Maternal & Child Health (MCH) Program

Utilizing innovative & integrated approaches to improve healthcare services in underserved communities
in Pakistan

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About IRD - Reimagining Global Health

IRD is committed to improving the lives of vulnerable communities by building a network that shares ideas and innovations to create global impact

MATERNAL AND CHILD HEALTH (MCH) PROGRAM | INFECTIOUS DISEASE (ID) PROGRAM | NEGLECTED TROPICAL DISEASES (NTD) PROGRAM | NON-COMMUNICABLE DISEASE (NCD) PROGRAM | GLOBAL SURGERY (GS) PROGRAM

Antenatal Care | Childhood Immunizations | IMCI | Childhood Pneumonia | Malaria | TB | HIV | Hepatitis | Rabies | Deworming | Mental Health | Hypertension | Diabetes Care | COPD | Safe Surgery | Clubfoot | Male Circumcision

IRD
Interactive Research & Development

IRD Programs

Through effective health delivery programs, disease surveillance, clinical research & information technology innovations, IRD is making an impact in **15 countries**

Maternal & Child Health

Mental Health

Neglected Tropical Diseases

Infectious Diseases

Youth Engagement

Non Communicable Diseases

MCH Programs & Studies

Technological initiatives

Zindagi Mehfooz Electronic Immunization Registry

Predictive analytics

AI based Chatbot for immunization

GSM tracking for vaccinators

THRIVE OpenSRP

Decision Support System (DSS)

Pregnant Women & Child Registry

eIMCI

MCH Programs & Studies

Ongoing programs and studies


Incentive schemes and reminders


Kiran Sitara


Mobile Vans for Immunization


Affordable transport for immunization


Cold chain equipment monitoring


Vaccine hesitancy


HPV vaccination In Pakistan


ANC-TB

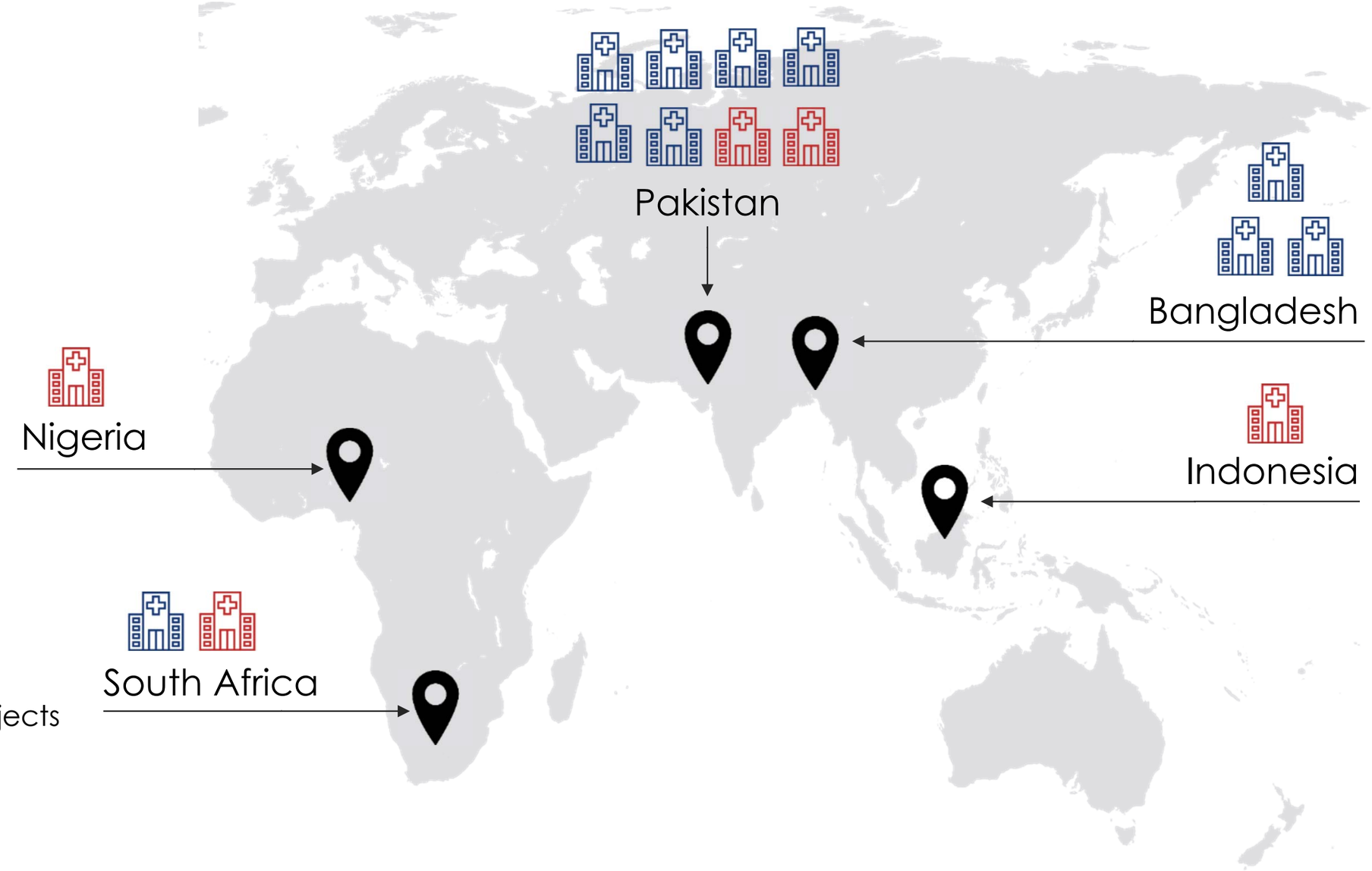

Extended immunization clinics


Bracelet reminders


Immunization monitoring assessment study


Health facility assessment

Maternal & Child Health Global Footprint



Maternal & Child Health-Footprint in Pakistan

4

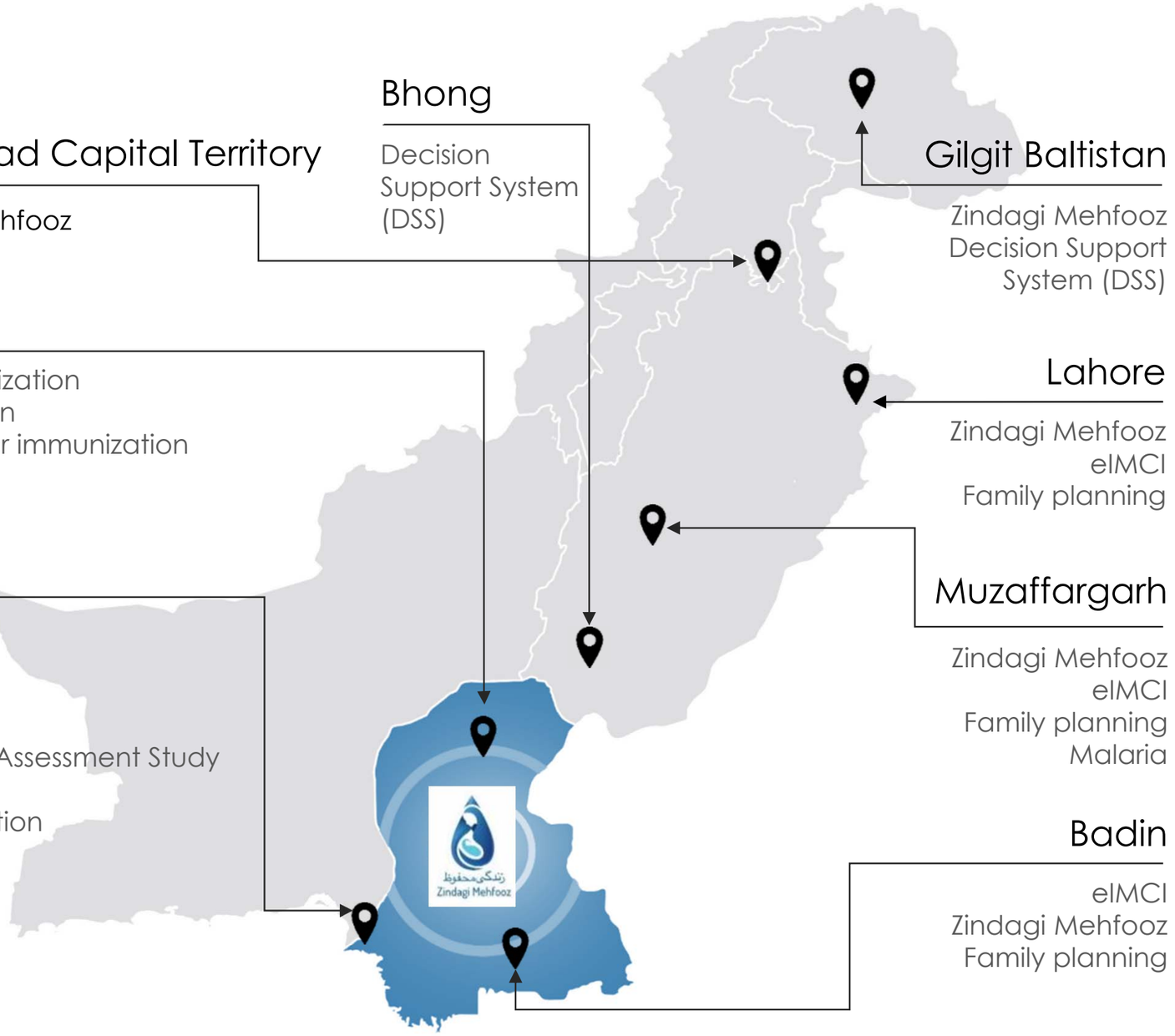
Provinces

8

Cities

16+

Programs and research projects



The Immunization Landscape in Pakistan

Globally

1 OUT OF 5

Children are not fully immunized

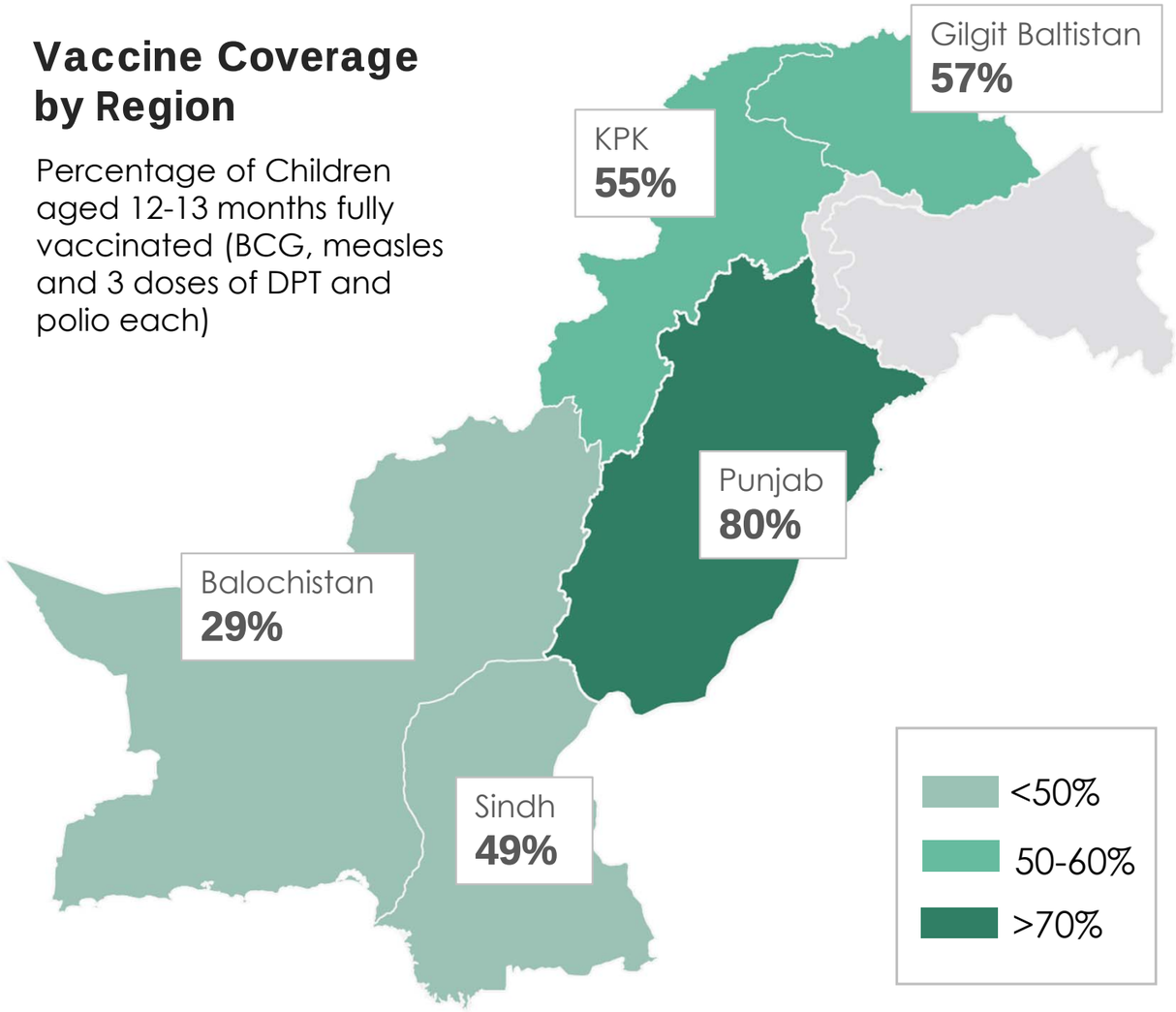
In Pakistan

2 OUT OF 5

Children are not fully immunized

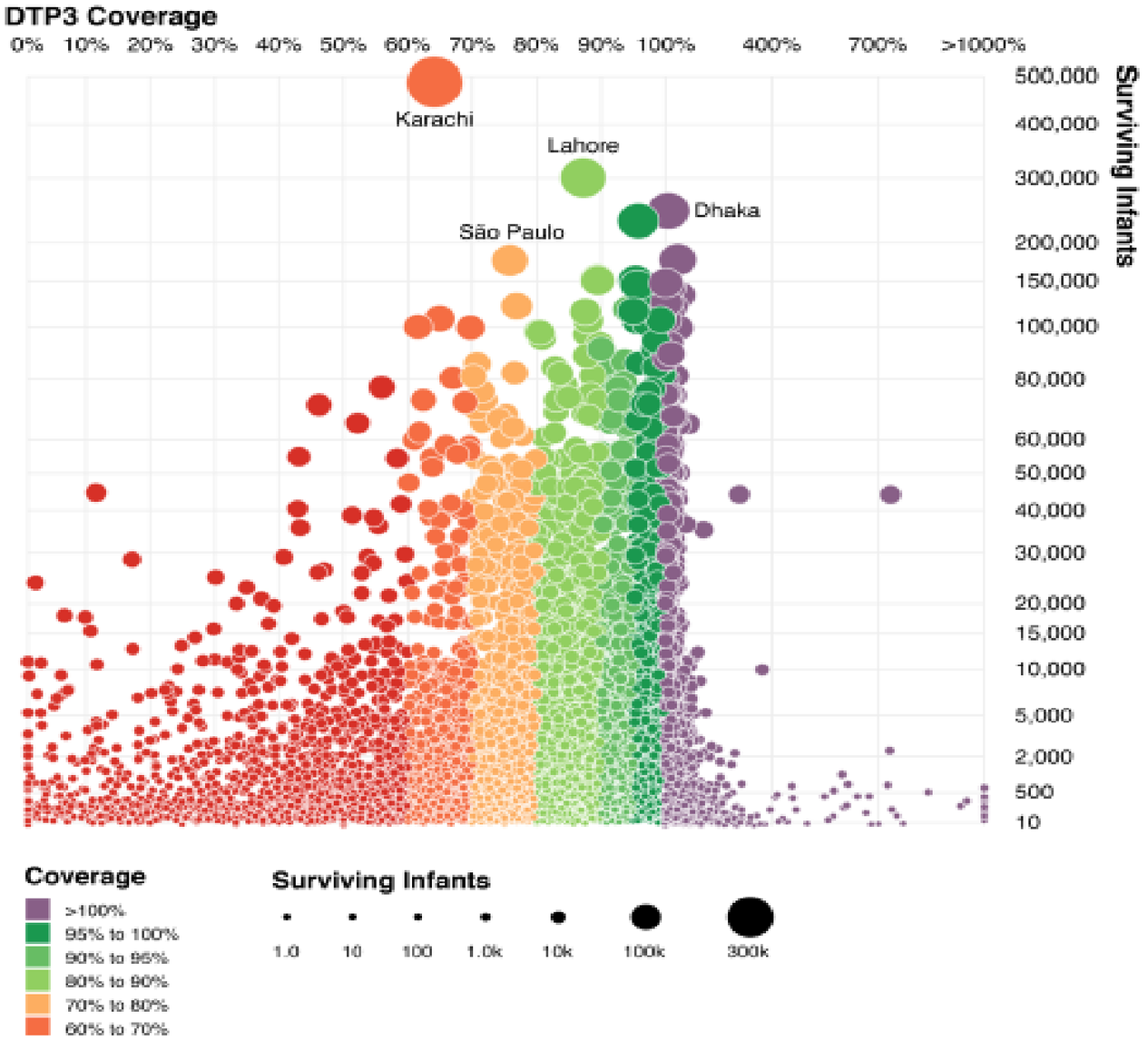
Vaccine Coverage by Region

Percentage of Children aged 12-13 months fully vaccinated (BCG, measles and 3 doses of DPT and polio each)



Source: 2017-18 Pakistan Demographic and Health Survey

DTP3 Coverage in Surviving Infants in Urban cities



Source: WHO 2017

Preliminary Findings

Evaluating the impact of Small Conditional Cash Transfers of Different Sizes, Designs and Schedules on Improving Immunization Outcomes: A Randomized Controlled Trial

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A Case for Conditional Cash Transfers (CCTs)

In Sindh Province of Pakistan:

2007 Food Vouchers showed more than **2 –fold increase** in DTP3 coverage

2014 Lottery based Transfers showed a **15% increase** in Fully Immunized Child (FIC) coverage

? **Gap in knowledge** on ideal incentive size, design and structure prevents scale-up

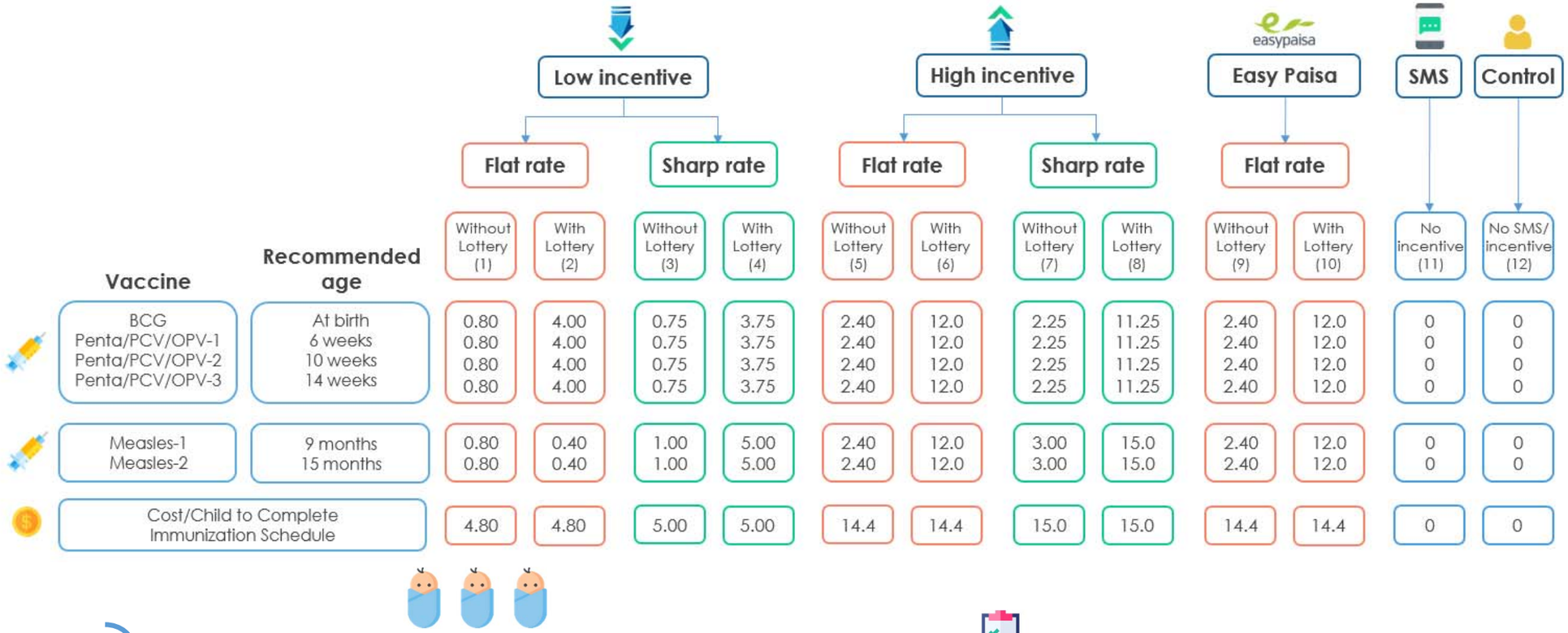
2017 Designed a **7-arm trial** to ascertain optimal incentive design, schedule and size

Key Study Objective:

Determine the impact of small incentives, **4.80 - 15 USD per fully immunized child**, of different **designs, schedules and sizes**, on immunization outcomes of children <2 years of age

Explorations of inequality: childhood immunization. World Health Organization. (2018),Chandir, et al (2010), Chandir, et al (2017).

