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TechNet-21
The Technical Network for Strengthening Immunization Services

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An Introduction to DHIS2 Tracker & Bangladesh Use Case

Mike Frost, Senior Advisor
HISP Centre, University of Oslo

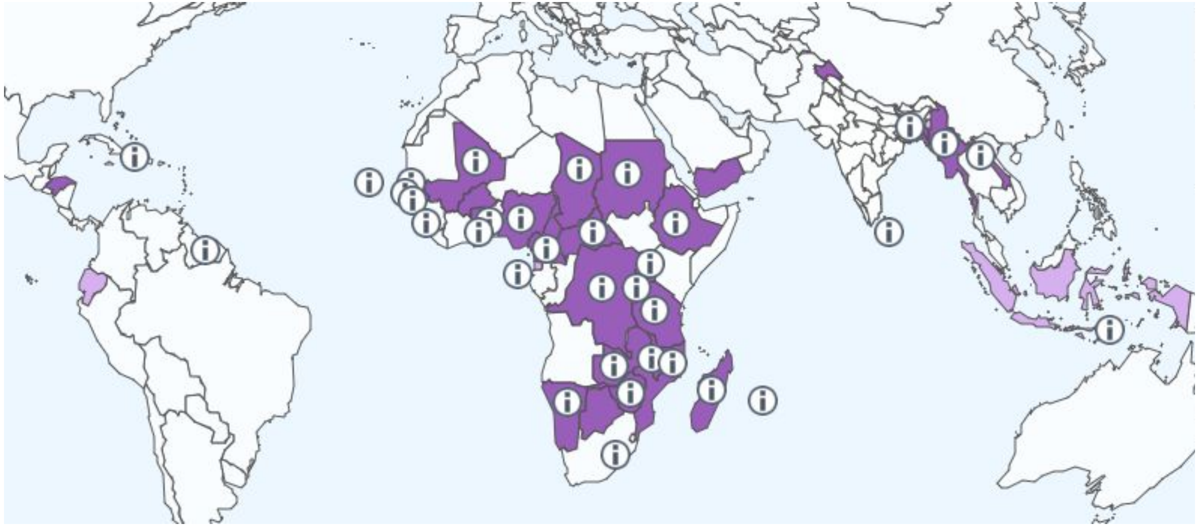
Pamod Amarakoon, Director and Senior Implementer
HISP Sri Lanka

HISP and DHIS2 – a quick background

- **Health Information Systems Program (HISP)**
  - Global movement to strengthen health information systems in developing countries
  - Started in 1994, in South Africa, by University of Western Cape and University of Oslo
  - Today there are 17 HISP groups in Africa, Asia and Latin America, and at University of Oslo (UiO), Norway
- **DHIS2**
  - Free- and open source software platform for health information since 1996
  - Univ of Oslo is the governing body
  - Endorsed as a global public good by WHO and supported by the Global Fund, GAVI, PEPFAR, CDC, Norad, the BMGF and others
  - The world's largest health management information system used by ministries of health in 73 countries in the Global South
  - A global community of developers, implementers, and users

HISP Vietnam
HISP India
HISP Indonesia
HISP Sri Lanka
HISP Bangladesh
HISP Pakistan
HISP Ethiopia
HISP Kenya
HISP Tanzania
HISP Uganda
HISP Rwanda
HISP Malawi
HISP Mozambique
HISP South Africa
HISP Nigeria
HISP West and Central Africa
HISP Colombia

EIR is expanding on established DHIS2 Systems



Countries using DHIS2 for Covid-19 Vaccine systems

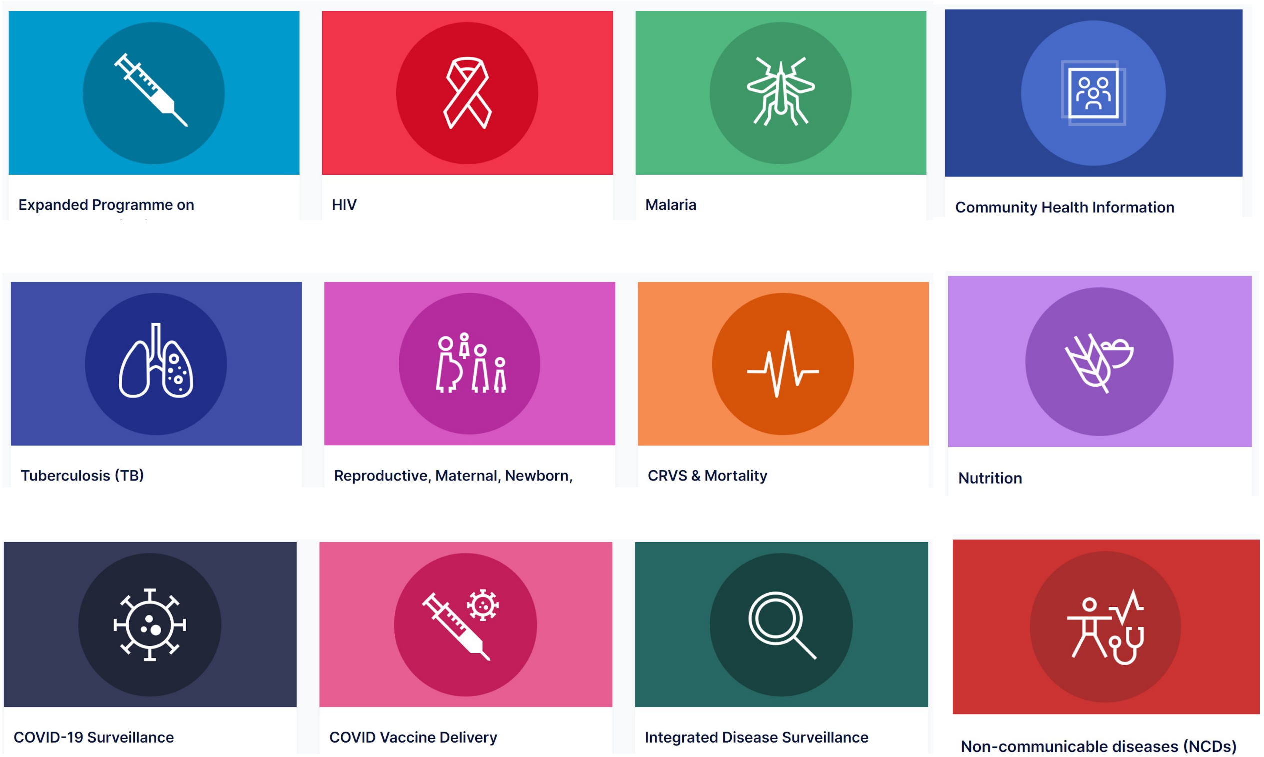
45 countries use DHIS2 for Immunization data

30 countries have installed WHO EPI package

42 countries use DHIS2 for Covid Vaccine Response

HISP Center, University of Oslo (DHIS2) is a WHO Collaborating Centre

Standards-based configuration to improve data quality, analysis and use in national systems

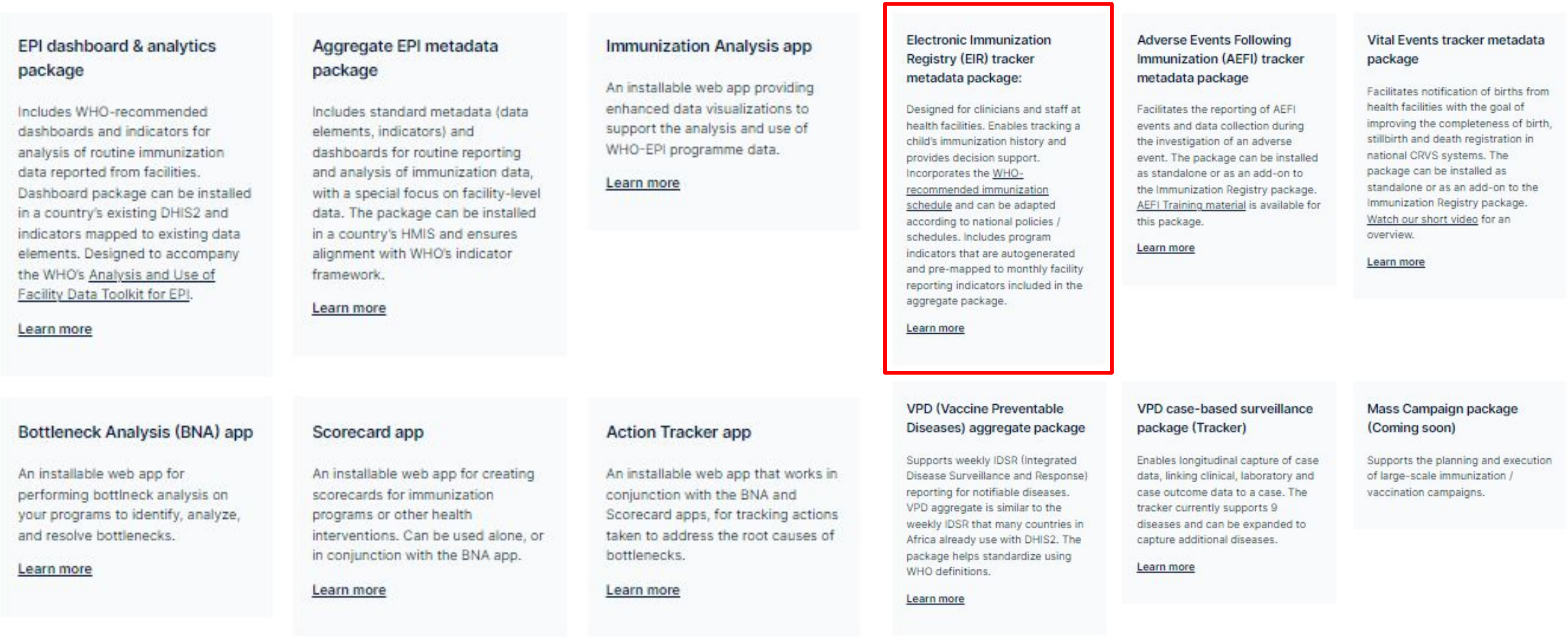

Expanded Programme on
HIV
Malaria
Community Health Information
Tuberculosis (TB)
Reproductive, Maternal, Newborn,
CRVS & Mortality
Nutrition
COVID-19 Surveillance
COVID Vaccine Delivery
Integrated Disease Surveillance
Non-communicable diseases (NCDs)

WHO Toolkit for Routine Health Information Systems Data
And
WHO Digital health data packages

- **Core indicators and metadata**
- **Data quality metrics**
- **Programme specific indicators and data elements**
- **Best practice dashboards, analyses**
- **Modules optimized for integrated HMIS and individual level/case-based**
- **Standard data entry forms/registers**

More info:
https://www.who.int/data/data-collection-tools/health-service-data/

DHIS2 and Immunization



EPI dashboard & analytics package

Includes WHO-recommended dashboards and indicators for analysis of routine immunization data reported from facilities. Dashboard package can be installed in a country's existing DHIS2 and indicators mapped to existing data elements. Designed to accompany the WHO's Analysis and Use of Facility Data Toolkit for EPI.

Learn more

Aggregate EPI metadata package

Includes standard metadata (data elements, indicators) and dashboards for routine reporting and analysis of immunization data, with a special focus on facility-level data. The package can be installed in a country's HMIS and ensures alignment with WHO's indicator framework.

Learn more

Immunization Analysis app

An installable web app providing enhanced data visualizations to support the analysis and use of WHO-EPI programme data.

Learn more

Electronic Immunization Registry (EIR) tracker metadata package:

Designed for clinicians and staff at health facilities. Enables tracking a child's immunization history and provides decision support. Incorporates the WHO-recommended immunization schedule and can be adapted according to national policies / schedules. Includes program indicators that are autogenerated and pre-mapped to monthly facility reporting indicators included in the aggregate package.

Learn more

Adverse Events Following Immunization (AEFI) tracker metadata package

Facilitates the reporting of AEFI events and data collection during the investigation of an adverse event. The package can be installed as standalone or as an add-on to the Immunization Registry package. AEFI Training material is available for this package.

Learn more

Vital Events tracker metadata package

Facilitates notification of births from health facilities with the goal of improving the completeness of birth, stillbirth and death registration in national CRVS systems. The package can be installed as standalone or as an add-on to the Immunization Registry package. Watch our short video for an overview.

Learn more

Bottleneck Analysis (BNA) app

An installable web app for performing bottlneck analysis on your programs to identify, analyze, and resolve bottlenecks.

Learn more

Scorecard app

An installable web app for creating scorecards for immunization programs or other health interventions. Can be used alone, or in conjunction with the BNA app.

Learn more

Action Tracker app

An installable web app that works in conjunction with the BNA and Scorecard apps, for tracking actions taken to address the root causes of bottlenecks.

Learn more

VPD (Vaccine Preventable Diseases) aggregate package

Supports weekly IDSR (Integrated Disease Surveillance and Response) reporting for notifiable diseases. VPD aggregate is similar to the weekly IDSR that many countries in Africa already use with DHIS2. The package helps standardize using WHO definitions.

Learn more

VPD case-based surveillance package (Tracker)

Enables longitudinal capture of case data, linking clinical, laboratory and case outcome data to a case. The tracker currently supports 9 diseases and can be expanded to capture additional diseases.

Learn more

Mass Campaign package (Coming soon)

Supports the planning and execution of large-scale immunization / vaccination campaigns.

