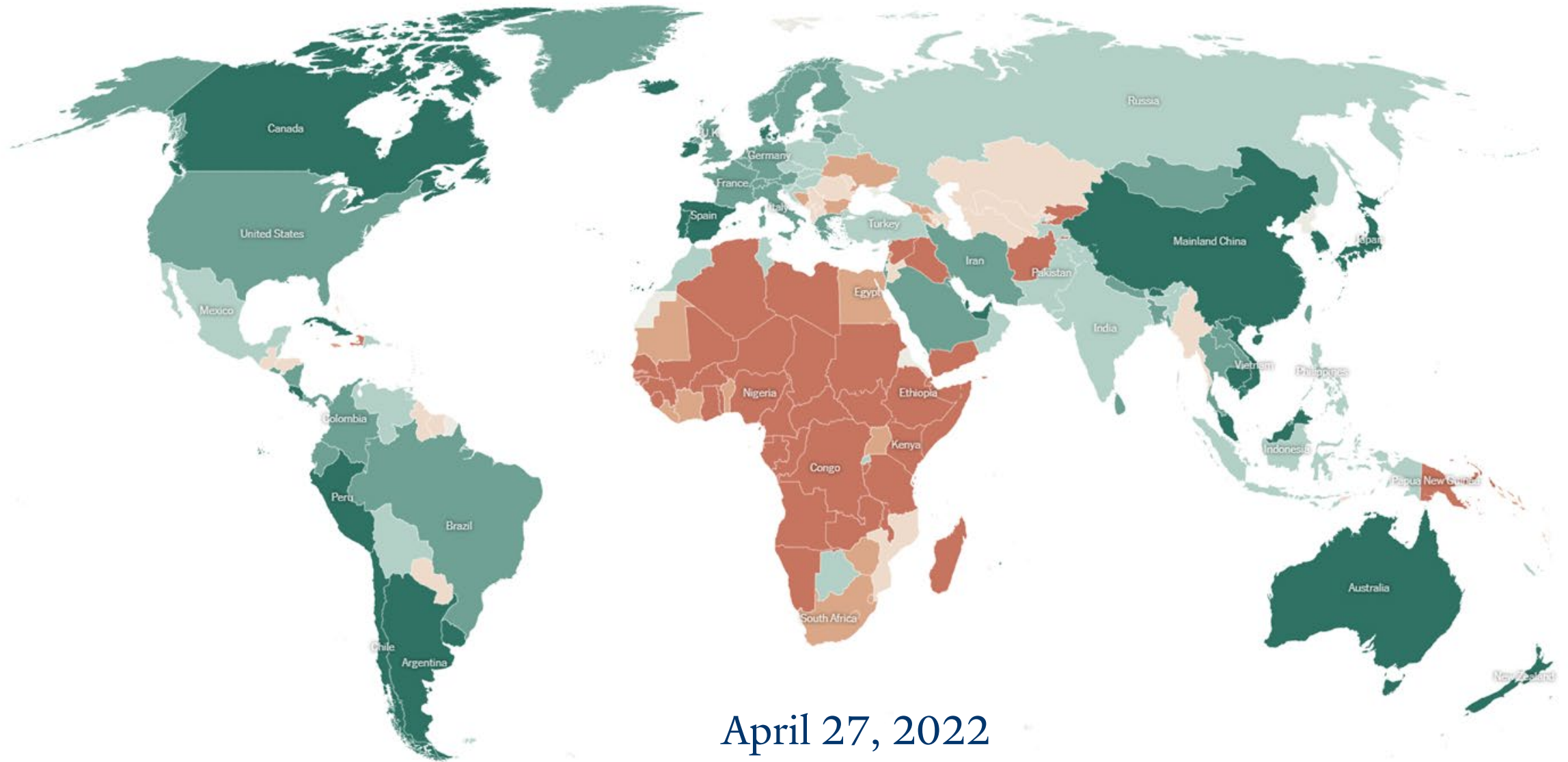
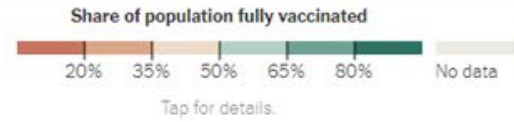




