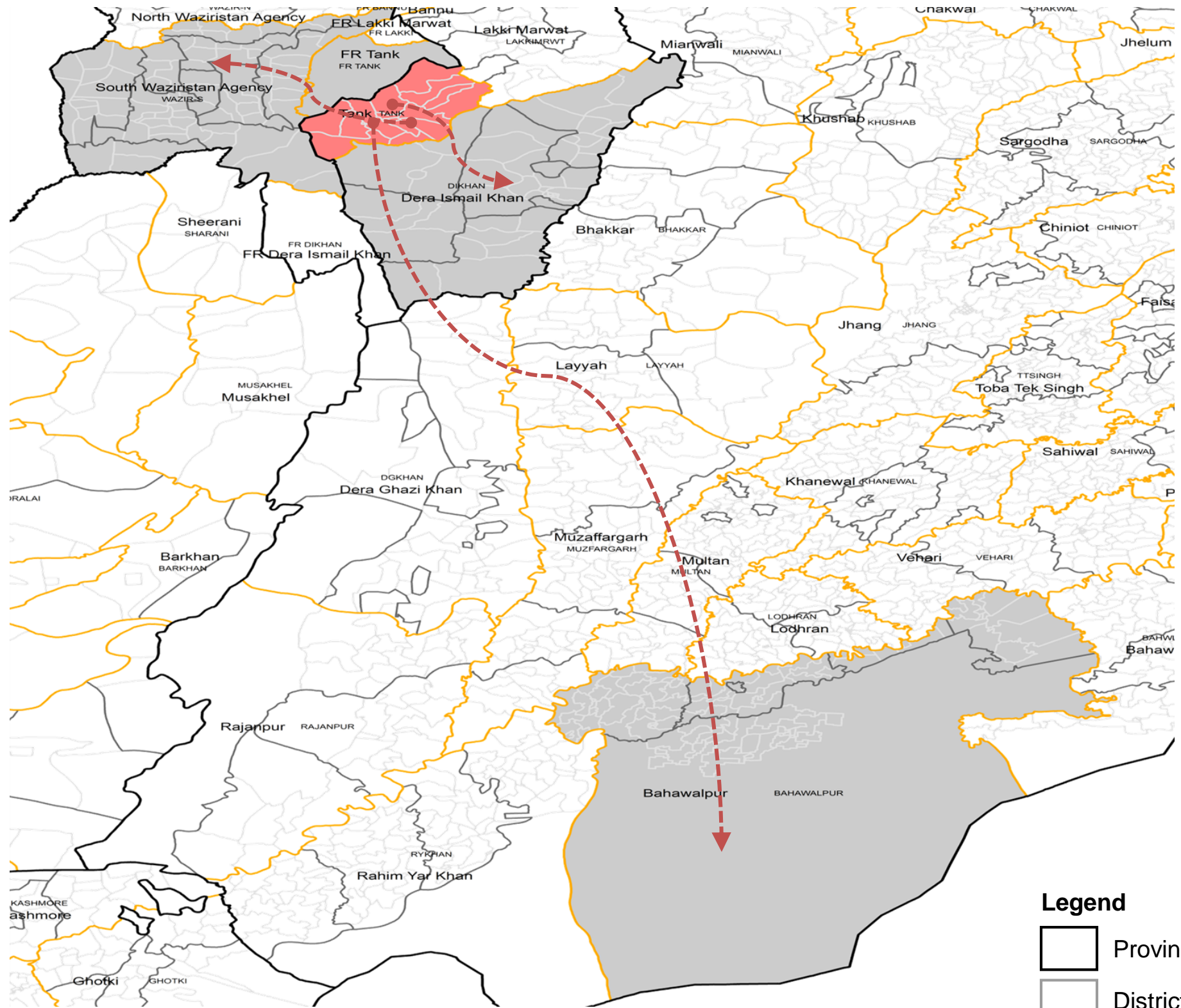
Movement Trends: Next Destination - % Children moving from Tank