Methodology



BCG
At birth

Penta-1
6 weeks

Penta-2
10 weeks

Enrolled from 12 EPI centers in Korangi Town

11,197
infants

Followed up to

18
Months

Blood collection of sub-sample (15%) for Validation

Within 6
Months

*All amounts are in USD; Probability of winning lottery set at 0.2 (1 out of 5).

Up to date Immunization Coverage for children up to 18 months of age by study arm, incentive design, structure and amount (N=11,197)

8.9%

increase in FIC in High Flat arm vs the control (p<0.001)

4.3%

increase in FIC in the Non-Lottery vs the Lottery arm (p<0.001)

% Difference in Immunization Coverage	Cost/Child for FIC (USD)	Penta-3	Measles-1	Measles-2	FIC at 12 months of age*
			*Study Arm***		
Low Flat	4.0	5.2	4.2	8.6	5.1
Low Sharp	4.0	7.7	6.1	8.3	6.9
High Flat	12.0	7.5	9.3	11.4	8.9
High Sharp	12.0	8.1	7.8	11.3	8.4
EasyPaisa	12.0	5.5	5.9	5.8	5.6
SMS	0.0	3.8	2.7	3.5	2.9
Control	0.0		-	-	-
			Incentive Design		
Lottery No-Lottery		-2.2	-4.4	-7.4	-4.3
			Incentive Schedule		
Flat Sharp		-1.6	0.2	0.2	-0.6
			Incentive Size		
High Low		1.4	3.4	3.0	2.7

Seropositivity Rate (SPR) Trends for measles and tetanus antibodies were consistent with coverage estimates. Absolute differences between SPR and coverage were 9-15% for Tetanus and 0-6% for Measles.

*Children receiving BCG, 3 doses of Penta and 1 dose of measles by 12 months of age
**Compared to control

Predictors of full immunization coverage (FIC) at 12 months of age in study participants (n=10,602)

All incentive arms made children **7-16% more likely** to achieve FIC by 12 months of age.

The highest impact was in the **High Flat Arm**

Receiving **a total of 12 USD** made children **16% more likely** to be **fully immunized**
(IRR: 1.16, CI: 1.09-1.22, P-value <0.001)

What Else?

Having lesser siblings
(IRR 0.97, CI: 0.96-0.98, P-value: <0.001)

Higher maternal education
(IRR 1.02, CI:1.01-1.02, P-Value: <0.001)

Having a personal vehicle
(IRR 1.05, CI:1.01-1.09), P-value: 0.008

Conclusion

Even **CCTs of 5 USD** for each child can significantly improve **immunization coverage >5%**.
The **greatest impact** can be seen when **sure payments of 2.4 USD** are provided on **each visit**

*All CIs are at 95% confidence

Pregnant Women and Birth Registry in Super High-Risk Union Councils (SHRUCs) in Karachi

Integrated with Government's
ZM Electronic Immunization Registry (ZM EIR)

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Background

Pakistan has one of the highest burdens of maternal, fetal, and child mortality worldwide.

31%
pregnant women are not vaccinated against tetanus

61%
of U2 children are not registered

39%
children do not receive BCG by 28 days of age

48%
children do not receive OPV-0 by 28 days of age

Objectives for Implementation

- Provide all pregnant women and newborns from SHRUCs in Sindh province visiting the 15 birthing facilities with an **EPI digital identity** and **link to vaccinators**
- Achieve **Universal Immunization Coverage** for birth dose of polio vaccination & other routine immunizations in SHRUCs
- **Improve health outcomes** for pregnant women and newborns, ensuring health equity in SHRUCs

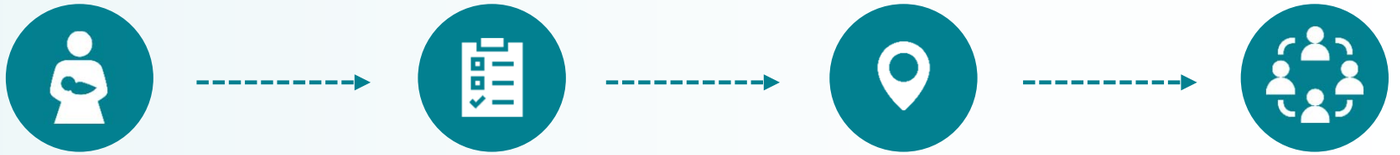
Objectives for Research Component

- To investigate the **impact of sociodemographic characteristics and antenatal care** practices on health and immunization outcomes

Sources: Pakistan National Institute of Population Studies; UNICEF; DHS 2017-18; ZM EIR

Pregnant Women & Birth Registry Project: Overview of the Implementation & Research Component

Implementation



Shadowing of activities at 15 birthing facilities

End-user **field testing** of Registry at 1 pilot site

Phase-wise **deployment** across all 15 birthing facilities

Transition of Registry to hospital staff

Research

At enrollment

Socio-demographic data

Medical data

ANC attendance

Throughout pregnancy

Women's triage data

Pregnancy-related conditions

Obstetric scan outcomes

Within 48 hrs post-delivery

Pregnancy outcomes

Newborn health & vaccination

Postnatal healthcare use

Number of Women Enrolled/Followed up and Newborns Enrolled and Vaccinated (BCG/OPV0) at 13 Birthing Facilities

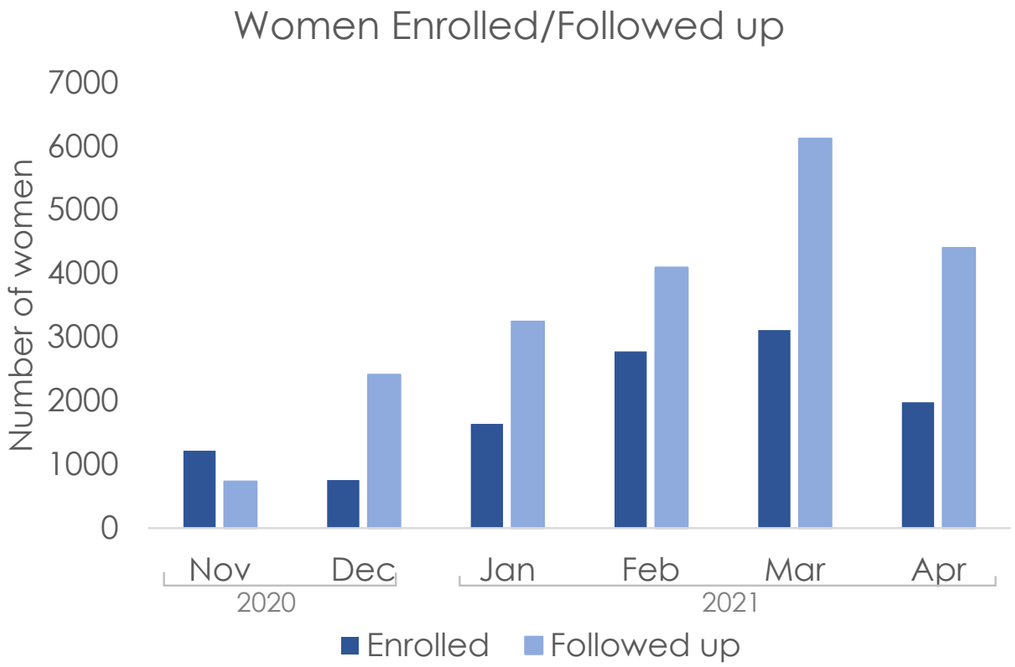
11,473
Enrollments

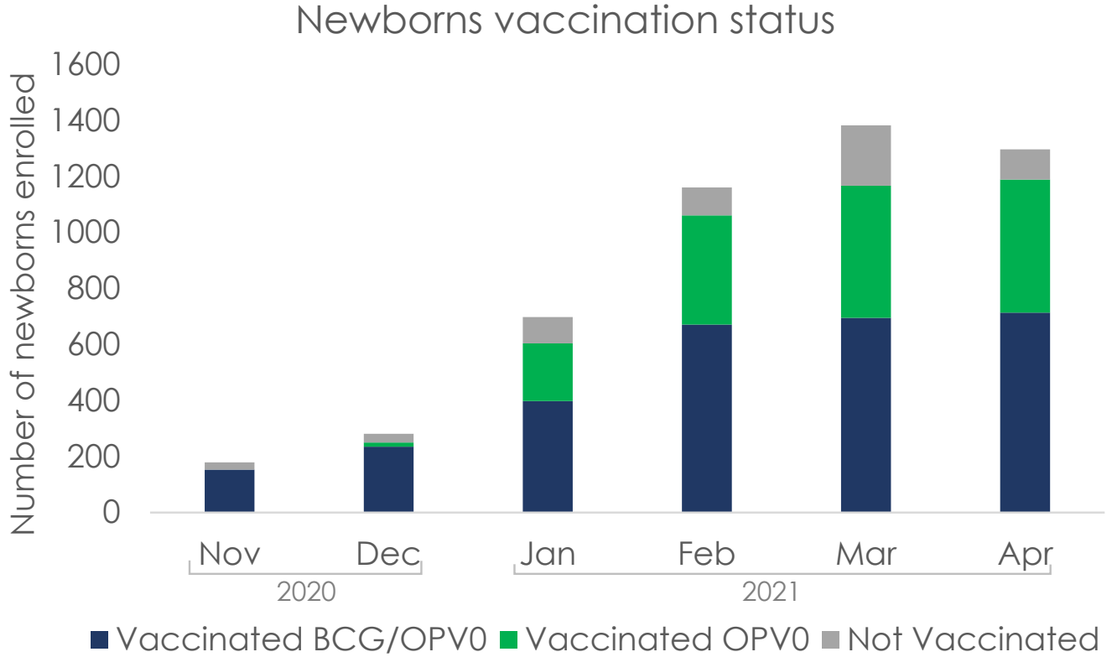
20,998
Follow ups

3,306
Enrollments

2,866
Vaccinated

440
Not vaccinated

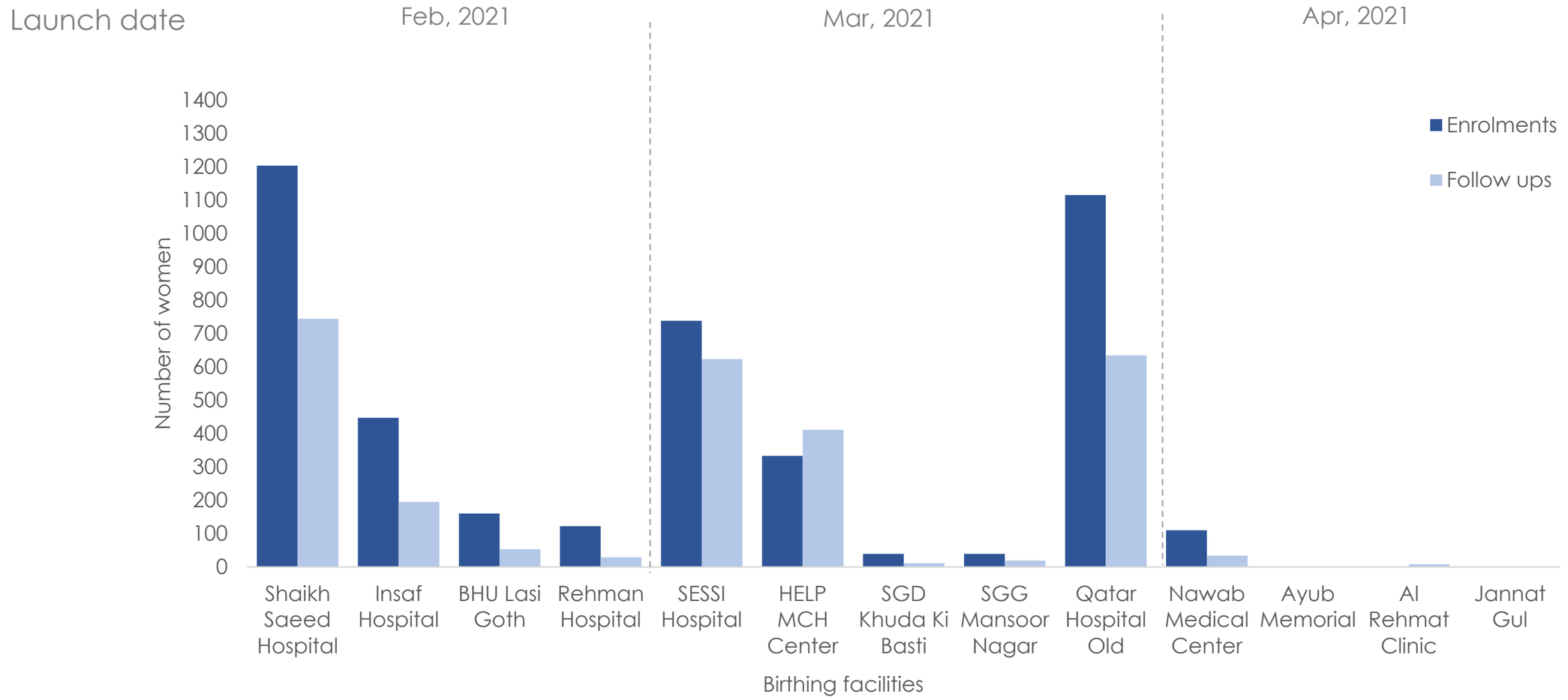




Number of women enrolled/followed up at 13 birthing facilities in Research survey

4,358 Enrollments

2,763 Follow ups



Key Takeaways

Successfully enrolling all pregnant women and newborns, benefitting both SHRUCs & overall Karachi metropolitan

Increased ANC visits through SMS reminders

Increased TT vaccine coverage among pregnant women

Registration of newborns into Health System & National database

Improved timeliness of BCG vaccination + Higher coverage & timeliness of OPV-0 vaccination

Predictive Analytics

Preventing missed opportunities and achieving higher immunization coverage and timeliness by identifying children who are at high risk of defaulting on their immunization schedule

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A Global Problem

Despite initiating vaccination, millions of children **default on the immunization schedule** each year

34.6%

Children drop out between BCG and Measles 2 in low-income countries

6 million

Children drop out between first and third dose of DTP every year

Vaccinators unable to identify high-risk children upon encounter

Governments lack resources to target all children

Source: WHO

Predictive Analytics to Prevent Drop-Outs & Delays

Child receives immunization

Vaccinator enters child's data into Electronic Immunization Registry (EIR)**; Predictive Analytics (PA) algorithm executes**

PA categorizes child as high risk. Vaccinator is alerted & risk status is stored in the system

Evidence-based interventions are **targeted** at caregivers of high-risk child

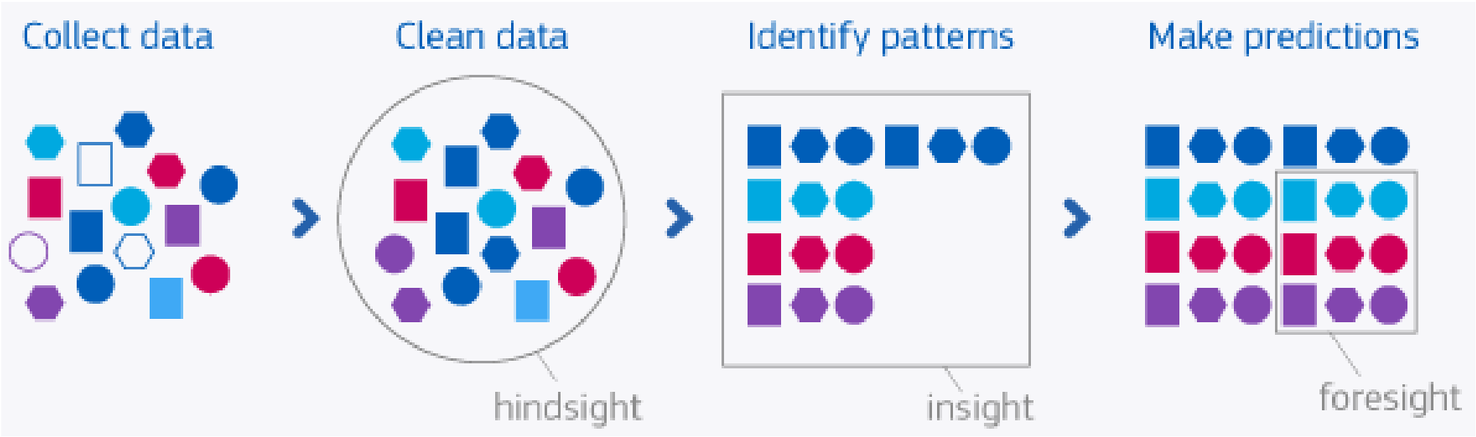
PA categorizes child as low risk. Standard of care is adopted

