



# Identifying zero-dose children through polio house-to- house campaigns in Pakistan

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# Background

# BACKGROUND

## What is a zero-dose child?

- Zero-dose (ZD) children are children who have **not received any routine vaccines**.
- The global operational indicator used to estimate zero-dose children is **those who lack the first dose of diphtheria-tetanus-pertussis** containing vaccine (Penta 1), which should be given at 6 weeks.
- Gavi definition: **child has missed Penta 1 by 18 weeks**, as this is when the final dose of pentavalent vaccine (Penta 3) should have been received.
- In Pakistan, there are **differing definitions** of zero dose:

The Polio Eradication Initiative (PEI): those who have not received any injectable vaccine (e.g. did not get BCG at birth)  
The Expanded Program on Immunization (EPI): aligns with the Gavi definition

## Zero-dose in Pakistan

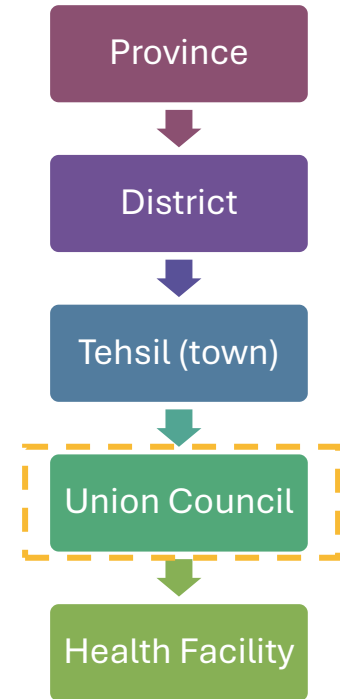
- Despite Pakistan being one of only two countries where **polio is still endemic**, many children do not receive their first birth dose of oral polio vaccine (OPV) on time.
- The EPI and PEI are implementing **numerous initiatives** to reduce zero-dose prevalence. However, how these compare in terms of cost and output is unknown.

# BACKGROUND

## Polio house-to-house (H2H) campaign

- Organized by the PEI, the campaigns take place nationally and sub nationally, involving health workers and volunteers **visiting households to immunize children against polio**.
  - Campaigns are between 5 and 7 days.
  - Multiple campaigns throughout the year, can be up to 12.
  - Health workers and volunteers will typically visit households in teams of 2.
- Campaigns are **organized at Union Council level** with Union Council Medical Officers (UCMOs) supervising the operations and staff pulled by the facilities in that Union Council.
  - Union Council is a local government body, serving as the lowest tier of government and responsible for local administration and service delivery.
- Since 2018, polio H2H campaigns (both national/subnational) have been leveraged to **identify and report on zero-dose children**. This data is shared with EPI to enable them to be reached with routine vaccines within 6 weeks of the campaign.

## Local governance structure



# Objectives



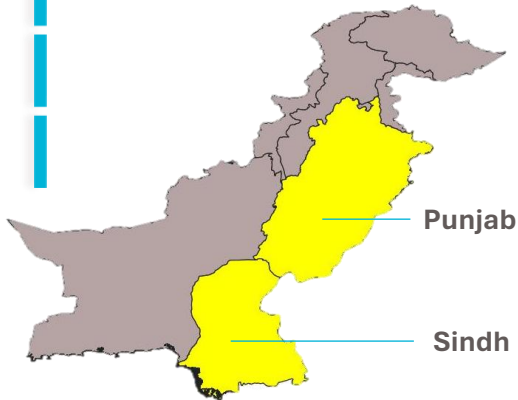
## OBJECTIVES

- To compare the number of identified unvaccinated children (both as per the polio and Gavi definitions of a zero-dose child) in H2H polio campaigns by province, district, campaign period, urban v. rural geographies, and age
- To compare the proportion of children reached (vaccinated) after being identified.

# Methods

## SAMPLE

- In close consultation with the government, a sample was selected that covered 2 provinces (Punjab and Sindh), 7 districts, and 6 health facilities from each district (**42 facilities in total**).
- Districts represented both **urban and rural settings**. The selection is based on several factors: Gavi priority status, population size, immunization coverage rates, and the number of zero-dose children.
- The **number of Union Councils in each district varies** depending on geographies and population size. For instance, in Faisalabad the 6 health facilities selected cover 6 Union Councils, yet in Karachi West the 6 facilities cover 2 Union Councils. See table below:



Province	Punjab				Sindh		
District	Faisalabad	Lahore	Dera Ghazi Khan (DG)	Bahawalnagar	Karachi West	Ghotki	Kambar Shahdadkot (Kambar)
Union Councils	6	4	3	3	2	3	3
Health facilities	6	6	6	6	6	6	6

# SAMPLE

Below summarizes the population, urban-rural classification, and total length of a polio house-to-house campaign in each district in our sample.

Province	PUNJAB				SINDH		
District	Faisalabad	Lahore	Dera Ghazi (DG) Khan	Bahawalnagar	Karachi West	Ghotki	Kambar Shahdadt
Population size	9,075,819	13,004,135	3,393,705	3,550,342	2,679,380	1,772,609	1,514,869
Rural vs Urban	Urban	Urban	Rural	Rural	Urban	Rural	Rural
Length of polio H2H campaigns (days)	7	7	5	5	7	5	6