% Children moving from Tank

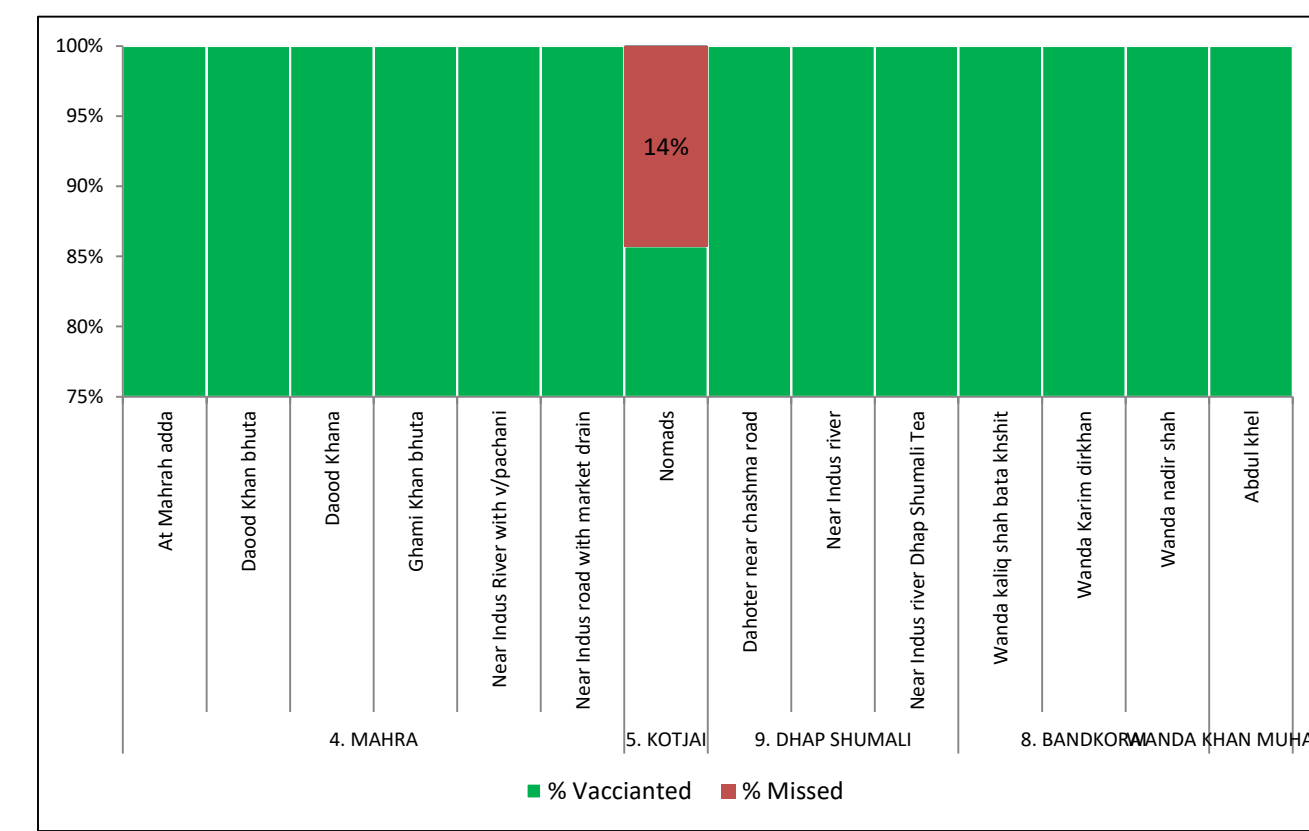
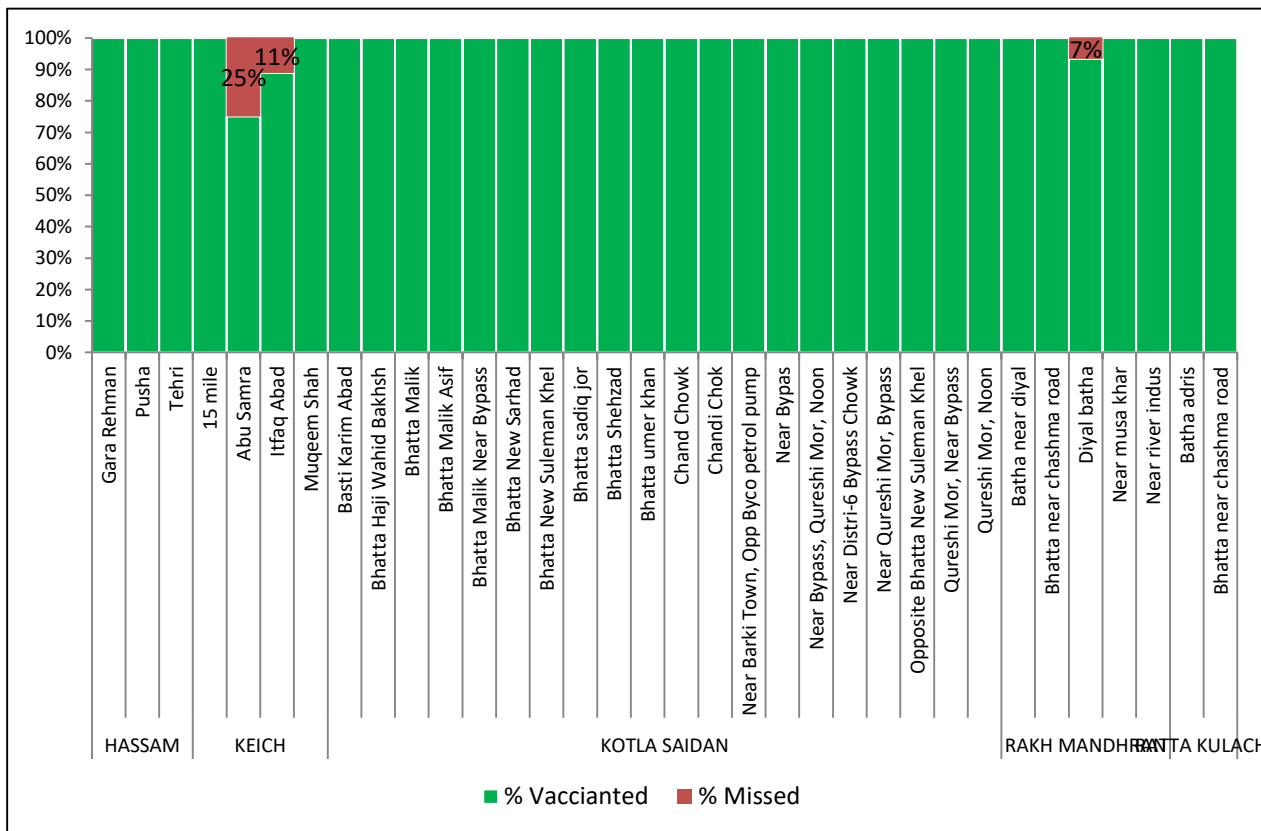