# Marklate don cam: Scaling bundled health services in rural Sierra Leone

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April 27, 2022

# Why are Vaccination Rates Lagging?



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# nature medicine

Article | [Open Access](#) | Published: 16 July 2021

## COVID-19 vaccine acceptance and hesitancy in low- and middle-income countries

Julio S. Solís Arce, Shana S. Warren, Niccolò F. Meriggi, Alexandra Scacco, Nina McMurry, Maarten Voors, Georgiy Syunyaev, Aryn Abdul Malik, Samya Aboutajdine, Opeyemi Adejo, Deborah Anigo, Alex Armand, Saher Asad, Martin Atyera, Britta Augsburg, Manisha Awasthi, Gloria Eden Ayesiga, Antonella Bancalari, Martina Björkman Nyqvist, Ekaterina Borisova, Constantin Manuel Bosancianu, Magarita Rosa Cabra García, Ali Cheema, Elliott Collins, Filippo Cuccaro, Ahsan Zia Farooqi, Tatheer Fatima, Mattia Fracchia, Mery Len Galindo Soria, Andrea Guariso, Ali Hasanain, Sofía Jaramillo, Sellu Kallon, Anthony Kamwesigye, Arjun Kharel, Sarah Kreps, Madison Levine, Rebecca Littman, Mohammad Malik, Gisele Manirabaruta, Jean Léodomir Habarimana Mfura, Fatoma Momoh, Alberto Mucauque, Imamo Mussa, Jean Aime Nsabimana, Isaac Obara, María Juliana Otálora, Béchir Wendemi Ouédraogo, Toubá Bakary Pare, Melina R. Platas, Laura Polanco, Javaeria Ashraf Qureshi, Mariam Raheem, Vasudha Ramakrishna, Ismail Rendrá, Taimur Shah, Sarene Eyla Shaked, Jacob N. Shapiro, Jakob Svensson, Ahsan Tariq, Achille Mignondo Tchiboza, Hamid Ali Tiwana, Bhartendu Trivedi, Corey Vernot, Pedro C. Vicente, Laurin B. Weissinger, Basit Zafar, Baobao Zhang, Dean Karlan, Michael Callen, Matthieu Teachout, Macartan Humphreys, Ahmed Mushfiq Mobarak ✉ & Saad B. Omer ✉ -Show fewer authors

*Nature Medicine* (2021) | [Cite this article](#)



Covid-19 vaccine acceptance is higher in every LMIC studied (average 80%), compared to USA or Russia



Childhood vaccine acceptance is very high in most low and middle income countries



Healthcare workers are the most trusted source of guidance on vaccine uptake in most LMICs.

In late 2021 in Sierra Leone, it took over 3 hours each way for the average rural person to get to a vaccination center, at a cost of 6.5 USD each trip

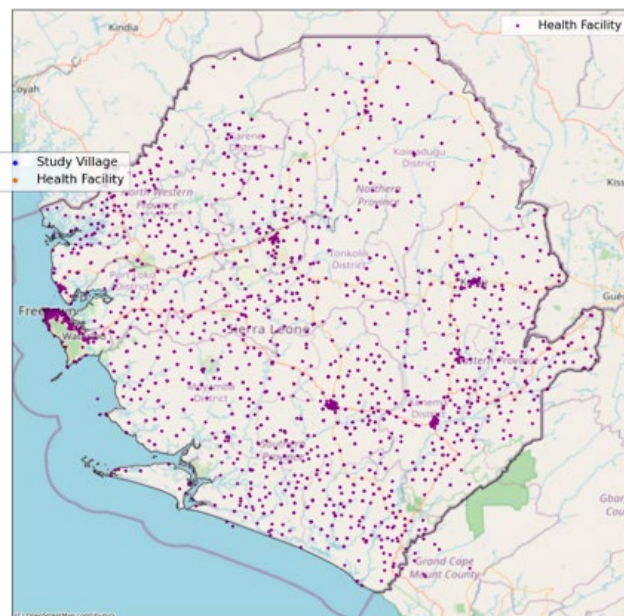
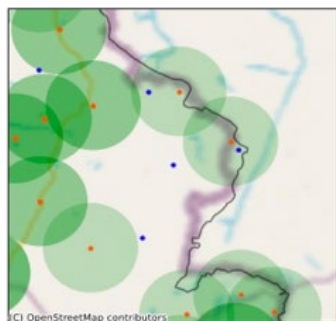