## METHODS

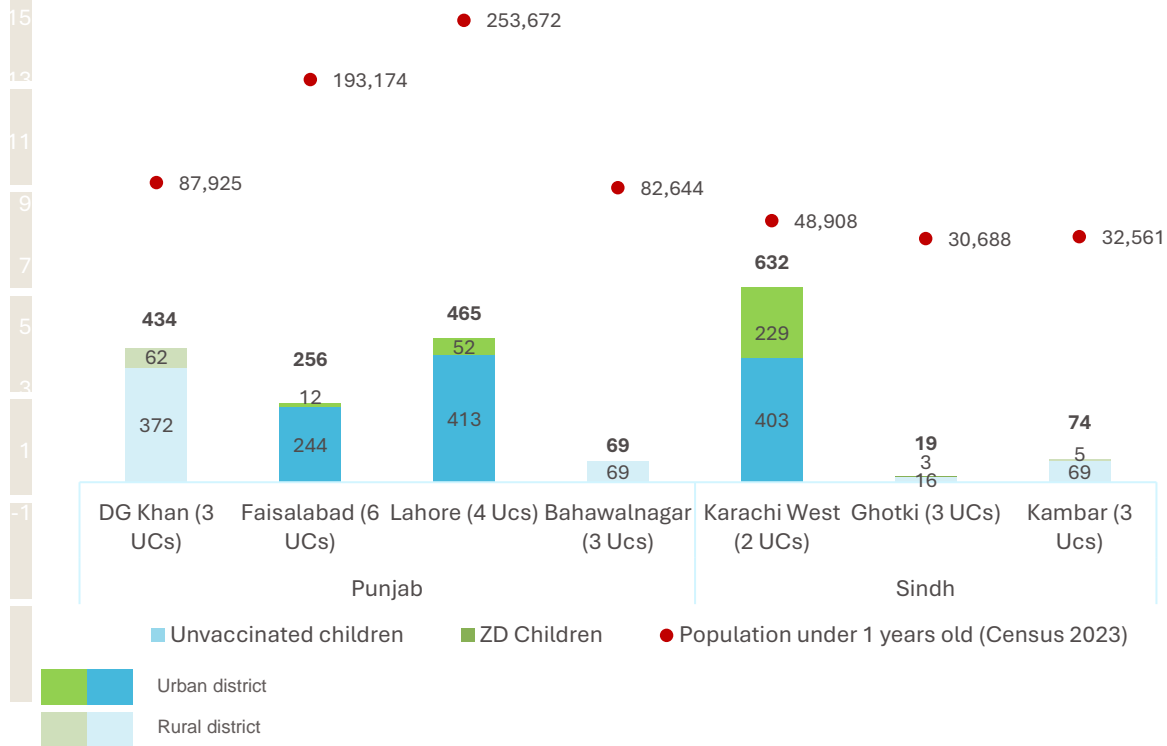
- Data collected for November 2023 and October 2024 H2H national campaigns
  - We opportunistically selected to collect data on the most recent campaign at the time of data collection and a campaign that was held the year prior, to examine any differences in output in one year. Campaigns were held in-between.
- The variable collected includes:
  - Number of unvaccinated and ZD children identified by age
    - e.g. < 6 weeks old, > 12 months old
  - Number of unvaccinated and ZD children identified then reached by EPI (vaccinated)
  - Number of polio teams
- The collected data was calculated by summing the number of unvaccinated and ZD children identified in the selected UCs in each district located in Punjab and Sindh
- Definitions used:
  - **Zero-dose** = children older than 18 weeks (in Punjab) or 4 months (in Sindh as they recorded the age of children in months, not weeks) at the time of identification, aligned to Gavi's definition of zero dose
  - **Unvaccinated** = younger children identified as zero dose as per the polio team's definition (no injectable vaccines received) but still on time for Penta1 as per Gavi definition

# Findings:

ZD children identified in the  
Nov 2023 and Oct 2024  
house-to-house campaigns

## Number of ZD children identified varied considerably across districts, with most ZD children being identified in Karachi West

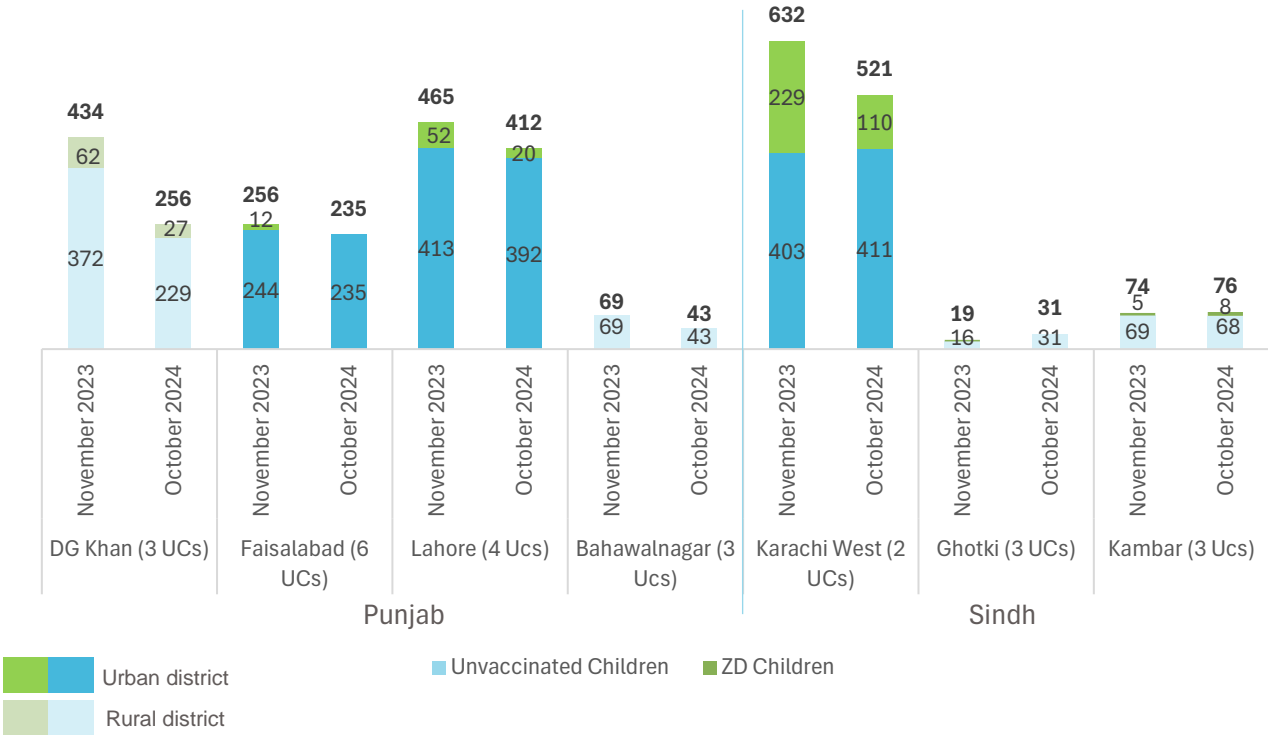
Figure 1: Total ZD children identified in selected Union Councils per district during November 2023 campaign



- The highest number of ZD children identified in November 2023 H2H campaign was found in Karachi West (229). This district is densely populated with large migrant communities. The sample comprises two High-Risk Union Councils (HRUC) for polio transmission.
- Overall, more ZD children were identified across the campaign in DG Khan (62 in Nov 2023), compared to the other rural districts in the sample. No ZD children identified in Bahawalnagar.
- No pattern between the population of under-ones in a district and the number of ZD children and/or unvaccinated children identified.

