Benefits and Implementation Considerations for Electronic Immunisation Registries (EIRs)
Welcome & Introductions

Please type your **name, organization and country** in the chat section!
Simultaneous interpretation

Изменение языка синхронного перевода

ENG: In your webinar controls, click the interpretation

RU: В элементах управления вебинаром нажмите интерпретацию

ENG: Click the language that you would like to hear

RU: Нажмите на язык, который вы хотели бы услышать
Housekeeping

- Keep your microphone muted
- We will not be using webcams (other than presenters)
- For technical support, write to dhanusha@ihp.lk

Send questions using the chat box
### About Linked

Gavi’s collaborative learning network for middle-income countries

<table>
<thead>
<tr>
<th>WHAT</th>
<th>WHY</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative peer-learning and problem-solving network to support strong, sustainable immunisation programs</td>
<td>To help MICs prevent and mitigate backsliding in coverage &amp; sustainably introduce key missing vaccines (HPV, Rota, PCV)</td>
<td>Action-oriented learning engagements and ongoing linkages with immunisation stakeholders at country and regional levels</td>
</tr>
</tbody>
</table>

- Former Gavi countries in South Asia Pacific (6), Euro and Central Asia (7), Latin America (5), Africa (1)
- Never Gavi countries TBA

![Gavi Logo](linkedimmunisation.org) | ![IHP Logo](linkedimmunisation.org) | ![CIF Logo](linkedimmunisation.org) | ![RESULTS FOR DEVELOPMENT Logo](linkedimmunisation.org)

**Linked Immunisation Action Network**
Agenda

▪ Use of Electronic Immunisation Registers to strengthen immunisation programs
  ▪ Q&A
▪ Vietnam’s experience using EIRs for routine & COVID-19 vaccinations
  ▪ Q&A
▪ Bhutan’s experience using a COVID-19 registry
  ▪ Q&A
▪ Closing remarks
Learning Objectives

1. To describe EIRs and their potential benefits to routine immunisation programs.

2. To learn from countries that have utilized EIRs for both routine and COVID-19 vaccination about their transition from paper-based systems and their EIR evolution over time.

3. To identify implementation challenges for EIRs (finance, design, technical, training).

4. To understand barriers and challenges to adoption in countries that do not have EIRs.
Use of Electronic Immunisation Registers to strengthen immunisation programs

- A/Prof Meru Sheel
- Sydney School of Public Health
- University of Sydney
- e: meru.sheel@sydney.edu.au
- @merusheel
1. Electronic immunisation registries (EIRs) and immunisation information systems
   • Health Information Management Systems
2. Usefulness of EIRs in strengthening immunisation programs
   • Individual level
   • Population level
3. Considerations for implementation
Electronic immunization registries (EIRs)

• Tools that facilitate the monitoring of individual immunization schedules and the storage of individual immunization histories, and, consequently, help enhance the performance immunisation program.

• Immunisation registries can also be paper-based and non-individual
Immunisation information systems (IIS)

- Produce information that will guide the strategic, managerial, and operational decisions of the EPI within each country.
Health information systems (HIS)

- Tool for collection, processing, analysis, and transmission of information required for organizing and operating health services.

- Provide useful, high-quality data in a timely fashion. Improvements in health information systems arise from the changing information needs of programs, sectors, users, and the population.
Inter-relationships among HIS and IIS

Do you have an immunisation registry in your area/ country?
How can EIRs be used?
Sheel et al, Vaccine, 2020, Electronic immunization registers – A tool for mitigating outbreaks of vaccine-preventable diseases in the Pacific

**Electronic Immunization Registry**

**BENEFITS**

- Improves the vaccine recipient’s experience
- Improves EPI performance
- Improves EPI management and efficiency
- Provides improved evidence for operational response and research

**Examples**

- Stores vaccine history
- Helps ensure the quality of vaccine administration
- Improves coverage through follow-up
- Reduces dropout rates
- Improves indicators of simultaneity in vaccine administration
- Improves resource and activity planning processes
- Enables support for training and supervision
- Assess provider workload immunisation productivity
- Allows complete vaccine traceability
- Guides outbreak management
- Supports estimation of vaccine effectiveness
- Supports vaccination safety studies
Australian Immunisation Register