More at: https://dhis2.org/immunization/

Electronic Immunization Registry

General Overview and Purpose

Improve routine data collection

developed in response to an expressed need from countries and partners to improve timeliness, accuracy of data, expand coverage, efficiency and effectiveness through the Expanded Programme on Immunization (EPI)

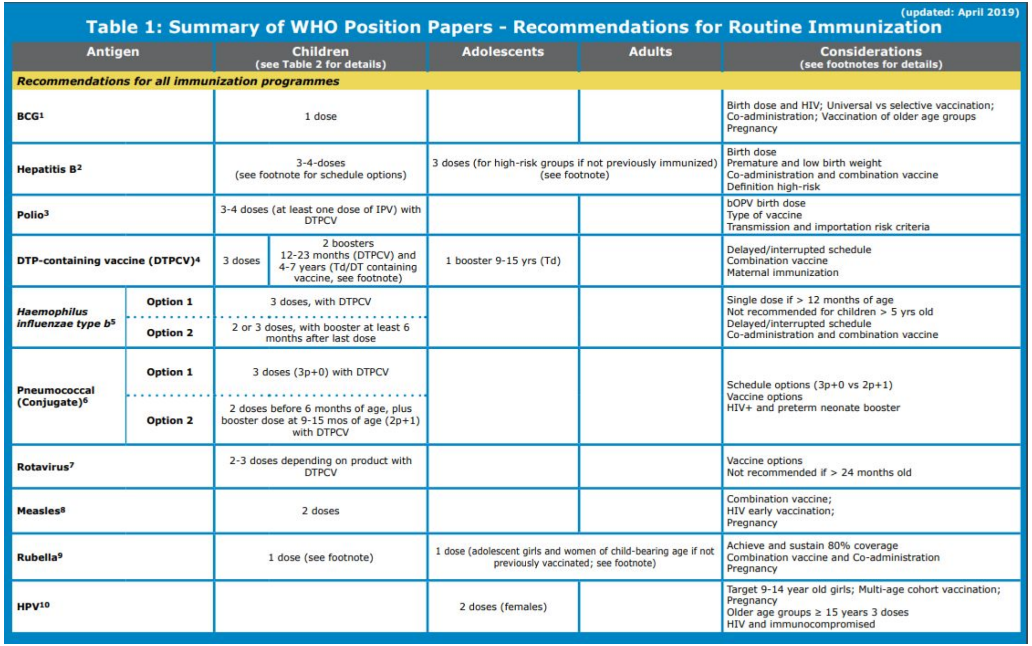
Increase data reliability

provide clinical guidance to health care providers on immunization schedules and contraindications based on global standards, as well as generate reliable data for decision making

Design and resources

designed based on the WHO Position Papers-Recommendations for Routine Immunization (2018), and resources from collaborating institutions; such as, the Norwegian Institute of Public Health. These resources can be found in the References section. The design also draws on immunization country use cases from Zambia, Botswana, and Rwanda, as well as published literature from PAHO.

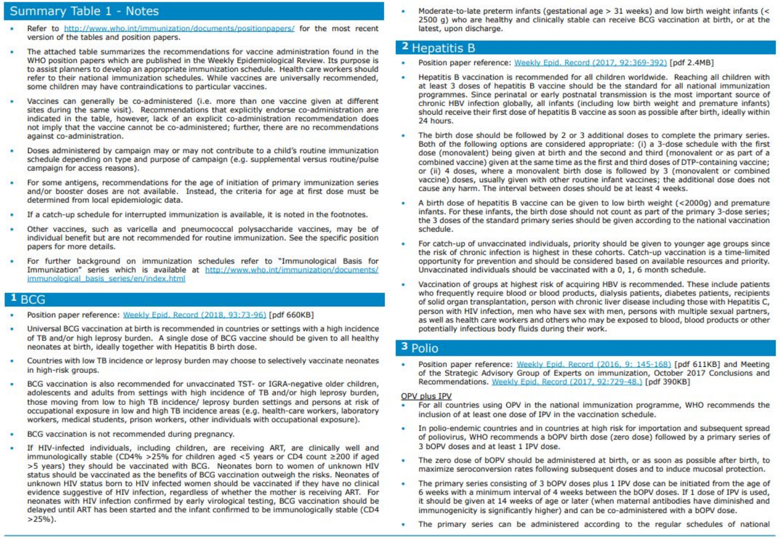
WHO-Recommendations for Routine Immunization



(updated: April 2019)

Table 1: Summary of WHO Position Papers - Recommendations for Routine Immunization

Antigen		Children (see Table 2 for details)		Adolescents	Adults	Considerations (see footnotes for details)
Recommendations for all immunization programmes						
BCG[1]		1 dose				Birth dose and HIV; Universal vs selective vaccination; Co-administration; Vaccination of older age groups Pregnancy
Hepatitis B[2]		3-4-doses (see footnote for schedule options)		3 doses (for high-risk groups if not previously immunized) (see footnote)		Birth dose Premature and low birth weight Co-administration and combination vaccine Definition high-risk
Polio[3]		3-4 doses (at least one dose of IPV) with DTPCV				bOPV birth dose Type of vaccine Transmission and importation risk criteria
DTP-containing vaccine (DTPCV)[4]		3 doses	2 boosters 12-23 months (DTPCV) and 4-7 years (Td/DT containing vaccine, see footnote)	1 booster 9-15 yrs (Td)		Delayed/interrupted schedule Combination vaccine Maternal immunization
Haemophilus influenzae type b[5]	**Option 1**	3 doses, with DTPCV				Single dose if > 12 months of age Not recommended for children > 5 yrs old Delayed/interrupted schedule Co-administration and combination vaccine
	Option 2	2 or 3 doses, with booster at least 6 months after last dose				
Pneumococcal (Conjugate)[6]	**Option 1**	3 doses (3p+0) with DTPCV				Schedule options (3p+0 vs 2p+1) Vaccine options HIV+ and preterm neonate booster
	Option 2	2 doses before 6 months of age, plus booster dose at 9-15 mos of age (2p+1) with DTPCV				
Rotavirus[7]		2-3 doses depending on product with DTPCV				Vaccine options Not recommended if > 24 months old
Measles[8]		2 doses				Combination vaccine; HIV early vaccination; Pregnancy
Rubella[9]		1 dose (see footnote)		1 dose (adolescent girls and women of child-bearing age if not previously vaccinated; see footnote)		Achieve and sustain 80% coverage Combination vaccine and Co-administration Pregnancy
HPV[10]				2 doses (females)		Target 9-14 year old girls; Multi-age cohort vaccination; Pregnancy Older age groups ≥ 15 years 3 doses HIV and immunocompromised



Summary Table 1 - Notes

- Refer to http://www.who.int/immunization/documents/positionpapers/ for the most recent version of the tables and position papers.
- The attached table summarizes the recommendations for vaccine administration found in the WHO position papers which are published in the Weekly Epidemiological Review. Its purpose is to assist planners to develop an appropriate immunization schedule. Health care workers should refer to their national immunization schedules. While vaccines are universally recommended, some children may have contraindications to particular vaccines.
- Vaccines can generally be co-administered (i.e. more than one vaccine given at different sites during the same visit). Recommendations that explicitly endorse co-administration are indicated in the table, however, lack of an explicit co-administration recommendation does not imply that the vaccine cannot be co-administered; further, there are no recommendations against co-administration.
- Doses administered by campaign may or may not contribute to a child's routine immunization schedule depending on type and purpose of campaign (e.g. supplemental versus routine/pulse campaign for access reasons).
- For some antigens, recommendations for the age of initiation of primary immunization series and/or booster doses are not available. Instead, the criteria for age at first dose must be determined from local epidemiologic data.
- If a catch-up schedule for interrupted immunization is available, it is noted in the footnotes.
- Other vaccines, such as varicella and pneumococcal polysaccharide vaccines, may be of individual benefit but are not recommended for routine immunization. See the specific position papers for more details.
- For further background on immunization schedules refer to "Immunological Basis for Immunization" series which is available at http://www.who.int/immunization/documents/immunological_basis_series/en/index.html

1 BCG

- Position paper reference: Weekly Epid. Record (2018, 93:73-96) [pdf 660KB]
- Universal BCG vaccination at birth is recommended in countries or settings with a high incidence of TB and/or high leprosy burden. A single dose of BCG vaccine should be given to all healthy neonates at birth, ideally together with Hepatitis B birth dose.
- Countries with low TB incidence or leprosy burden may choose to selectively vaccinate neonates in high-risk groups.
- BCG vaccination is also recommended for unvaccinated TST- or IGRA-negative older children, adolescents and adults from settings with high incidence of TB and/or high leprosy burden, those moving from low to high TB incidence/ leprosy burden settings and persons at risk of occupational exposure in low and high TB incidence areas (e.g. health-care workers, laboratory workers, medical students, prison workers, other individuals with occupational exposure).
- BCG vaccination is not recommended during pregnancy.
- If HIV-infected individuals, including children, are receiving ART, are clinically well and immunologically stable (CD4% >25% for children aged <5 years or CD4 count ≥200 if aged >5 years) they should be vaccinated with BCG. Neonates born to women of unknown HIV status should be vaccinated as the benefits of BCG vaccination outweigh the risks. Neonates of unknown HIV status born to HIV infected women should be vaccinated if they have no clinical evidence suggestive of HIV infection, regardless of whether the mother is receiving ART. For neonates with HIV infection confirmed by early virological testing, BCG vaccination should be delayed until ART has been started and the infant confirmed to be immunologically stable (CD4 >25%).
- Moderate-to-late preterm infants (gestational age > 31 weeks) and low birth weight infants (< 2500 g) who are healthy and clinically stable can receive BCG vaccination at birth, or at the latest, upon discharge.

2 Hepatitis B

- Position paper reference: Weekly Epid. Record (2017, 92:369-392) [pdf 2.4MB]
- Hepatitis B vaccination is recommended for all children worldwide. Reaching all children with at least 3 doses of hepatitis B vaccine should be the standard for all national immunization programmes. Since perinatal or early postnatal transmission is the most important source of chronic HBV infection globally, all infants (including low birth weight and premature infants) should receive their first dose of hepatitis B vaccine as soon as possible after birth, ideally within 24 hours.
- The birth dose should be followed by 2 or 3 additional doses to complete the primary series. Both of the following options are considered appropriate: (i) a 3-dose schedule with the first dose (monovalent) being given at birth and the second and third (monovalent or as part of a combined vaccine) given at the same time as the first and third doses of DTP-containing vaccine; or (ii) 4 doses, where a monovalent birth dose is followed by 3 (monovalent or combined vaccine) doses, usually given with other routine infant vaccines; the additional dose does not cause any harm. The interval between doses should be at least 4 weeks.
- A birth dose of hepatitis B vaccine can be given to low birth weight (<2000g) and premature infants. For these infants, the birth dose should not count as part of the primary 3-dose series; the 3 doses of the standard primary series should be given according to the national vaccination schedule.
- For catch-up of unvaccinated individuals, priority should be given to younger age groups since the risk of chronic infection is highest in these cohorts. Catch-up vaccination is a time-limited opportunity for prevention and should be considered based on available resources and priority. Unvaccinated individuals should be vaccinated with a 0, 1, 6 month schedule.
- Vaccination of groups at highest risk of acquiring HBV is recommended. These include patients who frequently require blood or blood products, dialysis patients, diabetes patients, recipients of solid organ transplantation, person with chronic liver disease including those with Hepatitis C, person with HIV infection, men who have sex with men, persons with multiple sexual partners, as well as health care workers and others who may be exposed to blood, blood products or other potentially infectious body fluids during their work.

3 Polio

- Position paper reference: Weekly Epid. Record (2016, 9: 145-168) [pdf 611KB] and Meeting of the Strategic Advisory Group of Experts on immunization, October 2017 Conclusions and Recommendations. Weekly Epid. Record (2017, 92:729-48.) [pdf 390KB]

OPV plus IPV

- For all countries using OPV in the national immunization programme, WHO recommends the inclusion of at least one dose of IPV in the vaccination schedule.
- In polio-endemic countries and in countries at high risk for importation and subsequent spread of poliovirus, WHO recommends a bOPV birth dose (zero dose) followed by a primary series of 3 bOPV doses and at least 1 IPV dose.
- The zero dose of bOPV should be administered at birth, or as soon as possible after birth, to maximize seroconversion rates following subsequent doses and to induce mucosal protection.
- The primary series consisting of 3 bOPV doses plus 1 IPV dose can be initiated from the age of 6 weeks with a minimum interval of 4 weeks between the bOPV doses. If 1 dose of IPV is used, it should be given at 14 weeks of age or later (when maternal antibodies have diminished and immunogenicity is significantly higher) and can be co-administered with a bOPV dose.
- The primary series can be administered according to the regular schedules of national

https://www.who.int/immunization/policy/immunization_tables/en/

Design

Routine Immunizations

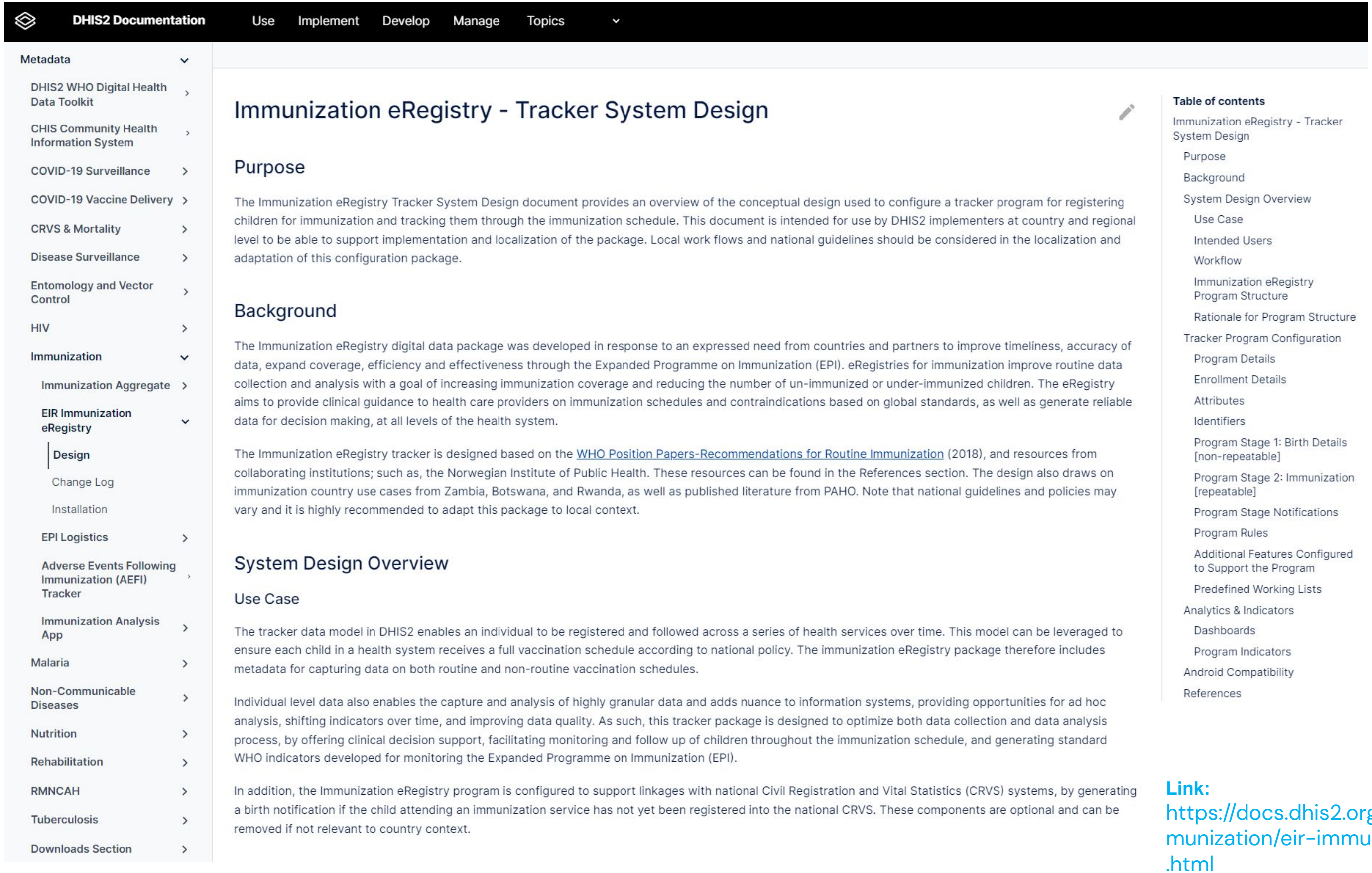
Child's Age	**Immunizations Required**
Birth	BCG 0.05mg, bOPV 0, Hep B 1
6 weeks	bOPV 1, Penta (DPT- Hep B- Hib) 1, PCV 1, RV 1
10 weeks	bOPV 2, Penta (DPT- Hep B- Hib) 2, PCV2, RV 2
14 weeks	bOPV 3, IPV 1, Penta (DPT- Hep B- Hib) 3, PCV 3
9 months	Measles 1, Rubella 1
18 months	Measles 2