# Overall, fewer ZD children were identified in the Oct 2024 campaign compared to the Nov 2023 campaign

Figure 2: Total ZD and unvaccinated children identified in selected Union Councils per district during Nov 23 and Oct 24 campaigns

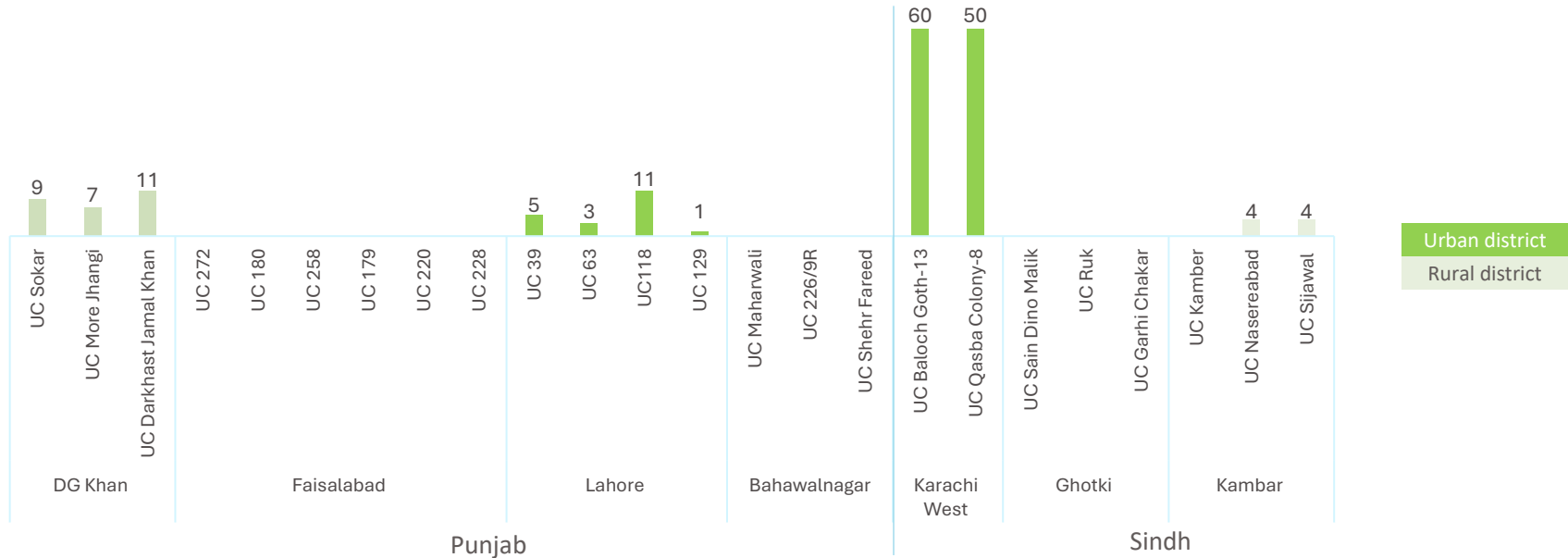


- In all districts except Kambar, we found fewer zero-dose children identified in the campaign the following year, indicating a positive trend.
- While Lahore, DG Khan, Karachi West, had the highest numbers of zero-dose children identified, we found these numbers **halved** between the two campaigns, by 61% (62 to 27), 56% (52 to 20), and 52% (229 to 110), respectively.
- Number of unvaccinated children identified decreased between the two campaigns in all districts in Punjab. Same was not found in Sindh.

\* Further analysis ongoing to understand why the decrease (e.g. merely an issue of timing and less of backlog operational differences)

## Despite variability across districts, number of ZD children identified were similar numbers between union councils within the same district.