- Established 1996 – childhood vaccines <7 years
- Maintained by Services Australia on behalf of Australian Government Department of Health
- Jan 2016 – expanded to age 19 years
- Oct 2016 – expanded to include all ages
- 2018 – National HPV vaccine register data transferred to AIR

Australian Childhood Immunisation Register (ACIR)

Identifying and definitional attributes

<table>
<thead>
<tr>
<th>Item type:</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>The Australian Childhood Immunisation Register (ACIR) is a national register administered by Medicare Australia that records details of vaccinations given to children under seven years of age who live in Australia. It was established in 1996 in response to a decline in childhood immunisation levels and an increase in preventable childhood diseases.</td>
</tr>
</tbody>
</table>


Slide courtesy: A/Prof Frank Beard
How does AIR work?

- Anyone Medicare-registered automatically added and assigned PIN
- If not Medicare-registered but vaccination reported assigned SIN
- Overseas vaccinations can also be added
- Limited data fields
  - Vaccine, dose number, date
  - Age, sex, Indigenous status, postcode of residence
  - Provider type
  - Exemptions (validated by authorised providers)
- But Medicare number is not a unique ID…
Individual level follow-up

- Compliance with vaccination schedule
- Reminder for those who maybe overdue (eg SMS)
- Safety monitoring for individuals
- Vaccine certificates (eg COVID-19 vaccine certificate)
- Immunisation history statement (eg for school entry program)
Program evaluation for population impact

Coverage

Program evaluation for population impact

Coverage using administrative and survey methods

**Routine administrative method**

**Advantages:**
- Based on data necessary for service provision
- Timely management monitoring tool
- Provides data at local level

**Disadvantage / Limitations:**
- Denominator (target population may be projected based on old/poor census data)
- Transcription or calculation errors
- Incomplete reporting
- May include vaccination conducted outside the target group
- May not include private sector

**Survey method**

**Advantages:**
- Estimate of coverage can be obtained if the denominator is unknown.
- Provides additional information on social economical status, maternal characteristics, sex, etc of reached and unreached children
- Vaccinations given by the private sector reflected
- Allows assessing timeliness (among those with cards)

**Disadvantage / Limitations:**
- Bias – selection, information and sampling error
- Provides information on the previous birth year’s cohort.
  - Immunization card availability and quality
  - Reliance on recall in absence of card
  - Representativeness
- Interviewer interaction
- Length or complexity of the questionnaire may compromise accuracy
- Resource intensive

Adapted from WHO, Dr Jan Grevendonk
Program evaluation for population impact

Tailored immunisation programs

See Thomas et al 2022 Vaccine.
Program evaluation for population impact

Effectiveness

- Vaccine effectiveness
  - Needs individual vaccine data linked to disease outcome data
  - Context-specific data
  - Builds program confidence

- Cost-effectiveness
- Efficiency, outbreak response

- Adverse events monitoring

https://www.gavi.org/vaccineswork/what-difference-between-efficacy-and-effectiveness
Norway and Denmark

- One of the most advanced
- Unique identifier
- Norwegian SYSVAK (established 1995)
- Danish vaccination register (established 2013)
- Based on unique PIN issued at birth or immigration
- Facilitates linkage to other national health registers
- Eg MMR/autism cohort study (660,000 children) linking data on autism diagnoses and risk factors
Observational data from Tanzania

- Potential to add value to immunization stakeholders at all levels of the health system.
- Individual-level data can enable new analyses to understand service delivery or care-seeking patterns, potential risk factors for under-immunization, and where challenges occur.

To achieve this potential, country programs need to leverage and strengthen the capacity to collect, analyze, interpret, and act on the data.

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Preprints (earlier versions) of this paper are available at https://preprints.jmir.org/preprint/32455, first published July 20, 2021.