# We conducted a trial in the most remote communities

150 Study Sites

Control

Last Mile Delivery  
of Vaccines




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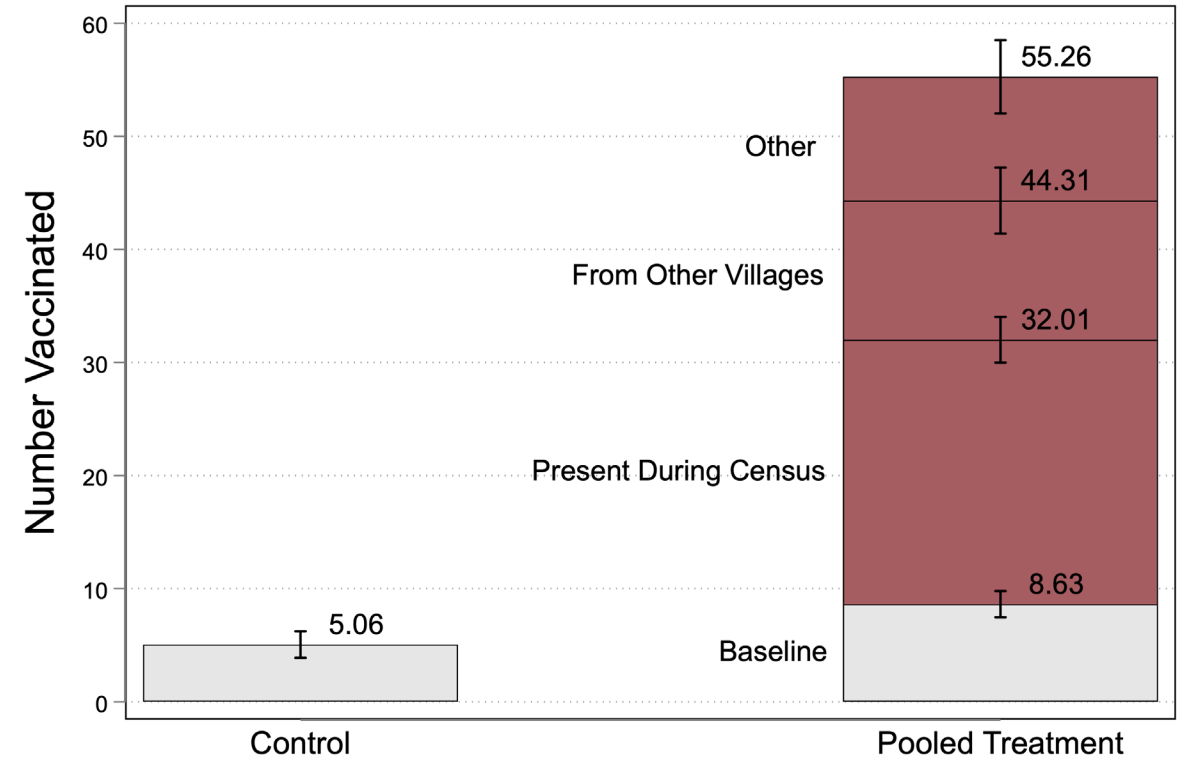
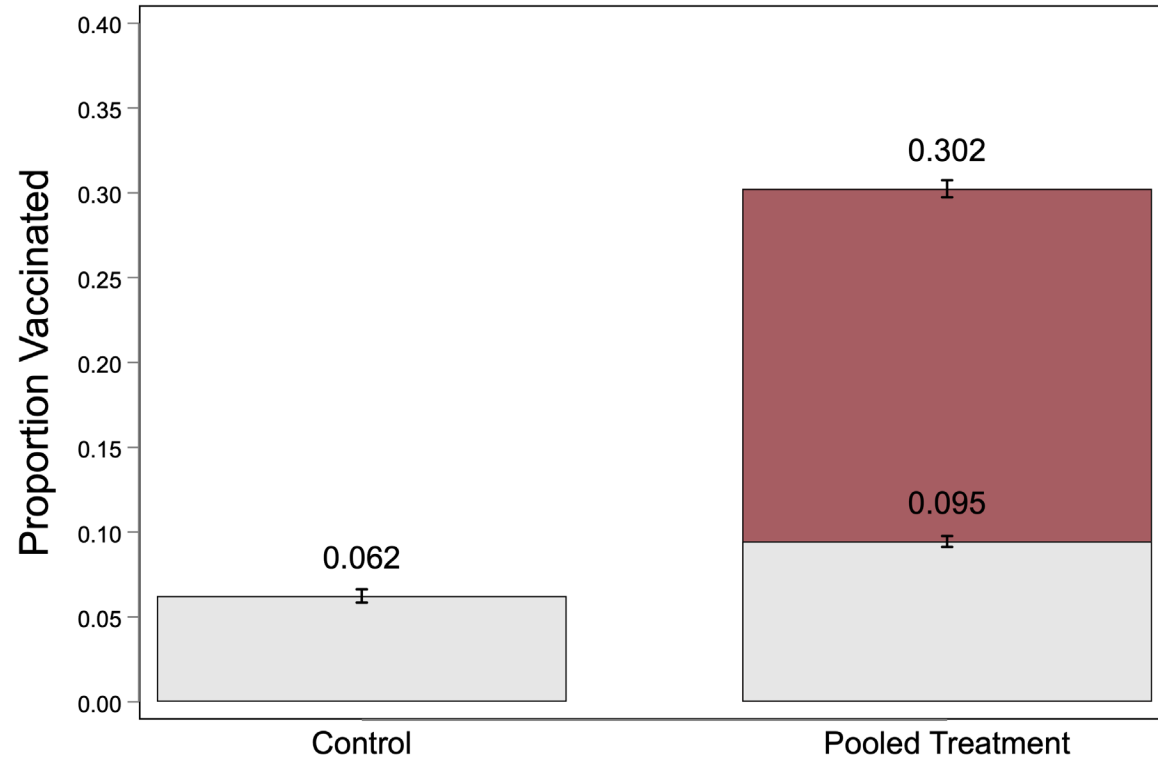
Article | [Open access](#) | Published: 13 March 2024

## Last-mile delivery increases vaccine uptake in Sierra Leone

[Niccolò F. Meriggi](#) , [Maarten Voors](#), [Madison Levine](#), [Vasudha Ramakrishna](#), [Desmond Maada Kangbai](#), [Michael Rozelle](#), [Ella Tyler](#), [Sellu Kallon](#), [Junisa Nabieu](#), [Sarah Cundy](#) & [Ahmed Mushfiq Mobarak](#) 