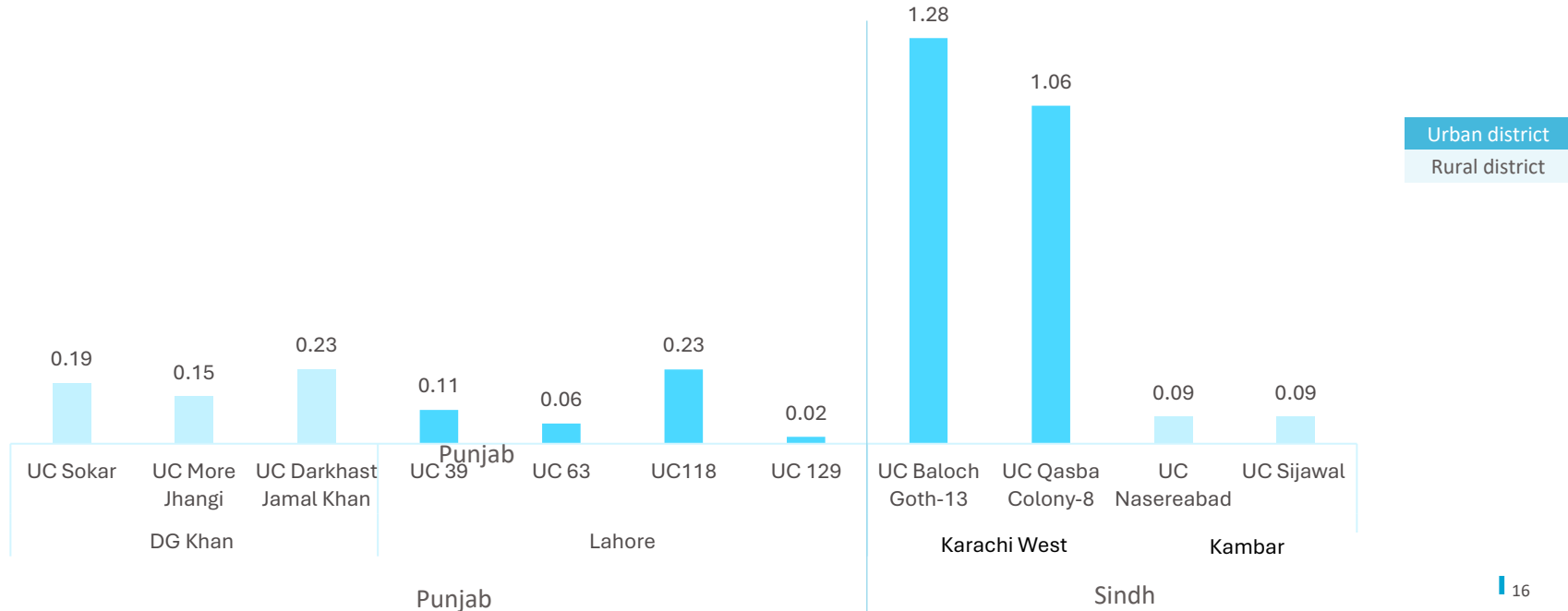
Figure 3: Number of ZD children identified in each union council in Oct 2024 campaign



- Karachi West Union Councils identified significantly higher number of ZD children compared to other districts. Consistent numbers reached between Union Councils in the district, with the biggest variance in mega-city Lahore.
- 3 districts did not identify any ZD children in the October 2024 campaign.

# Polio teams in Karachi West identified significantly more ZD children per team than other districts (1 per polio team in October 2024 campaign)