A Cutting-Edge Solution

Machine learning

Mathematical and computational statistical modeling

Multidimensional data mining



Artificial Intelligence enables the system to iteratively improve over time, and to adapt to dynamic contexts

Improve Routine Immunization Timeliness

Lower BCG to Measles Drop-out Rate

Improve Immunization Equity

Identify Variables Correlating with High Drop-out Risk

Model Development and Testing

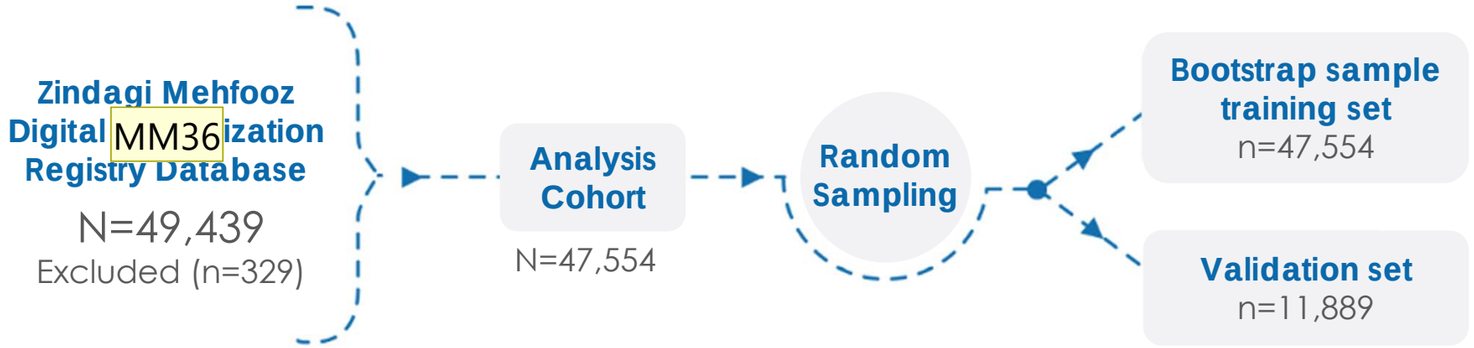
STUDY POPULATION

49,439 **Records in registry**
May 2012 to April 2016

21 **Immunization centers**

2 CITIES **(Karachi and Muzzaffargarh)**

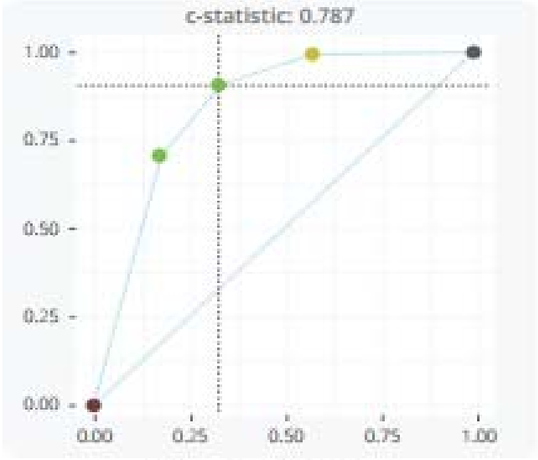
FLOW DIAGRAM



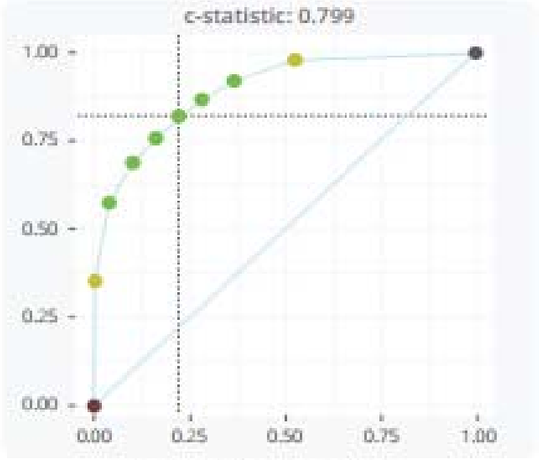
PREDICTORS

- Gender
- Language spoken at home
- Enrollment vaccine timelines
- Enrolling staff
- Place of residence
- Enrollment vaccines
- DoB
- Age group

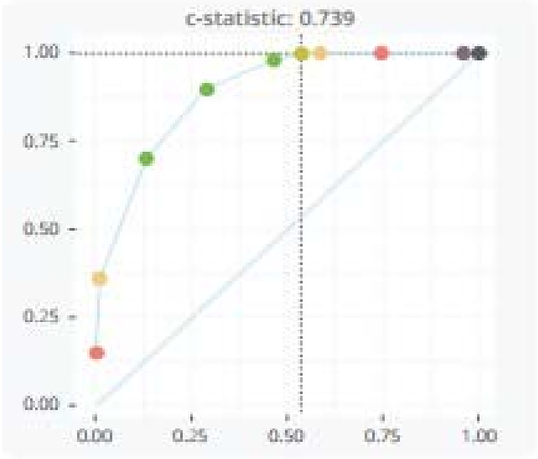
Performance Parameters for Prediction Models



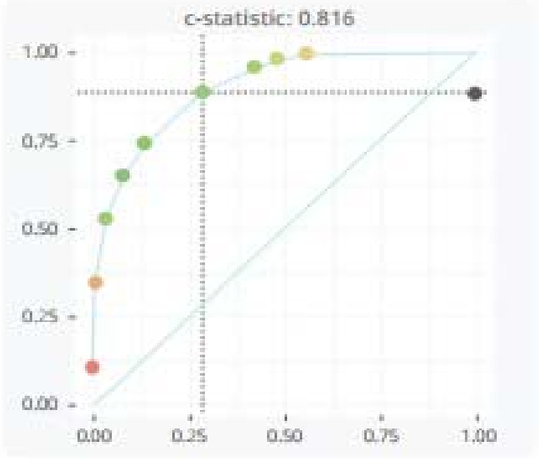
Recursive Partitioning



Support Vector Machine

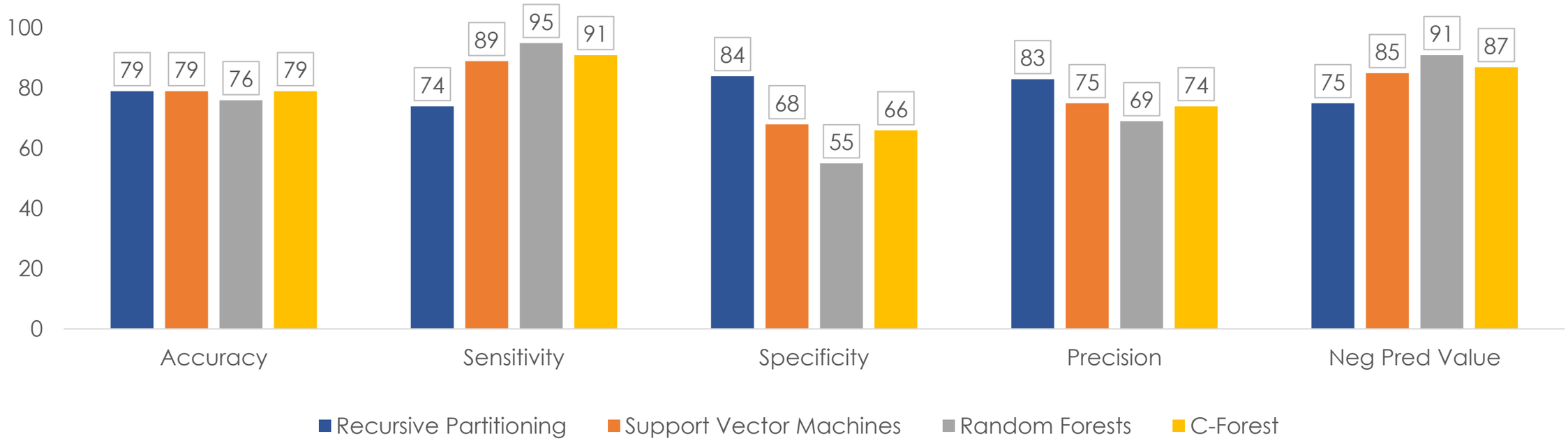


Random Forests



C-Forest

Feasibility Testing Results



Model	Number of correct cases predicted	AUC-c statistic	95% confidence interval
Recursive partitioning	6974	0.787	0.792 UCL
Support vector machines	7108	0.799	0.807
Random forests	6487	0.739	0.738
C-forest	7254	0.816	0.823

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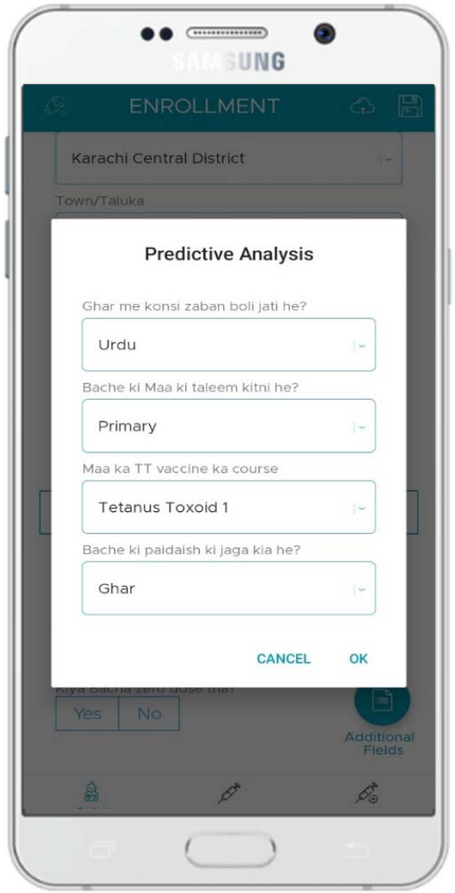
Game-changing Aspects

Instantaneous & accurate risk categorization

Self-learning algorithm

Elimination of time lags



Interoperable with EIRs

Applicable to low resource settings

Reduced burden on vaccinator

GSM Tracking

For Vaccinators

GSM based GIS tracking to improve workforce monitoring for improved geographic coverage of immunization services

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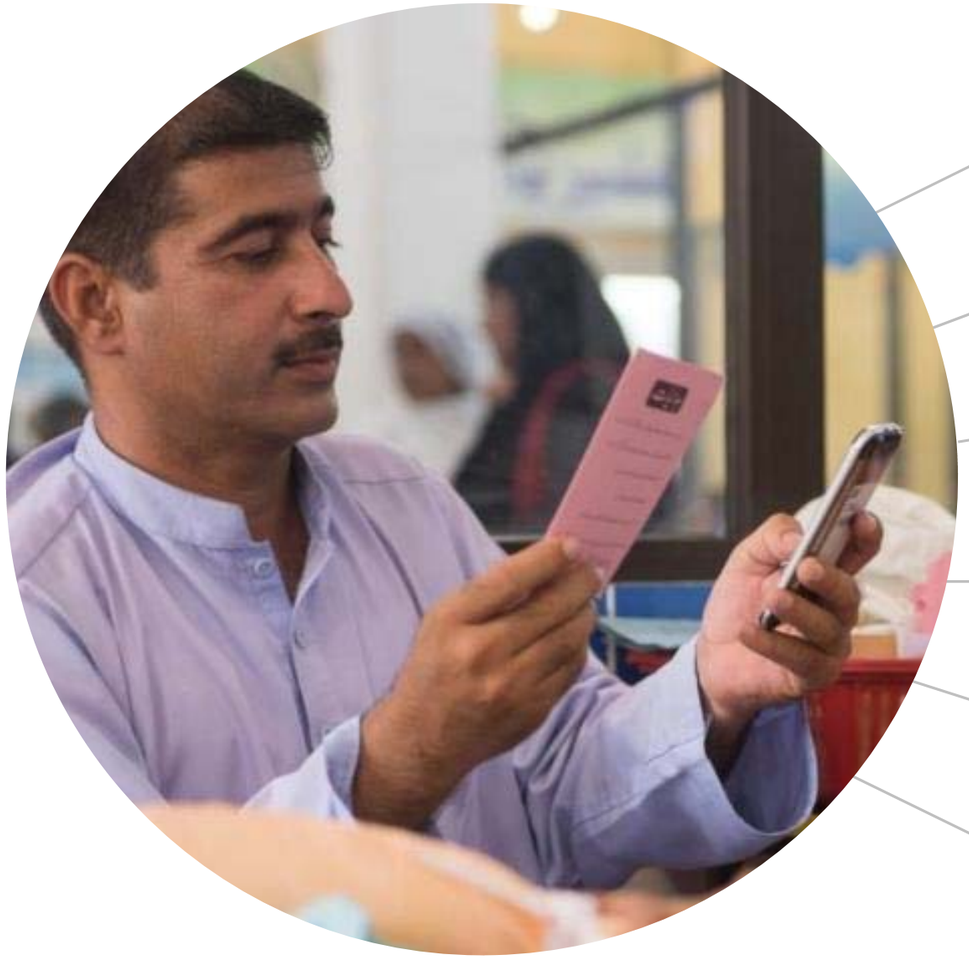
GSM Tracking for Vaccinators

Pacesetters in utilizing low cost GSM based GIS tracking to **improve real time monitoring and accountability** of vaccinators during polio supplementary immunization activities (SIAs)

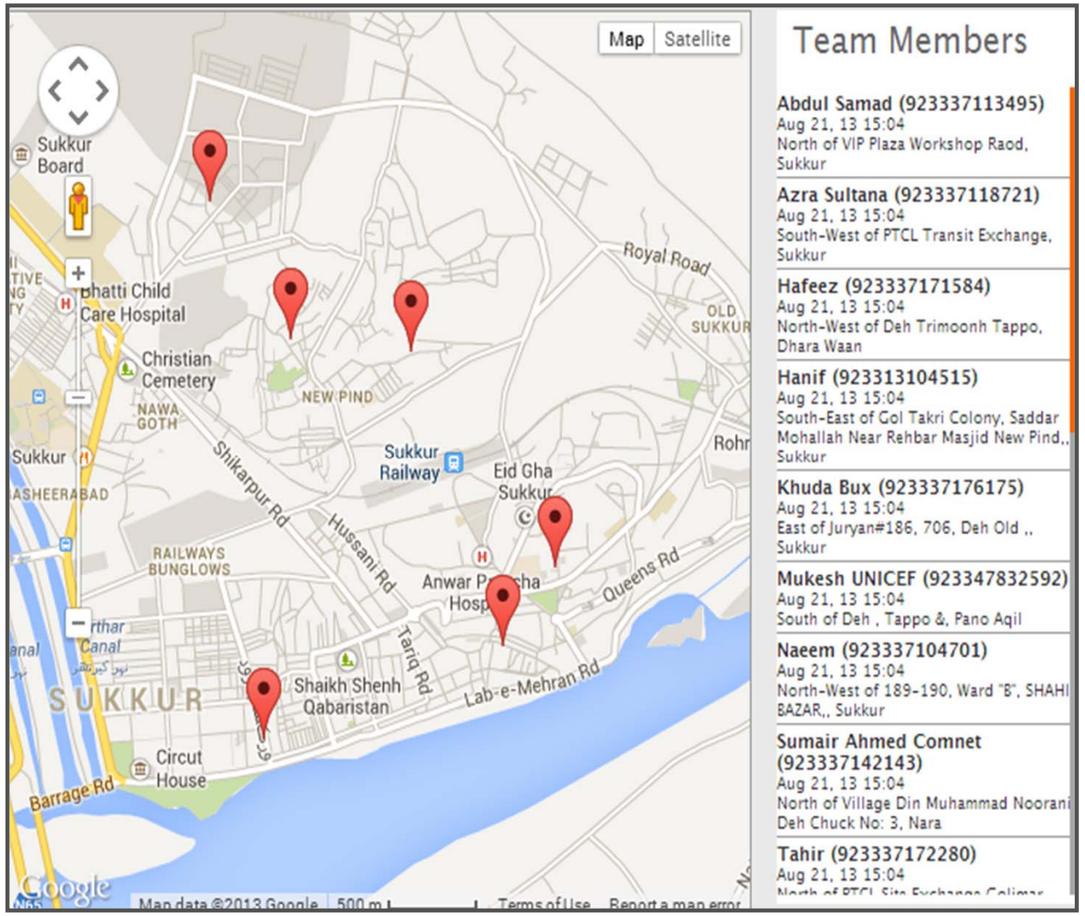
- Real-time tracking
- Active surveillance system to ensure complete coverage
- Route view to monitor attendance and mobility of field staff
- Live web dashboard for supervision
- Team view for simultaneous supervision of multiple teams
- Touch points to enable follow-up teams to locate refusal households
- Online mapping
- Geo-fencing for effective coverage of remote areas

GSM Tracking Benefits

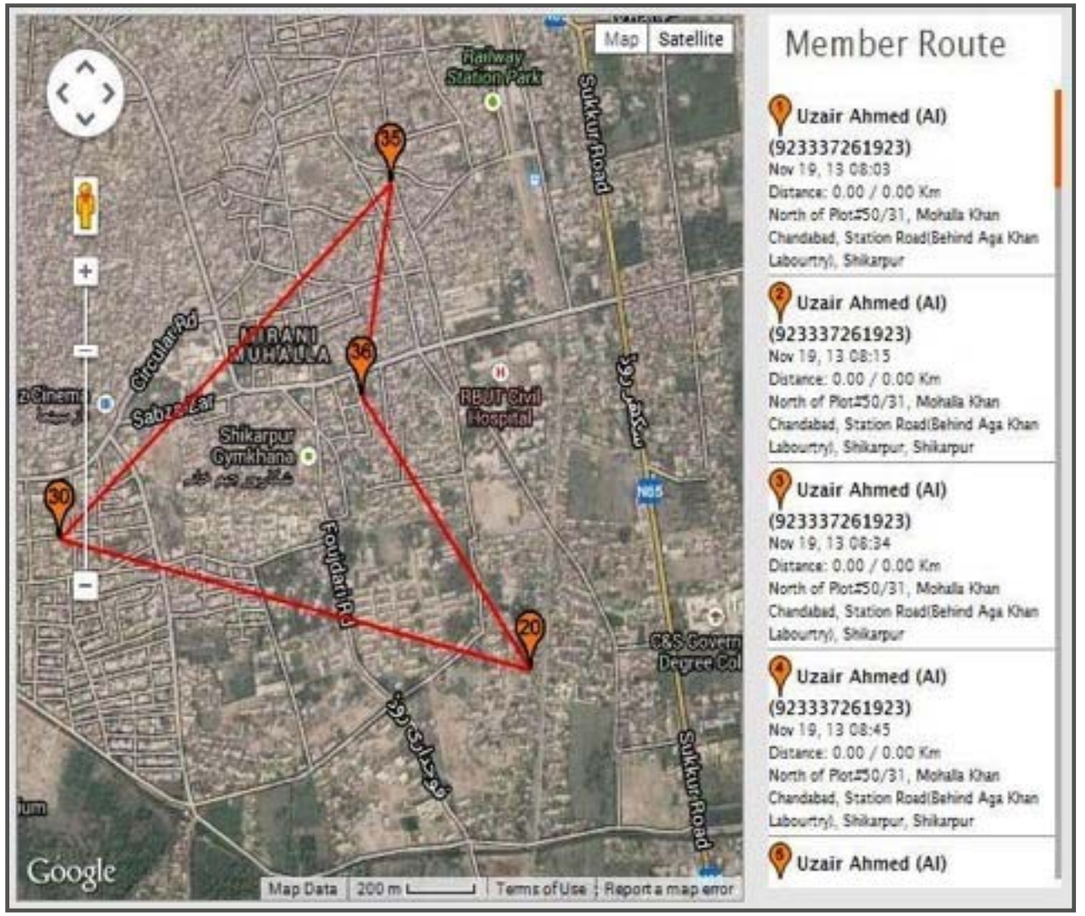


- Highly cost efficient
- Great potential for scale-up
- Effective monitoring of high-risk security areas
- Generates real-time actionable data
- Improved geographic coverage of SIAs
- Improved accountability of vaccinators