Design

Non Routine Immunizations

MR (2 doses)	Tdap (Td and ap containing) 1
MMR (2 doses)	Cholera [3 doses]
Japanese Encephalitis (Inactivated and Live atten) [2 doses]	Meningococcal [2 doses]
Tick-Borne Encephalitis [3 doses]	Hepatitis (A, B2 and B3) [1 dose]
Typhoid TCV (Typbar and Vi PS) [1 dose]	Rabies [2 doses]
Typhoid (Ty21a) [4 doses]	Dengue [3 doses]
Varicella [2 doses]	mOPV
DPT (Booster) 1	DTwP (Td containing) 1
DTap (Td containing) 1	Covid-19

Documentation and Downloads


DHIS2 Documentation
Use
Implement
Develop
Manage
Topics
Metadata
DHIS2 WHO Digital Health Data Toolkit
CHIS Community Health Information System
COVID-19 Surveillance
COVID-19 Vaccine Delivery
CRVS & Mortality
Disease Surveillance
Entomology and Vector Control
HIV
Immunization
Immunization Aggregate
EIR Immunization eRegistry
Design
Change Log
Installation
EPI Logistics
Adverse Events Following Immunization (AEFI) Tracker
Immunization Analysis App
Malaria
Non-Communicable Diseases
Nutrition
Rehabilitation
RMNCAH
Tuberculosis
Downloads Section
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Immunization eRegistry - Tracker System Design

Purpose

The Immunization eRegistry Tracker System Design document provides an overview of the conceptual design used to configure a tracker program for registering children for immunization and tracking them through the immunization schedule. This document is intended for use by DHIS2 implementers at country and regional level to be able to support implementation and localization of the package. Local work flows and national guidelines should be considered in the localization and adaptation of this configuration package.

Background

The Immunization eRegistry digital data package was developed in response to an expressed need from countries and partners to improve timeliness, accuracy of data, expand coverage, efficiency and effectiveness through the Expanded Programme on Immunization (EPI). eRegistries for immunization improve routine data collection and analysis with a goal of increasing immunization coverage and reducing the number of un-immunized or under-immunized children. The eRegistry aims to provide clinical guidance to health care providers on immunization schedules and contraindications based on global standards, as well as generate reliable data for decision making, at all levels of the health system.

The Immunization eRegistry tracker is designed based on the WHO Position Papers-Recommendations for Routine Immunization (2018), and resources from collaborating institutions; such as, the Norwegian Institute of Public Health. These resources can be found in the References section. The design also draws on immunization country use cases from Zambia, Botswana, and Rwanda, as well as published literature from PAHO. Note that national guidelines and policies may vary and it is highly recommended to adapt this package to local context.

System Design Overview

Use Case

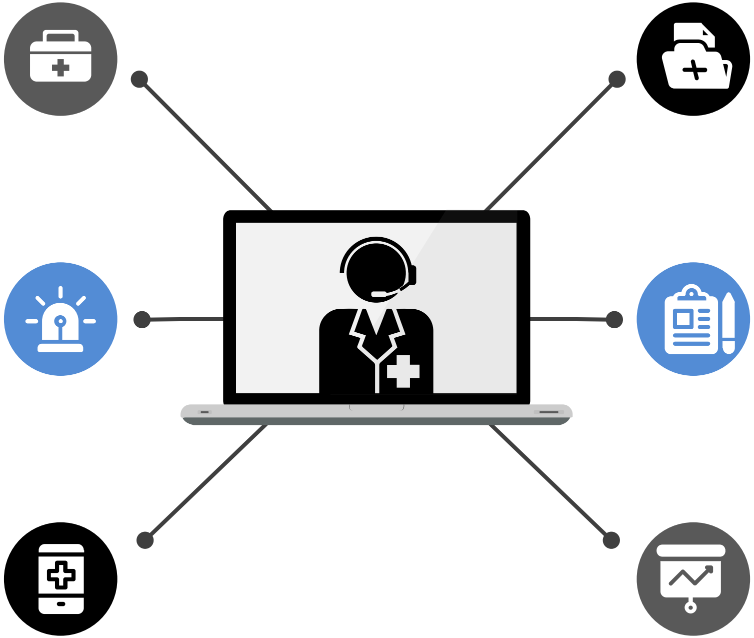
The tracker data model in DHIS2 enables an individual to be registered and followed across a series of health services over time. This model can be leveraged to ensure each child in a health system receives a full vaccination schedule according to national policy. The immunization eRegistry package therefore includes metadata for capturing data on both routine and non-routine vaccination schedules.

Individual level data also enables the capture and analysis of highly granular data and adds nuance to information systems, providing opportunities for ad hoc analysis, shifting indicators over time, and improving data quality. As such, this tracker package is designed to optimize both data collection and data analysis process, by offering clinical decision support, facilitating monitoring and follow up of children throughout the immunization schedule, and generating standard WHO indicators developed for monitoring the Expanded Programme on Immunization (EPI).

In addition, the Immunization eRegistry program is configured to support linkages with national Civil Registration and Vital Statistics (CRVS) systems, by generating a birth notification if the child attending an immunization service has not yet been registered into the national CRVS. These components are optional and can be removed if not relevant to country context.

Link:
https://docs.dhis2.org/en/topics/metadata/immunization/eir-immunization-eregistry/design.html

The EIR aims to provide **clinical guidance and support** to health care providers



Hide and Show Program rules

Program rules are used extensively to show data elements for routine vaccinations on the Routine Immunization event based on the date of birth (attribute) and previous vaccination history (data elements).

Warnings and Contraindications

Based on the answers selected in the Pre-Immunization Question section, program rules are triggered to give decision support.. These are shown in the TEI dashboard (e.g. allergies, high risk status) and are also used to trigger warnings and contraindications during immunization service delivery

SMS Notifications

Program stage notifications have been configured based on program rules to enable birth notification for CRVS and appointment reminders to parents/caregivers. These notifications can be sent by system messages (internal to DHIS2), external email, or by SMS.

Vaccine Card View

Tabular data entry view displays an electronic “Vaccine card” for the health care provider or data entry clerk that follows the format of the typical yellow paper-based immunization card. The card gives the history of all the child’s immunizations.

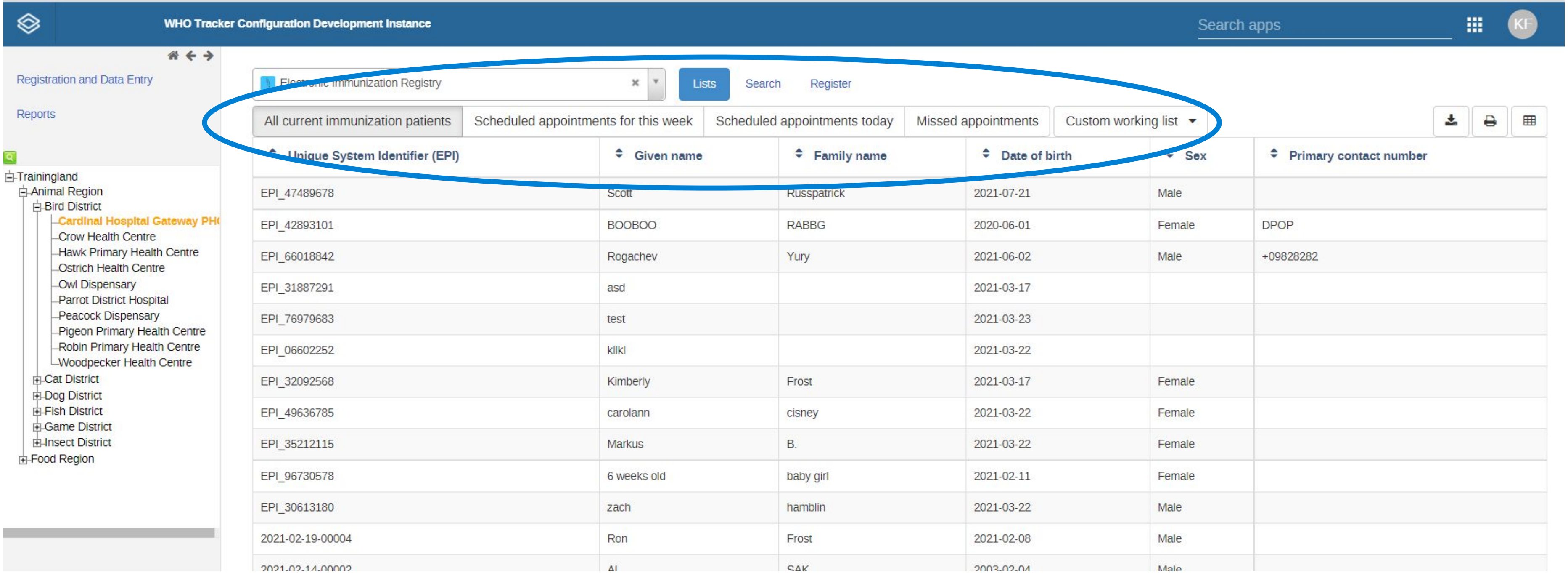
Working Lists

To support quick search of patients at facility level, four separate “working lists” are predefined in the “Lists” tab of the Tracker Capture landing page. Each of these working lists display TEI that meet certain criteria, such as upcoming appointments or missed appointments.

Analytics & Indicators

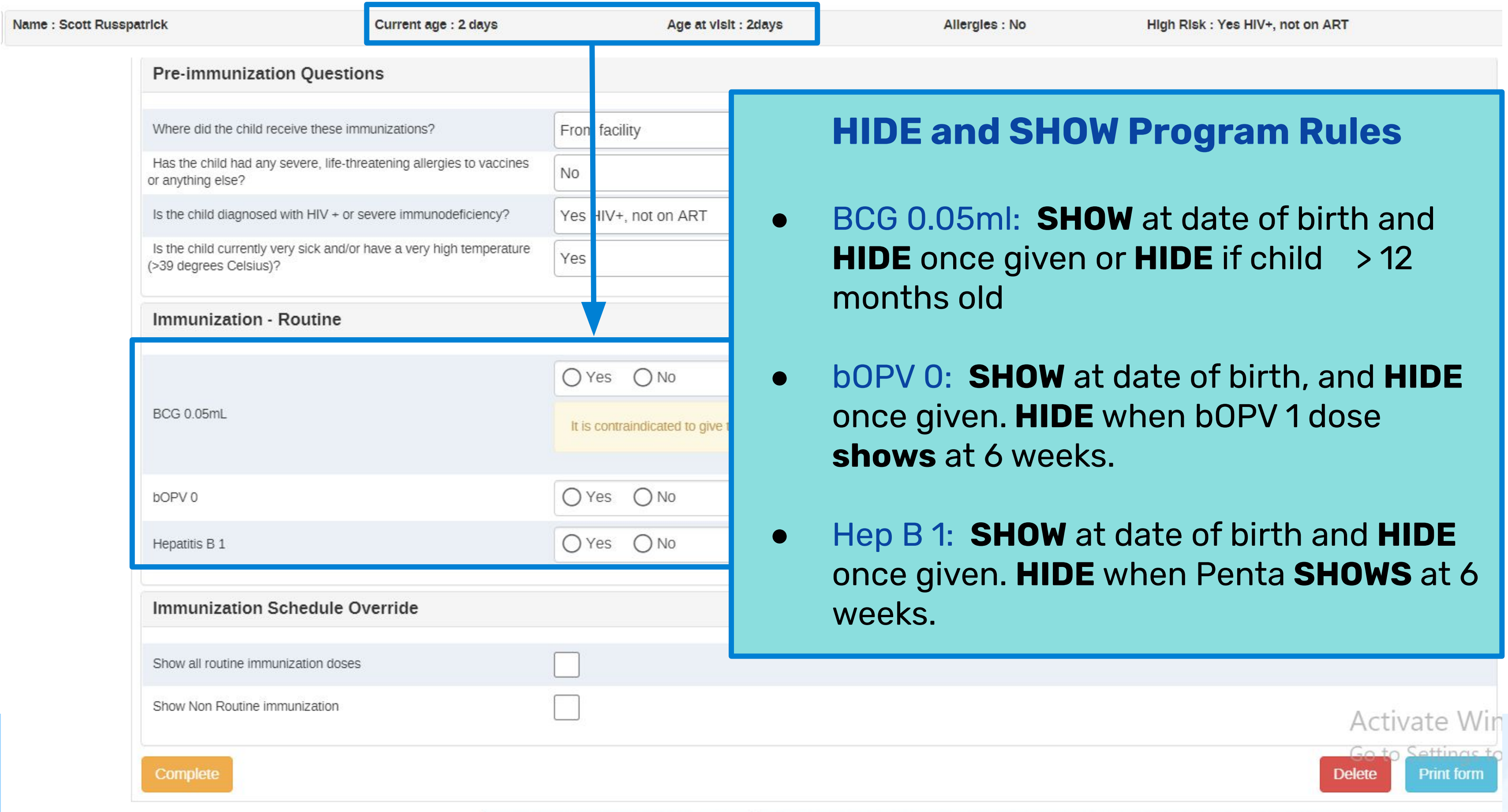
The indicators are based on the WHO EPI aggregate program . In addition, many indicators from the Immunization Tracker program are based on ***cohorts***, rather than raw counts. (Note that the Immunization Tracker program can only calculate a subset of the recommended aggregate indicators,)