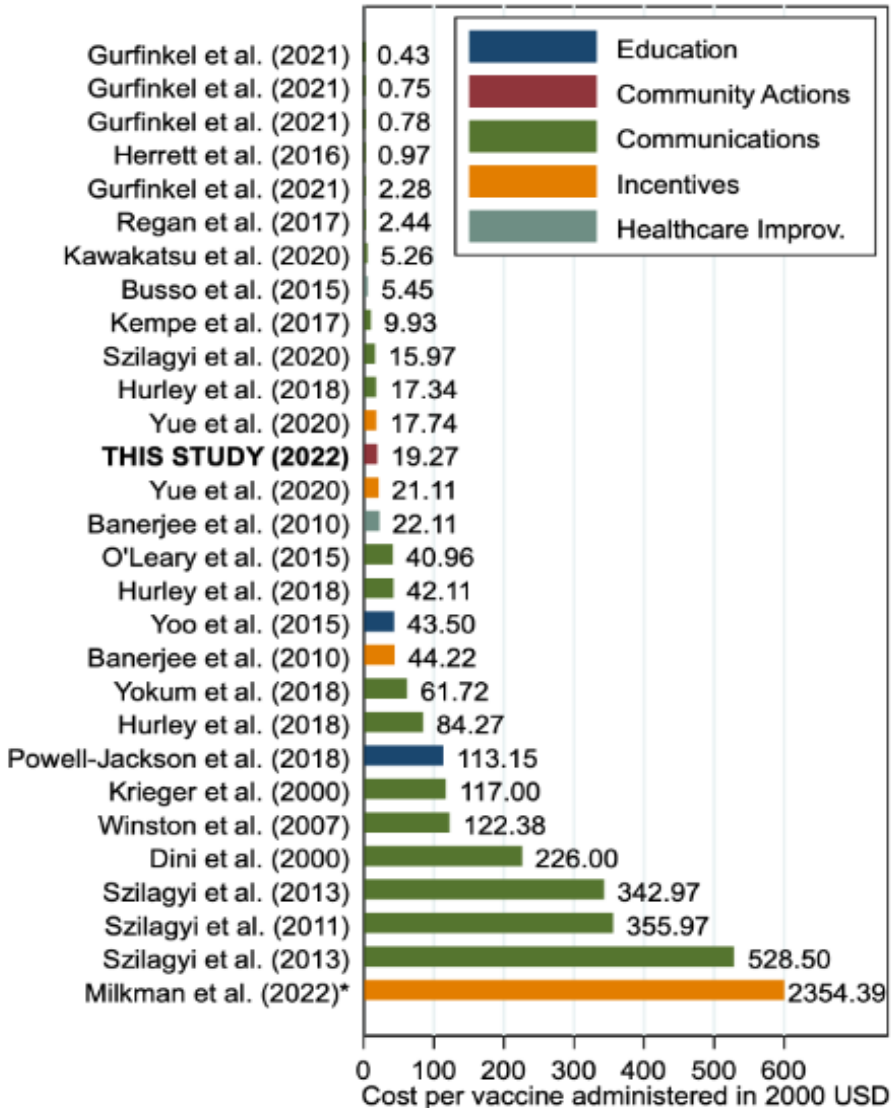
[Nature](#) **627**, 612–619 (2024) | [Cite this article](#)

# Cluster RCT Results in *Nature* 627: 612-619, March 2024



- Immunization rates increased by ~26 percentage points within 48–72 h
- Auxiliary populations visited our community vaccination points, which more than doubled the number of inoculations administered

# Cluster RCT Results in *Nature* 627: 612-619, March 2024



- Implementation cost: \$33 per person vaccinated (in 2022 US\$)
- Transportation cost of reaching remote villages was the biggest cost component



## Implication

Given the large fixed costs of delivery to remote communities, taking a bundle of useful health interventions on the same trip would lower cost per person treated.



# Pilot Data for identifying the Bundle of interventions



Descriptive pilot data collected from 418 households in rural remote communities indicates:

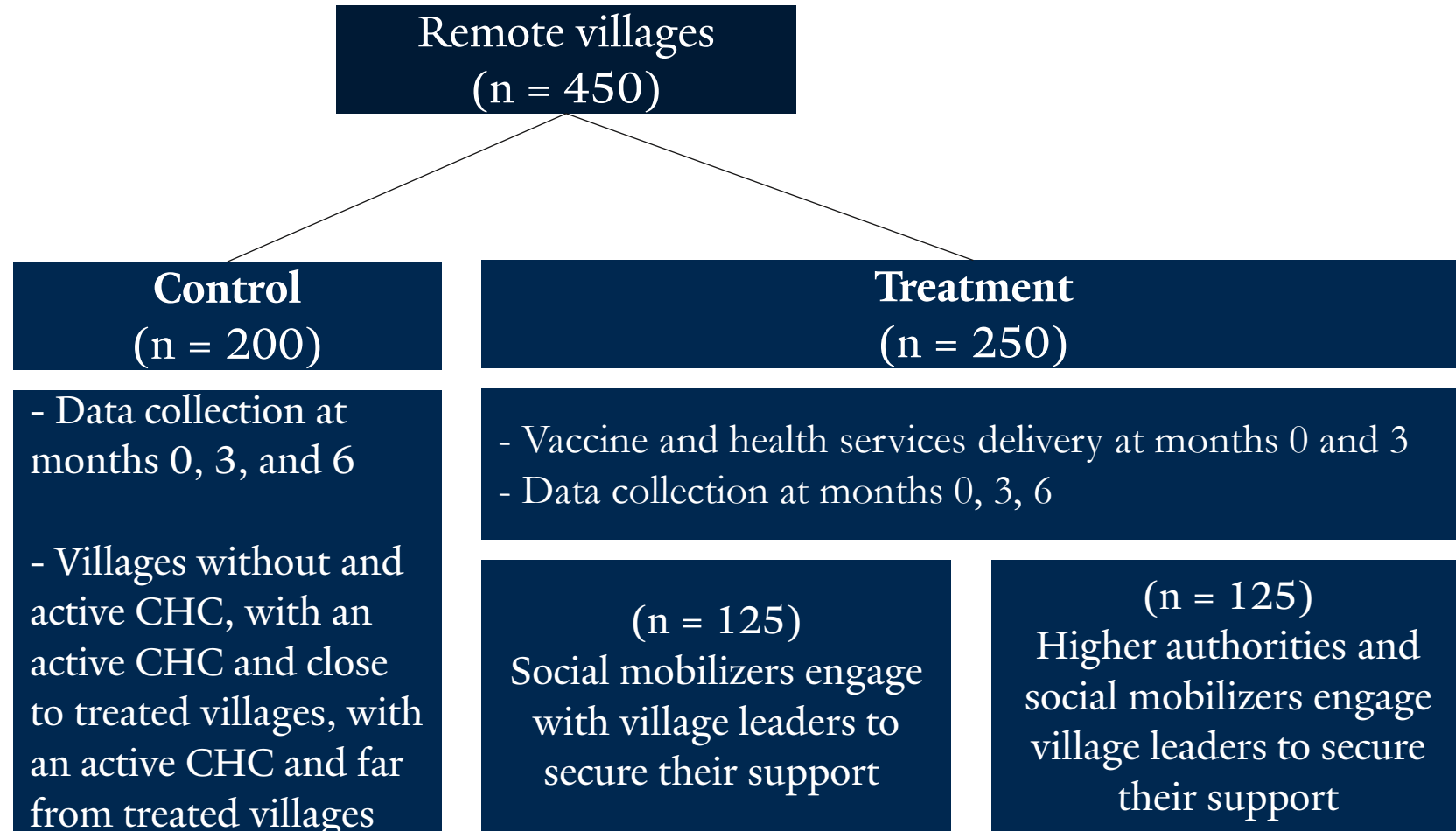
- Poor drinking water quality and very little chlorination. [Details](#)
- Routine childhood immunization rates below MoHS targets. [Details](#)
- Malaria vaccine and HPV vaccination rates very low. [Details](#)

Bundle  
we intend to  
distribute in a  
new trial

We formed a coalition to procure a bundle of health services:

1. Routine immunizations for children under 5
  - BCG, pneumococcal, rotavirus, IPTi, MCV, yellow fever, Malaria RTs, IPV, pentavalent, OPV
2. HPV vaccines for girls aged 10-17
3. Health services that protect infants and children
  - Vitamin A drops
  - Deworming pills
  - ORS/Zinc sachets to treat cases of diarrhea
  - Chlorination tablets to treat drinking water

# Research Design



# Timeline of Activities



- **Cost-effectiveness:** What is the increase in DALYs per dollar spent delivering a bundle of health services to remote, rural communities?
- **Individual incentives:** do individual incentives (as unconditional cash transfer or travel vouchers) increase visits to health facilities? How does it compare to last-mile-delivery?
- **Re-delivery:** What are the marginal gains from visiting a community a second time?
- **Longer-run effects:** human capital investments for children, independent procurement of chlorine and ORS/Zinc, and increase trips to health facilities, water habits