Added Value of Electronic Immunization Registries in Low- and Middle-Income Countries: Observational Case Study in Tanzania

Andrew M Secor 1; Hassan Mtega 2; John Richard 2; Ngwegwe Bulula 3; Ellen Ferriss 1; Mainsi Rathod 1; Tove K Ryman 4; Laurie Werner 1; Emily Carnahan 1

Secor et al, 2022,https://publichealth.jmir.org/2022/1/e32455
How do you use?
- individual data
- aggregated data
Considerations for implementation
To make the most of new EIRs....

• Unique identifier
  • Denmark, Norway, New Zealand

• Clinical decision support systems to aid medical practitioners and improve individual experience Population denominator

• Data quality
  • Incomplete reporting and timeliness
  • Audit of the Australian Register
  • Mandated through COVID-19 in Australia

• All-of-life esp in the context of COVID-19 vaccines
To make the most of new EIRs....

- Alignment with other components of immunisation information systems
  - VPD surveillance, notification, hospitalisation, deaths
- Real-time data analyses
- Interaction with electronic medical records/ 2-way interactive platform
- Resource allocation – hardware, software and human resources for data quality
- Data governance and privacy
Conclusions

• EIRs and Immunisation Information Systems can **improve vaccine coverage** and strengthening immunisation programs
• Data can enable **data-drive decision making**
• Strengthen immunisation information systems
• For settings where COVID-19 registries have been established, **program and process evaluation** can help with integration – don’t waste a crisis!
• **EIRs take a long time to mature** – ensure resource allocation
Q&A session

Please type your question in the chat
Vietnam’s experience of using EIRs for routine & COVID-19 vaccinations

Mr. Sang Dao Dinh, MPH
IDEAL–Vietnam Team Lead
PATH, Vietnam
System main functions: Immunization Registry Module

Commune Health Center

- Barcode Scan
- SMS Reminder
- Immunization Tracker & Planning
- Dashboard and reports
- E-Immunization Card

Fee-based Immunization Facility

Hospital
EIR System cloned for COVID-19 vaccination

Commune Health Center

Barcode Scan
SMS Reminder
Immunization Tracker & Planning
Dashboard and reports
PC-Covid

Mobile Vaccination Sites
Hospital
Timeline of the EIR introduction and scale-up in Vietnam

- Developed Vaxtrak and ImmReg
- Tested in small-scale, district-level pilots
- VaxTrak Scaled up nationwide by MOH

2014-2015
- Transferred ImmReg/VaxTrak technology towards the development of the NIIS
- NIIS launched nationwide in March 2017 by MOH

2012-2013
- VaxTrak and ImmReg integrated into one system and scaled up
- Evaluation revealed the system increased on-time vaccination and reduced drop-out-rates

2016-2017
- Focus on increasing NIIS uptake and improving data quality and data use
- Transition to paperless immunization records

2018-2022
Facilitators and Barriers
# mHealth Assessment and Planning for Scale

| 1. GROUNDWORK | The initial steps of specifying the key components of the project’s approach to scaling up, assessing relevant contextual influences, and taking stock of the scientific basis for the product |
| 2. PARTNERSHIPS | Collaborations with external groups to support the process of scaling up, including strategies for identifying, developing and sustaining fruitful partnerships |
| 3. FINANCIAL HEALTH | The projection of scale-up costs, and the development of a financial plan for securing and managing funds over the long term |
| 4. TECHNOLOGY & ARCHITECTURE | Steps taken to optimize the mHealth product for scaling up based on its anticipated user base, purpose, integration with information systems and compatibility with other components of the information systems architecture |
| 5. OPERATIONS | Organizational and programmatic measures for supporting the implementation, use and maintenance of the product throughout the scaling-up process |
| 6. MONITORING & EVALUATION | Decisions and activities that enable effective process monitoring and in-depth outcome evaluation, based on project and stakeholder need |

### Groundwork/Partnerships

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Landscape Assessment</td>
<td>• Time</td>
</tr>
<tr>
<td>• Business model framework</td>
<td>• Poor infrastructure</td>
</tr>
<tr>
<td>• Small-scale pilots</td>
<td>• Lack of foundational national policies</td>
</tr>
<tr>
<td>• Government commitment and priorities</td>
<td>• Cost of national scale-up underestimated</td>
</tr>
<tr>
<td>• Foundational guidelines</td>
<td>• Population growth was not factored in</td>
</tr>
<tr>
<td>• Costing analysis</td>
<td>• Time/learning curve</td>
</tr>
<tr>
<td>• Support from government partners</td>
<td>• Lack of initial formal contracts</td>
</tr>
<tr>
<td>• Formation of technical working group</td>
<td></td>
</tr>
<tr>
<td>• Partnership with technology expert as a service provider</td>
<td></td>
</tr>
</tbody>
</table>
# Technology