GSM Tracking for Vaccinators

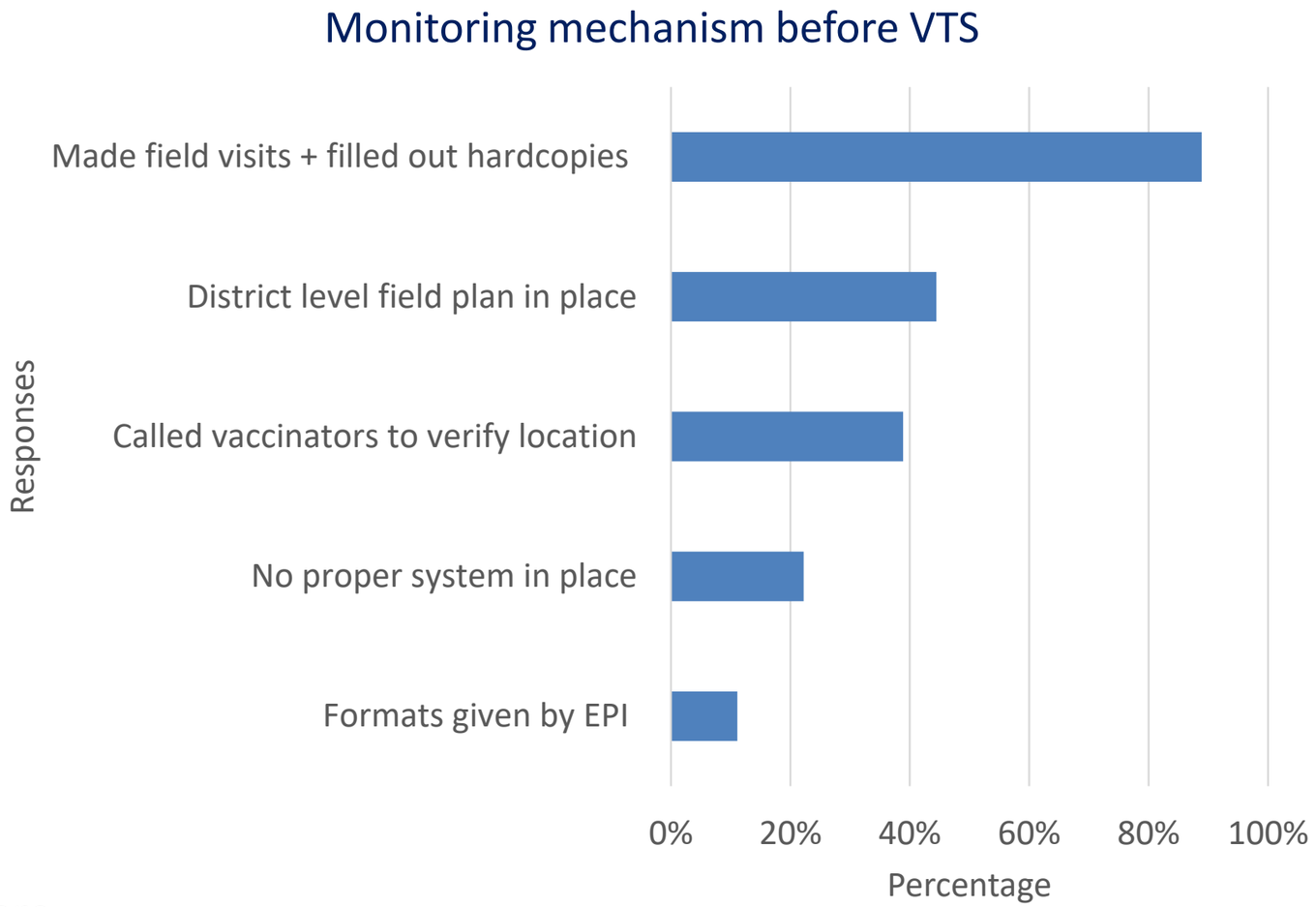


Team tracking



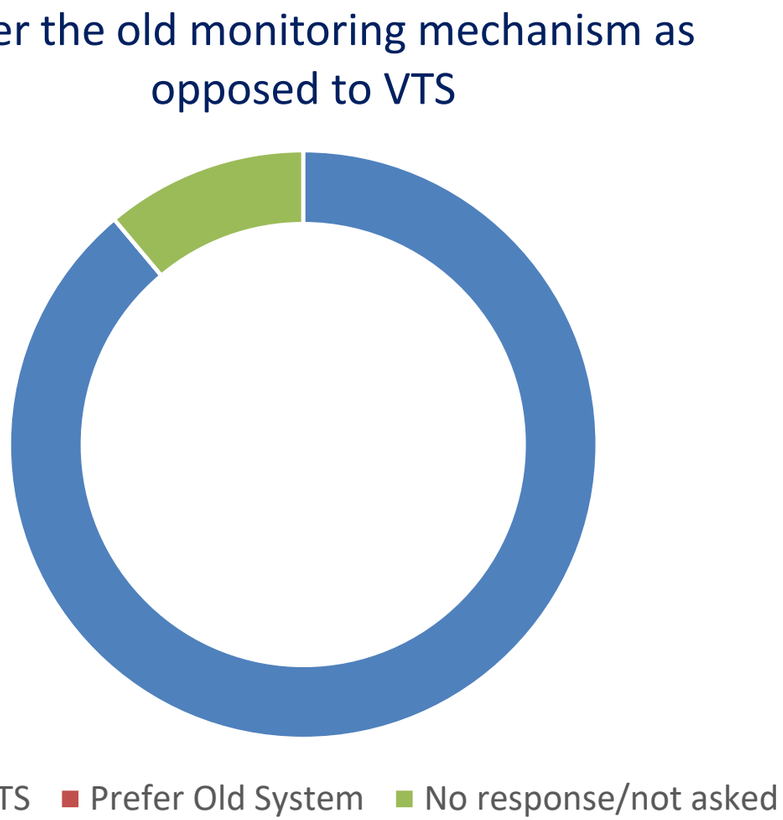
Route tracking

Vaccinator Monitoring Mechanism Used before VTS (n=18)



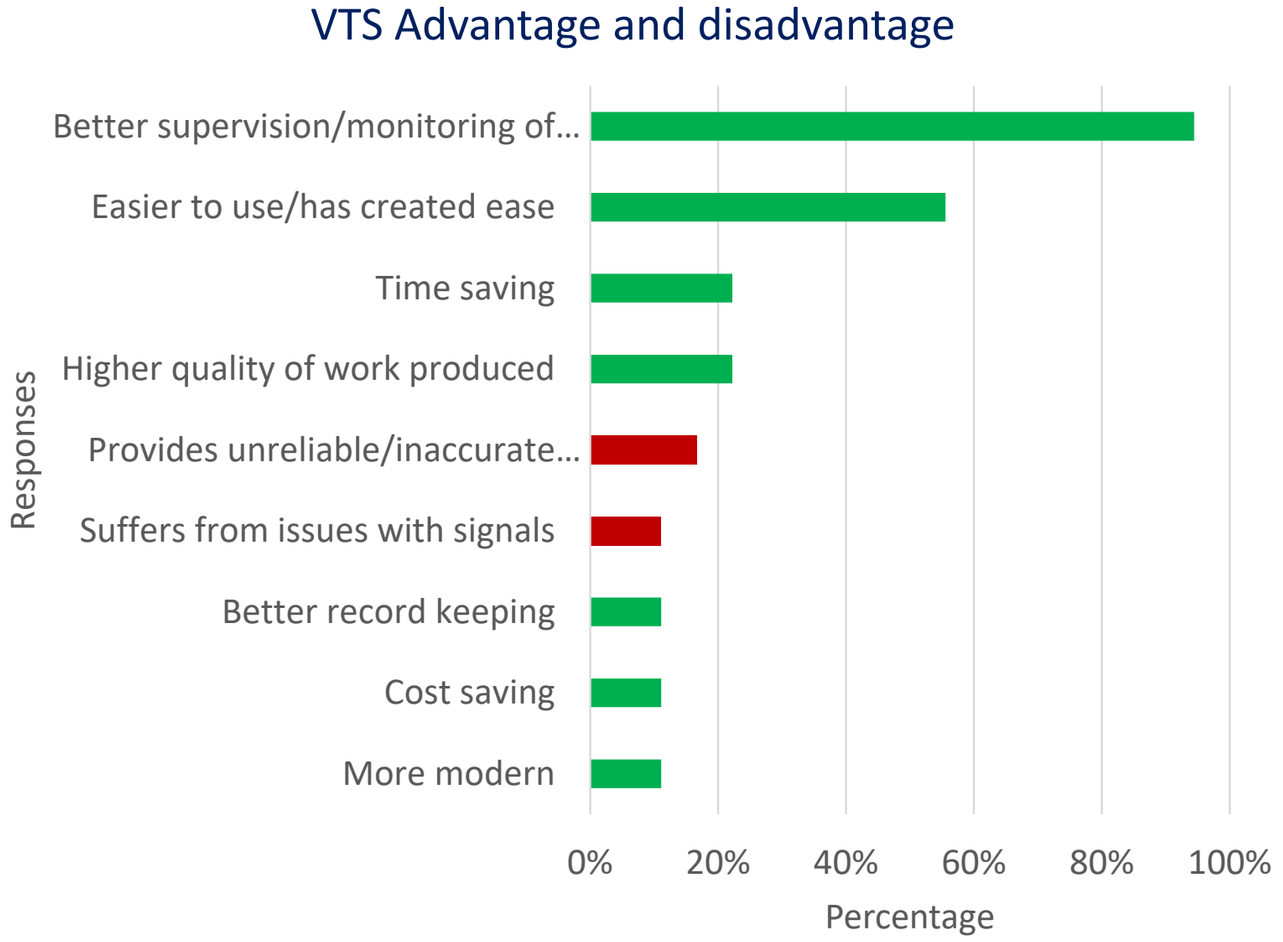
22% respondents said there was no proper system in place before VTS

Preference of VTS over other Monitoring Mechanisms (n=18)



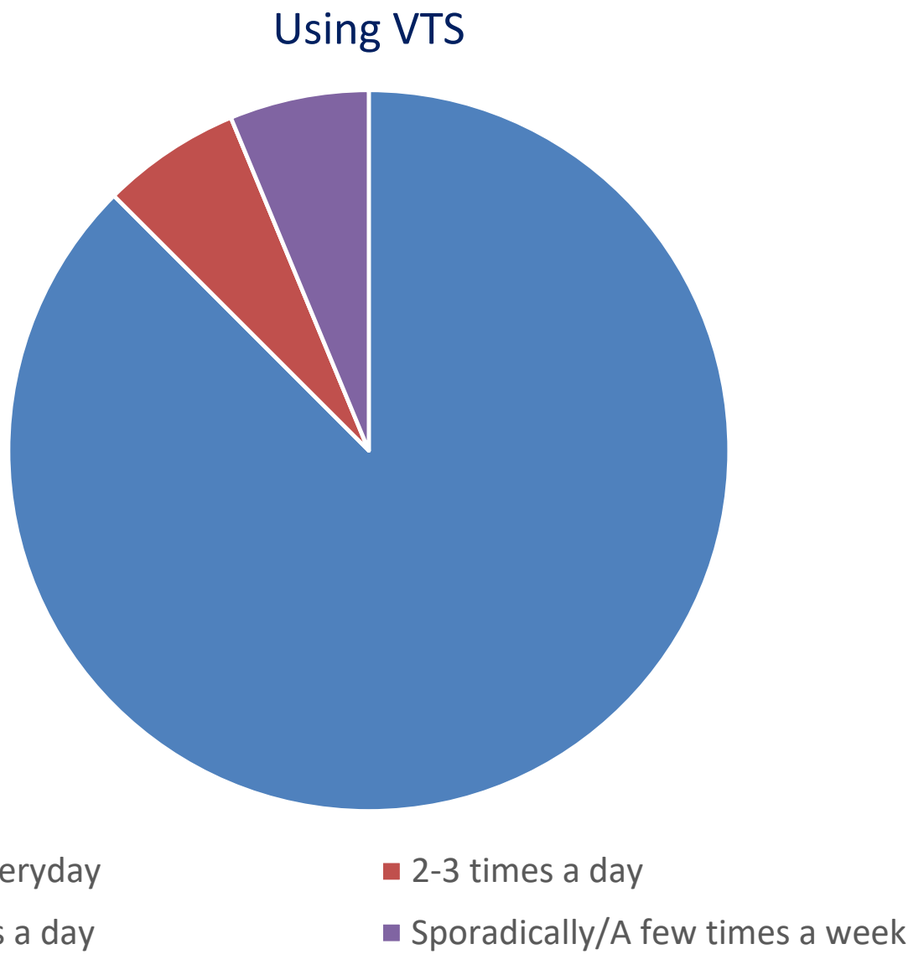
89% Respondent said they prefer VTS to the old system they used

Advantages of VTS compared to other Monitoring Mechanisms (n=18)



94% of respondents said they found VTS to be better for monitoring of field workers

Usage of Vaccinator Tracking System at District level (n=18)



78% said they use the system to monitor staff, on average, once a day while 11% said they used it 2-3 times a day and 11% said their usage was a few times a week.

Kiran Sitaras for Immunization

Mobilizing Adolescent Girls to Improve Immunization Coverage and Timeliness

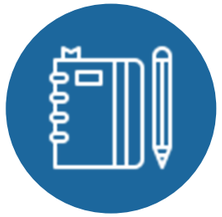
Background and Objectives

Background

1.4 million* children in Pakistan are zero-dose** and under-immunized

Demand and supply-side factors can explain endemic pockets of low immunization coverage: **Inaccessibility** of outsiders to closely knit societies, Caregivers **lack knowledge, information and motivation**, **Weak linkages** between community and health system

Objectives



Develop, pilot & conduct the **Adolescent Health & Leadership Program**

Evaluate the feasibility of KS community mobilization in identifying **zero-dose** and **under-immunized children** under 2-years of age

Validate KS's ability to accurately identify **zero-dose** and **under-immunized children** through follow-up verification surveys

*Source: WHO/UNICEF Estimates of National Immunization Coverage, 2019
**Never-immunized

Program Overview of Kiran Sitaras (KSs) for Immunization

4. Program team enters data collected by KSs

3. KSs conduct community mobilization and screen < 2 years children

2. Teachers train KSs on leadership skills & health directives

1. Program team trains teachers

5. Field staff conducts follow-up surveys to verify the immunization statuses identified by KSs

6. Program team analyzes the accuracy of the collected data

7. 2nd wave of community mobilization to invite children to receive vaccination

8. Program team organizes mobile immunization camps in the targeted communities

Skills Developed by Kiran Sitaras (KSs) for Immunization

Communication Skills

Leadership

Community Mobilization

Self Awareness

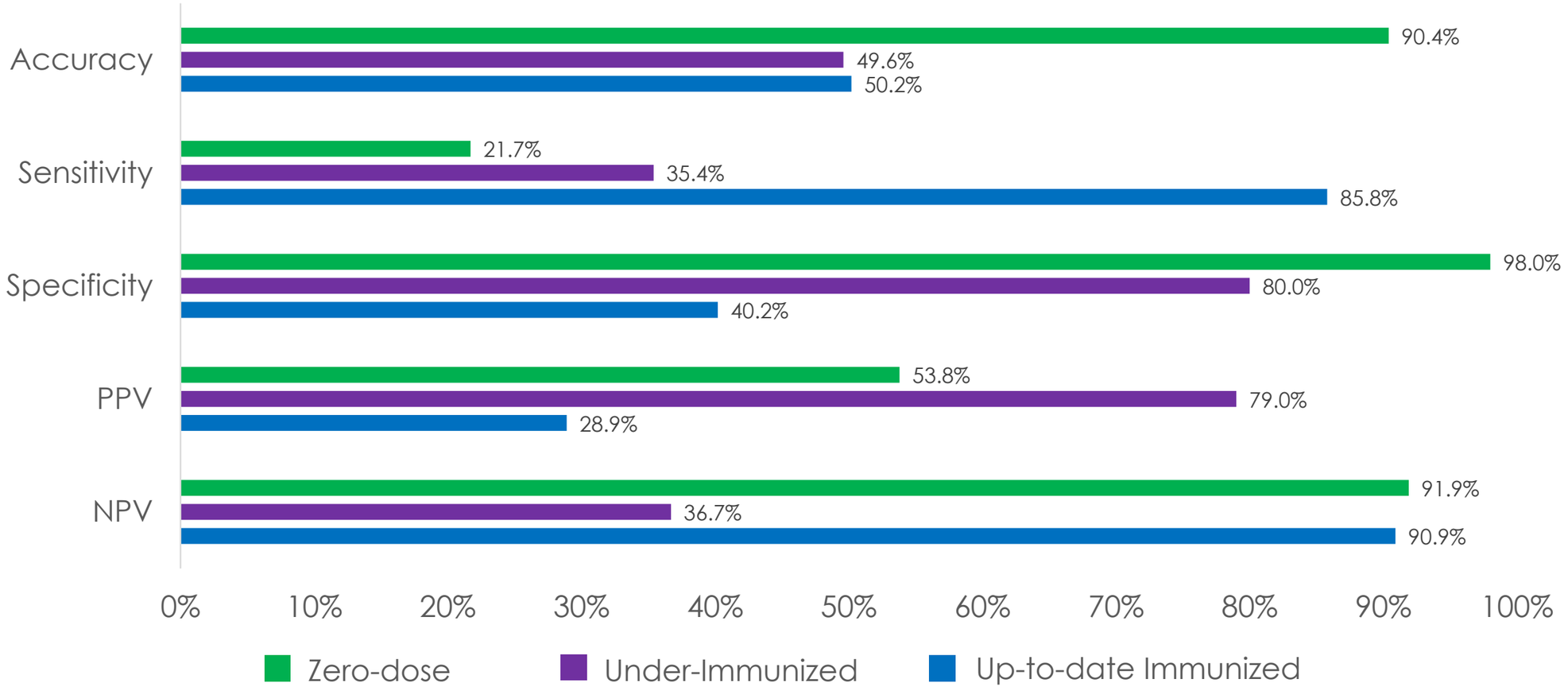
Health
(Immunizations, Tuberculosis, Mensural Hygiene, Human papillomavirus)