Working Lists


WHO Tracker Configuration Development Instance
Search apps
KF
Registration and Data Entry
Reports
Trainingland
Animal Region
Bird District
Cardinal Hospital Gateway PH
Crow Health Centre
Hawk Primary Health Centre
Ostrich Health Centre
Owl Dispensary
Parrot District Hospital
Peacock Dispensary
Pigeon Primary Health Centre
Robin Primary Health Centre
Woodpecker Health Centre
Cat District
Dog District
Fish District
Game District
Insect District
Food Region
Electronic Immunization Registry
Lists
Search
Register
All current immunization patients
Scheduled appointments for this week
Scheduled appointments today
Missed appointments
Custom working list

Unique System Identifier (EPI)	Given name	Family name	Date of birth	Sex	Primary contact number
EPI_47489678	Scott	Russpatrick	2021-07-21	Male	
EPI_42893101	BOOBOO	RABBG	2020-06-01	Female	DPOP
EPI_66018842	Rogachev	Yury	2021-06-02	Male	+09828282
EPI_31887291	asd		2021-03-17		
EPI_76979683	test		2021-03-23		
EPI_06602252	klkl		2021-03-22		
EPI_32092568	Kimberly	Frost	2021-03-17	Female	
EPI_49636785	carolann	cisney	2021-03-22	Female	
EPI_35212115	Markus	B.	2021-03-22	Female	
EPI_96730578	6 weeks old	baby girl	2021-02-11	Female	
EPI_30613180	zach	hamblin	2021-03-22	Male	
2021-02-19-00004	Ron	Frost	2021-02-08	Male	
2021-02-14-00002	Al	SAK	2003-02-04	Male	

Program rules based on AGE



Name : Scott Russpatrick | Current age : 2 days | Age at visit : 2days | Allergies : No | High Risk : Yes HIV+, not on ART

Pre-immunization Questions

Where did the child receive these immunizations?	From facility
Has the child had any severe, life-threatening allergies to vaccines or anything else?	No
Is the child diagnosed with HIV + or severe immunodeficiency?	Yes HIV+, not on ART
Is the child currently very sick and/or have a very high temperature (>39 degrees Celsius)?	Yes

Immunization - Routine

BCG 0.05mL	○ Yes ○ No It is contraindicated to give
bOPV 0	○ Yes ○ No
Hepatitis B 1	○ Yes ○ No

Immunization Schedule Override

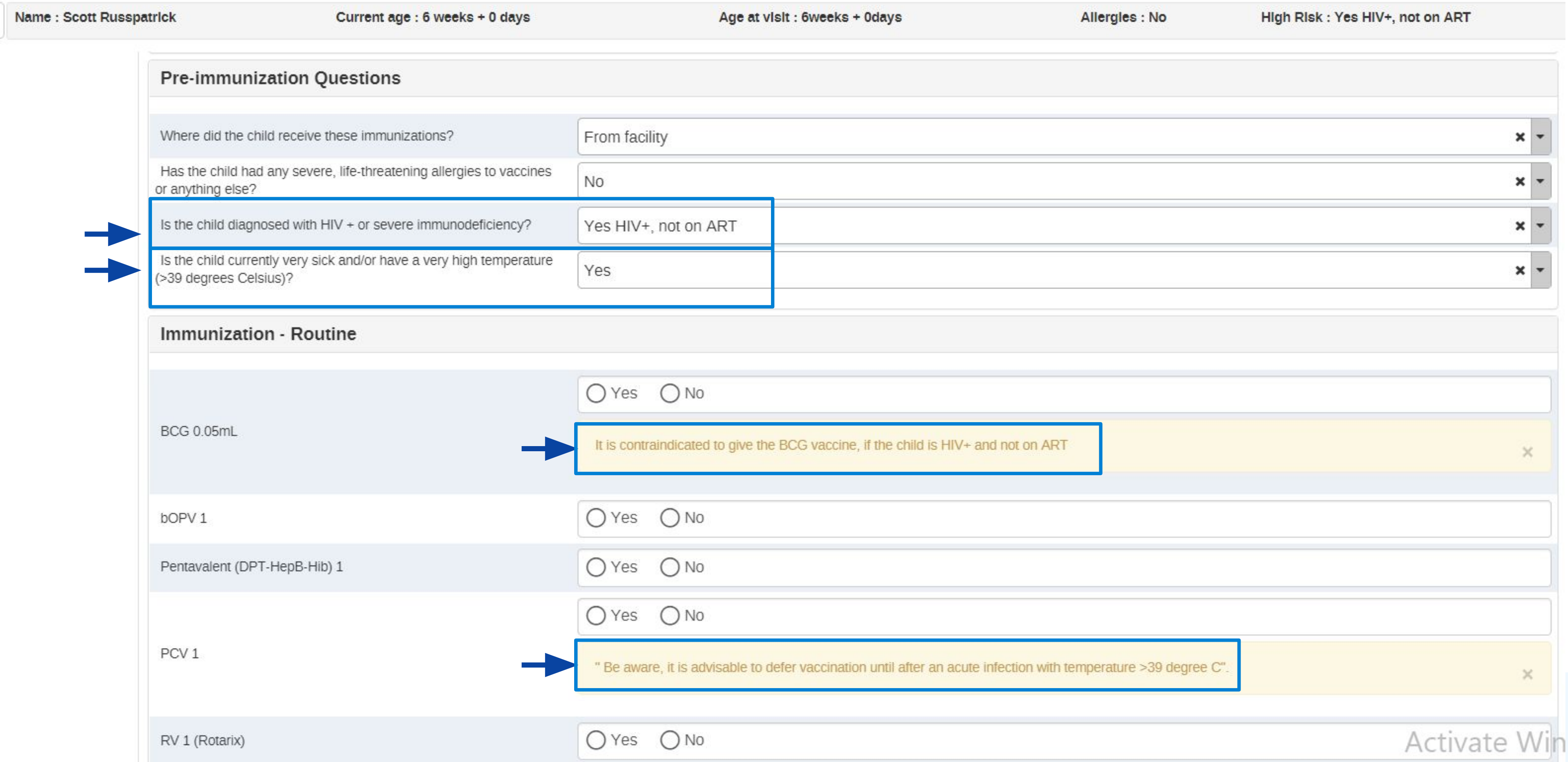
Show all routine immunization doses	☐
Show Non Routine immunization	☐

Activate Wir
Go to Settings to

HIDE and SHOW Program Rules

- BCG 0.05ml: **SHOW** at date of birth and **HIDE** once given or **HIDE** if child > 12 months old
- bOPV 0: **SHOW** at date of birth, and **HIDE** once given. **HIDE** when bOPV 1 dose **shows** at 6 weeks.
- Hep B 1: **SHOW** at date of birth and **HIDE** once given. **HIDE** when Penta **SHOWS** at 6 weeks.

Warning and Validation Rules



Name : Scott Russpatrick | **Current age : 6 weeks + 0 days** | **Age at visit : 6weeks + 0days** | **Allergies : No** | **High Risk : Yes HIV+, not on ART**

Pre-immunization Questions

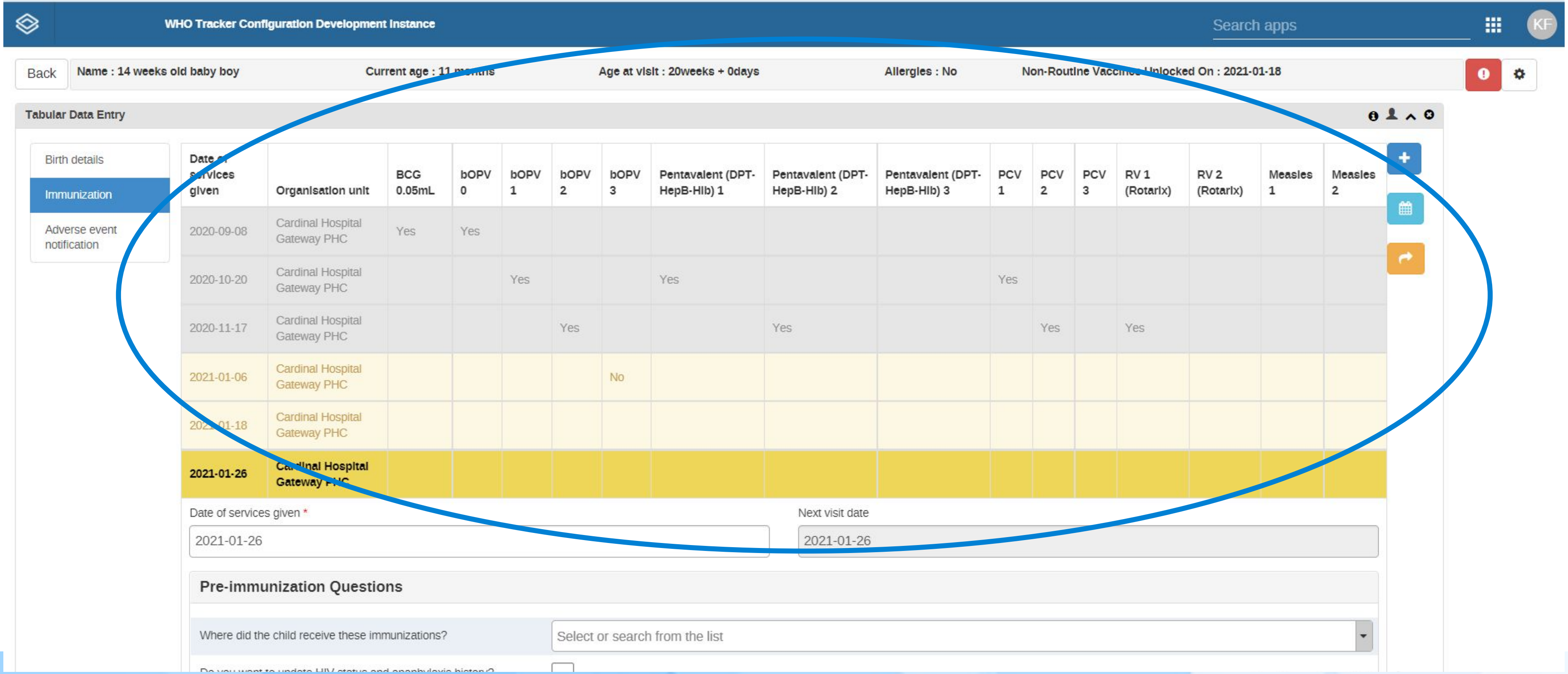
Where did the child receive these immunizations?	From facility
Has the child had any severe, life-threatening allergies to vaccines or anything else?	No
Is the child diagnosed with HIV + or severe immunodeficiency?	Yes HIV+, not on ART
Is the child currently very sick and/or have a very high temperature (>39 degrees Celsius)?	Yes

Immunization - Routine

BCG 0.05mL	○ Yes ○ No It is contraindicated to give the BCG vaccine, if the child is HIV+ and not on ART
bOPV 1	○ Yes ○ No
Pentavalent (DPT-HepB-Hib) 1	○ Yes ○ No
PCV 1	○ Yes ○ No " Be aware, it is advisable to defer vaccination until after an acute infection with temperature >39 degree C".
RV 1 (Rotarix)	○ Yes ○ No

Activate Win

Vaccine Card (Tabular Data Entry)


WHO Tracker Configuration Development Instance
Search apps
KF
Back
Tabular Data Entry
Birth details
Immunization
Adverse event notification

Name : 14 weeks old baby boy   Current age : 11 months   Age at visit : 20weeks + 0days   Allergies : No   Non-Routine Vaccines Unlocked On : 2021-01-18

Date of services given	Organisation unit	BCG 0.05mL	bOPV 0	bOPV 1	bOPV 2	bOPV 3	Pentavalent (DPT-HepB-Hib) 1	Pentavalent (DPT-HepB-Hib) 2	Pentavalent (DPT-HepB-Hib) 3	PCV 1	PCV 2	PCV 3	RV 1 (Rotarix)	RV 2 (Rotarix)	Measles 1	Measles 2
2020-09-08	Cardinal Hospital Gateway PHC	Yes	Yes													
2020-10-20	Cardinal Hospital Gateway PHC			Yes			Yes			Yes						
2020-11-17	Cardinal Hospital Gateway PHC				Yes			Yes			Yes		Yes			
2021-01-06	Cardinal Hospital Gateway PHC					No										
2021-01-18	Cardinal Hospital Gateway PHC															
2021-01-26	**Cardinal Hospital Gateway PHC**															