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mobile Network Operator capabilities</td>
<td>• Lack of national ID</td>
</tr>
<tr>
<td>• Sustainable technical leadership</td>
<td>• Large data</td>
</tr>
<tr>
<td>• End-user feasibility and feedback</td>
<td>• Fee-based and private facilities</td>
</tr>
<tr>
<td>• Data security and quality</td>
<td></td>
</tr>
<tr>
<td>• Not a handover software</td>
<td></td>
</tr>
<tr>
<td>• API</td>
<td></td>
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</tbody>
</table>
## Operations and Monitoring & Evaluation

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ToT as a sustainable method for training large audience</td>
<td>- More time needed for ToT training than anticipated</td>
</tr>
<tr>
<td>- Training support from PATH</td>
<td>- Lack of funding for EIR-specific supervision visits</td>
</tr>
<tr>
<td>- Training provincial and district staff provided sustainable layers of technical support</td>
<td>- Supervisors do not have enough time to prioritize the NIIS supervision</td>
</tr>
<tr>
<td>- Technical support well planned for long-term sustainability</td>
<td>- SOPs for supportive supervision pre- and post- training not developed</td>
</tr>
<tr>
<td>- Input data used to determine supervision priorities</td>
<td>- Few resources are available for monitoring</td>
</tr>
<tr>
<td>- M&amp;E framework was developed at an early stage</td>
<td>- Inconsistent data quality remains an issue</td>
</tr>
</tbody>
</table>
Lessons learnt
Phase 1: System Design and Development

• Form TWG
• Conduct Landscape Assessment
• Develop User Requirement Document: User-center Approach
• Select and collaborate with appropriate MNO
• Develop System Technical Specification document: follow both national and global standard
• Develop Detailed Testing Plan to evaluate functions carefully
Phase 2: Small Pilot

- Continue maintain and strengthen roles of TWG
- Pilot in small sites
- Mobilize resources from international organizations
- Advocate and engage the involvement and commitment of authorities at levels from the beginning
- Sufficient timeline for piloting to provide meaningful evaluation
- Develop the implementation guideline and necessary SOPs
- Capture lessons learnt and challenges during the pilot
- Conduct Cost Analysis for Scale-up
Phase 3: Nationwide Scale-up

• Continue maintain and strengthen roles of TWG
  • Develop planning and roadmap for the implementation
  • Develop and issue regulations/policies related to the implementation of the system

• Update and Upgrade the system
  • Maintain the partnership with MNO to update/upgrade the system on time to meet the requirements of end-users, changes of policy.

• Develop the guidelines and SOPs
  • The implementation guideline
  • The guideline on data quality and data use
  • Necessary SOPs
Phase 3: Nationwide Scale-up (Cont.)

• Prepare infrastructures and equipment:
  • Internet connectivity
  • Computers, printers, barcode reader

• Capacity building for health workers at levels
  • Conduct TOT trainings
  • Conduct Cascade trainings with multiple approaches such as on-site training, virtual training and e-learning
Phase 3: Nationwide Scale-up (Cont.)

- Mobilize resources
  - Local budget
  - Support from international organizations
  - Resources from local enterprises
- Monitoring and technical support
  - Develop monitoring and evaluation framework
  - Strengthen technical support from the beginning of the implementation
  - Use multiple approaches for technical support: on-site and virtual
Phase 4: Transition to paperless

- Strengthen commitment of local authority
- Ensure the system operate stably and inter-operably with other systems
- Mobilize and engage the involvement of the hospitals and fee-based-immunization facilities
- Improve data quality and cultivate data use skills for health workers
- Develop and issue guidance and regulations related to the transition to paperless system/retirement of the paper-system
Thank you
Q&A session