Empowerment

Evaluation of Immunization Statuses identified by Kiran Sitaras through follow-up verification surveys (n=1,628*) (May 3, 2020-Dec 21, 2020)

591 KSs screened **10,330 households** and identified **3,295** children**

KSs identified **7% zero-dose** children and **27% under-immunized** children



*Excludes cases where at least one of the vaccination dates was missing
**Missing immunization status for 26 children

Preliminary comparison of antigen-wise coverage at 12 months among 12-23 months old children in the 5 UCs where Kiran Sitaras surveyed households in Karachi, Pakistan

	All Children Living in the 5 UCs*			Children screened by KSs			
	Due	Given	Proportion Received (a)	Due	Given	Proportion Received (b)	Difference (b-a)
	n	n	%	n	n	%	%
BCG	42,420	41,760	98.4	688	652	94.8	-3.7
OPV-0	25,331	25,321	100.0	478	474	99.2	-0.8
Penta-1	51,205	45,029	87.9	520	503	96.7	8.8
OPV-1	51,224	45,126	88.1	473	465	98.3	10.2
Rota-1	47,164	37,863	80.3	356	355	99.7	19.4
PCV-1	48,223	42,045	87.2	462	461	99.8	12.6
Penta-2	45,765	37,182	81.2	491	475	96.7	15.5
OPV-2	45,847	37,210	81.2	451	442	98.0	16.8
Rota-2	39,907	31,467	78.9	326	324	99.4	20.5
PCV-2	44,445	35,866	80.7	439	436	99.3	18.6
Penta-3	38,387	32,035	83.5	449	440	98.0	14.5
OPV-3	38,727	32,084	82.8	325	315	96.9	14.1
PCV-3	38,654	31,896	82.5	409	404	98.8	16.3
IPV	52,413	35,765	68.2	423	418	98.8	30.6
Measles-1	60,891	38,709	63.6	546	466	85.3	21.8
Measles-2	39,206	22,731	58.0	426	360	84.5	26.5
FIC_M1	20,491	19,171	93.6	170	167	98.2	4.7
FIC_M2	31,244	20,496	65.6	271	208	76.8	11.2

14.5% increase in coverage for penta-3

>20% increase in rota-2, IPV, measles-1 & 2 coverage rates

*Data Nagar-11, Ghaziabad-6, Gujro-04, Hanifabad-3, Saeedabad-5

Takeaways

The Adolescent Health and Leadership Program (AHLP) is a **feasible and acceptable intervention for identifying and linking zero-dose and under-immunized children** to immunization services in under-served communities

A community-based youth engagement immunization initiative can cause and **improvement in caregivers' knowledge** on immunization and an **increase in the uptake of immunization services** thus leading to the eventual **reduction in prevalence of vaccine preventable diseases**

As a low-cost intervention, the AHLP empowers young adolescent girls to not only **promote immunization equity and coverage in their communities today but also champion this cause in their capacity as tomorrow's mothers**

Cold Chain Equipment Sentinel Surveillance

Piloting sentinel surveillance with the government, EPI and local partners to establish a sustainable monitoring system for CCE performance in Pakistan & Bangladesh

Maternal & Child Health
mch@ird.global

Problem Statement and Objective

Lack of a systematic Post Market Monitoring (PMM) mechanism for Cold Chain Equipment (CCE) causes poor design or performance to go unnoticed and unaddressed, threatening vaccine potency

- Develop a centralized, systematic sentinel surveillance system to address deficiencies in cold chain equipment monitoring

- Equip the national Expanded Programme on Immunization (EPI) with a comprehensive cold chain equipment monitoring framework that enables rapid identification and diagnosis of equipment failure

- Protect vaccine potency by ensuring a properly functioning cold chain system

Methodology

- IRD Implemented a centralized, systematic sentinel surveillance system to address deficiencies in CCE monitoring
- Selected 93 sentinel sites in Pakistan and 20 in Bangladesh on the basis of accessibility, weather, and power-availability
- Collected temperature data of 153 Ice-lined Refrigerators (ILRs) in Pakistan and 53 in Bangladesh using Fridge-Tag
- Reported an ILR non-functional if Fridge-Tag produced ≥5 heat alarms (continuous temperature excursion above +8°C for ≥10 hours) or ≥1 freeze alarm (continuous temperature excursion below -0.5°C for ≥1 hour) in a month
- Conducted root-cause-of-failure-analysis (RCFA) of non-functional ILRs and categorized cause of failure as poor equipment-performance, human error, or external factors

Cumulative Temperature Alarms and Functionality Status of Operational ILRs & SDDs by Manufacturer (N = 153) – Pakistan
(Feb 26, 2020 – Mar 31, 2021)

Manufacturer	ILRs/SDDs with fridge tag data collected		Heat alarms				At least 1 Freeze alarm		Non-functional ILRs/SDDs	
			At least Five (10hrs)		At least One (48hrs)					
	N*	%	n	%	n	%	N	%	n	%
B Medical System	32	21	3	9	6	19	3	9	9	28
Haier	44	29	13	30	10	23	2	5	15	34
Vestfrost	73	48	7	10	11	15	10	14	20	27
Dulas	4	2	-	-	-	-	-	-	-	-
Electrolux	-	-	-	-	-	-	-	-	-	-
Total	153	100	23	**15**	27	**18**	14	**10**	44	**29**

*N shows unique ILRs/SDDs surveilled with Fridge Tag data collected since the beginning of the study

Cumulative temperature alarms and functionality status of operational ILRs by manufacturer (N = 53) - Bangladesh

(April 1 – Feb 28, 2021)

Manufacturer	ILRs with fridge tag data collected		Heat alarms				At least 1 Freeze alarm		Non-functional ILRs	
			At least Five (10hrs)		At least One (48hrs)					
	N*	%	n	%	n	%	n	%	n	%
Vestfrost	4	8	-	-	-	-	-	-	-	-
B Medical System	7	13	-	-	-	-	-	-	-	-
Electrolux	5	9	-	-	1	20	1	20	2	40
Dometic	37	70	-	-	4	11	2	5	6	16
Total	53	100	-	**-**	5	**9**	3	**6**	8	**15**

*N shows unique ILRs/SDDs surveilled with Fridge Tag data collected since the beginning of the study

Key Takeaways

- Our results demonstrate presence of sub-optimal equipment performance both in Bangladesh and Pakistan

- Specific CCE components, including the thermostat and sensor, need design improvement. Furthermore, there is a need for proactive preventive action, including provision of alternate sources of power and regular cleaning

- Overall, a systematic CCE monitoring mechanism that enables rapid identification and diagnosis of equipment failure can help maintain an effective cold chain

Mobile Immunization Vans

Expanding provision of vaccine services in under-served and inaccessible areas to improve immunization coverage

Maternal & Child Health
mch@ird.global

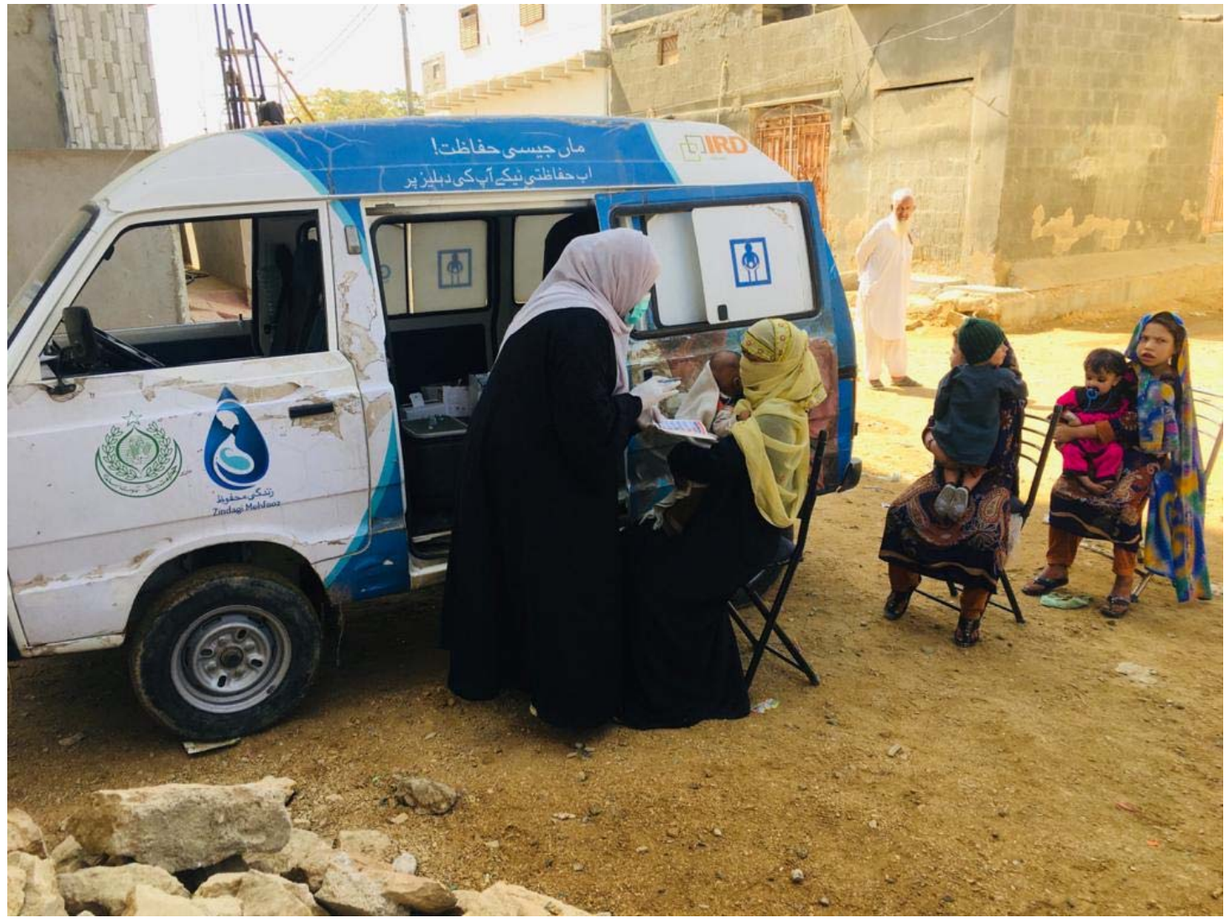
Problem Statement and Objective

Distantly located immunization centers coupled with unavailability of affordable and reliable means of transport is one of the major barrier preventing access to immunization in Pakistan, including Karachi

Expand provision of vaccine services in slums and under-served areas in Karachi including the **Super High Risk Union Councils**

Vaccinate **under-immunized children** who have not received all the age-appropriate vaccines and are likely to default on their schedule

Enroll zero-dose children in the government's Electronic Immunization Registry



Methodology

Vans get deployed daily at 8am

Vans reach EPI center to pick up vaccines and vaccinators

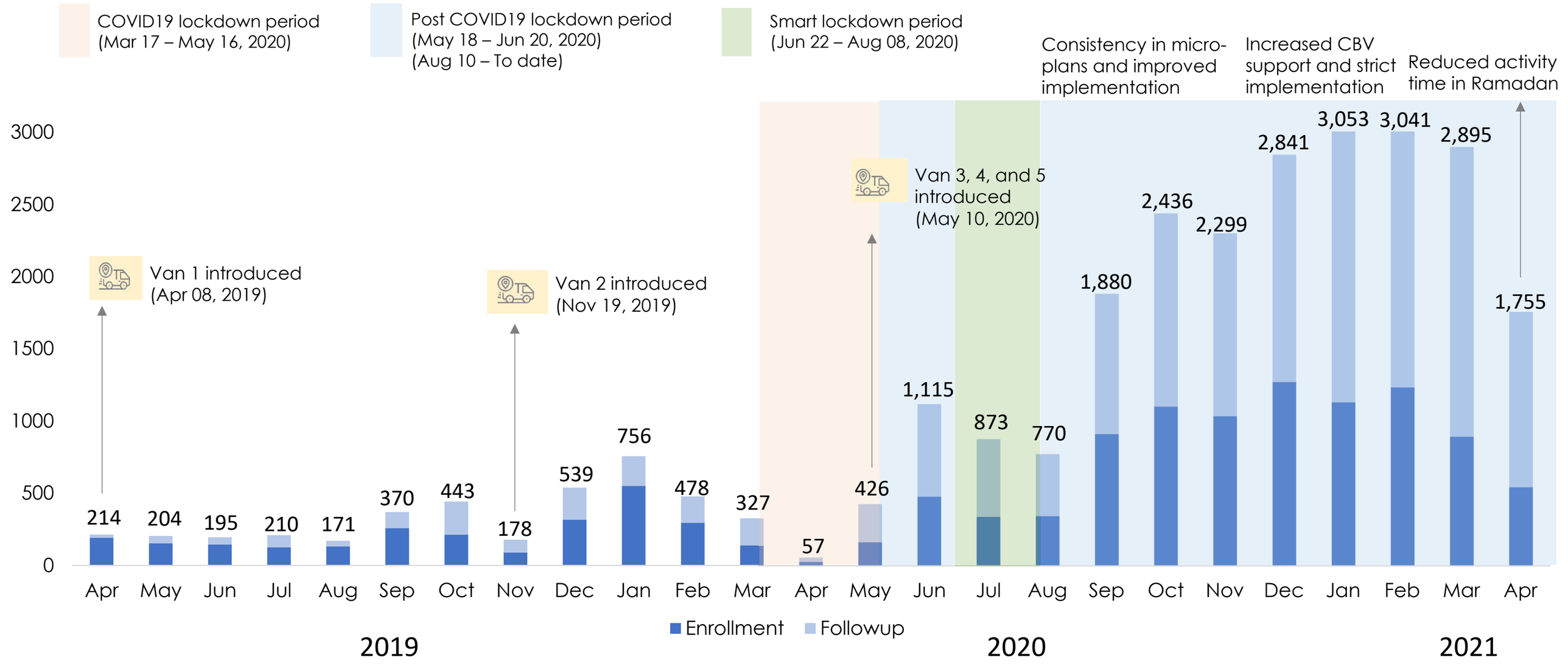
Vans arrive at sites as per micro plans developed in coordination with EPI

Announcements are made by field workers via loudspeaker to mobilize children

Coverage is supported by LHW's and CHW's to mobilize community

Vaccines are administered by the vaccinators and data is entered in Government-EIR

Monthly Trend Of Total Immunization Visits Through Mobile Vans (Apr 08, 2019 – Apr 30, 2021)

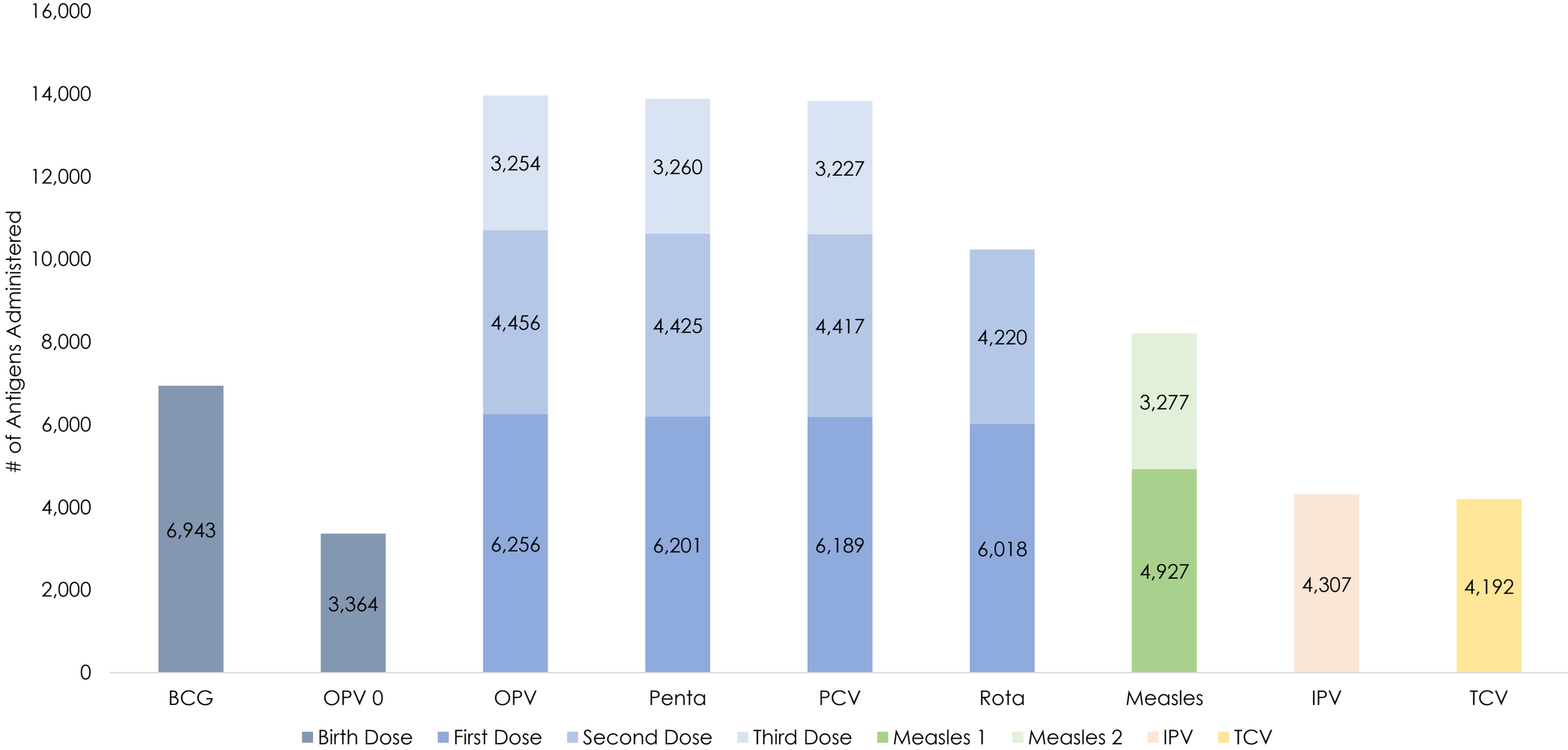


Total: 27,526 | Enrollments: 44% | Follow-ups: 56%

* Follow-up children can be repeated in more than one month

Antigens Administered by Doses through Mobile Vans in Karachi (n=78,933)

From Apr 8, 2019 – Apr 30, 2021



Key Takeaways

1. Provision of vaccine services in the under-served areas through mobile vans encourage caregivers to get their children vaccinated who otherwise may not get access to immunization services

2. Expanding convenient access to vaccine administration is a cornerstone for achieving universal immunization coverage and equity, particularly in areas where outbreaks of vaccine- preventable diseases are still common

3. Engagement of mobile vans for the purpose of immunization is an affordable and reliable approach to target zero-dose children residing in remote and inaccessible areas