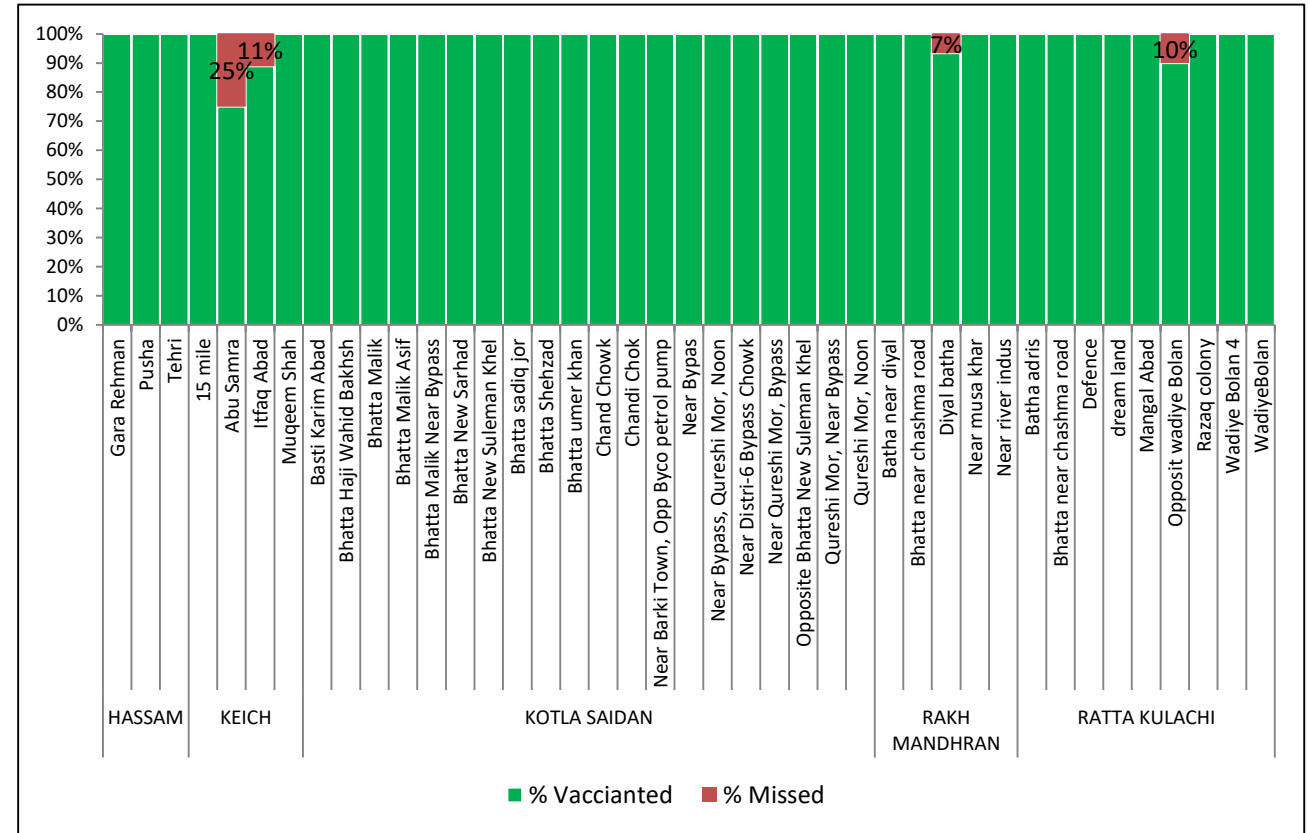
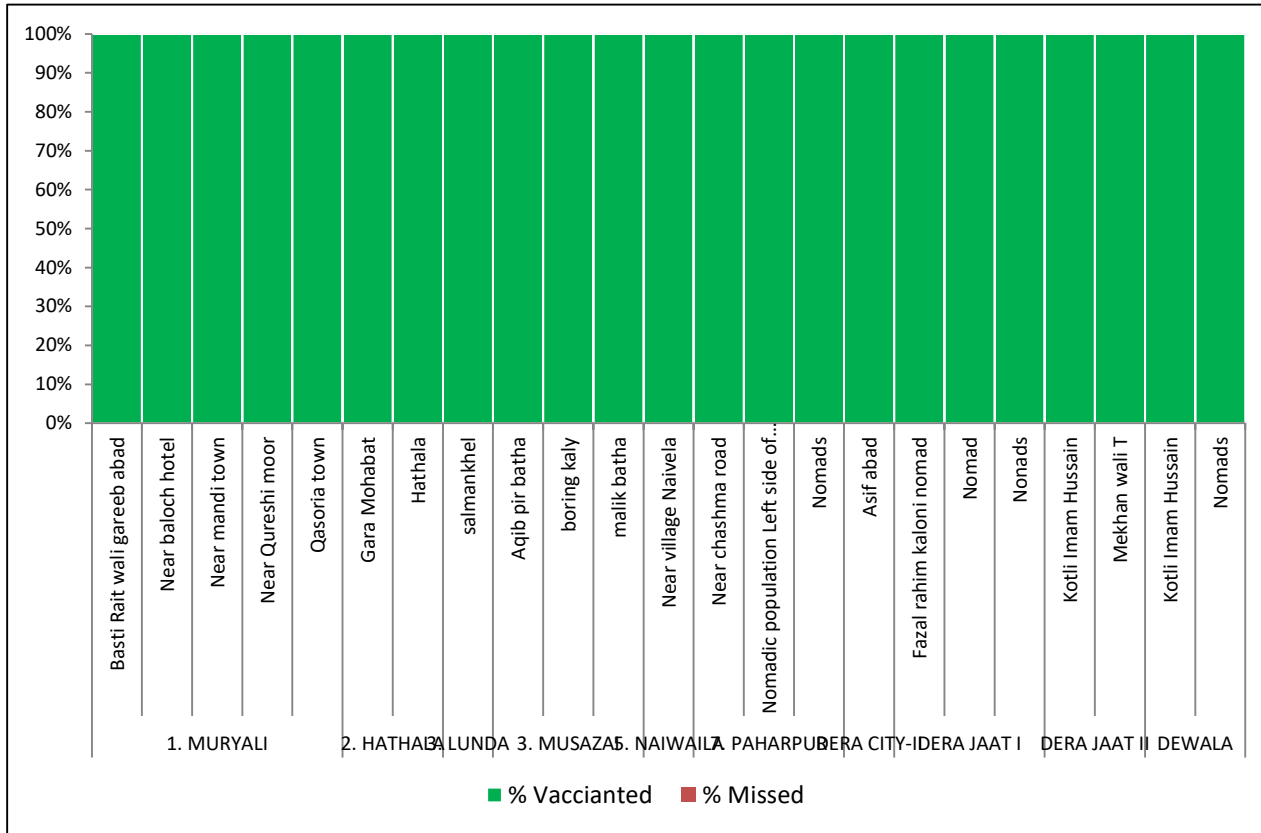