Figure 4: Number of ZD children identified per polio team in Oct 2024 campaign

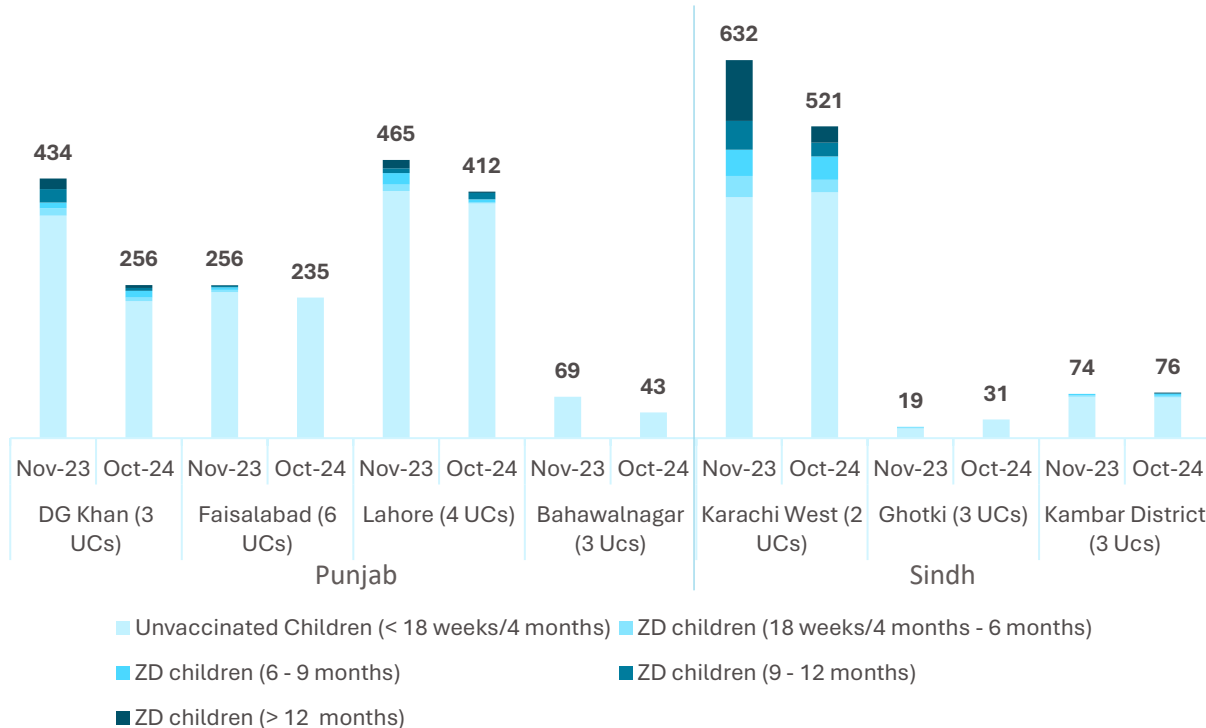


# Findings:

ZD children identified by age group

# In both campaigns in our sample, very few ZD children over 12 months old were identified

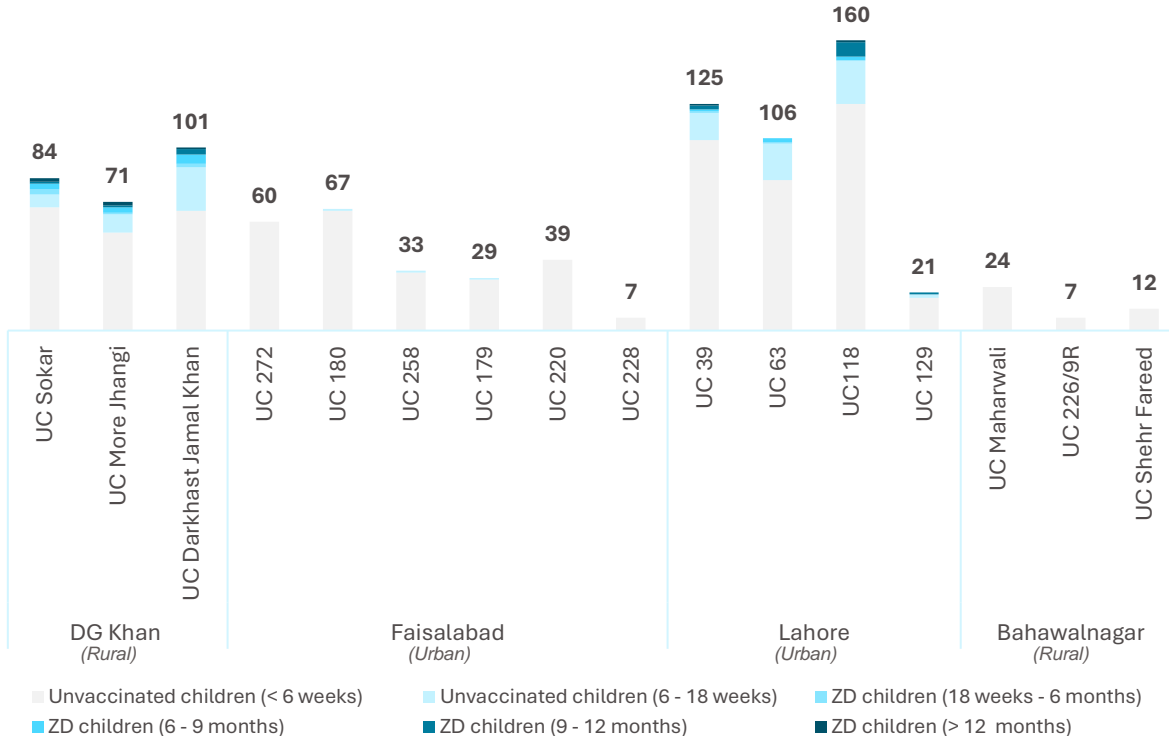
Figure 5: Total number of unvaccinated and ZD children identified in selected union councils per district by age bracket: Nov 2023 and Oct 2024 campaigns



- Less than 5% ZD children identified in districts were over 12 months old in Oct 2024 campaign.
- While Karachi West had the highest proportion of ZD children over 12 months old identified in each campaign, this proportion reduced significantly from 16% in the 2023 campaign to 5% in the 2024 campaign.
- We also observed reductions in the proportion of zero-dose children aged over one that were identified in Oct 2024 when compared to Nov 2023 campaign in DG Khan (4% to 2%) and Lahore (3% to 0.5%).

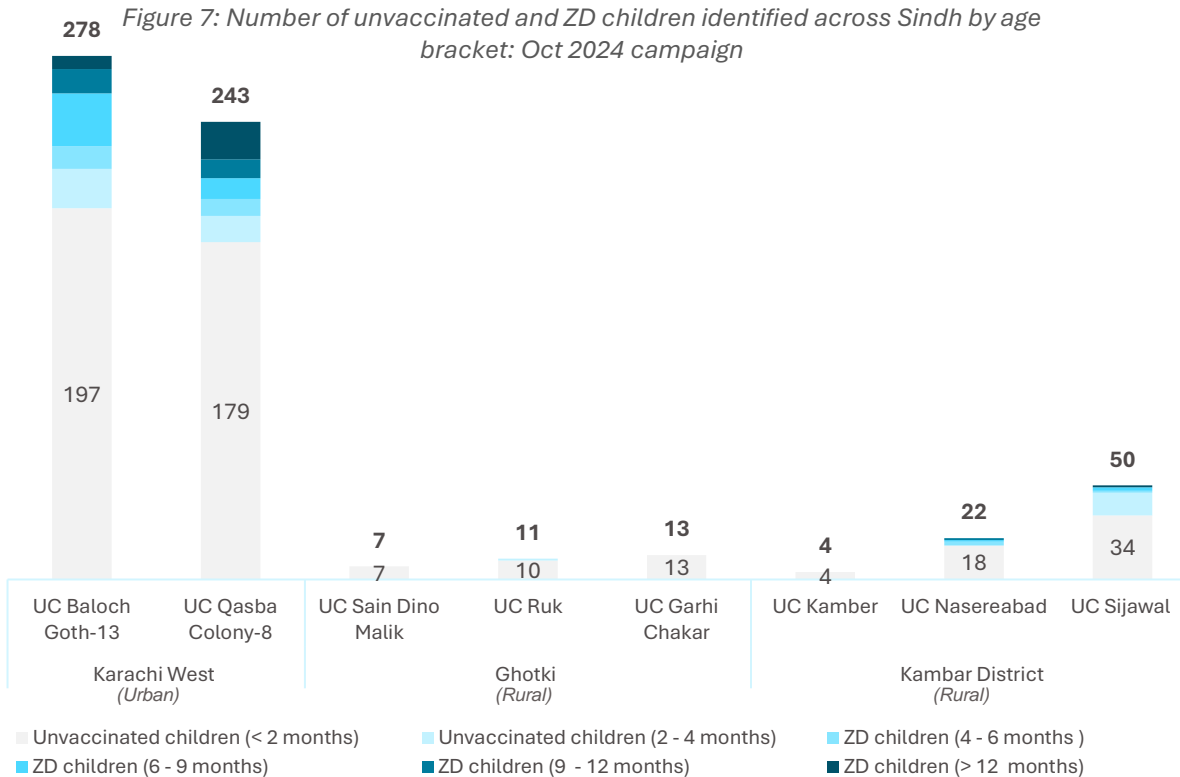
# Approximately 5% of the children identified in Punjab were zero dose in October 2024 campaign

Figure 6: Number of unvaccinated and ZD children identified across Punjab by age bracket: Oct 2024 campaign



- Only 1% of the children identified in Punjab during the Oct 2024 campaign were ZD children over 12 months old
- Union Councils in rural DG Khan, identified the highest proportion of ZD children over 18 weeks old (10-11%).
- At least 60% of the children identified in Punjab Union Councils were under six weeks old in Oct 2024 campaign and 89% were under 18 weeks old.
- In rural Bahawalnagar, all children identified in the 2024 campaign were under six weeks old.