IRD
Interactive Research & Development

CENTER FOR GLOBAL HEALTH DELIVERY
HARVARD MEDICAL SCHOOL

Immunization Reminder & Tracker Bracelets

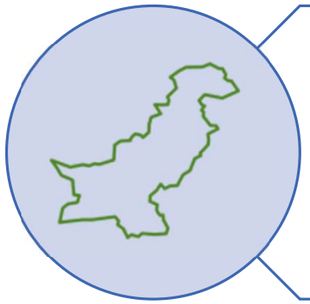
Improving immunization coverage and timeliness by using simple silicon bracelets designed especially for children under 2 years of age

Maternal & Child Health
mch@ird.global

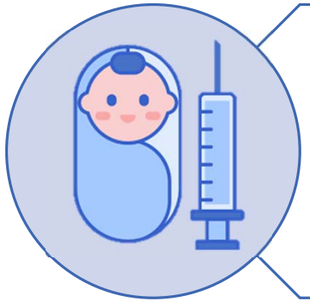
Background

Problems

20 million children are deprived of routine vaccines, globally

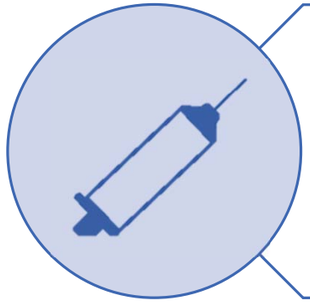


50% of children in Pakistan do not receive timely vaccinations



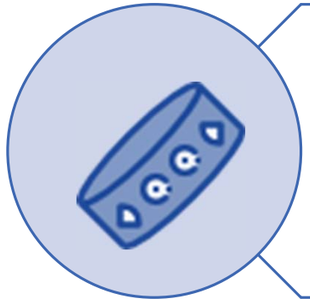
Innovative methods for parental reminders are required to improve immunization coverage

Objectives



Overall Aim:

Improve routine immunization coverage and timeliness in Pakistan



Objective 1:

Adapt Alma Sana bracelets for use in Pakistan

Objective 2:

Evaluate impact of reminder bracelets on coverage and timeliness of Penta 3 and Measles 1 vaccine

Methods

Study Sites

4 EPI Centers in Landhi, Town Karachi

Participants

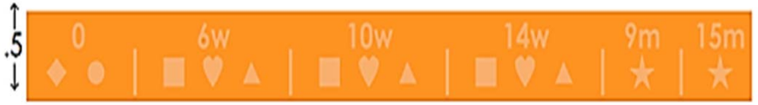
1,446 infants enrolled in 3 different intervention Arms

Randomization

Intervention Arm A
482
Intervention Arm B
482
Control Arm
482

Intervention

Intervention Arm A:
Alma Sana Bracelet



Intervention Arm B:
Simple Silicon Bracelet

Intervention Arm C:
Only EPI Card

Outcome

Impact of bracelet for vaccine reminder & Timeliness

Child who has received:

- One dose of BCG
- 3 doses of each OPV, Pentavalent & PCV immunizations
- 1 dose of Measles vaccine

Results

Up to date coverage by antigen and allocation group for study participants due* for each vaccine

	Alma Sana Bracelet n=482		Simple Silicon Bracelet n=482		Control n=481	
Enrollments at:	n	%	n	%	n	%
At BCG	217	45.0	200	41.5	216	44.9
At Penta 1	265	55.0	282	58.5	265	55.1
Penta 1**	208	95.8	183	91.5	202	93.5
Penta 2	446	92.5	435	90.2	432	89.8
Penta 3	412	85.4	412	85.4	403	83.7
Measles 1***	348	72.5	340	70.5	332	69.1

*Number of children due for a particular vaccine is calculated by determining the number of children who have reached the minimum recommended age in days for receiving the vaccine. The minimum recommended age is as follows: Penta1 (42 days), Penta2 (70 days), Penta3 (98 days), Measles 1 (274 days).

**For infants enrolled at BCG

*** Denominator of children due for measles 1 till date – **A-480, B-482, C-480, after excluding 3 children who passed away**

Key Takeaways

1. Tracker bracelets could be used as low-cost reminders for childhood vaccines
2. Tracker bracelets provides optimum benefits to caregivers who could not read or interpret written messages

IRD Interactive Research & Development

HEALTH DEPARTMENT GOVERNMENT OF SINDH

SCHOOL EDUCATION AND LITERACY DEPARTMENT GOVERNMENT OF SINDH

NUS National University of Singapore

Adolescent girls' perspectives on Human Papillomavirus Vaccination

Background

Globally, cervical cancer is **4th** most common cancer in **females** and the **7th** most common cancer **overall**

In Pakistan, cervical cancer is the **3rd** most common cancer among **females**

No formal program for adolescents vaccinations including HPV, in Pakistan

Objectives

1. Assess knowledge and attitude of adolescence girls towards cervical cancer, HPV infection, and HPV vaccination

2. Investigate adolescent girls' perceived informational needs with regards to cervical cancer prevention and HPV vaccination

3. Identify factors that influence HPV vaccine-related decision-making amongst adolescent girls

Methodology

Study Design

Qualitative Exploratory

Study Site

District West, Karachi, Pakistan

Study Participants

Adolescence girls

Inclusion criteria

1. Unmarried
2. Age between 16-19 years

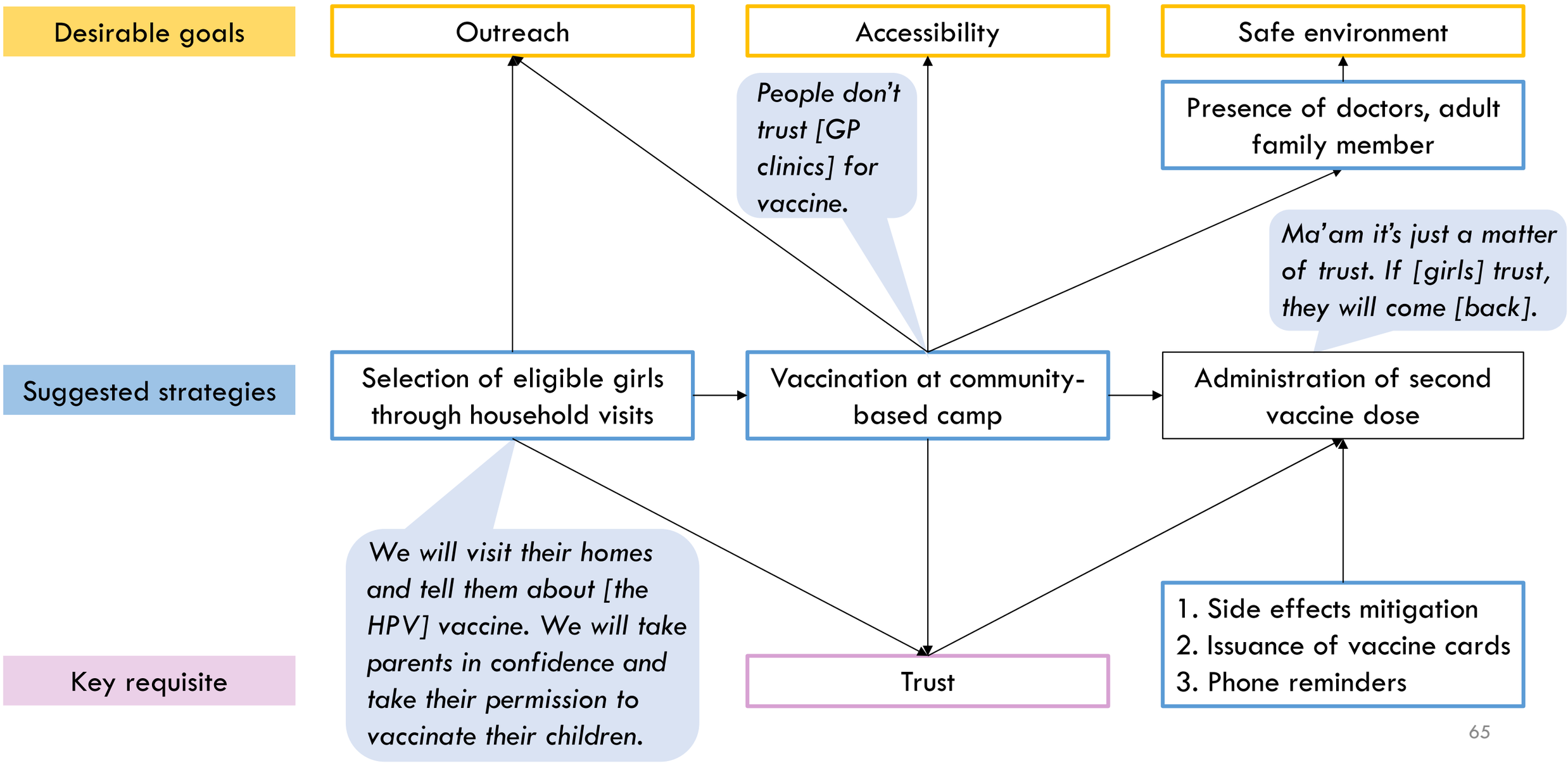
Study Methods

4 Focus Group Discussions (12 participants each)

Analysis

Thematic Analysis

Results


Desirable goals
Outreach
Accessibility
Safe environment
People don't trust [GP clinics] for vaccine.
Presence of doctors, adult family member
Ma'am it's just a matter of trust. If [girls] trust, they will come [back].
Suggested strategies
Selection of eligible girls through household visits
Vaccination at community-based camp
Administration of second vaccine dose
We will visit their homes and tell them about [the HPV] vaccine. We will take parents in confidence and take their permission to vaccinate their children.
Key requisite
Trust
1. Side effects mitigation
2. Issuance of vaccine cards
3. Phone reminders

Key Takeaways

1. Adolescent girls are key stakeholders in designing HPV vaccination programs

2. Inclusion of adolescent girls in community-based HPV vaccination programs could improve vaccine uptake and reduce vaccine hesitancy

Sehat Savaris (Health-Cars) for Immunizations

Introducing immunization carpool services to facilitate immunization of children under 2 years

Maternal & Child Health
mch@ird.global

Background

Low immunization rates (66%)

>60% rural population

Distantly located center

Limited or no transport facilities

Socio-cultural barriers for women to travel alone

Objectives

To evaluate feasibility of establishing an immunization carpool model

To assess uptake and performance of immunization cars by gauging end-user utilization and feedback

To estimate the difference in immunization coverage after the Intervention

Methodology

Feasibility Trial

Design

Shikarpur

Site

4

Sub-districts

4

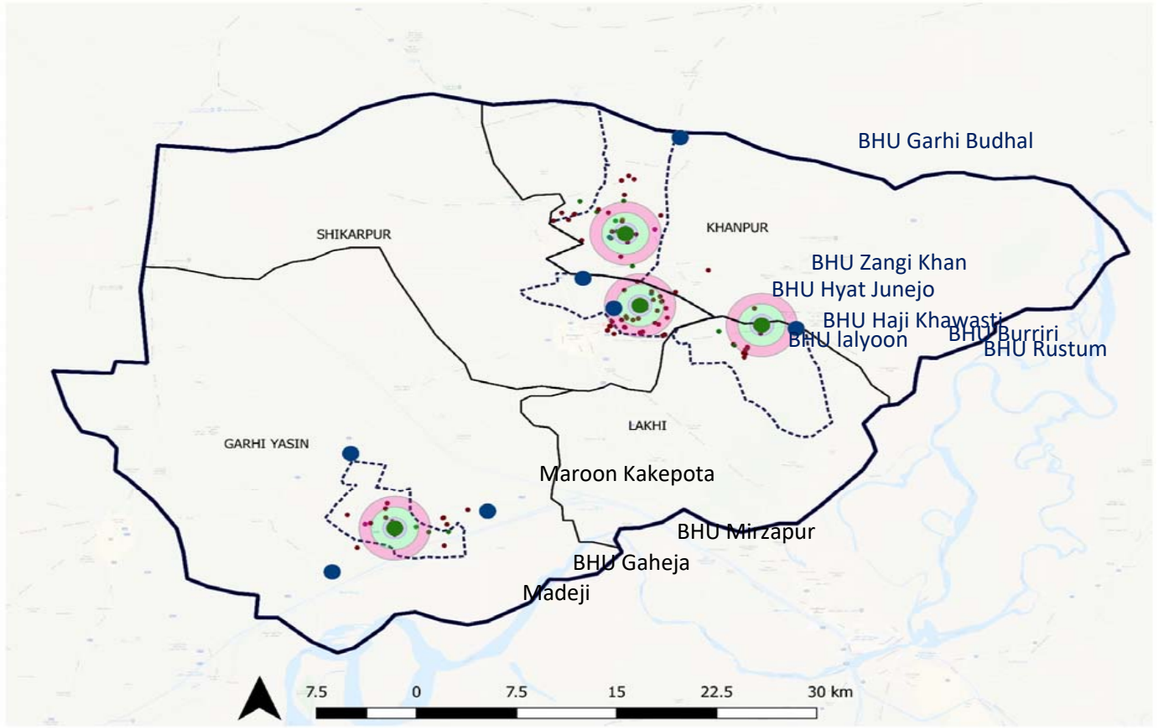
Low coverage Immunization Clinics

98

Catchment Sites

<2 years

Participants



Interventions

Free transport service for mother-child pairs of children aged under 2 years

Educational sessions for the community

Results

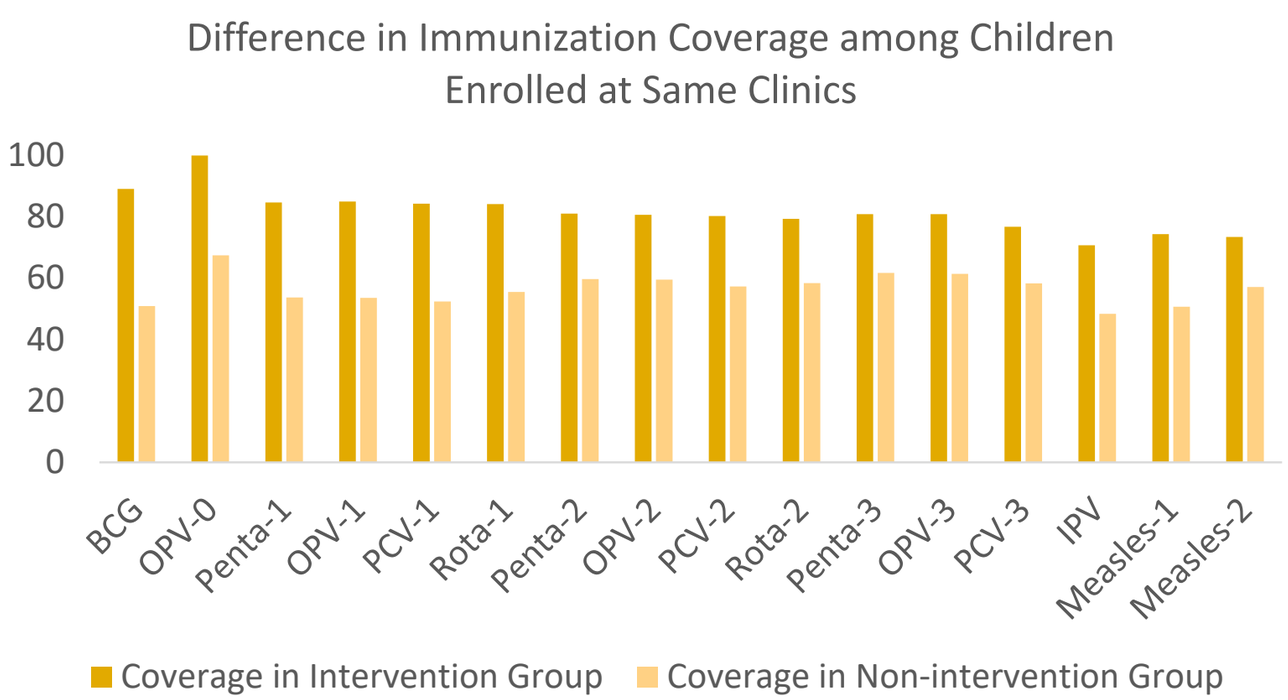
2,520
Round Trips

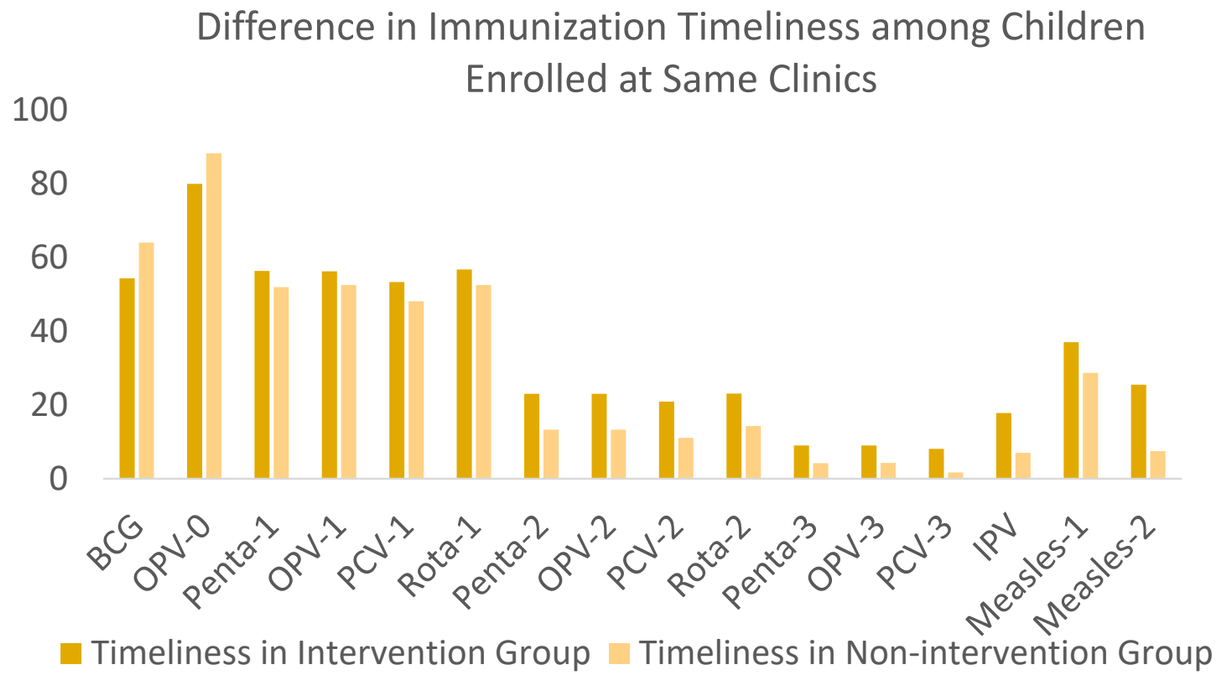
4,691
Immunization Visits

2,391
Children Transported

1,100
Educational Sessions

3,521
Session Participants





Takeaways

1. Immunization carpool model can be established conveniently in rural settings using local transport options

2. The model is well accepted and utilized by female caregivers in the community

3. Transport model can successfully improve immunization coverage and timeliness by women empowerment & reducing accessibility barriers

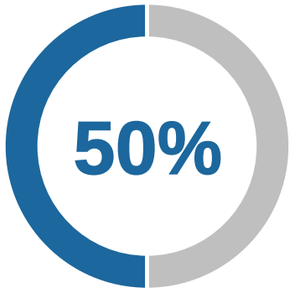
Immunization Decision Support System (iDSS)

Development and Validation of DSS-Application Programing Interface (API) for **automatic forecasting of age-appropriate vaccine schedule for** <2 years children

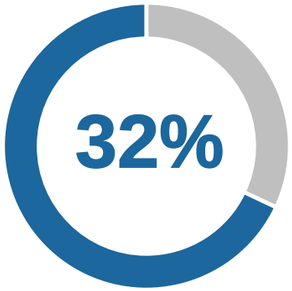
Maternal & Child Health
mch@ird.global

Background

Low Middle Income Countries (LMICs) disproportionately suffer from low immunization coverage.