Map of Movement Trends: Next Destination - % Children moving from Tank

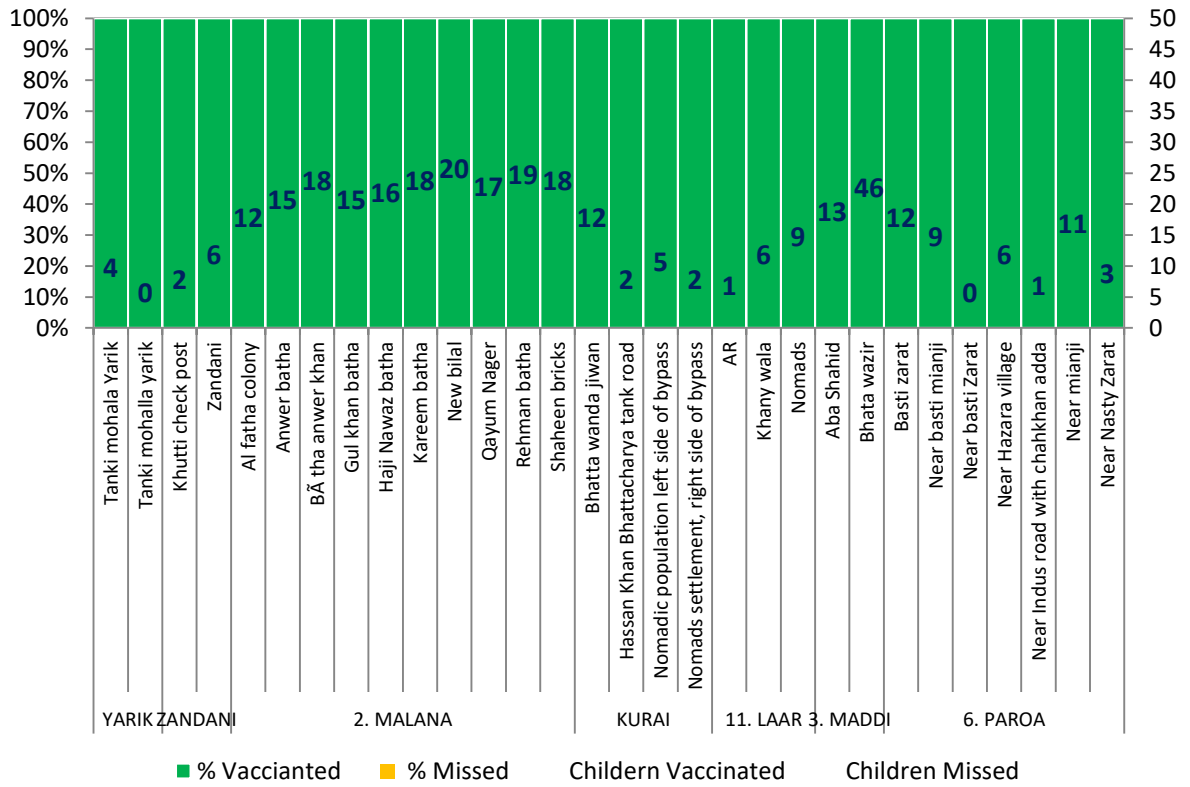
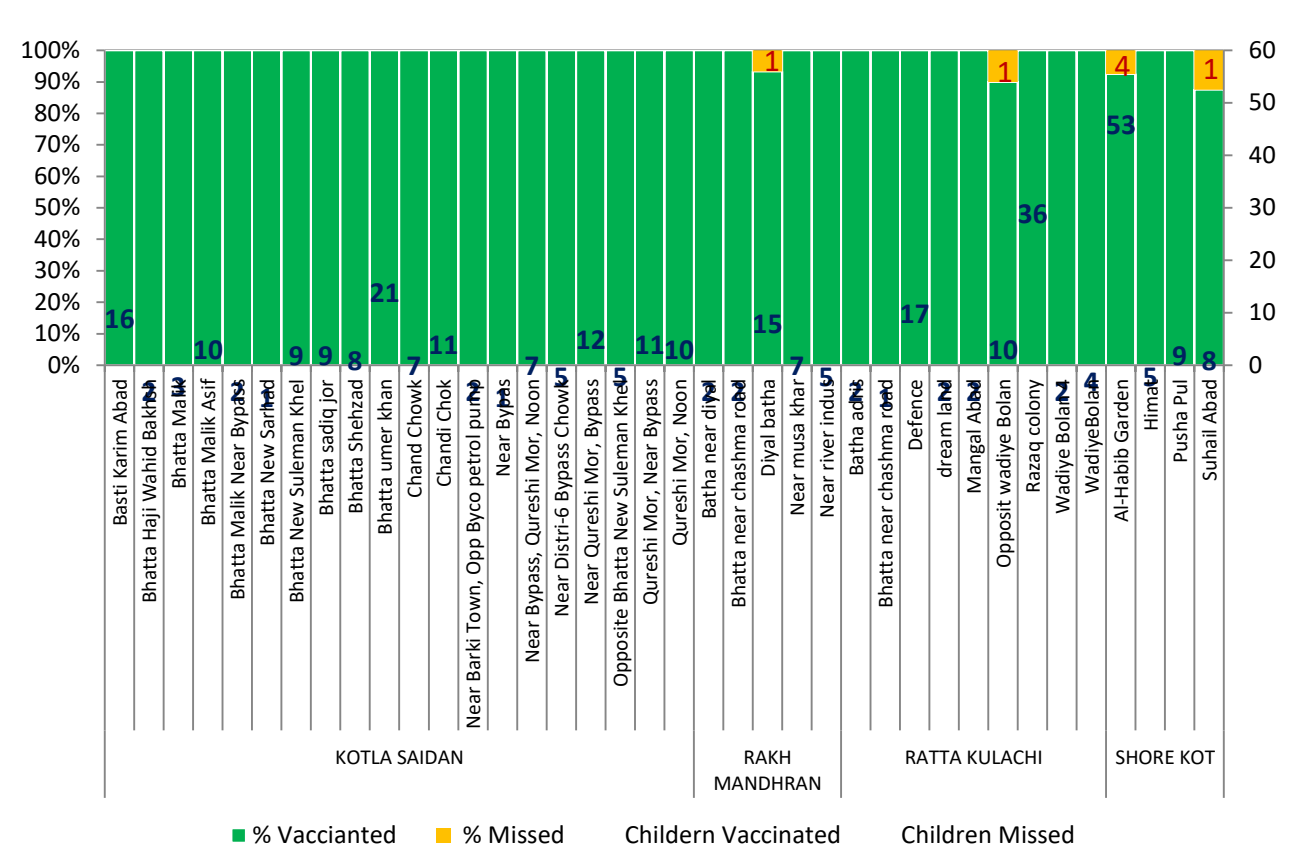