Please type your question in the chat
Bhutan’s experience of using COVID-19 registries

Mr. Garab Dorji
Chief ICT Officer
ICT Division, Ministry of Health, Bhutan
Q&A session

Please type your question in the chat raise your hand
Feedback survey

Please let us know what you think about this learning engagement & how we can improve us next time!
Closing remarks

Mrs. Hashta Meyta
Head Secretariat for coordination and integration of the Gavi Immunization Program
Ministry of Health, Republic of Indonesia
Linked Steering Committee Member
Thank you!
Annexure
EXTRA SLIDES – Bhutan
Menus

Menu:
1. Vaccine (COVID19)
2. Dashboard
3. Vaccination
4. Zero AEFI Reporting
5. Campaign
6. Reports
7. Registration
8. Registration Category
9. Vulnerable Population
10. Vaccines
11. Vaccine Brands
12. Health Facilities
13. Comorbidity
14. Inventory (Sub Menu)
15. Master Setting (Sub Menu)
16. AEFI Check List
17. Roles
18. Permissions
19. Schools
20. Disabilities
21. Occupations
22. Occupation Sectors
23. ICE Type
24. Vulnerability Criteria
25. Reports
26. SMS Logs
27. Offline App Data

Sub Menus:
Reports:
- a. Vaccination,
- b. AEFI,
- c. Pre-Screening
- d. Monitoring

Inventory:
- a. Stock,
- b. Item Category & Items

Master Setting:
- a. User
- b. Dzongkhag (Districts)
- c. Gewogs (Sub Districts)
- d. Chiwogs (Cluster)
- e. Villages
- f. Zones (For cities)
- g. Pre-Screening Questions
Selecting the vaccine type

**Select vaccine**

You need to select a vaccine from the list below to continue. Once a vaccine has been selected, all functions of the system will relate to the selected vaccine.

- Covid-19
- Flu Vaccine
- HPV Vaccine

**Dashboard**

- **719,769**
  - Total Registered

- **693,438**
  - Vaccinated (Dose 1)

- **673,200**
  - Vaccinated (Dose 2)

- **546,959**
  - Vaccinated (Dose 3)

- **192,082**
  - Vaccinated (Dose 4)

- **7**
  - Vaccinated Today

- **8,156**
  - External Vaccinations

- **125,305**
  - Homologous Vaccinations

- **547,828**
  - Heterologous Vaccinations

- **620,483**
  - Dose 1: Same Place

- **72,955**
  - Dose 1: Different Place

- **584,804**
  - Dose 2: Same Place

- **58,396**
  - Dose 2: Different Place

(linkedimmunisation.org | 60)
# User registration

## Update Registration

**Registration Information**

- **Resident Type** *
  - [Select Type]
- **ID** (Citizenship ID/Passport/Work Permit/Visa/MCH)
  - [Search]
- **First Name** *
- **Middle Name**
- **Last Name**
- **Sex** *
- **Date of Birth** *
- **Mobile Number**

**Category**
- [Select Category]

**Present Address/Current Residence**

- **Dzongkhag/Thromde** *
  - [Select Dzongkhag/Thromde]
- **Mega Zone**
  - [Select Mega Zone]
- **Gewog/Zone** *
  - [Select Gewog/Zone]
- **Chiwog** *
  - [Select Chiwog]
- **Village**
  - [Select Village]

## Health Conditions/Comorbidities

- [All Cancers on Chemotherapy (under treatment)]
- [Cardiovascular diseases (heart failure, coronary artery diseases)]
- [Chronic neurologial disease]
- [Epilepsy/seizure]
- [High Blood Pressure (hypertension)]
- [Interstitial lung disease]
- [Migrane]
- [Others]
- [Solid organ transplant recipients including bone marrow or stem cell transplant]
- [Ulcers]
- [Uncontrolled Diabetes]

**In case you are a highly vulnerable individual, are you willing to go to an identified facility for protecting yourself from COVID infection?**

- [Yes]
- [No]

**Pregnancy Status** (Select due date if pregnant, leave blank if not pregnant)

- [Select Due Date]
- [Clear Pregnancy]
System records vaccine dose details