## However, one fifth (19%) of the children identified in Sindh were zero dose in October 2024 campaign



- Approximately, 4% of the children identified in Sindh during the Oct 24 campaign were ZD children aged over 1.
- Union Councils in Karachi West identified the highest proportion of ZD children over 4 months old (21%-22%) in the Oct 2024 campaign.
- Over two thirds of children identified in Sindh districts were under two months old in Oct 2024 campaign.
- ZD children were not identified in Union Councils in Ghotki. In 2 out of 3 Union Councils in Ghotki, all children identified were below two months old.

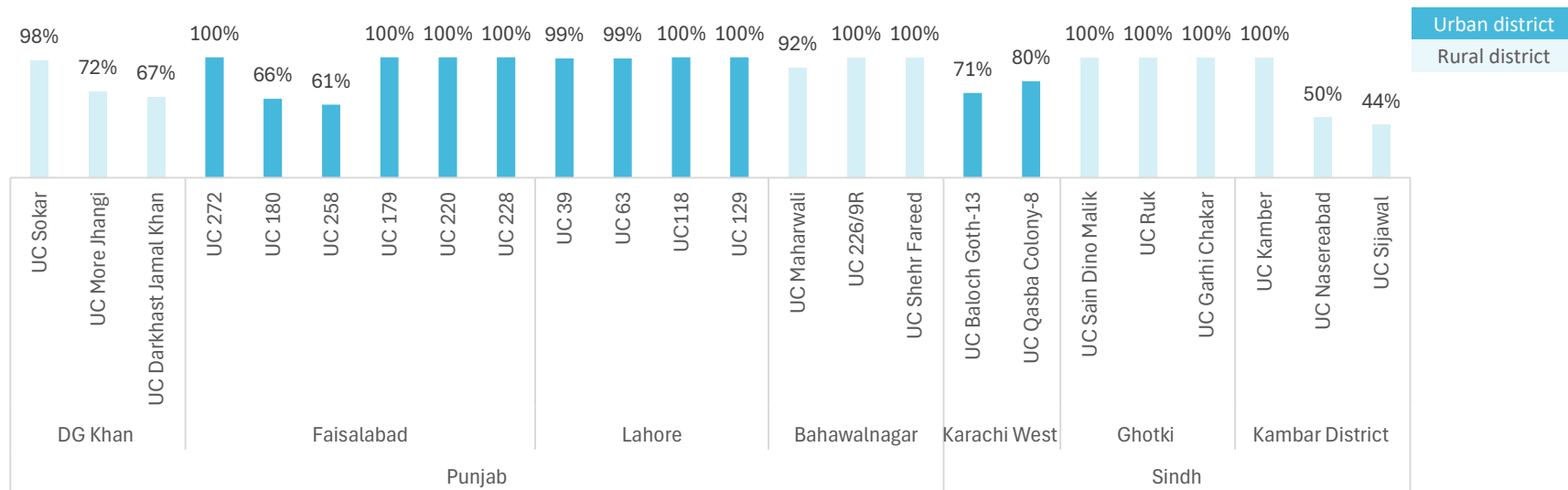
Note: Data on age recorded by month in Sindh as opposed to by week, so zero dose cut off considered at 4 months rather than 18 weeks

# Findings:

From identification to vaccination

## In half of the Union Councils, 100% of all children identified (as unvaccinated or ZD) from 2024 campaign were then reached with routine vaccines within six weeks

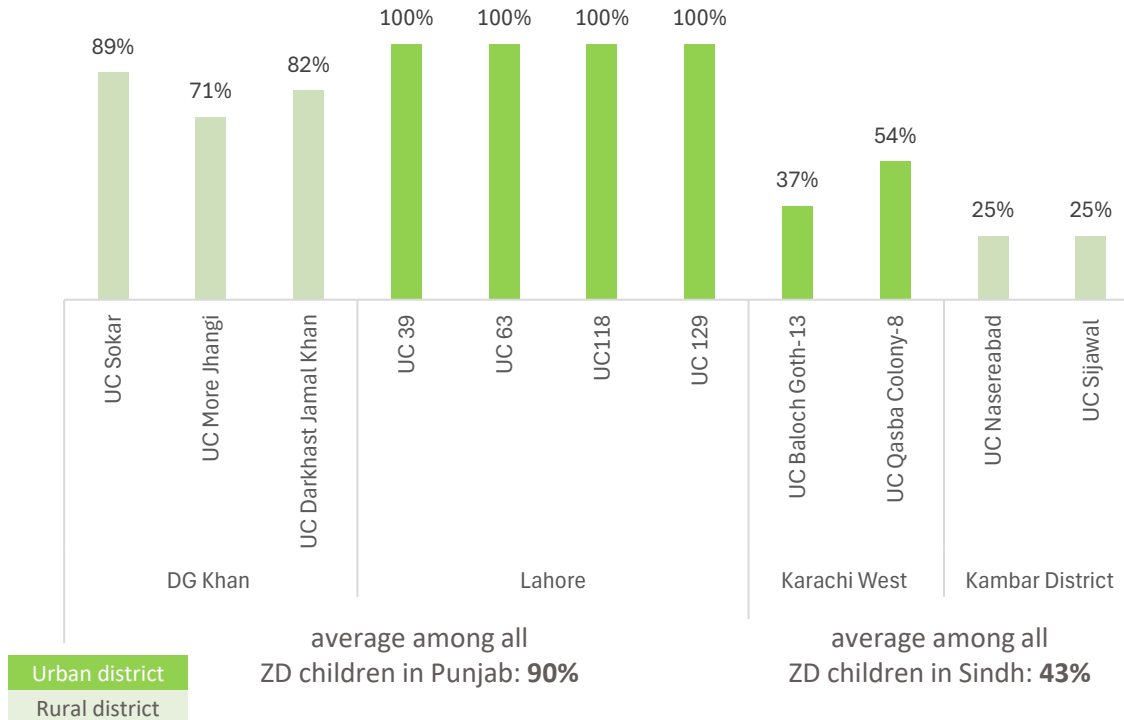
Figure 8: Percentage of identified unvaccinated & ZD children then reached with routine vaccines in Oct 24 campaign



- In Lahore Union Councils, nearly all children identified as unvaccinated/ZD were reached by EPI (99%-100%).
- In other districts, this coverage varied significantly between Union Councils including Kambar (44%-100%) and Faisalabad (61%-100%).
- Reasons reported for children not being reached: health system weaknesses, refusals, identified outside of residence (e.g. grandfathers' home), wrong contact information noted.