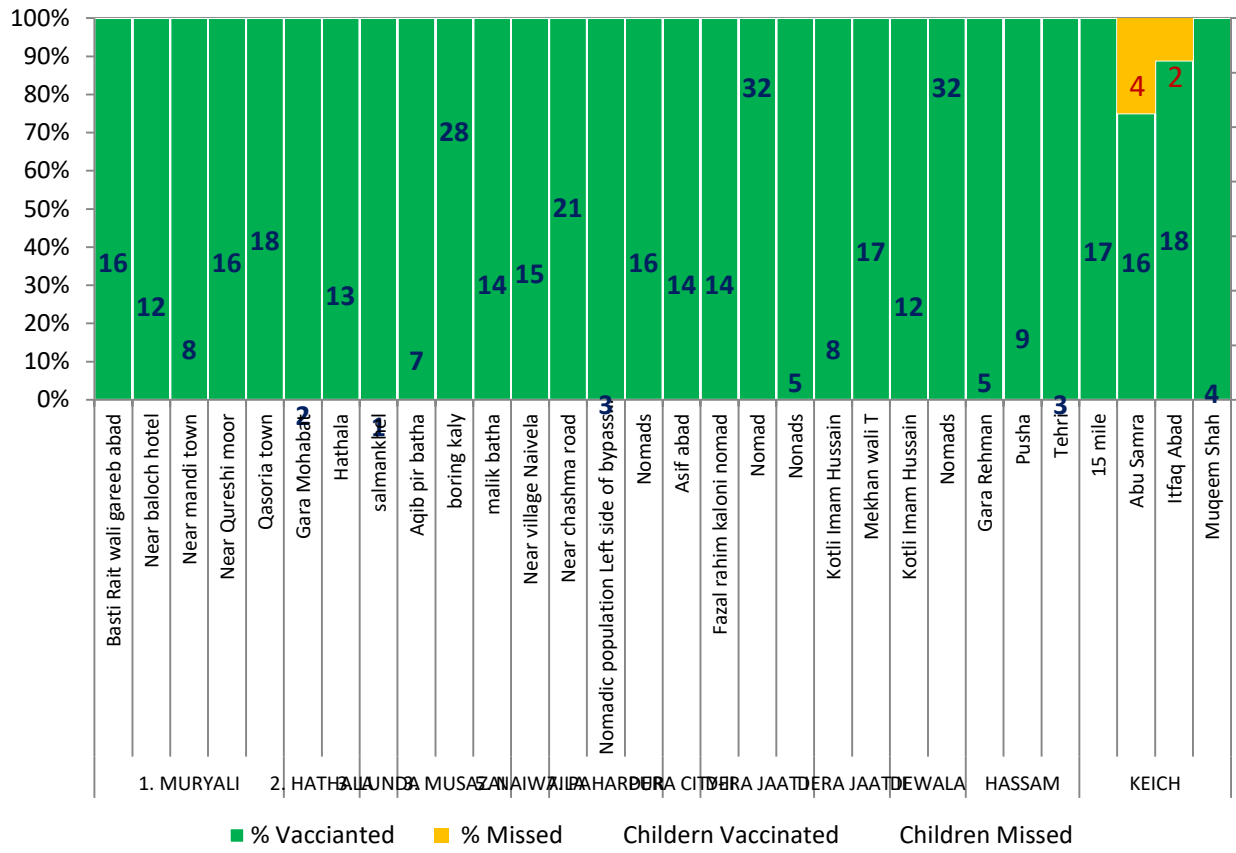
Where to	Proportion
BAHAWALPUR	6.3%
DIKHAN	6.3%
FR TANK	6.3%
Within district	31.3%
WAZIR-S	50%