Children in Pakistan & Bangladesh do not receive timely vaccination



Prevalence of missed opportunities for vaccination among children in LMICs

Missed Opportunities for Immunization (MOI) created by:

Lack of refresher trainings for vaccinators
(Salihi et al, 2019)

Complex EPI schedules
(Butt et al, 2020)

Manual construction of EPI schedules
(Samia et al, 2016)

Over-burdened vaccinators
(Salihi et al, 2019)

Objectives

1. To develop a robust iDSS for calculating age-appropriate vaccine schedule as per WHO recommended immunization schedule for <2 years children
2. To implement and validate the diagnostic accuracy of the iDSS in scheduling catch-up immunization schedules for <2 years children
3. To generate rigorous end-user feedback on the feasibility, utility and functionality of iDSS

Methods

STUDY SITES

Pakistan and Bangladesh
6 immunization Facilities
July 2019 to April 2020

PARTICIPANTS

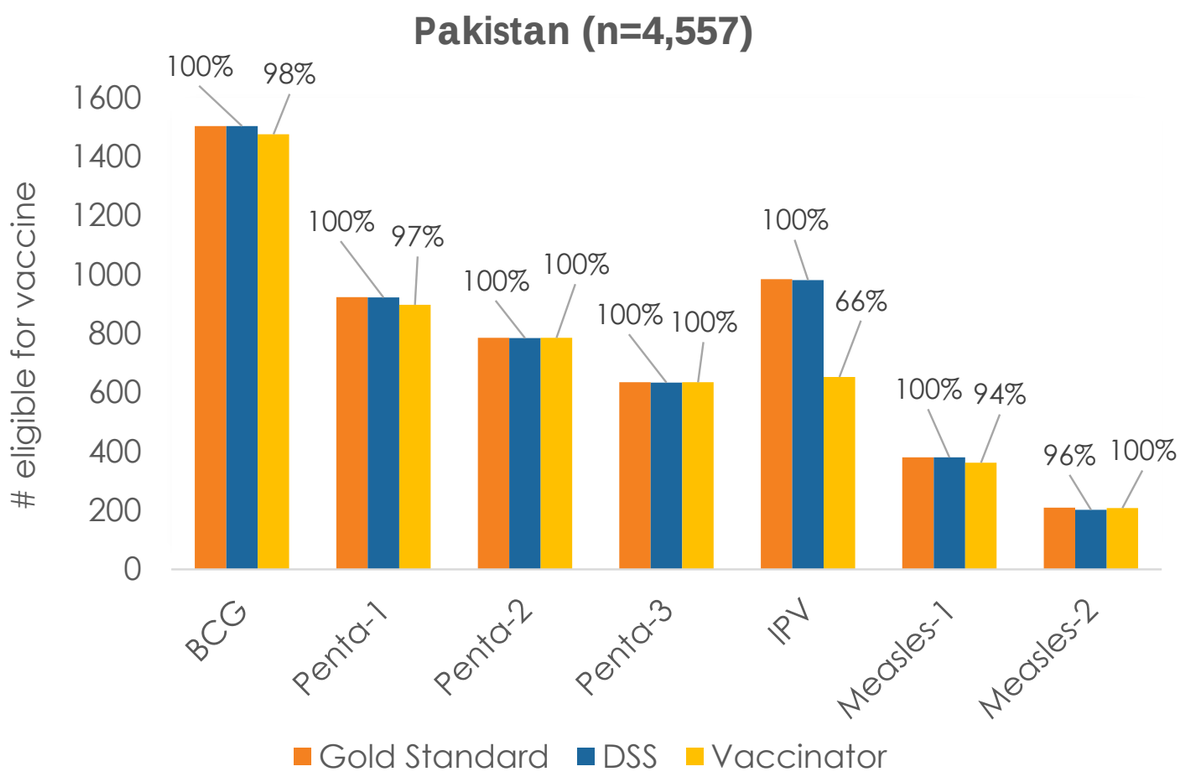
Total **6,241** immunization visits recorded
Pakistan – **4,557** visits
Bangladesh – **1,684** visits

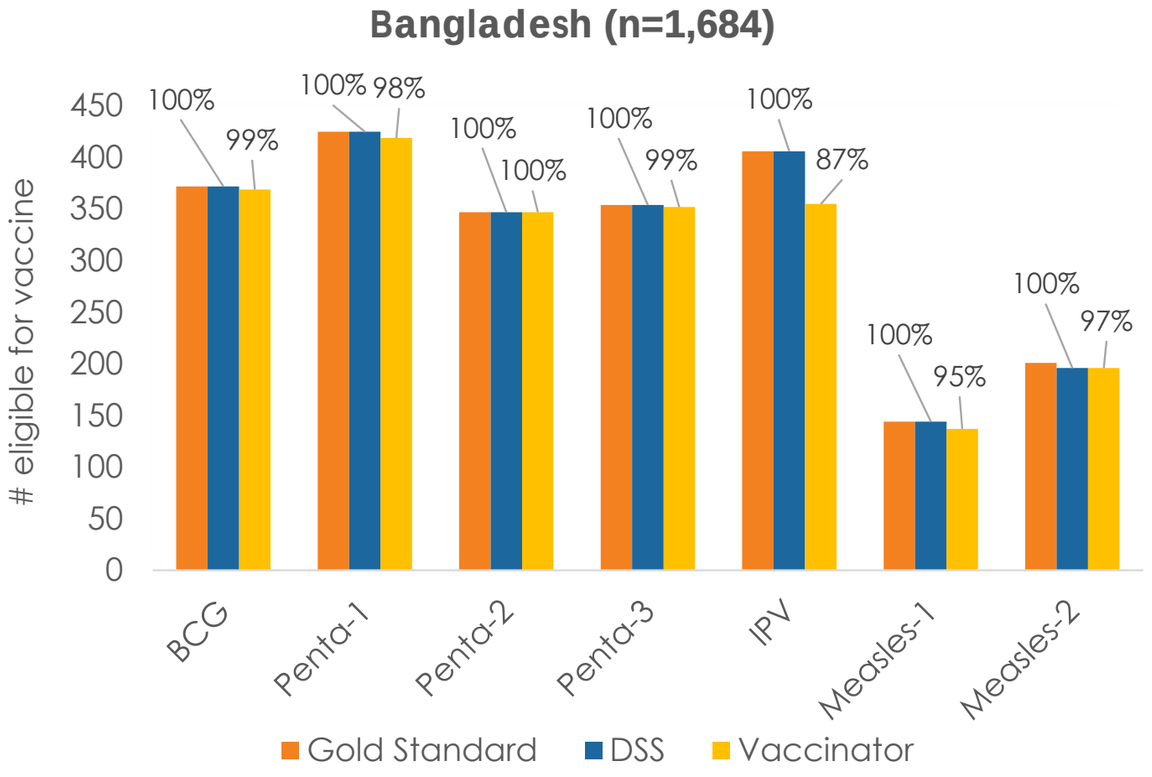
DATA COLLECTIONS
& ANALYSYS

Using date of birth and past immunization history, iDSS formulates individualized schedules displayed on a color coded Interface

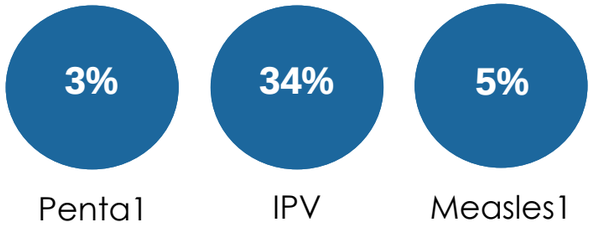
Comparison of iDSS outputs with gold standard (immunization expert)

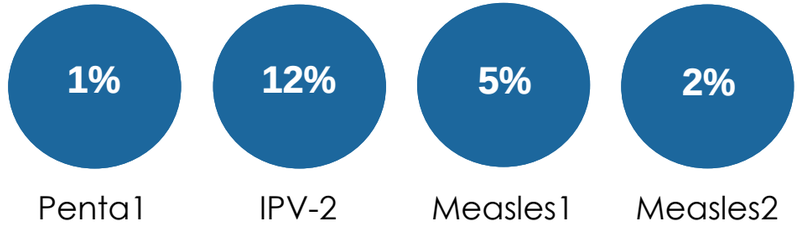
Results: Comparison of Vaccine Schedule Constructed by iDDS & Vaccinator with the Gold Standard





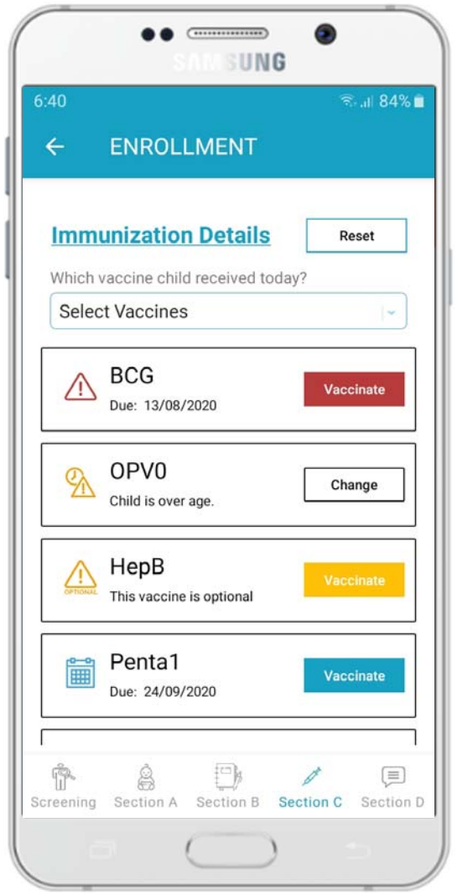
MOI that could potentially be prevented through iDDS:





iDDS scheduled individual immunization doses with a **sensitivity of 99-100%** and **specificity of 98-100%**

Key Takeaways



- Embedded logic & process algorithms as per WHO schedule
- Algorithm based on child's vaccination history, date of birth, and timing and spacing of doses
- Color coded scheme to support low literacy vaccinators
- Search functionality to retrieve child record
- Interoperable
- Offline mode
- User-friendly
- Easily modifiable
- Fast

eVVM 2D Barcode Scanning To Track Vaccine Vials

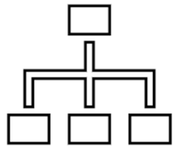
Piloting eVVM 2D barcodes on vaccine vials to link vials to immunized child: A digital solution for accurate management of vaccine stocks

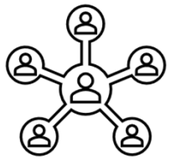
Online Meeting with Temptime: Apr 23, 2021

Maternal & Child Health
mch@ird.global

Background

In Pakistan, the current vaccine stock and supply management system has severe limitations. Data reported is untimely and inaccurate, stock and storage capacity indicators are unreliable, mainly due to the reliance on vaccinator self-reporting for consumption data.





1 Develop:

- Develop an integrated ZM EIR tool for 2D barcode vaccine vials
- Develop and test survey tool

2 Deploy:

- District level (1 management)
- 12 vaccinators/ fixed site and outreach
- Live tracking of process and bug fixes

3 Validate:

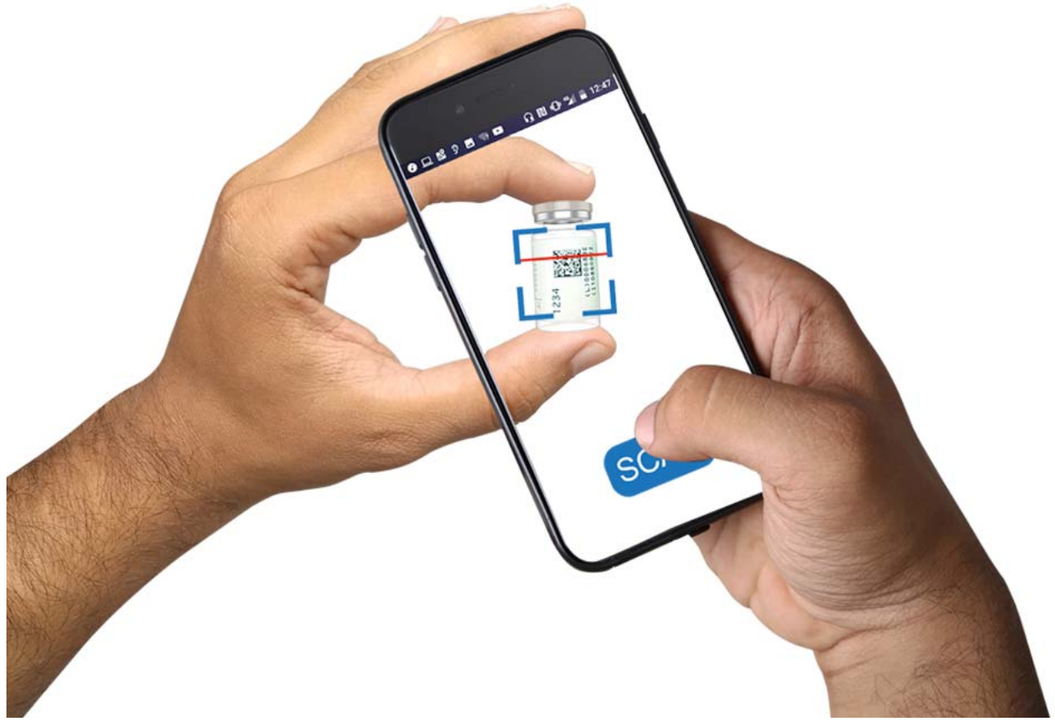
- Quantitative and qualitative data collection
- Data analysis

4 Disseminate:

- Dissemination event with all key stakeholders
- Publications in journals

Study Aim

To evaluate the feasibility and acceptance of using 2D barcodes to track vaccine vials from the district cold room/ storeroom to the immunized child in selected government EPI centres in Pakistan



Primary Objectives

Evaluating the feasibility and acceptance of scanning vaccine vials with 2D barcodes in a field setting at selected Government's EPI centres (fixed and outreach) in Sindh, Pakistan

Evaluating the hardware performance of existing android camera phones and Temptime provided add-on handheld scanners for successfully capturing bar codes on vials

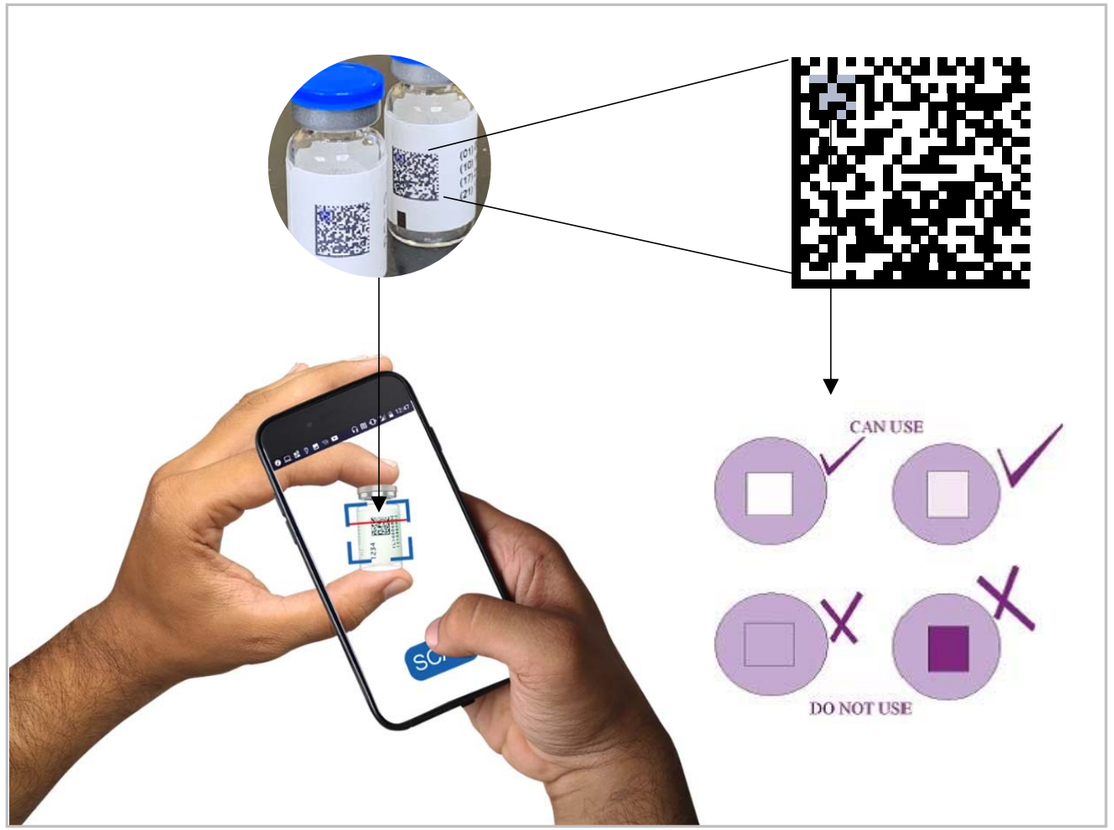
Secondary Objectives

Expand the capacity of Zindagi Mehfooz Electronic Immunization Registry (ZM-EIR) to capture 2D barcode information (product identity, batch, lot, serial number and expiry date) from vaccine vials, to the immunized child to establish "vial to child" linkages