# Research questions

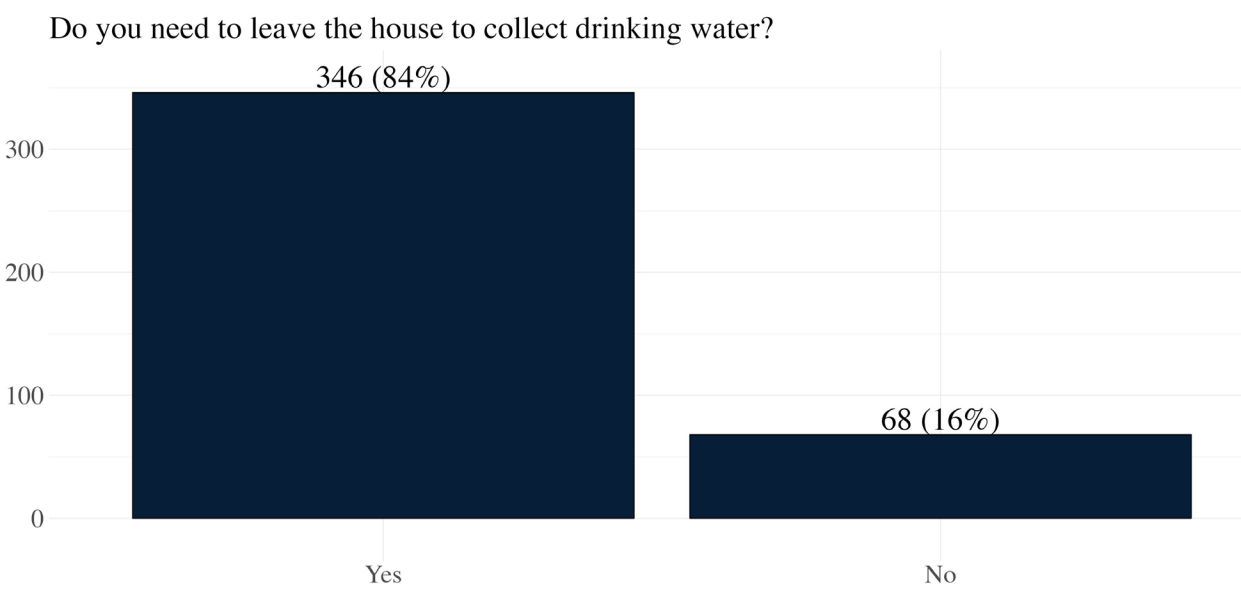
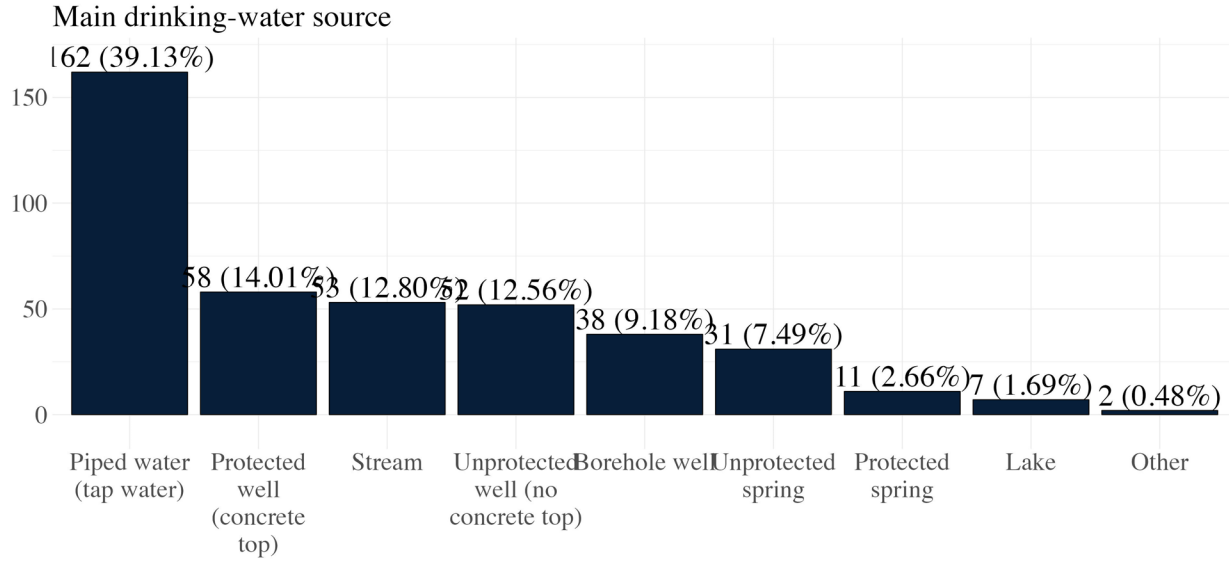