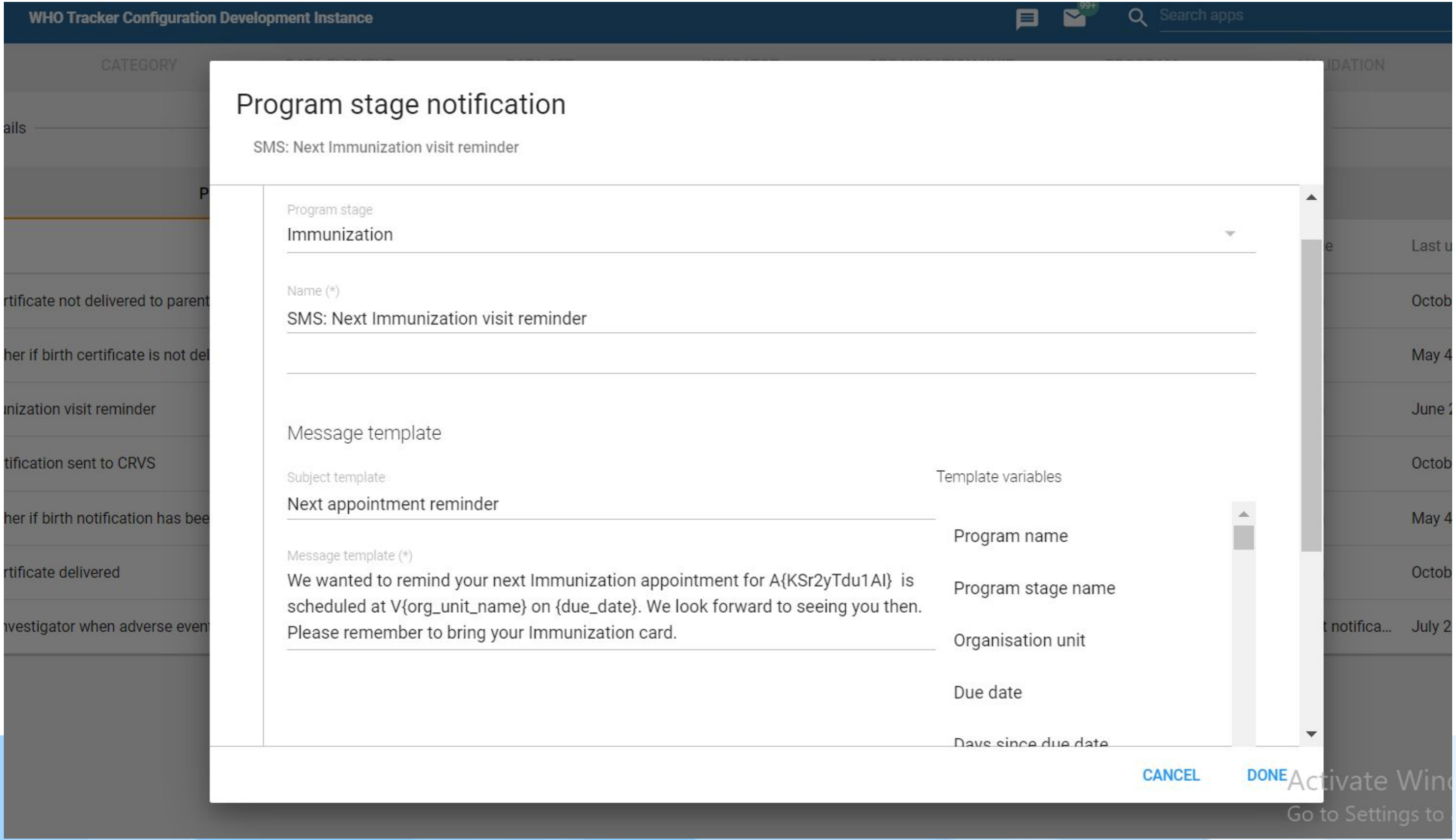
Date of services given *: 2021-01-26

Next visit date: 2021-01-26

Pre-immunization Questions

Where did the child receive these immunizations? Select or search from the list

SMS Notifications



WHO Tracker Configuration Development Instance

Program stage notification

SMS: Next Immunization visit reminder

Program stage: Immunization

Name (*): SMS: Next Immunization visit reminder

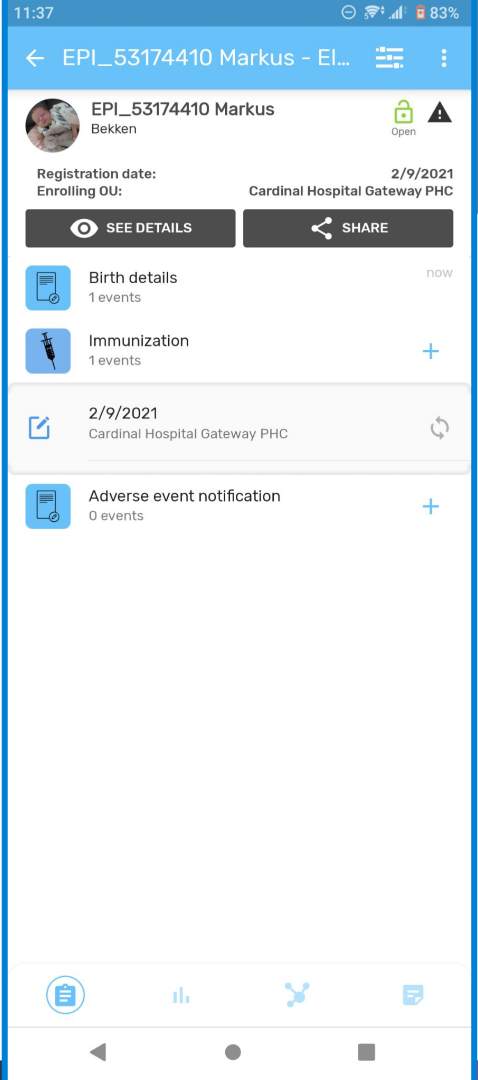
Message template

Subject template: Next appointment reminder

Message template (*): We wanted to remind your next Immunization appointment for A{KSr2yTdu1AI} is scheduled at V{org_unit_name} on {due_date}. We look forward to seeing you then. Please remember to bring your Immunization card.

Template variables:
- Program name
- Program stage name
- Organisation unit
- Due date
- Days since due date

Activate Win
Go to Settings to



11:37 83%

EPI_53174410 Markus - El...

EPI_53174410 Markus
Bekken

Open

Registration date: 2/9/2021
Enrolling OU: Cardinal Hospital Gateway PHC

SEE DETAILS
SHARE

Birth details
1 events
now

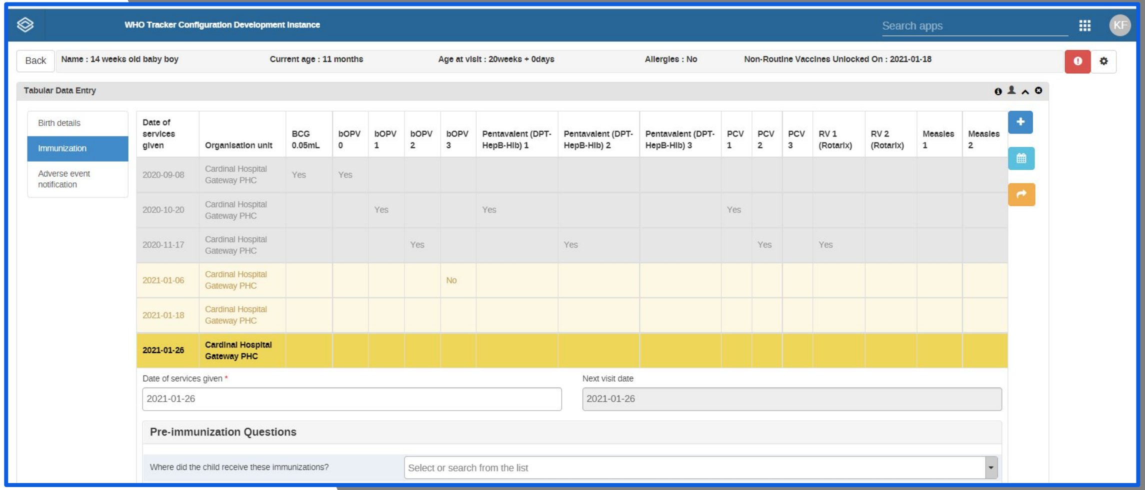
Immunization
1 events

2/9/2021
Cardinal Hospital Gateway PHC

Adverse event notification
0 events

Web and Android

Digital data packages are optimized for Android data collection with the DHIS2 Capture App, free to download on the Google Play store.



WHO Tracker Configuration Development Instance
Search apps
KF
Back

Name : 14 weeks old baby boy **Current age : 11 months** **Age at visit : 20weeks + 0days** **Allergies : No** **Non-Routine Vaccines Unlocked On : 2021-01-18**

Tabular Data Entry

Birth details
Immunization
Adverse event notification

Date of services given	Organisation unit	BCG 0.05mL	bOPV 0	bOPV 1	bOPV 2	bOPV 3	Pentavalent (DPT-HepB-Hib) 1	Pentavalent (DPT-HepB-Hib) 2	Pentavalent (DPT-HepB-Hib) 3	PCV 1	PCV 2	PCV 3	RV 1 (Rotarix)	RV 2 (Rotarix)	Measles 1	Measles 2
2020-09-08	Cardinal Hospital Gateway PHC	Yes	Yes													
2020-10-20	Cardinal Hospital Gateway PHC			Yes			Yes			Yes						
2020-11-17	Cardinal Hospital Gateway PHC				Yes			Yes			Yes		Yes			
2021-01-06	Cardinal Hospital Gateway PHC					No										
2021-01-18	Cardinal Hospital Gateway PHC															
2021-01-26	Cardinal Hospital Gateway PHC															

Date of services given *
2021-01-26

Next visit date
2021-01-26

Pre-immunization Questions

Where did the child receive these immunizations? Select or search from the list

EPI Tracker Analytics & Indicators

The indicators are based on the WHO EPI aggregate program, with the intention that the relevant data collected in the Tracker program can be reported to the aggregate HMIS indicators.

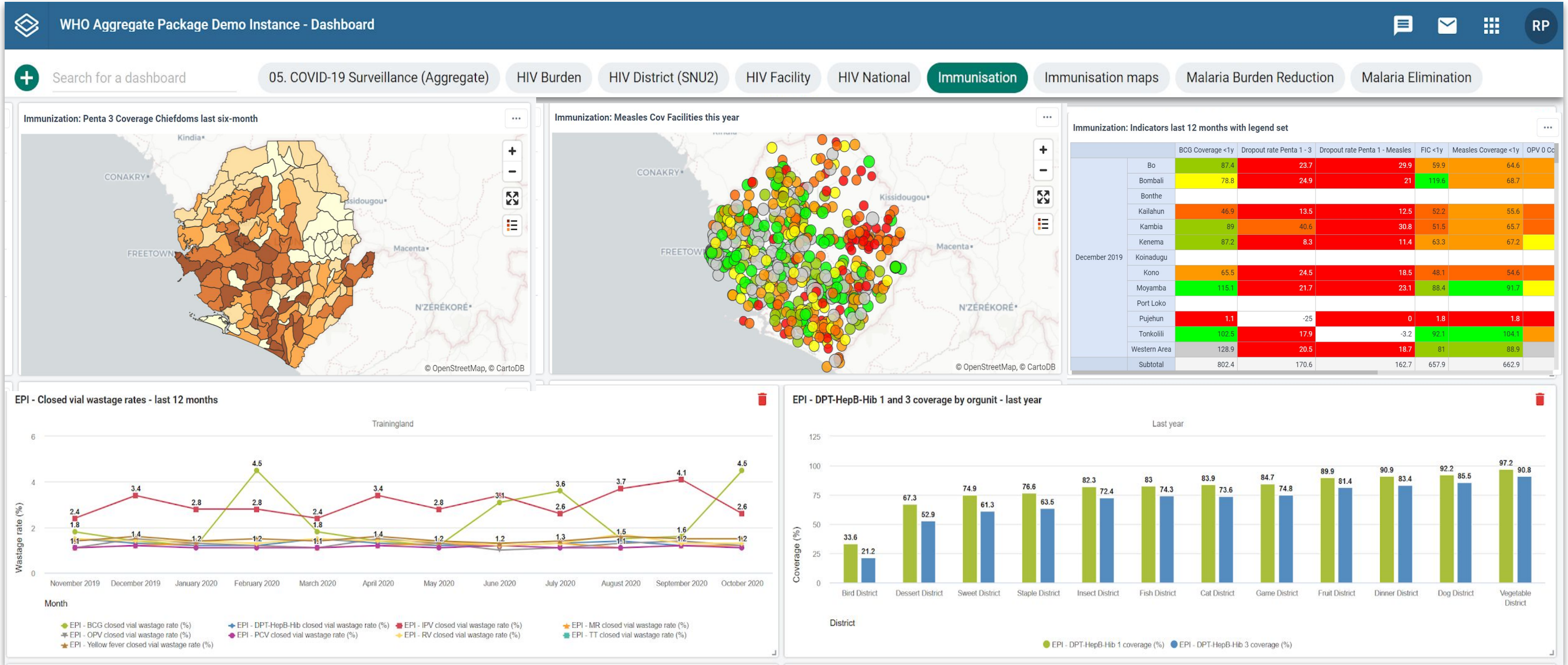
Five dashboards are included in the metadata package

1.EIR Overall Rollout
2. EIR Age Ranges
3. EIR Dropout Rates
4. EIR Vax Doses
5. EIR Immunization

Many indicators from the Immunization Tracker program are based on ***cohorts***, rather than raw counts.