District DI Khan Vaccination Status – Settlement wise

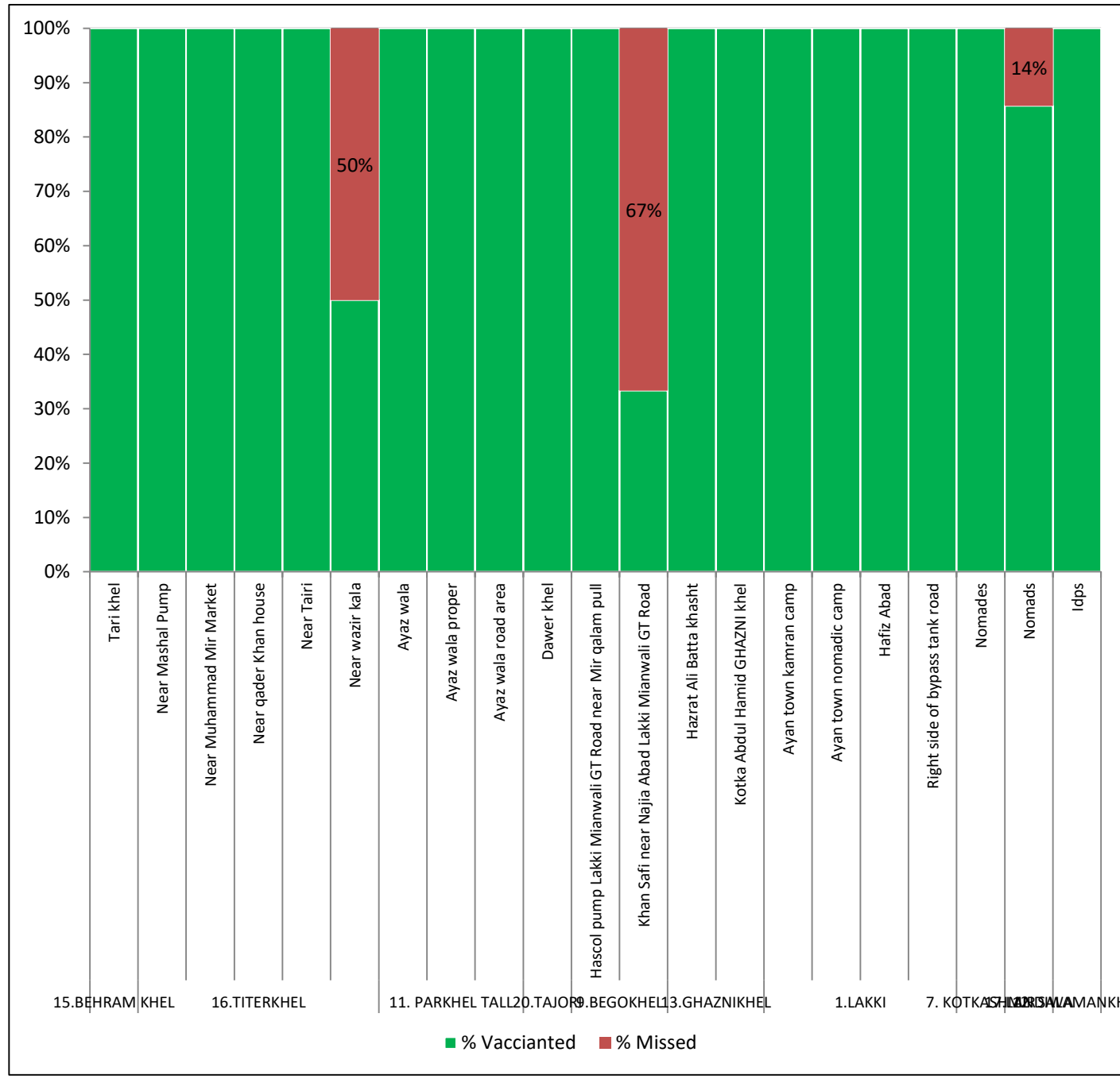
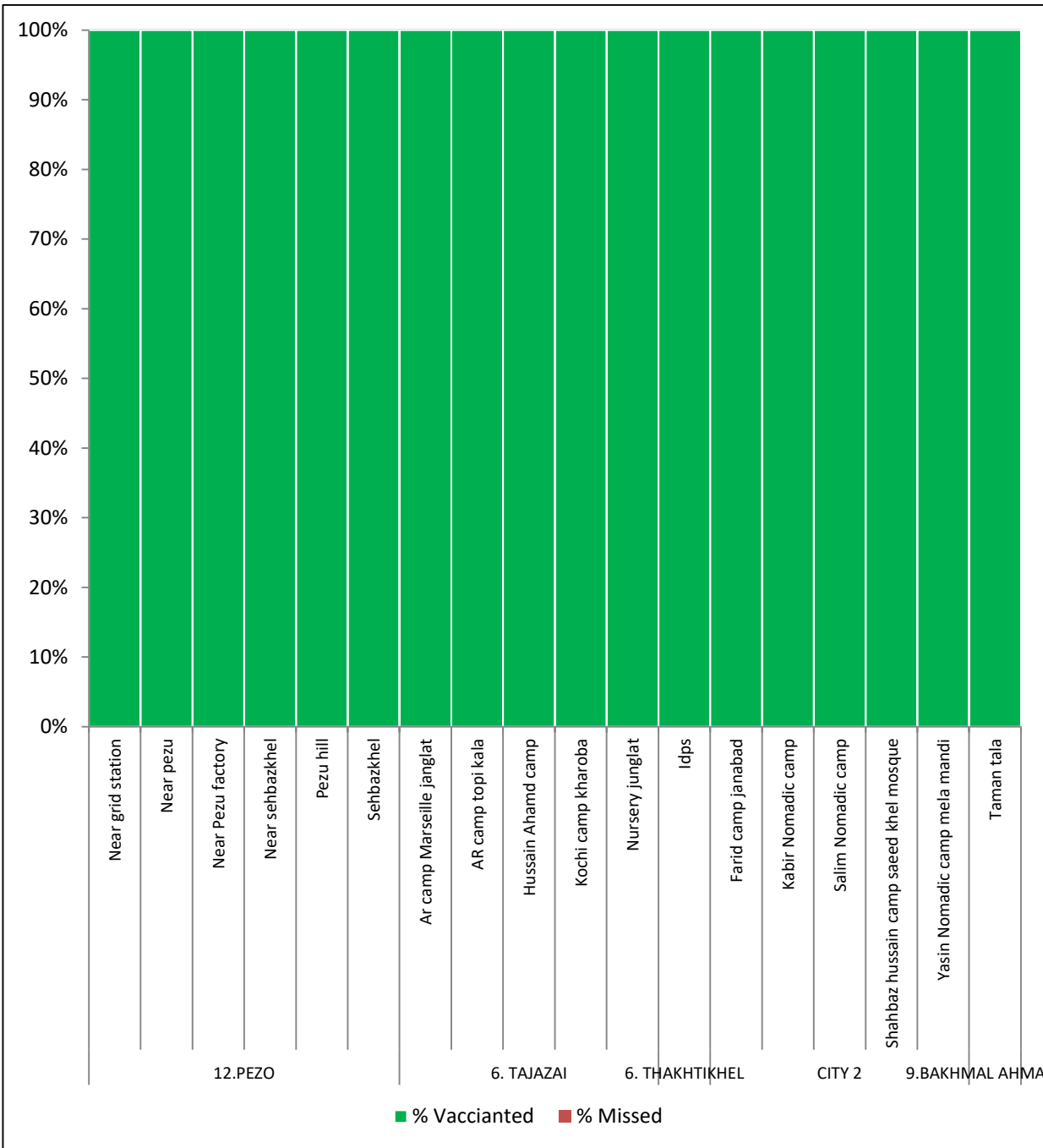