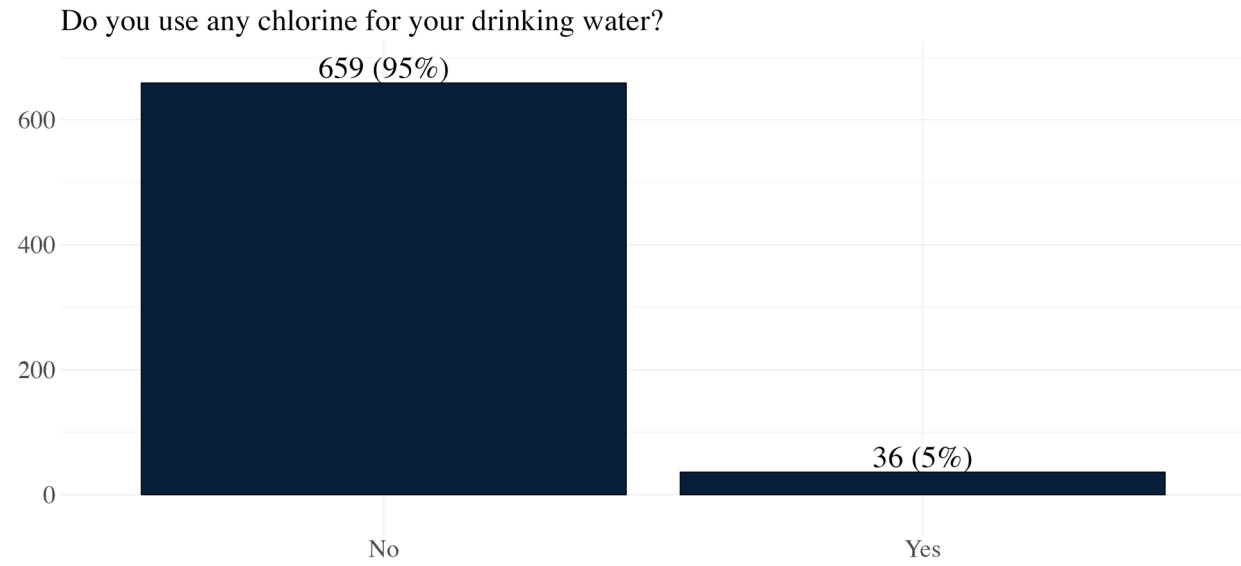
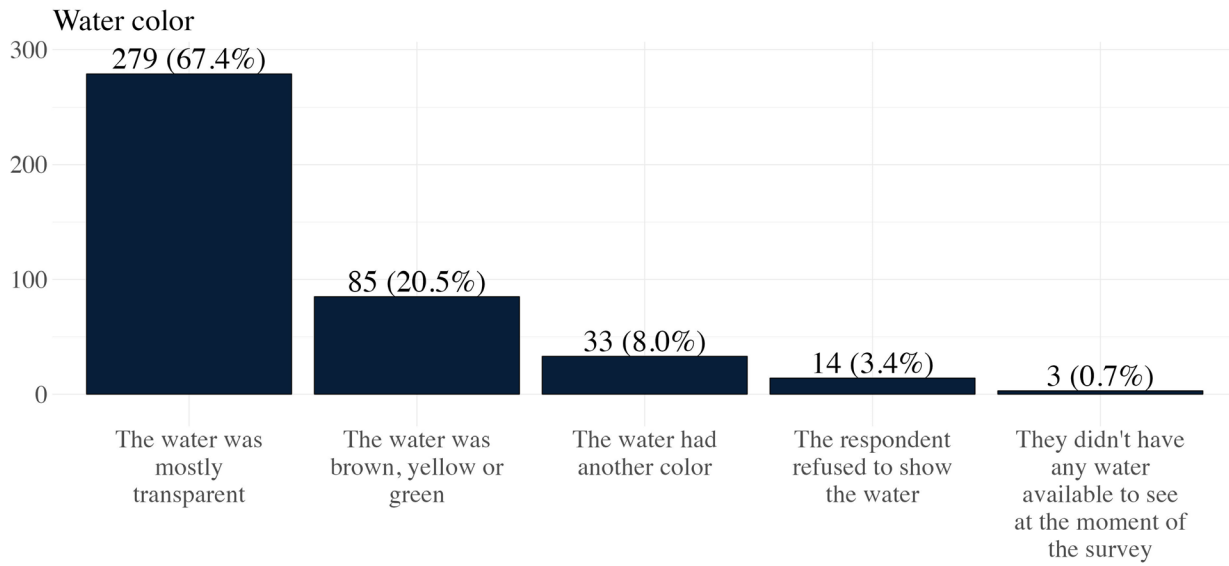
## *Secondary questions*