Individual level data enables the capture and analysis of highly granular data and adds nuance to information systems, providing opportunities for ad hoc analysis, shifting indicators over time, and improving data quality

Analytics


WHO Aggregate Package Demo Instance - Dashboard
RP
Search for a dashboard
05. COVID-19 Surveillance (Aggregate)
HIV Burden
HIV District (SNU2)
HIV Facility
HIV National
Immunisation
Immunisation maps
Malaria Burden Reduction
Malaria Elimination

Immunization: Penta 3 Coverage Chiefdoms last six-month

Kindia
CONAKRY
FREETOWN
Kissidougou
Macenta
N'ZÉRÉKORÉ
© OpenStreetMap, © CartoDB

Immunization: Measles Cov Facilities this year

CONAKRY
FREETOWN
Kissidougou
Macenta
N'ZÉRÉKORÉ
© OpenStreetMap, © CartoDB

Immunization: Indicators last 12 months with legend set

		BCG Coverage <1y	Dropout rate Penta 1 - 3	Dropout rate Penta 1 - Measles	FIC <1y	Measles Coverage <1y	OPV 0 Cc
December 2019	Bo	87.4	23.7	29.9	59.9	64.6	
	Bombali	78.8	24.9	21	119.6	68.7	
	Bonthe						
	Kailahun	46.9	13.5	12.5	52.2	55.6	
	Kambia	89	40.6	30.8	51.5	65.7	
	Kenema	87.2	8.3	11.4	63.3	67.2	
	Koinadugu						
	Kono	65.5	24.5	18.5	48.1	54.6	
	Moyamba	115.1	21.7	23.1	88.4	91.7	
	Port Loko						
	Pujehun	1.1	-25	0	1.8	1.8	
	Tonkolili	102.5	17.9	-3.2	92.1	104.1	
	Western Area	128.9	20.5	18.7	81	88.9	
	Subtotal	802.4	170.6	162.7	657.9	662.9	

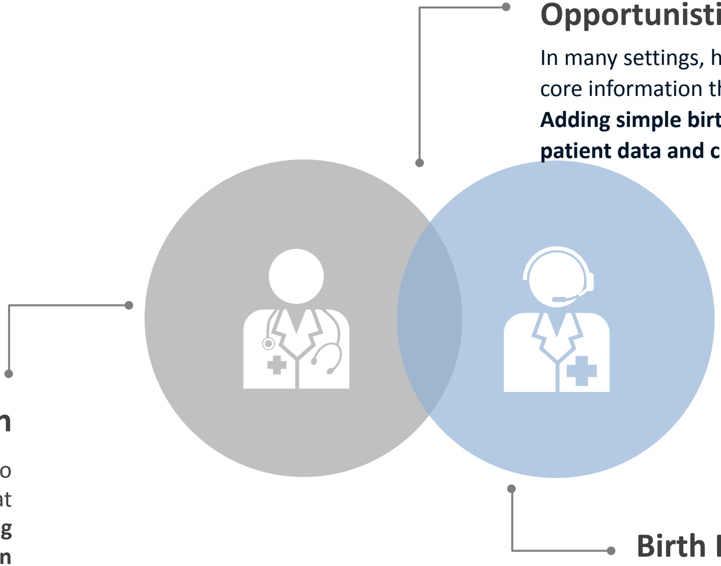
EPI - Closed vial wastage rates - last 12 months

Trainingland
Wastage rate (%)
6
4
2
0
2.4
3.4
2.8
4.5
2.8
2.4
3.4
2.8
3.1
3.6
2.6
3.7
4.1
4.5
2.6
1.8
1.4
1.2
1.2
1.8
1.4
1.2
1.2
1.3
1.5
1.6
1.2
1.1
1.1
1.1
November 2019
December 2019
January 2020
February 2020
March 2020
April 2020
May 2020
June 2020
July 2020
August 2020
September 2020
October 2020
Month
EPI - BCG closed vial wastage rate (%)
EPI - DPT-HepB-Hib closed vial wastage rate (%)
EPI - IPV closed vial wastage rate (%)
EPI - MR closed vial wastage rate (%)
EPI - OPV closed vial wastage rate (%)
EPI - PCV closed vial wastage rate (%)
EPI - RV closed vial wastage rate (%)
EPI - TT closed vial wastage rate (%)
EPI - Yellow fever closed vial wastage rate (%)

EPI - DPT-HepB-Hib 1 and 3 coverage by orgunit - last year

Last year
Coverage (%)
125
100
75
50
25
0
33.6
21.2
67.3
52.9
74.9
61.3
76.6
63.5
82.3
72.4
83
74.3
83.9
73.6
84.7
74.8
89.9
81.4
90.9
83.4
92.2
85.5
97.2
90.8
Bird District
Dessert District
Sweet District
Staple District
Insect District
Fish District
Cat District
Game District
Fruit District
Dinner District
Dog District
Vegetable District
District
EPI - DPT-HepB-Hib 1 coverage (%)
EPI - DPT-HepB-Hib 3 coverage (%)

Birth Notification to the CRVS



Opportunistic collection of vital data

In many settings, health workers already collect much of the core information that is needed to register a birth or death. **Adding simple birth details to the EIR strengthens longitudinal patient data and creates cross sectional data usage**

Birth Notification

The EIR creates multiple opportunities to help overcome barriers in ensuring that births are notified to the CRVS. **Adding notification questions to the EIR can create a cascade response with SMS, and email notifications** .

Birth Registration

With improved systems for registering births health systems benefit because such information is fundamental to health decision making, both in terms of the provision of care at the level of individuals, and also in terms of the **generation of statistics for decision making.**

Resources

Documentation EIR:
https://docs.dhis2.org/en/topics/metadata/immunization/eir-immunization-eregistry/design.html
Demo EIR: https://who-demos.dhis2.org/newdemos/
Metadata Package download EIR: https://dhis2.org/metadata-package-downloads/#eir

https://dhis2.org/immunization/

Contact your local HISP group for technical assistance.

Contact UiO if you don't have a relationship to a HISP group or for global questions: **post@dhis2.org**

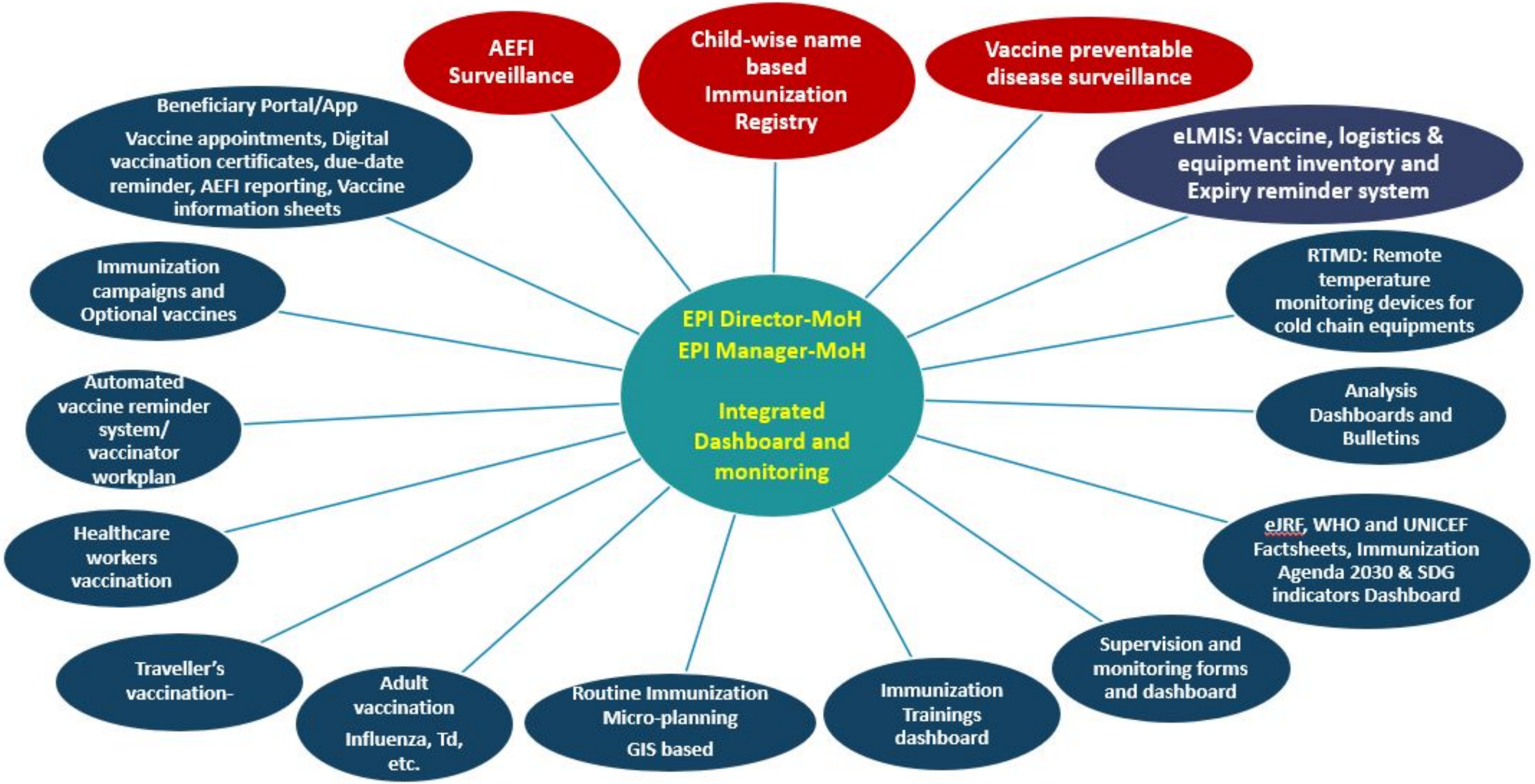
Ministry of Health
Republic of Maldives

Health
Protection
Agency

Comprehensive EIR Implementation in Maldives

Pamod Amarakoon
HISP Sri Lanka

Maldives Comprehensive Electronic Immunization Registry (EIR): DHIS2 overview



EPI Director-MoH
EPI Manager-MoH

Integrated Dashboard and monitoring

- AEFI Surveillance
- Child-wise name based Immunization Registry
- Vaccine preventable disease surveillance
- eLMIS: Vaccine, logistics & equipment inventory and Expiry reminder system
- RTMD: Remote temperature monitoring devices for cold chain equipments
- Analysis Dashboards and Bulletins
- eJRF, WHO and UNICEF Factsheets, Immunization Agenda 2030 & SDG indicators Dashboard
- Supervision and monitoring forms and dashboard
- Immunization Trainings dashboard
- Routine Immunization Micro-planning

  GIS based
- Adult vaccination

  Influenza, Td, etc.
- Traveller's vaccination-
- Healthcare workers vaccination
- Automated vaccine reminder system/ vaccinator workplan
- Immunization campaigns and Optional vaccines
- Beneficiary Portal/App

  Vaccine appointments, Digital vaccination certificates, due-date reminder, AEFI reporting, Vaccine information sheets

Credits: WHO CO - Maldives

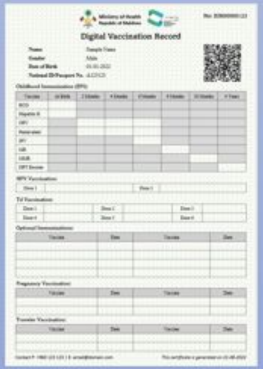
Technical Approach

Customization	Custom Developments	Integration
Child Immunization Registry	Beneficiary Portal	eLMIS
AEFI Surveillance	Immunization Certificate	Remote Temperature Monitoring
Vaccine Preventable Diseases	Immunization Microplanning	Integration with Birth Registration System
Healthcare Worker Vaccination		Vigiflow integration
Travelers Vaccination		
Adult Vaccination		
Supervision & Monitoring		
Analysis Dashboards		

Main Functions of EIR

Collect & Store Individual Level Vaccination Data

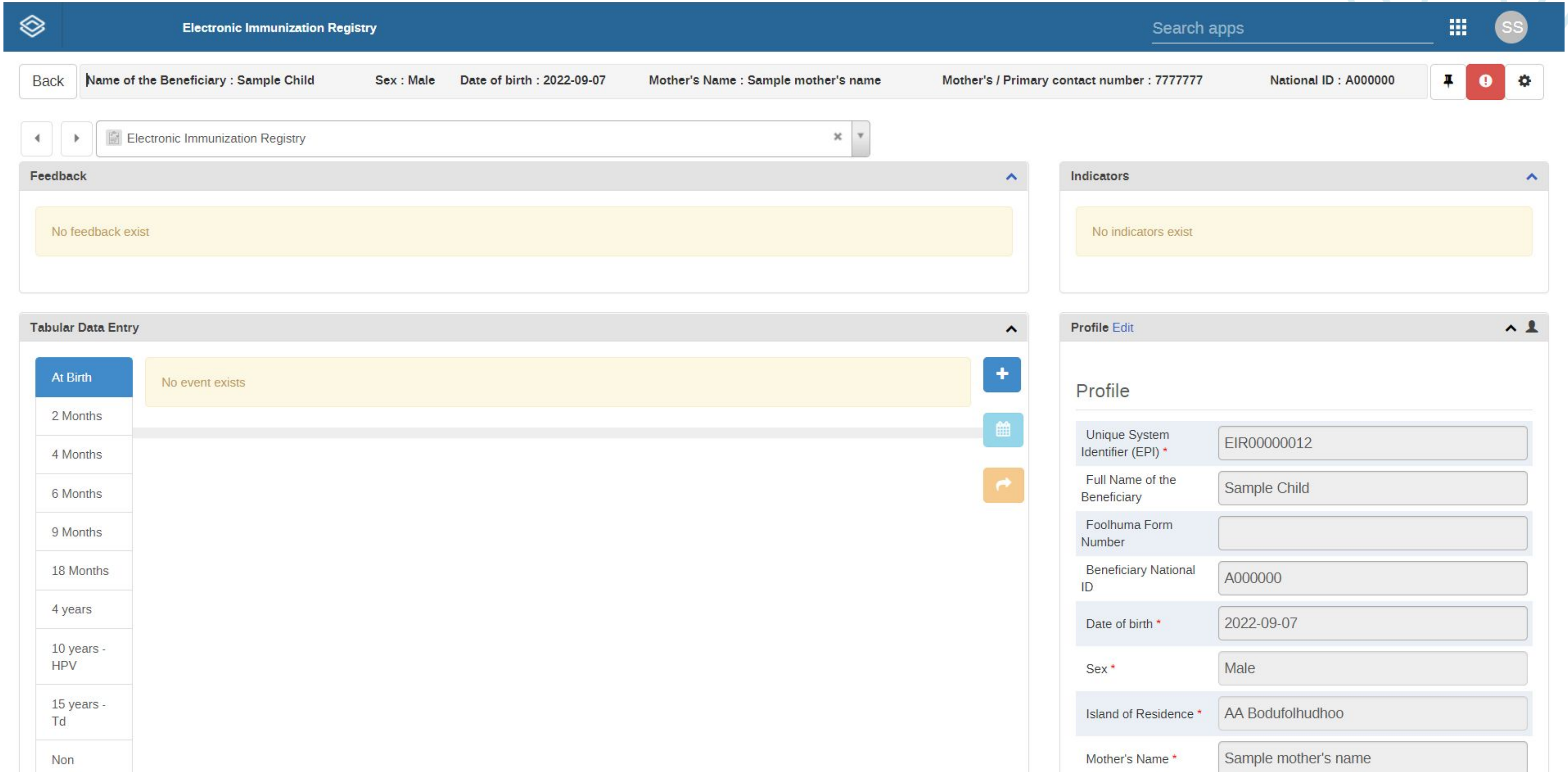
Analyze Data and Generate Reports



Digital Vaccination Record

Digital Vaccination Record through Beneficiary Portal

Tracked Entity Dashboard


Electronic Immunization Registry
Search apps
SS
Back
Electronic Immunization Registry
Feedback
Indicators
Tabular Data Entry
Profile Edit
At Birth
2 Months
4 Months
6 Months
9 Months
18 Months
4 years
10 years - HPV
15 years - Td
Non

Name of the Beneficiary : Sample Child Sex : Male Date of birth : 2022-09-07 Mother's Name : Sample mother's name Mother's / Primary contact number : 7777777 National ID : A000000