District DI Khan Vaccination Status – Settlement wise

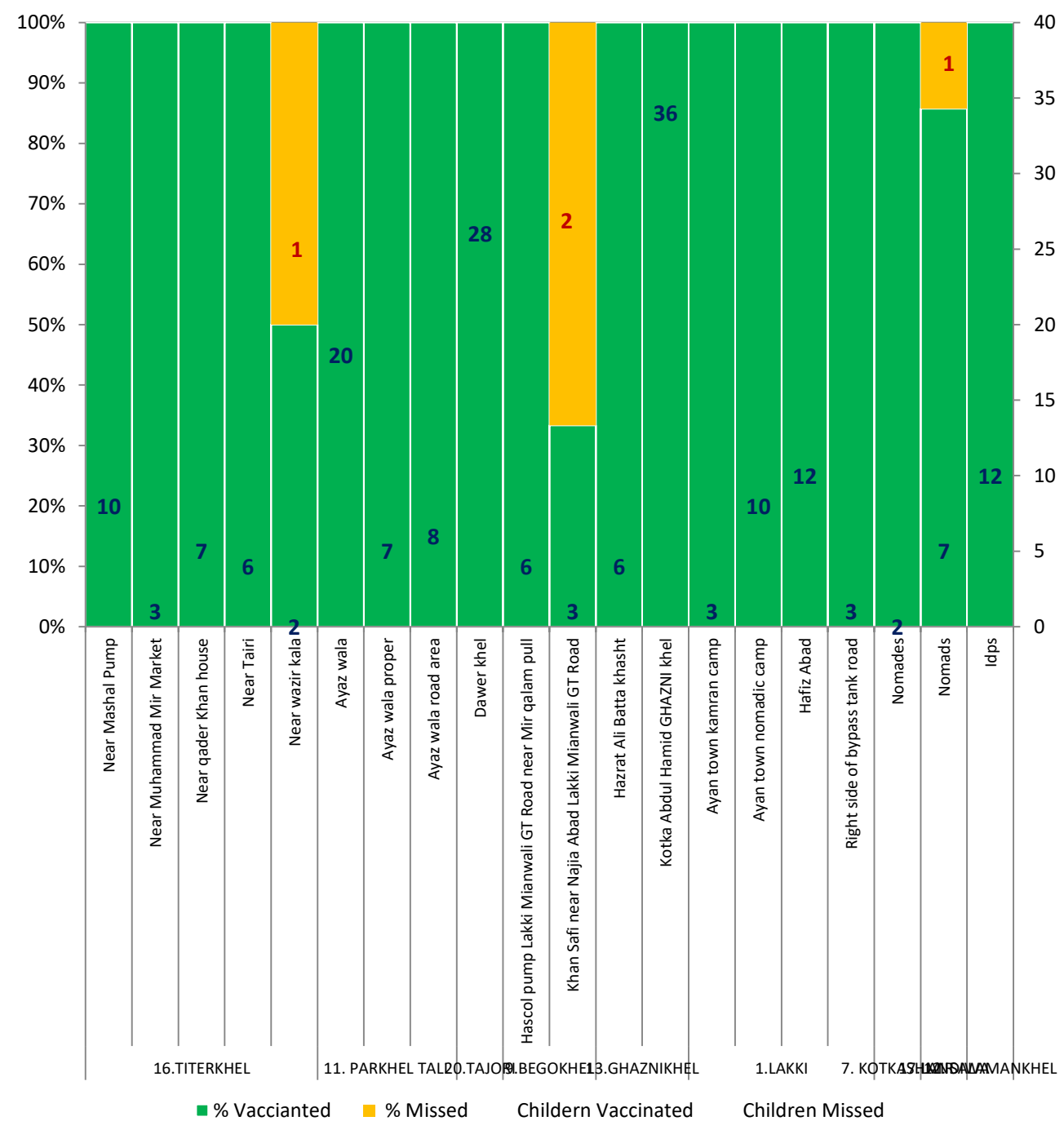
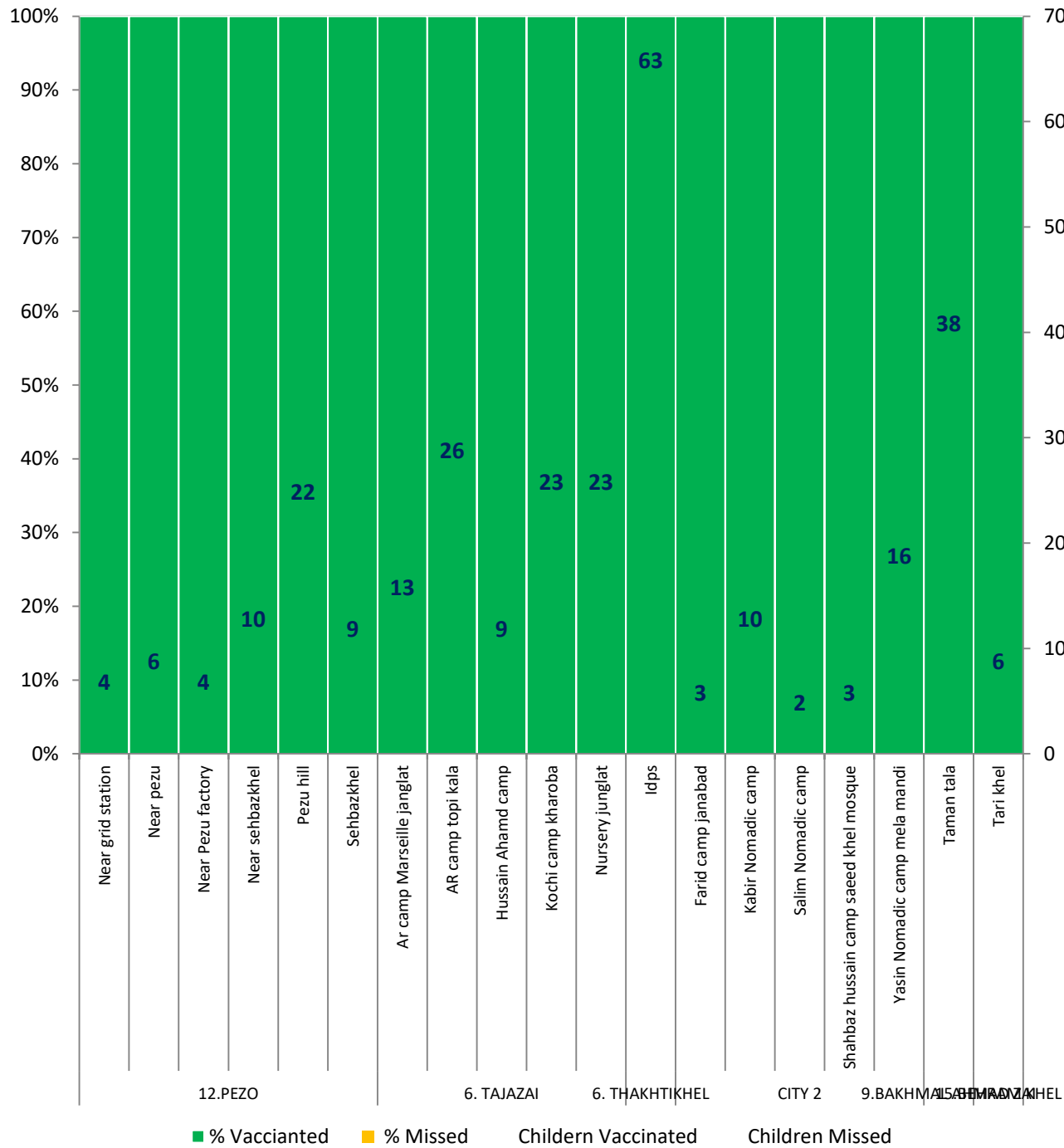


*Number of children vaccinated and missed are shown in the green and orange bar respectively.