- **Heterogeneous treatment effects:** by community remoteness, gender, age, initial attitudes towards vaccines, and initial attitudes of traditional authorities towards vaccines.
- **HPV:** Effects of in-home delivery of HPV relative to the standard in-school delivery
- **Spillover effects:** potentially through learnings of health facility staff in control communities, crowd-out of resources in health facilities, or visits to treated communities.
- **Longer-run effects:** on outcomes such as human capital investments for children, perceptions of acceptable taste of water, independent procurement of chlorine and ORS/Zinc, and increase trips to health facilities.

Thank you!



# APPENDIX

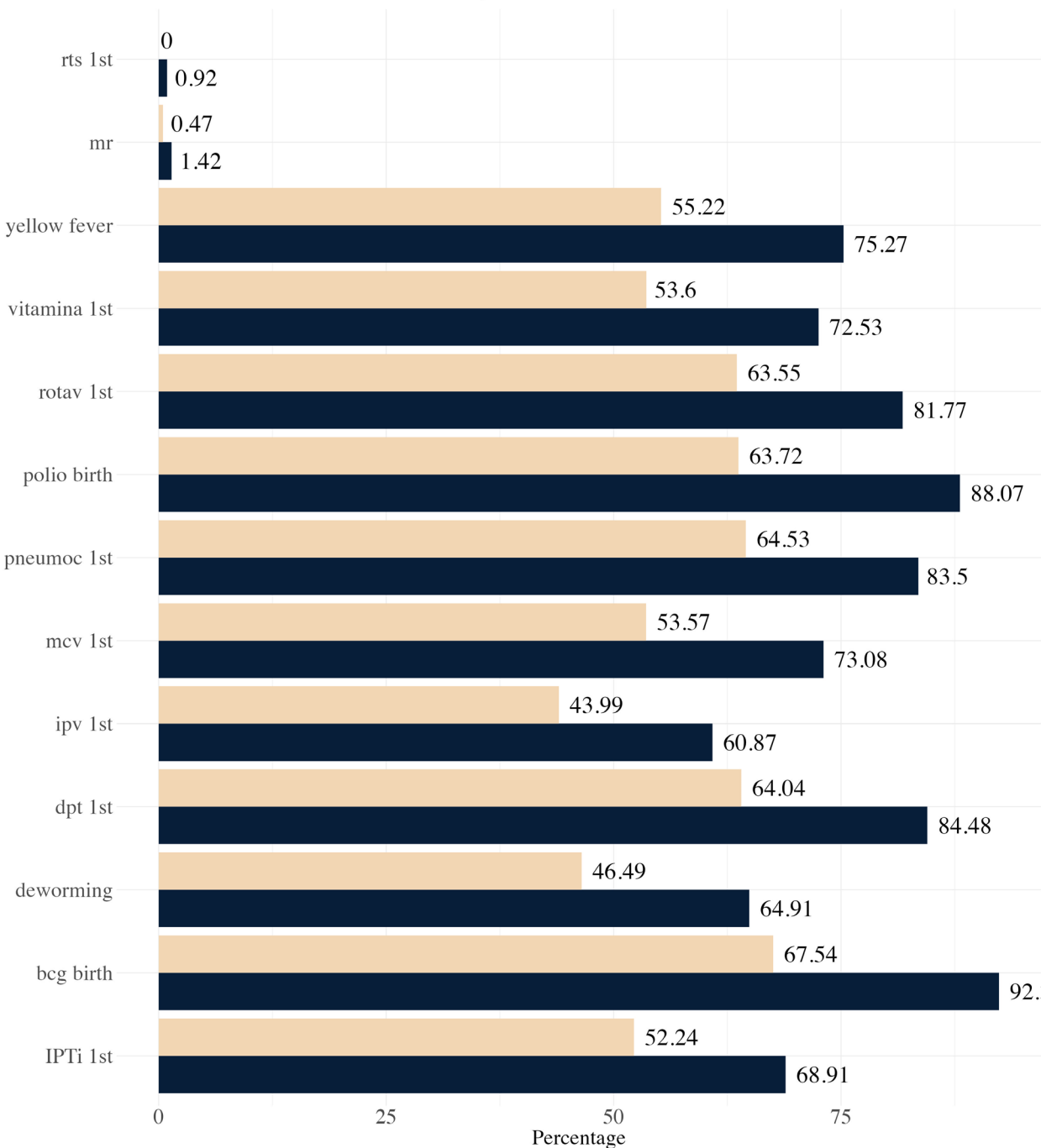


- On average, it takes people 20 mins to get from their house to the water collection point.



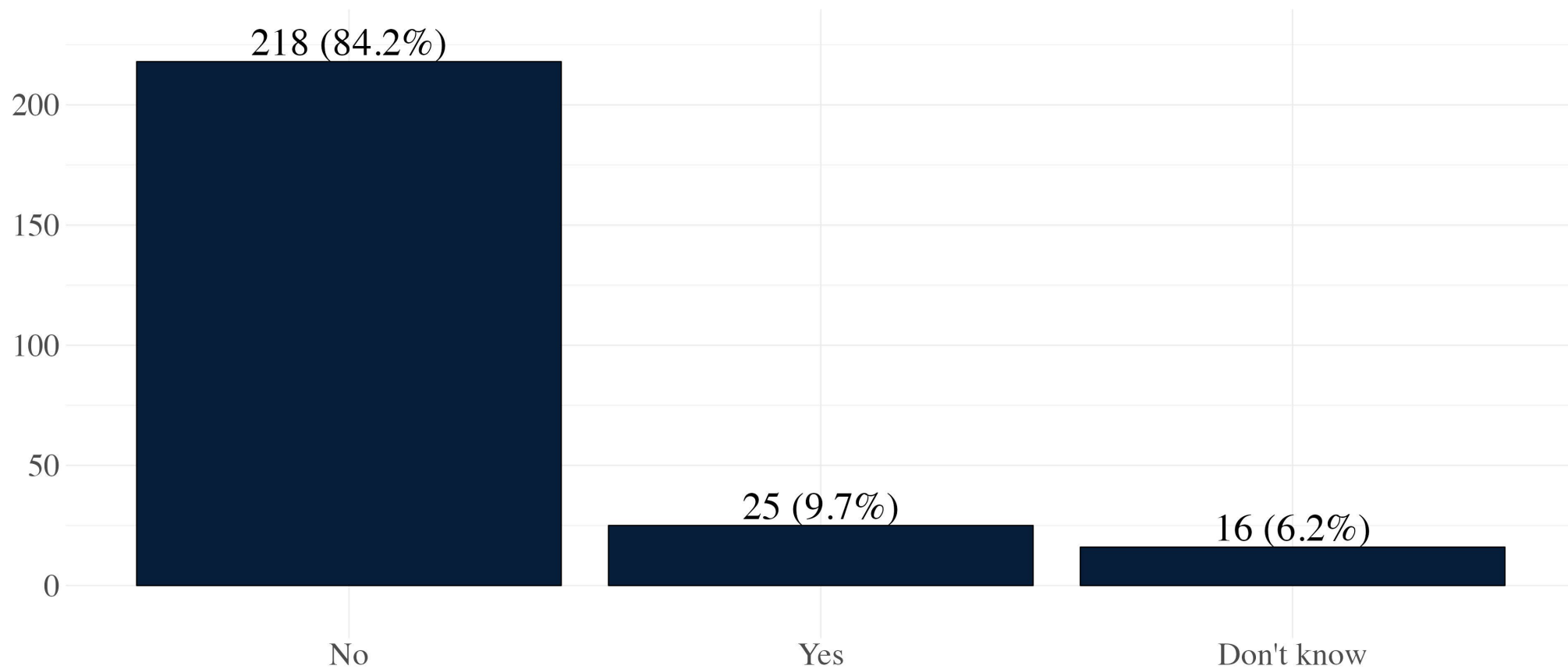
# Percentage of Vaccinated Children

Measurement ■ Self-reported or vaccine card ■ Showed vaccine card



Routine child immunization vaccination rates are below target rates

### Girls vaccinated with HPV



- HPV vax rate very low in Sierra Leone. The target is to reach 95% vaccination
- Furthermore, including HPV in a bundle delivered outside schools targets girls who may be more at risk. This is quite unique in the literature