No feedback exist

No indicators exist

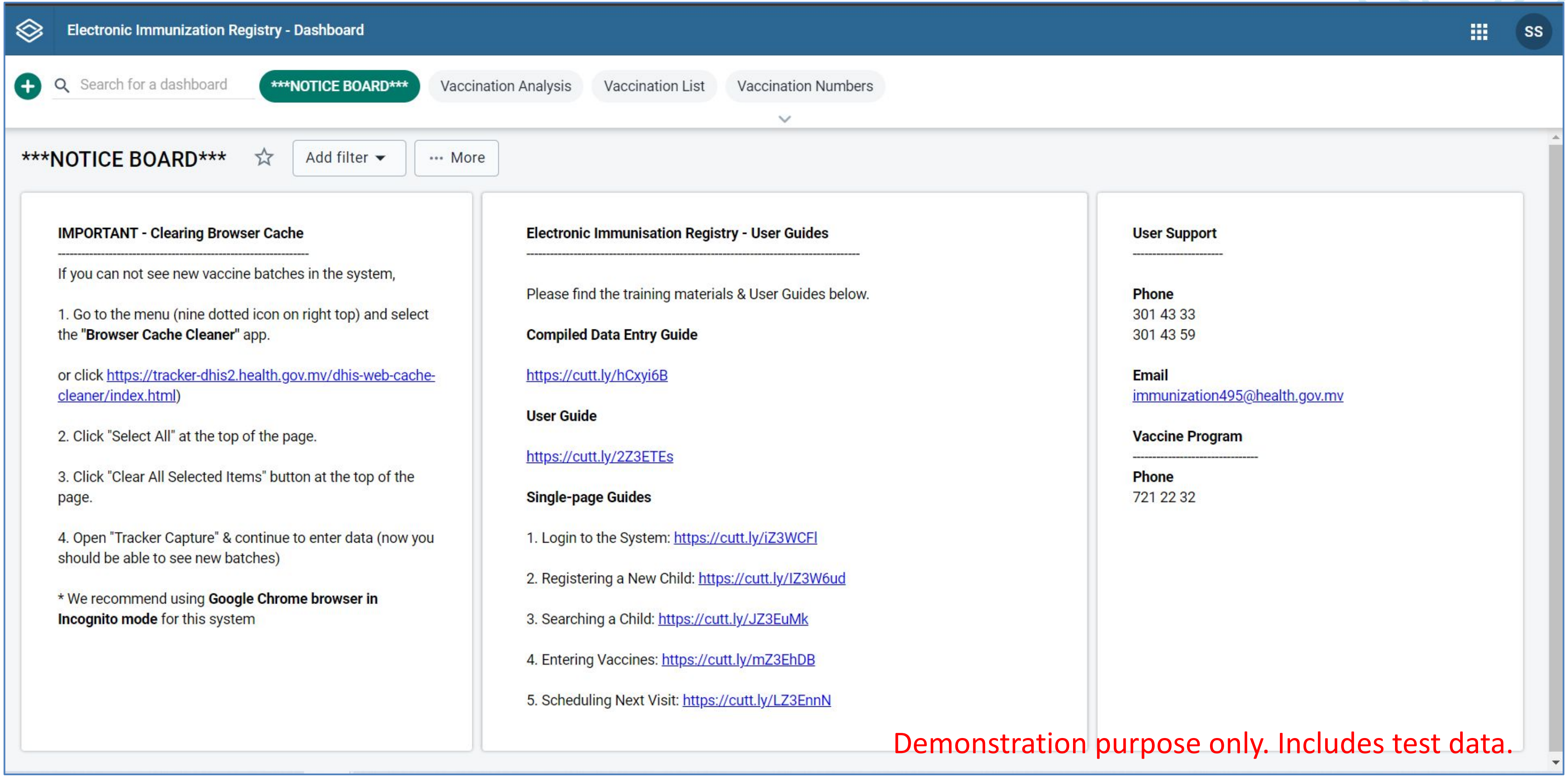
No event exists

Profile

Unique System Identifier (EPI) *	EIR00000012
Full Name of the Beneficiary	Sample Child
Foolhuma Form Number	
Beneficiary National ID	A000000
Date of birth *	2022-09-07
Sex *	Male
Island of Residence *	AA Bodufolhudhoo
Mother's Name *	Sample mother's name

Demonstration purpose only. Includes test data.

Dashboards


Electronic Immunization Registry - Dashboard
SS
Search for a dashboard
NOTICE BOARD
Vaccination Analysis
Vaccination List
Vaccination Numbers
Add filter
More

NOTICE BOARD

IMPORTANT - Clearing Browser Cache

If you can not see new vaccine batches in the system,

1. Go to the menu (nine dotted icon on right top) and select the "**Browser Cache Cleaner**" app.

or click https://tracker-dhis2.health.gov.mv/dhis-web-cache-cleaner/index.html)

2. Click "Select All" at the top of the page.

3. Click "Clear All Selected Items" button at the top of the page.

4. Open "Tracker Capture" & continue to enter data (now you should be able to see new batches)

* We recommend using **Google Chrome browser in Incognito mode** for this system

Electronic Immunisation Registry - User Guides

Please find the training materials & User Guides below.

Compiled Data Entry Guide

https://cutt.ly/hCxyi6B

User Guide

https://cutt.ly/2Z3ETEs

Single-page Guides

1. Login to the System: https://cutt.ly/iZ3WCFl

2. Registering a New Child: https://cutt.ly/IZ3W6ud

3. Searching a Child: https://cutt.ly/JZ3EuMk

4. Entering Vaccines: https://cutt.ly/mZ3EhDB

5. Scheduling Next Visit: https://cutt.ly/LZ3EnnN

User Support

Phone
301 43 33
301 43 59

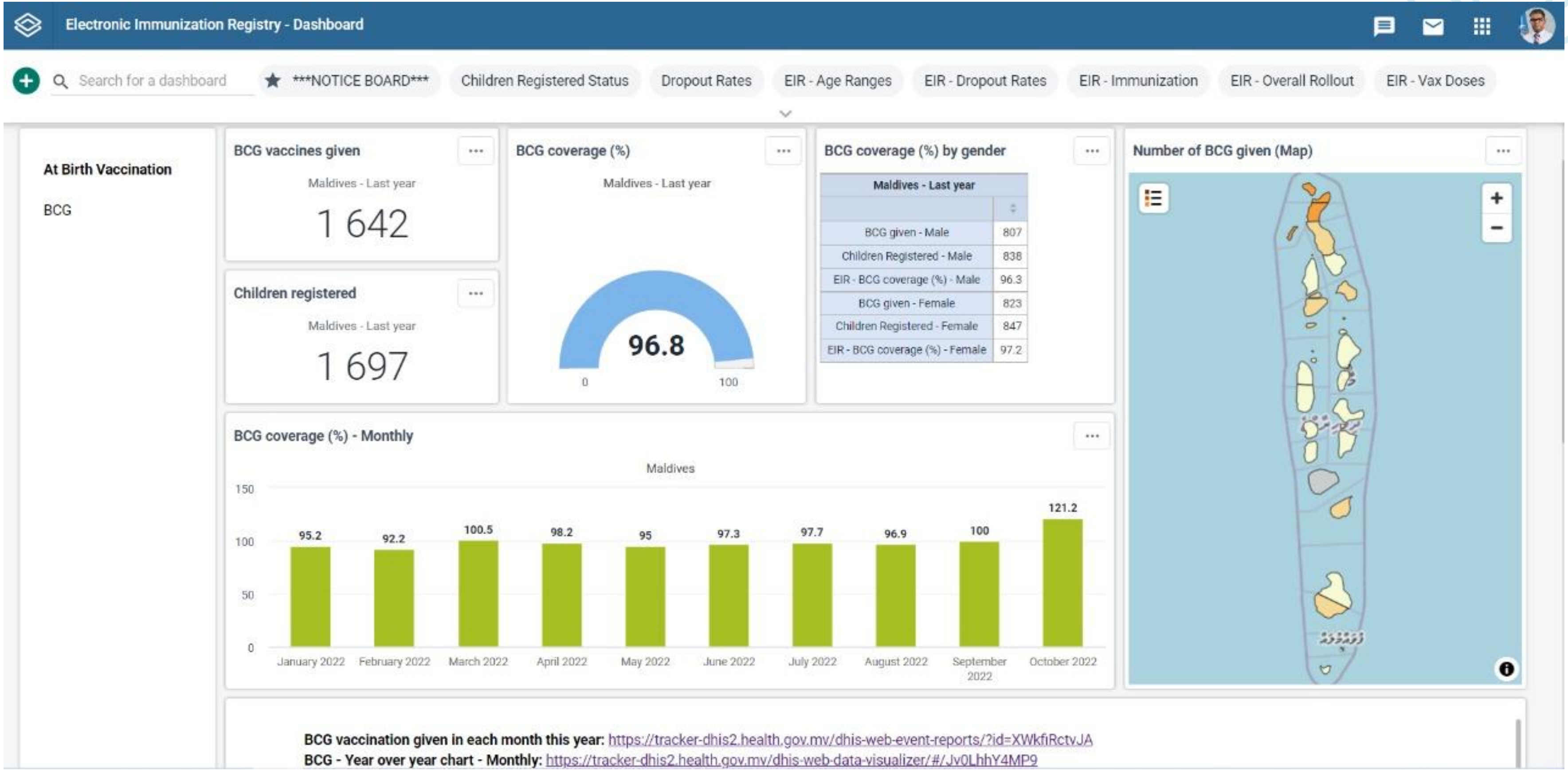
Email
immunization495@health.gov.mv

Vaccine Program

Phone
721 22 32

Demonstration purpose only. Includes test data.

Dashboards


Electronic Immunization Registry - Dashboard
Search for a dashboard
NOTICE BOARD
Children Registered Status
Dropout Rates
EIR - Age Ranges
EIR - Dropout Rates
EIR - Immunization
EIR - Overall Rollout
EIR - Vax Doses
At Birth Vaccination
BCG
BCG coverage (%)
0
100
BCG coverage (%) - Monthly
Maldives
150
100
50
0
95.2
92.2
100.5
98.2
95
97.3
97.7
96.9
100
121.2
January 2022
February 2022
March 2022
April 2022
May 2022
June 2022
July 2022
August 2022
September 2022
October 2022
Number of BCG given (Map)

BCG vaccines given

Maldives - Last year

1 642

Children registered

Maldives - Last year

1 697

BCG coverage (%)

Maldives - Last year

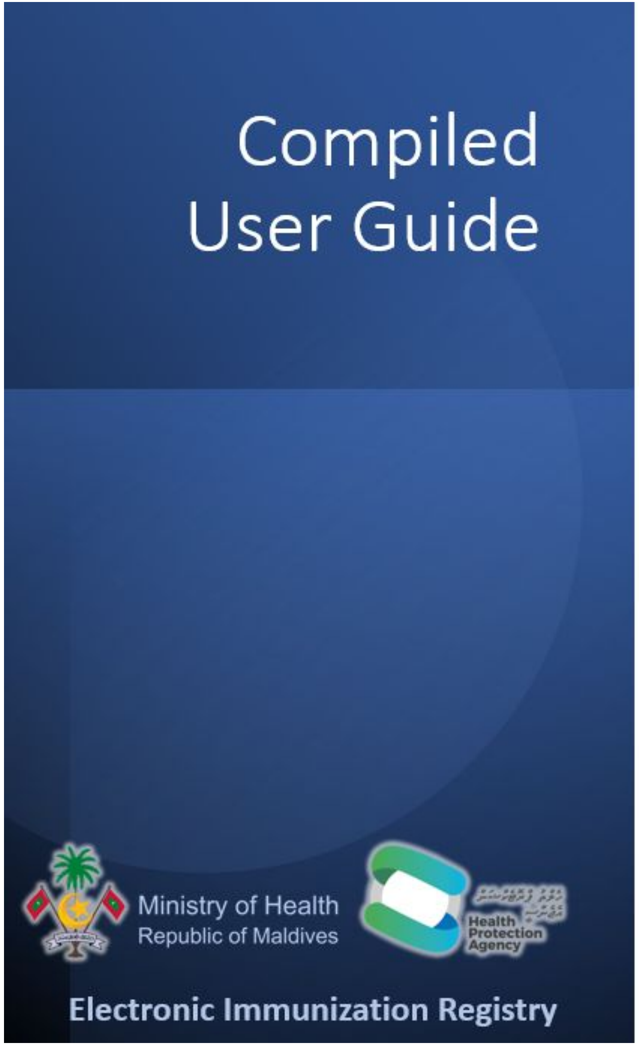
96.8

BCG coverage (%) by gender

Maldives - Last year	
BCG given - Male	807
Children Registered - Male	838
EIR - BCG coverage (%) - Male	96.3
BCG given - Female	823
Children Registered - Female	847
EIR - BCG coverage (%) - Female	97.2

BCG vaccination given in each month this year: https://tracker-dhis2.health.gov.mv/dhis-web-event-reports/?id=XWkfiRctvJA
BCG - Year over year chart - Monthly: https://tracker-dhis2.health.gov.mv/dhis-web-data-visualizer/#/Jv0LhhY4MP9

Demonstration purpose only. Includes test data.