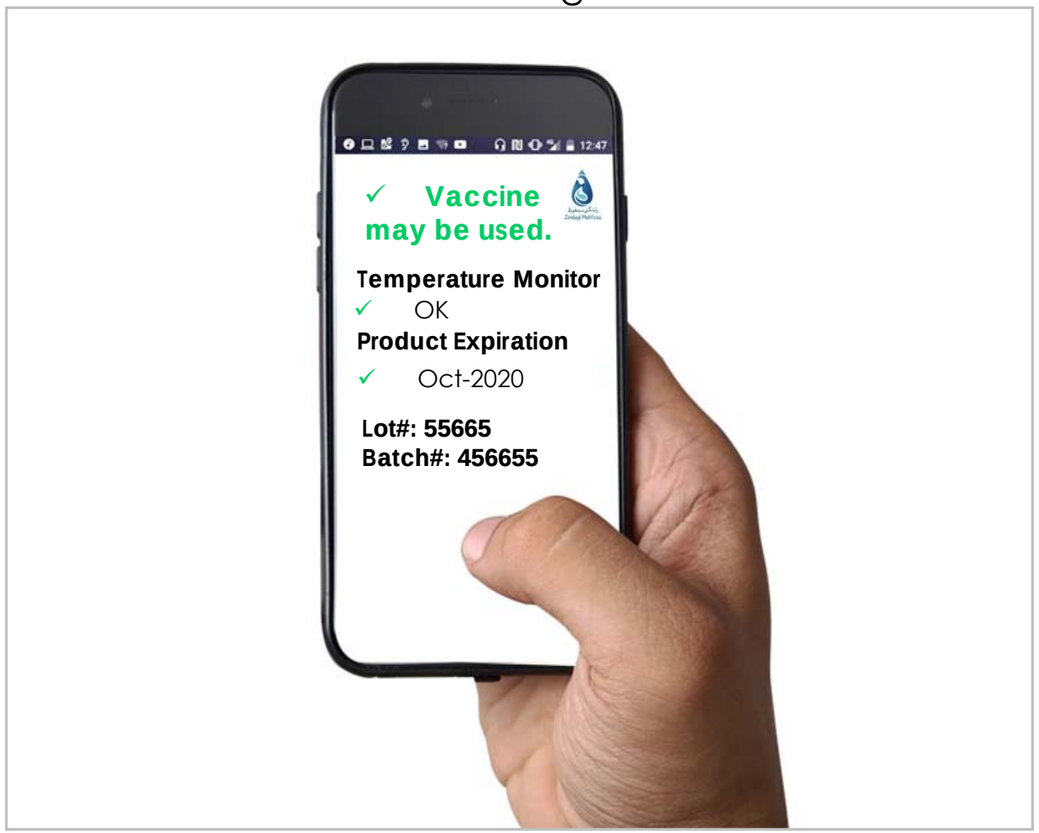
Assess the efficiency of reading VVM data embedded within the 2D barcode on vaccine vials

Stock Supply and Cold Chain Generating Accurate Vaccine Consumption Data And Vial-to-Child Linkage

Innovative 2D bar codes with eVVM



Automated Instant interpretation for vaccinator + EIR record linking vial-to-child



Vial to Child Link in ZM EIR

Leveraging existing digital technologies to merge supply-side barcoded vaccine vials with service-delivery-side barcoded immunization cards

Vaccine with 2D serialized barcode + eVVM

Real-time Child immunization in ZM EIR

Vial to child

EPI Rehnuma

کھیل کے ذریعے سیکھنے کا نیا انداز

Gamified Training for Vaccinators

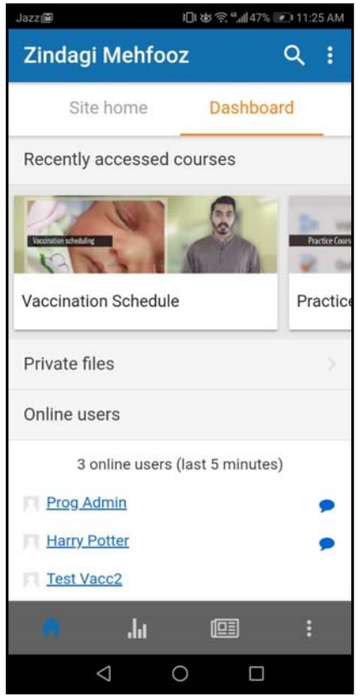
Low-cost, High impact, Readily scalable
solution for educational, interactive and engaging trainings
to improve vaccinator performance and motivation

The Challenge & Objectives

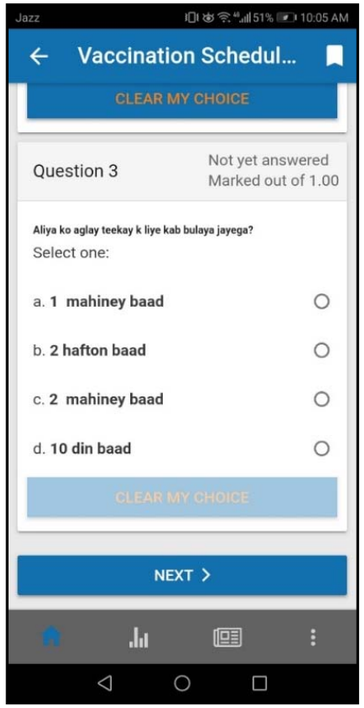
- Only 2808 vaccinators providing services for an annual birth cohort of 1.7 million children in Sindh
- Lack of standardised yet personalized delivery of training and refreshers on the job
- Logistical and individual barriers to enhanced skills development
- The project aims to leverage the availability of mobile technology among vaccinators to provide an engaging, flexible and up-to-date training experience in order to boost productivity, improve performance and ultimately enhance immunization outcomes for 3.2 million children under 2 years of age

Interactive, Game-based Trainings to Boost Vaccinator Performance

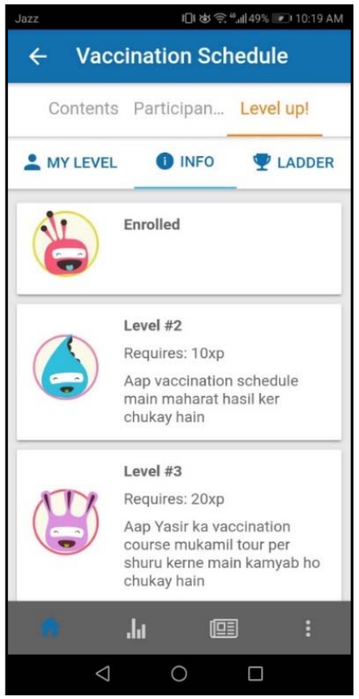
Through the ZM app, 4000 vaccinators across Sindh can access digital, game based learning modules to receive on-job training, access refresher courses and learn new information



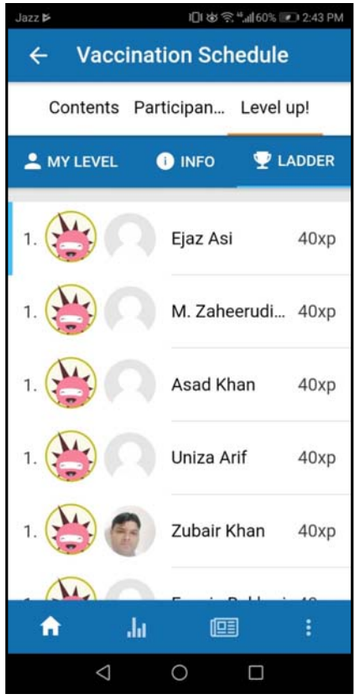
Story-based videos



Multiple choice questions for each chapter

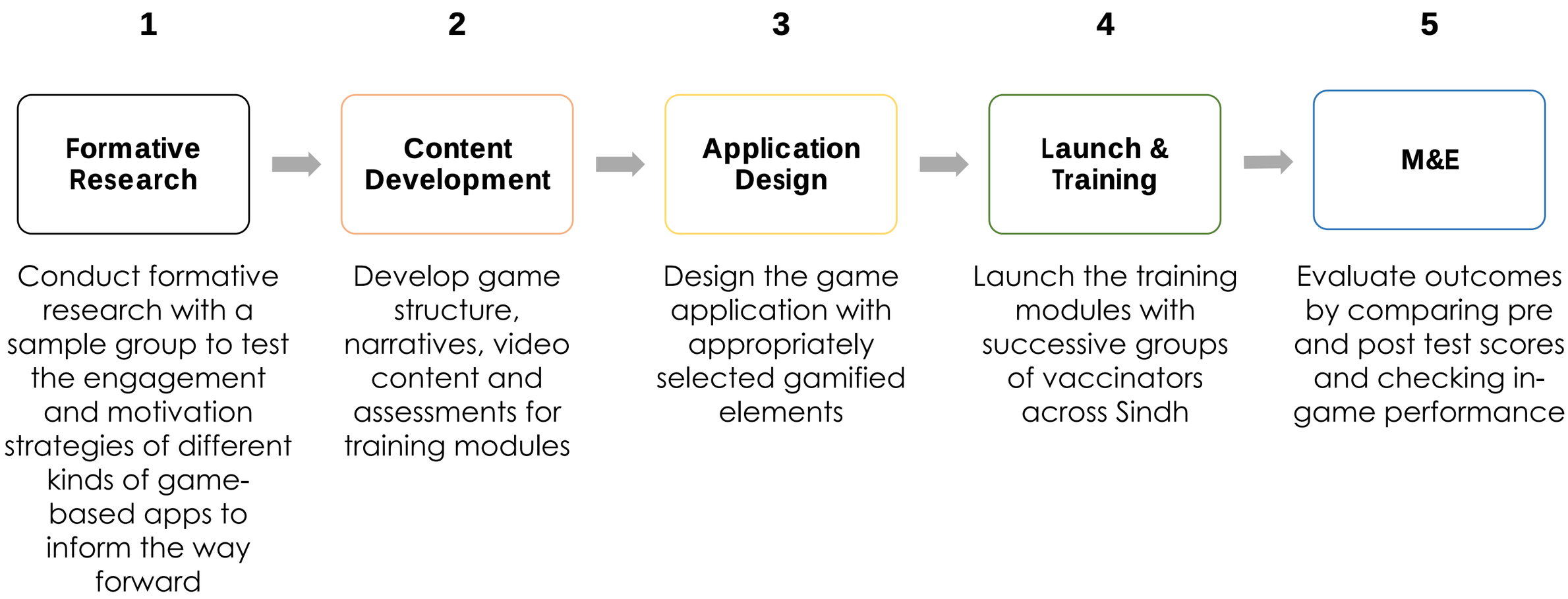


Friendly Competition/ Leaderboard



Peer to peer communication

Methodology



Progress to Date

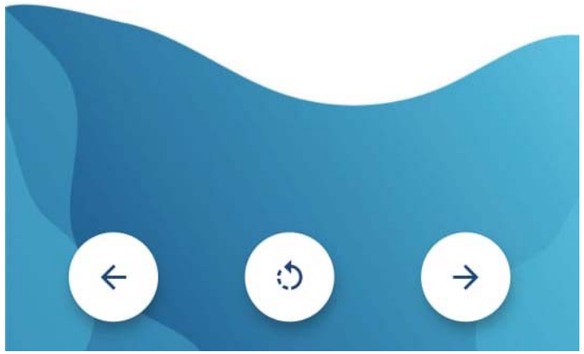
Trainings in 5/7 districts of Karachi have been completed

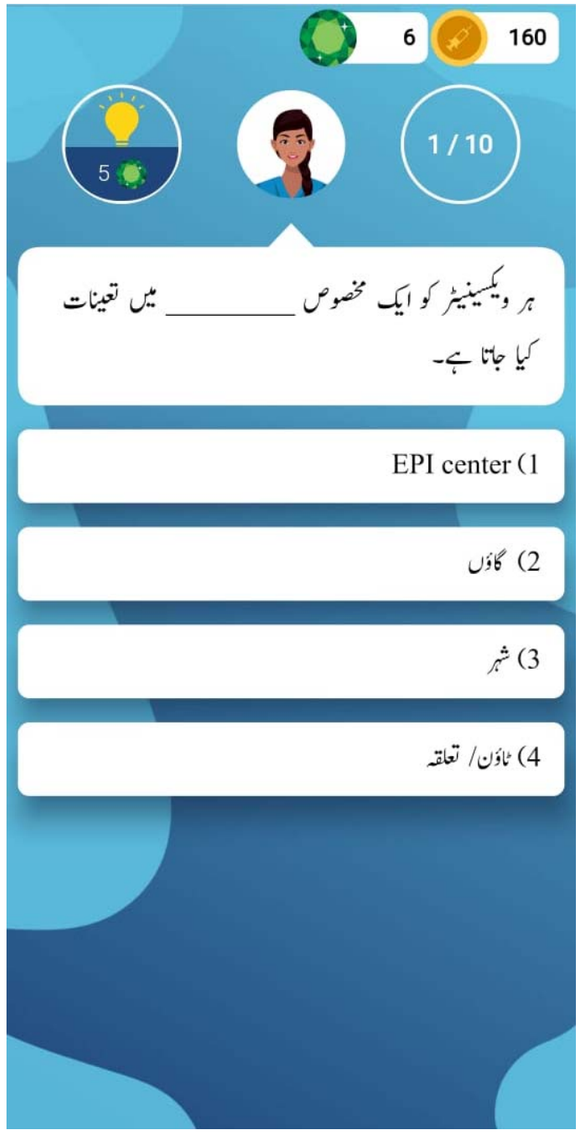
S #	District	Total Target	Vaccinators Trained	
		n	n	%
1	Central	149	131	88
2	Korangi	111	83	75
3	East	133	111	83
4	West	87	75	86
5	Kemari	90	75	83
	Total	**570**	**475**	**83**

Further data analysis is in progress

Key Takeaways

لال نگر میں کچھ والدین اپنے بچوں کو ٹیکہ لگوانے سینٹر پر نہیں لارہے۔





- First gamified app in Pakistan to conduct virtual trainings for vaccinators
- Can be used in the future in place of refresher trainings

Leveraging The Humanities in Healthcare Training

A Mixed Methods study for development and testing of an integrative Humanities curriculum for Lady Health Workers in Karachi, Pakistan

Maternal & Child Health
mch@ird.global

Background and Objectives

BACKGROUND

62/1,000 live births

Pakistan Under-5 Mortality (Pakistan Demographic & Health Survey, 2018)

186/100,000 live births

Maternal Mortality Ratio (United Nations Population Fund, 2020)

Lady Health Workers (LHWs)

are key to improving maternal & child health in Pakistan

PROBLEM

Inadequate training coupled with external stressors lower well-being and limit ability to provide humanistic care to ethno-religiously diverse communities

SPECIFIC OBJECTIVES

Develop and refine a tailored Humanities curriculum consisting of local art and literature to enhance key character strengths among LHWS in Karachi, Pakistan

Develop and validate a contextually-appropriate scale to measure character strengths among LHWs in Karachi, Pakistan

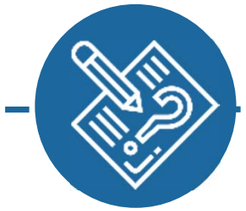
Evaluate impact of curriculum intervention on character strengths among LHWs recruited from selected towns of Karachi, Pakistan, using mixed methods

Methodology

Multi-phase mixed methods design under-pinned by lifecycle approach to measure increase in enthoculutral empathy, empathy towards religious minorities, purpose, compassion, and joy & self-worth

Limited deployment of the curriculum intervention with 48 participants from Korangi & Bin-Qasim Towns, Karachi

Ongoing process and formative evaluation throughout deployment



Administration of Character Strength scale pre- and post-intervention, and at 3 months follow-up

In-depth interviews with participants and their direct supervisors post-intervention

Electronic Integrated Management of Childhood Illnesses (eIMCI)

A mixed methods evaluation of the feasibility and efficacy of implementing integrated management of childhood illnesses (IMCI) through use of mobile technology in a developing country setting

Maternal & Child Health
mch@ird.global

Integrated Management of Childhood Illnesses (IMCI)

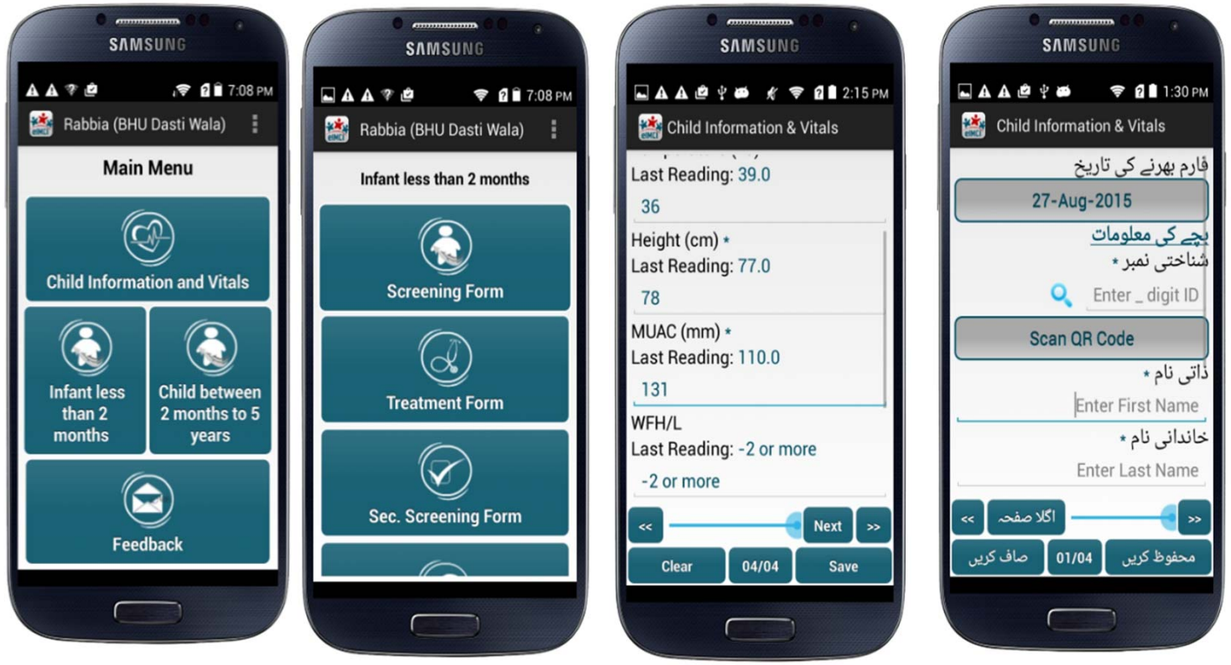
Developed by WHO and its partners in 1990s to reduce childhood morbidity and mortality in lower- and middle-income countries (93/1000):

- improving case management practices of health workers (particularly in outpatient settings)
- strengthening health systems
- promoting community and family health practices
- Officially implementation began in Pakistan in 1998, but remains limited to **30%** of health centres
- Pakistan child mortality **69.3/1000**

The Electronic Integrated Management of Childhood (eIMCI)

Electronic version of the 2014 IMCI guidelines

- Interactive algorithms
- Automatic classification
- SMS reminders
- Electronic referrals
- Real time data monitoring and supervision
- Offline mode



Time: 8 Weeks
Location: Muzaffargarh

Quantitative: Distribution of illness among diagnosed children

	Baseline (n=57)		Endline (n=42)		p-value
	n	%	n	%	0.04
Diarrhea	48	(84.2)	29	(69.0)	
Measles	4	(7.0)	8	(19.0)	
Pneumonia	3	(5.3)	0	(0.0)	
Malaria	2	(3.5)	5	(11.9)	

Qualitative Results

- Caregiver perceived field Health workers(FHWs) to be more knowledgeable and proactive
- FHWs felt they had improved screening, diagnosis, and treatment skills
- FHWs expressed preference for eIMCI over paper-based tools
- Medical officers observed increased synergies between outreach and facility-based health teams

Thank you

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Zindagi Mehfooz

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Picture: Outreach Vaccine through Mobile Immunization Van in Sindh, Pakistan