## The rate of reaching identified ZD children specifically was much higher in Punjab compared to Sindh

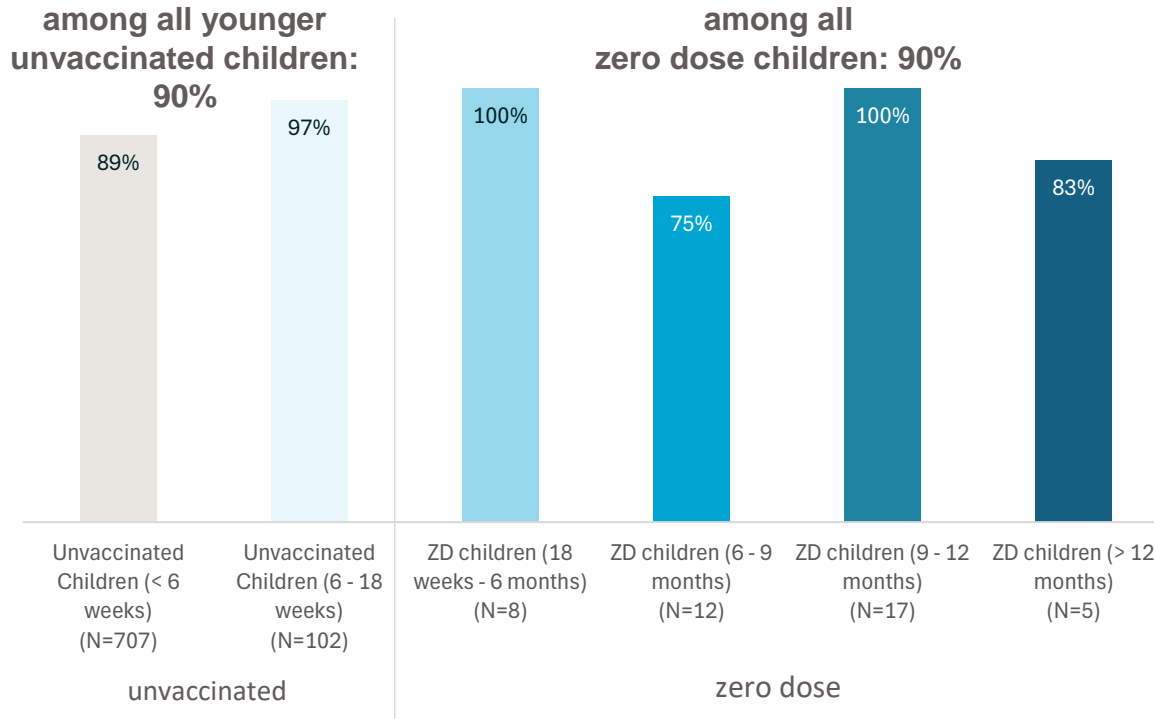
Figure 10: Percentage of identified ZD children then reached with routine vaccines in the selected union councils per district: Oct 2024 campaign



- Out of the four districts that identified zero-dose children in the Oct 2024 campaign, Lahore was the only district to reach all (100%) of these children with routine vaccines within six weeks of the campaign
- This success rate was much higher in Punjab than Sindh, which is characterized by having a stronger health system than Sindh.
- Overall, in Karachi West, only 49 out of 110 children identified as ZD children were reached by EPI within six weeks (22 out of 60 Union Council Baloch Goth and 27 out of 50 in Qasba Colony) in Oct 2024 campaign.

# In Punjab, 90% of the ZD children identified were reached by EPI within six weeks which is the same rate as for younger unvaccinated children

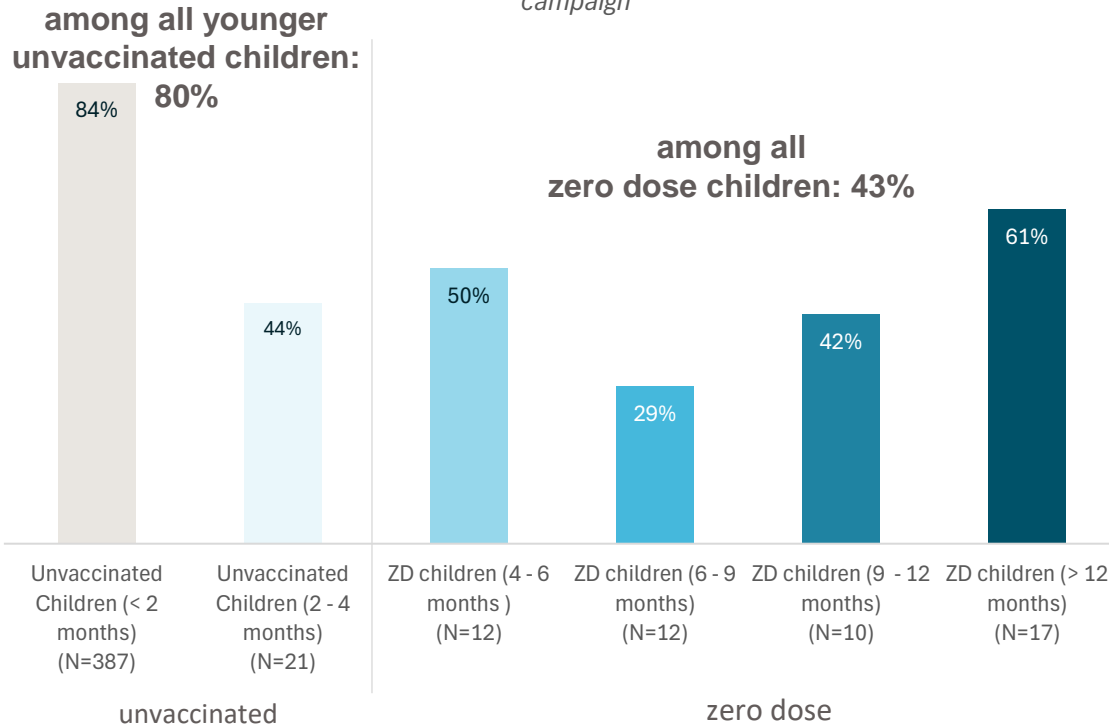
Figure 12: Percentage of identified ZD/unvaccinated children then reached with routine vaccines in the selected union councils in Punjab by age group: Oct 2024 campaign