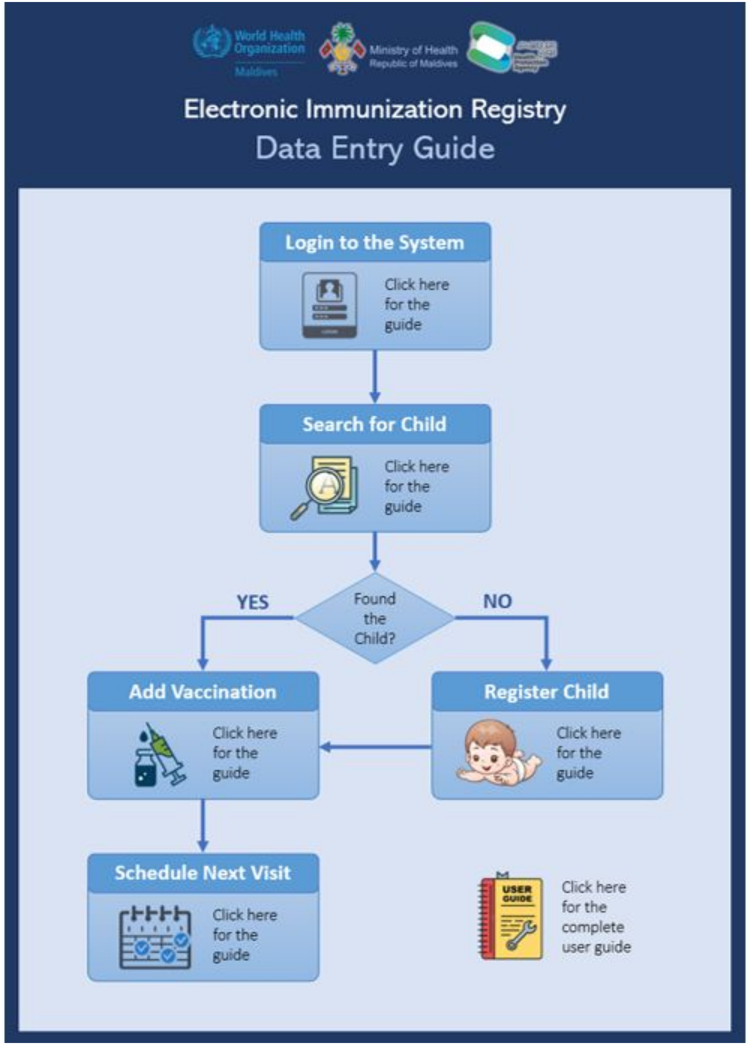


Compiled User Guide

Ministry of Health
Republic of Maldives

Health Protection Agency

Electronic Immunization Registry



World Health Organization
Maldives

Ministry of Health
Republic of Maldives

Electronic Immunization Registry

Data Entry Guide

Login to the System
Click here for the guide
Search for Child
Click here for the guide
Found the Child?
YES
NO
Add Vaccination
Click here for the guide
Register Child
Click here for the guide
Schedule Next Visit
Click here for the guide
USER GUIDE
Click here for the complete user guide

Principal Stakeholders

Ministry of Health
Republic of Maldives

Health Protection Agency

World Health Organization
Maldives

unicef
for every child

Status

- EIR fully customized, piloted and implemented at national level
- 35% of birth cohort registered & followed up in the system – 2 months of implementation
- AEFI & VPD Surveillance customized
- Beneficiary portal developed & ready to piloted

Learnings

- Use of dhis2 EIR metadata package
- Proper use of customization, custom developments & integration
- Country context & stakeholders
- Building in-country capacity
- Scaling, support & maintenance

Digital Health
Centre of
Excellence

TechNet-21
The Technical Network for
Strengthening Immunization Services

October 4th, 2022

An Introduction to DHIS2 Tracker & Bangladesh Use Case

Muhammad Masud Parvez, Unicef, Health Officer
Md. Jahid Hossen Shahed, Unicef, Health Officer

Background Situation

- 1.Bangladesh achieved fully vaccination coverage 82%, however the coverage remain static from 80% – 85% for years
- 2.Significant coverage gaps between urban vs rural and geographical areas
- 3.Gaps between valid and crude coverage
- 4.Big difference between administrative and survey coverage
- 5.Invalid doses, dropout and left out are main reason for low coverage
- 6.Fixing correct denominator is a big challenge
- 7.Unable to identify the zero dose children

Objective to introduce immunization E-tracker

- To increase valid Fully Vaccination Coverage to 95% from 82% which is stagnant for years
- Establish online registration system to monitor unvaccinated, partially vaccinated and fully vaccinated children
- Reduce invalid doses, left out and drop out through SMS to mothers and workers
- Reduce gaps between a) rural, urban and slums b) HTR and non HTR c) geographical areas

Requirements from Immunization E-tracker

- Both android and web base
- Registration of children as per current manual registration element
- Vaccination record entry as per current EPI schedule
- SMS to mother/guardians for registration, due dose, dropout dose and completion of vaccination.
- Pop up messages to vaccinator for invalid dose
- SMS to supervisor/managers for invalid dose
- List of due doses and overdue doses
- Offline data entry
- Country capacity, adaptability and sustainability

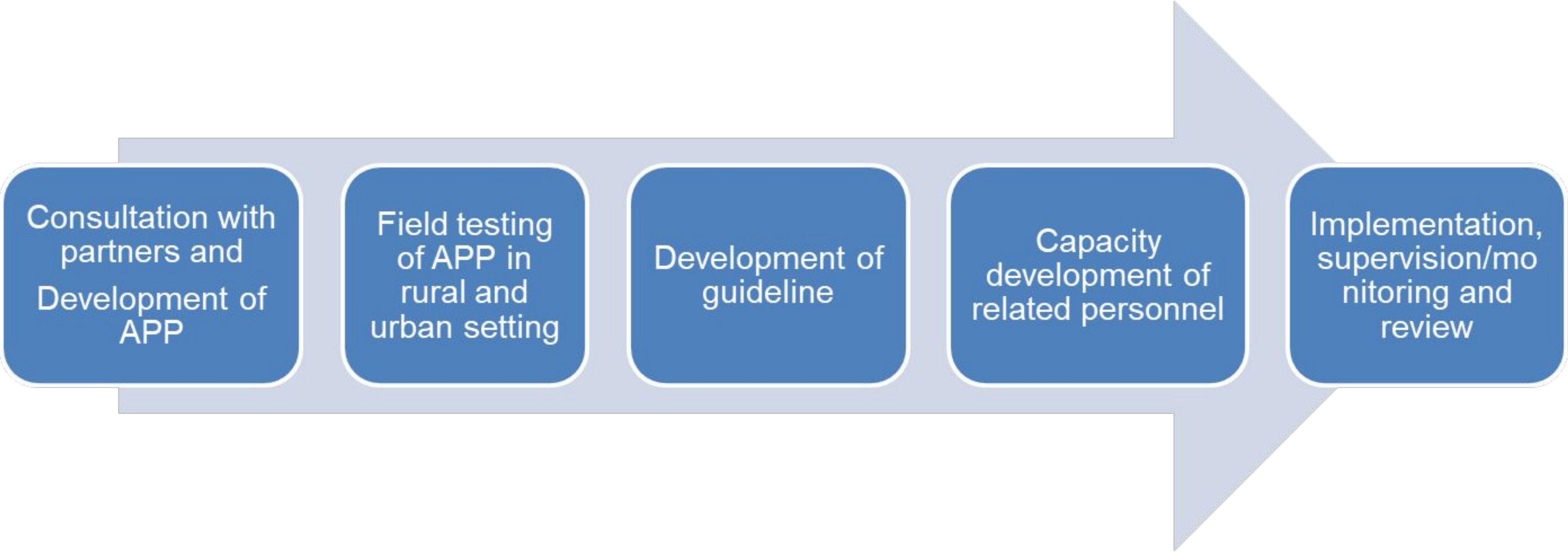
Why we selected DHIS2 tracker

- 2010 - Bangladesh is using DHIS2 to collect facility and community level aggregate data
- 2015 - All health managers and field level users were oriented on DHIS2
- 2015 - Community level maternal and child health tracking from 2015 through 14,000 community clinic
- 2016 - EPI program using DHIS2 aggregate datasets to collect vaccination, vaccine and logistics information
- 2016 – Introduce cold chain equipment inventory through DHIS2 tracker
- Technical expertise on DHIS2 is available and is opensource, free to use and have strong community support
- 2019 – Introduction of Immunization E-Tracker

How was the platform applied to the context to solve the problem?

- Using DHIS2 tracker module to register every child
- Flexible customization mechanism to design as per country immunization schedule
- Built-in SMS module to send reminder & defaulter to beneficiary & Health worker
- Built-in indicator & notification function facilitate to reduce invalid doses
- Flexible & advance analytics to reduce the zero dose
- GIS functionality to identify the service gap
- Reports generated to identify invalid dose, left out and drop out

Implementation timelines and steps



- Consultation with partners and Development of APP
- Field testing of APP in rural and urban setting
- Development of guideline
- Capacity development of related personnel
- Implementation, supervision/monitoring and review

EPI E-tracker implementation

Moulvibazar District

7 Upazila
3 Municipality
67 Unions
1584 Outreach sites

Rural

Cox's bazar District

8 Upazila
1 Municipality
72 Unions
1746 Outreach sites

Rural

Dhaka South City Corporation

1 Zone
15 Wards
122 Vaccination sites

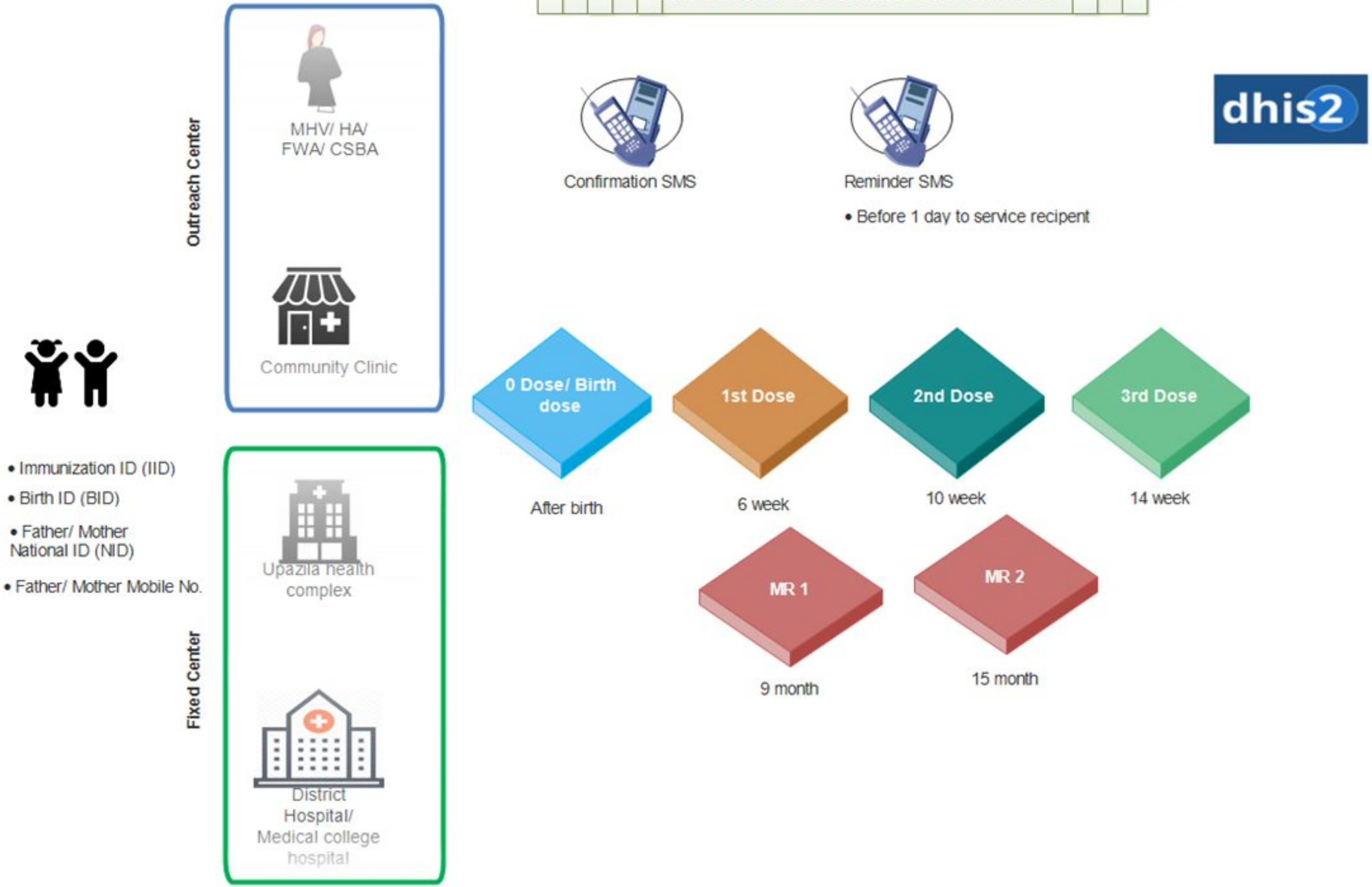
Urban

Rohingya refugee/Forcibly Displaced Myanmar Nationals (FDMN)

32 Camps
56 Outreach

Humanitarian response

E-Tracker Child Immunization



- Immunization ID (IID)
- Birth ID (BID)
- Father/ Mother National ID (NID)
- Father/ Mother Mobile No.

Outreach Center

MHV/ HA/
FWA/ CSBA

Community Clinic

Fixed Center

Upazila health complex

District Hospital/ Medical college hospital

Confirmation SMS

Reminder SMS

- Before 1 day to service recipent

dhis2

0 Dose/ Birth dose	1st Dose	2nd Dose	3rd Dose
After birth	6 week	10 week	14 week

MR 1	MR 2
9 month	15 month

Benefit and impact

Conducted Implementation research for E-tracker implementation in June to August 2021

Effectiveness mentioned in IR:

- *Overall, 50 (13.6%) caregiver received SMS notifications prior to the vaccination dates. All of them agreed it acted as a reminder about the vaccination date for them.*
- *The e-Tracker system aided in easy tracking of the dropout children using the digital platform (calling via mobile and sending out SMSs).*
- *Using e-Tracker help vaccinator to avoid giving invalid dose*
- *As monitoring of immunization activities became easier following the e-Tracker system, timely measures could be taken to minimize problems.*
- *The program aiding in notifying beneficiaries via short message services (SMS) to ensure a valid and effective vaccination process*

Conclusion of IR:

The e-Tracker intervention worked almost smoothly during the pilot phase because of the active involvement of the relevant stakeholders, namely EPI, MIS, and UNICEF. However, the IR study identified some significant challenges related to the service delivery for the project. A heavy technology-dependent intervention requires skilled workforces.

Contracting options and cost categories

Contracting options (DHIS2 is Opensource and free)

- Local vendor/HiSP
- UiO

Cost categories

- Server and infrastructure
- Cloud service
- Devices and accessories
- SMS
- Training
- Monitoring and supervision
- Annual maintenance

Pros

- Truly open-source software for customization & implementation
- Strong community support
- Flexible customization mechanism to design data entry form
- Version update in regular interval
- No vendor lock
- Followed international standard for security and privacy

Cons

- System performance could be affected based on server capacity & tracker design
- Global search configuration is tricky
- Vaccine card report printing required special skill
- Server configuration & maintenance need special skill
- System error log is difficult to interpret