District Lakkimarwat Vaccination Status – Settlement wise

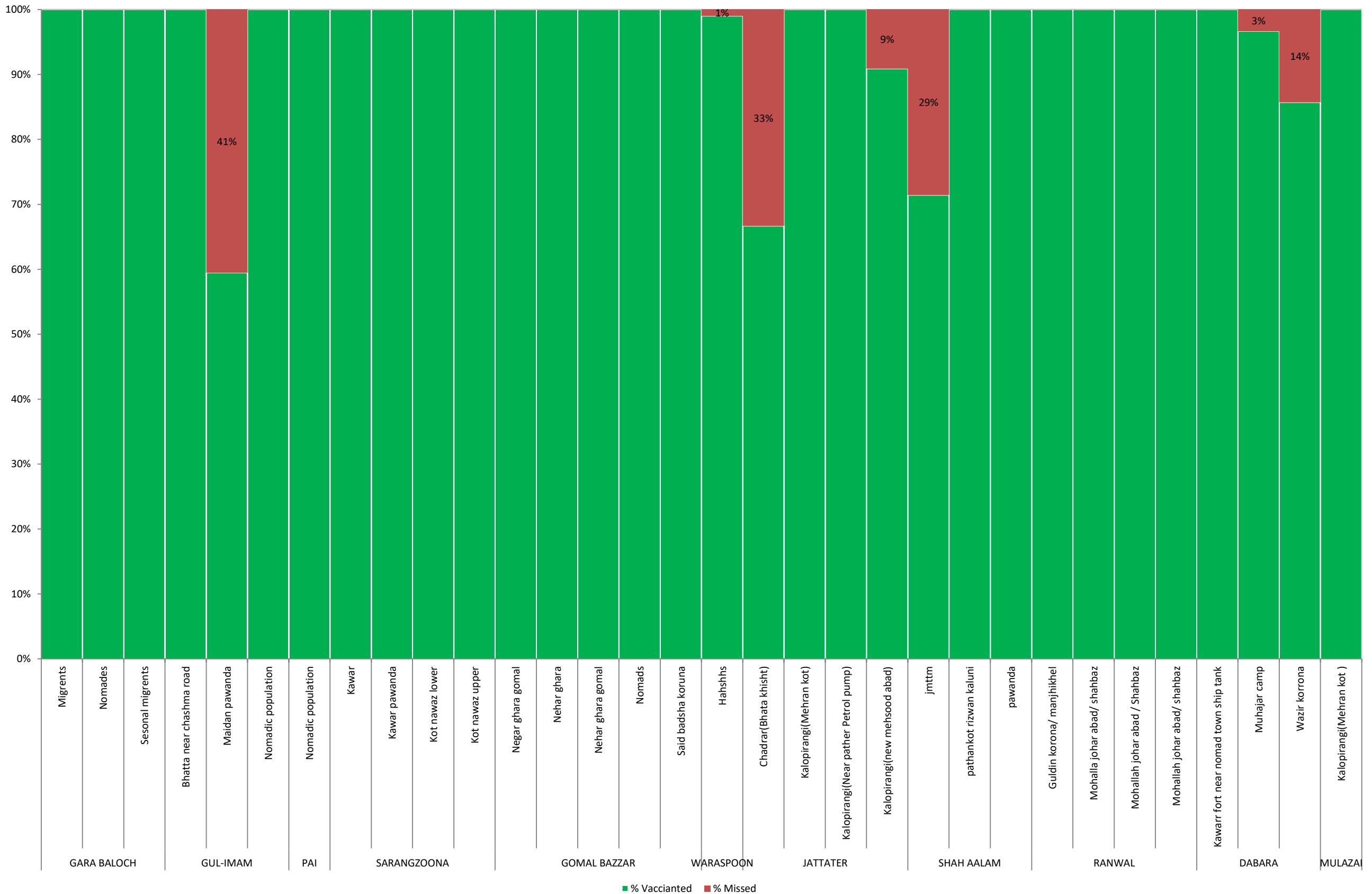


District Lakkimarwat Vaccination Status – Settlement wise



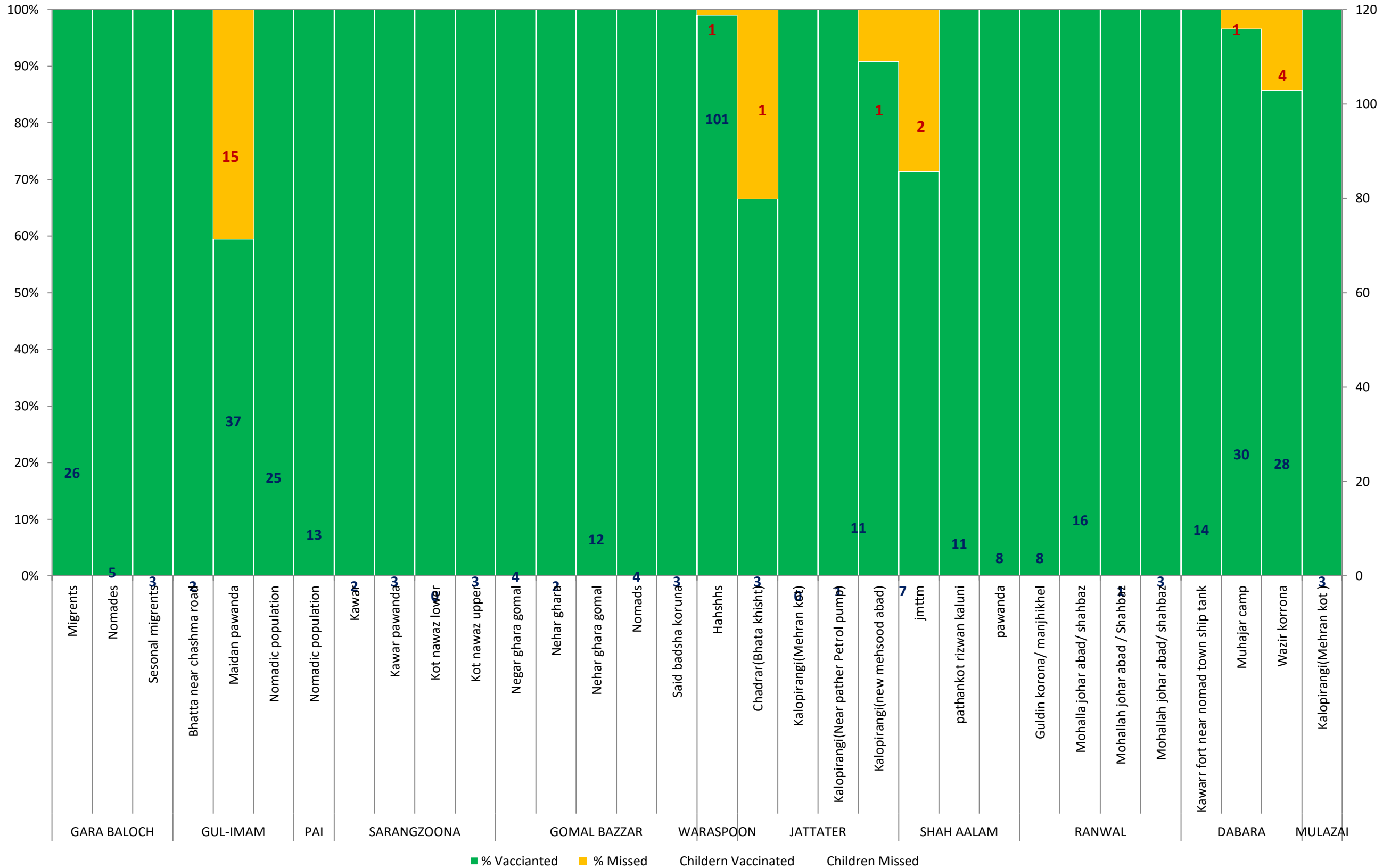
*Number of children vaccinated and missed are shown in the green and orange bar respectively.

District Tank Vaccination Status – Settlement wise



■ % Vaccianted ■ % Missed

District Tank Vaccination Status – Settlement wise



*Number of children vaccinated and missed are shown in the green and orange bar respectively.

THANK YOU