- ZD children were less likely to get vaccinated within six weeks from the campaign compared with younger unvaccinated children.
- Rate was lowest in ZD children between the ages of 6-9 months and over the age of 12 months.

# In Sindh, only 43% of ZD children identified were reached by EPI within six weeks, compared with 80% among the younger children

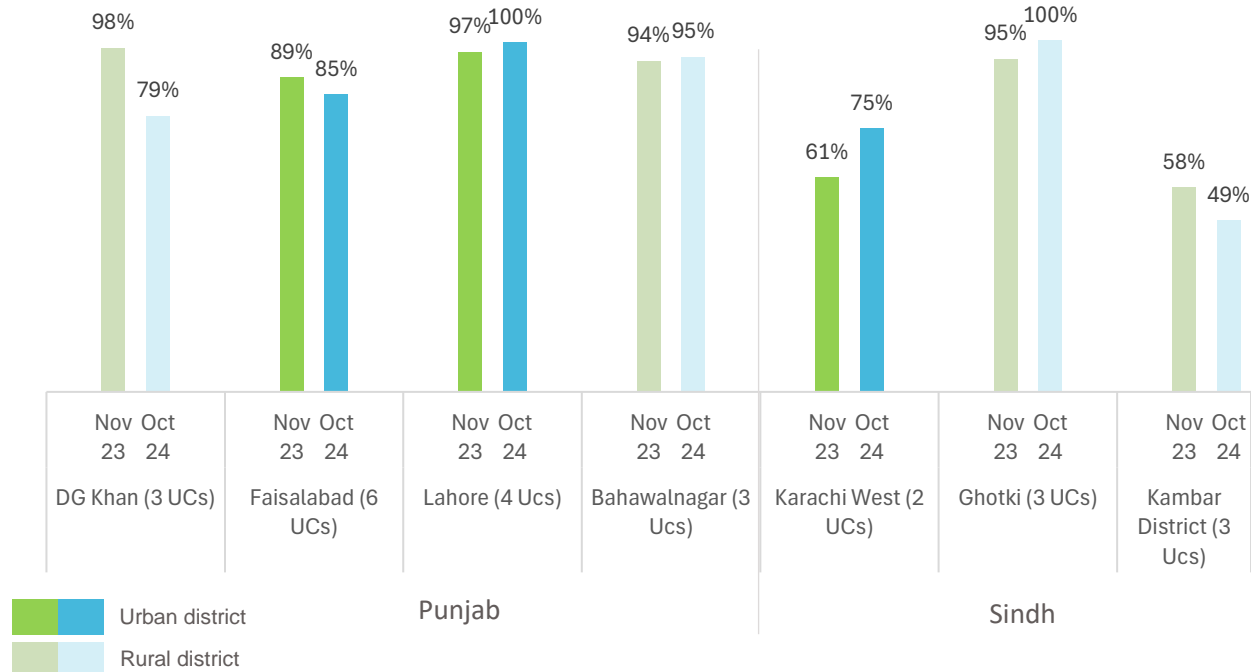
Figure 11: Percentage of identified ZD/unvaccinated children then reached with routine vaccines in the selected union councils in Sindh by age group: Oct 2024 campaign



- Across Sindh, 84% of unvaccinated children under 2 months old identified in the October 2024 campaign were reached within six months of the campaign.
- However, this was much lower in children identified as zero dose, as low as 29% for ZD children aged between 6 and 9 months.

## In most districts, the rate of all children identified that were vaccinated within six weeks of identification increased in the later campaign

Figure 13: Percentage of identified unvaccinated or ZD children then reached with routine vaccines in the selected union councils per district: Nov 2023 and Oct 2024 campaign



- In four out of seven districts, the proportion of children covered was higher in the campaign in Oct 2024 compared to one held in Nov 2023.
- However, the rate of **identified ZD children reached** actually dropped slightly from 60% reached within six weeks in November 2023, to 56% in October 2024.

# Key takeaways

## Key takeaways

- The number of ZD children identified in polio house-to-house campaigns in Punjab and Sindh varied across districts, stemming from clusters of ZD children being concentrated in certain areas and differences in population densities. However, it is important to note that ZD children are a moving target, and their location may be subject to change.
- Out of the children identified as unvaccinated in both campaigns, only a small share were ZD (10% in October 2024 and 19% in November 2023). Majority of children that were identified were unvaccinated and due their routine vaccines.
- Across both campaigns, just over half of all ZD children identified were reached with routine vaccines within 6 weeks (60% in November 2023 and 56% in October 2024), this highlights missed opportunities.
- On average, ZD children were less likely to get vaccinated within 6 weeks after the campaign compared with the younger unvaccinated children identified.
- The success rate of vaccinating zero dose children was higher in Punjab than Sindh (90% vs 43%). Differences in health system strength, campaign execution, and data quality likely play a role.

## Next steps

- Analyzing the qualitative data from key informant interviews to contextualize these findings.
- Analyze children reached through other ZD strategies (clinics on wheels, integrated outreach, etc.)
- Analyze cost data to compare the cost efficiency of reaching ZD children through various strategies

# Thank you

Questions? Please reach out to Rachel Archer  
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