Immunization Registries in Latin America and the Caribbean

M. Carolina Danovaro, MD, MSc
Comprehensive Family Immunization Unit

March, 2014
Vaccination Cards
### Tally sheets or equivalent

#### Programa Regular de Vacunación

**Registro Diario de Vacunación Menores de 1 año a Población de 1 año**

<table>
<thead>
<tr>
<th>No. Paciente</th>
<th>Nombre y Apellido</th>
<th>Municipio de Residencia</th>
<th>Dosis</th>
<th>Fecha de Vacuna</th>
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**Obs:**

- Sustitución: 
- No correspondiente:
- Total:

**Lugar de Vacunación:**

- Sistémático
- Jornada
- Barrido
- Escolar

**Fecha:** 12/10/2018

**Registro de Vacunas Aplicadas**

- BCG
- Antitéticos
- Virus

**Marca un símbolo por cada dosis aplicada**

- 1era
- 2da
- 3era
- Adic.

**Distribución de Vacunas**

- Unica

**Pendiente**

- Firma: V.B.G.
Individual Records
Example of an individual vaccination record – then entered into a computerized registry

<table>
<thead>
<tr>
<th>M.S.P.</th>
<th>PLAN NACIONAL DE VACUNACION</th>
<th>Nº H</th>
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<tbody>
<tr>
<td>C.H.L.A.-E.P.</td>
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<tr>
<th>LUGAR DE NACIMIENTO</th>
<th>FECHA DE NACIMIENTO</th>
<th>CEDULA DE IDENTIDAD</th>
<th>SEXO</th>
<th>Nº DE FUNCIONARIO</th>
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<th>1er. APELLIDO</th>
<th>2do. APELLIDO</th>
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<th>VACUNA</th>
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<td>BCG 9.29</td>
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<td>S R P + VAR</td>
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<td>HEPATITIS A</td>
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<td>d T</td>
<td>NEUMOCOCO</td>
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<tr>
<th>MOTIVO DE NO VACUNACION</th>
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<tr>
<td>1 - CONTRAINDICACION TRANSITORIA</td>
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<tr>
<td>2 - CONTRAINDICACION DEFINITIVA</td>
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<tr>
<td>3 - FALLA VACUNA</td>
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<td>4 - SE MEGA</td>
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<td>5 - OTROS</td>
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<th>USUARIO DE SERVICIO DE SALUD</th>
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<th>CONTROL PEDIATRICO</th>
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<th>DOMICILIO: CALLE y Nº.</th>
<th>ESQ.</th>
<th>DEPARTAMENTO</th>
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<th>LOCALIDAD</th>
<th>NOMBRE DE LA MADRE:</th>
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<th>DOMICILIO DE ALTERNATIVA: CALLE y Nº.</th>
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What is a National Electronic Immunization Registry (EIR)?

• **Immunization registries**: Electronic information system, confidential, population-based, with identification data sent directly from vaccination providers (Linkins et al, 2001 y Freeman et al. 2003).
  • Not to be confused with immunization information systems

• Population-based information system, confidential, with vaccination data (doses given) from an entire country
  • it had outputs to facilitate coverage monitoring by vaccine, dose, geographical area, age and provider
  • It supports individual (and timely) schedule follow-up
Advantages of Electronic Immunization Registries

• Coverage monitoring by cohort ("dynamic denominator) instead of using an annual goal
  • Coverage may vary depending on time report is run
  • More precise coverage may facilitate vaccine and supply forecasting
• Allows for a detailed analysis of who is un/under vaccinated to tailor vaccination strategies
• Individual follow-up of persons with delayed vaccines
  • No more negative drop-out rates
  • It may facilitate timely vaccination
• If well designed and implemented can be easy to use and well accepted
Characteristics of an Ideal Immunization Registry for Latin America

• Inclusion of all persons at birth, or as early as possible
• Unique ID
  o National ID or birth registration ID
  o Unique combination: names, parental names or their ID, birth date/place
  o Biometrics: fingerprints, iris
• Information about each person, including info on geographical area of residence
• Information about the vaccines given, dates, and provider
• Allowing aggregation of data by geographical level, as required
• Allowing timely individualized follow-up
• Data entry as close to vaccination as possible (time and place)
• Data security and protection of patient confidentiality

The first 5 criteria described by Gostin et al., JAMA 1995
Electronic Immunization Registries in Latin America and the Caribbean, 2013

Source: Country reports to PAHO
Various Approaches

• Relation to national Health Information System (HIS)
• Development and maintenance
• Relation to other immunization systems
• Financing
• Software
• Data entry (usually from paper)
• Data flow
  o Web-based
  o “Disconnected version”
2000s: API* and other systems

- Vaccination schedule for campaigns and routine (doses)
- Adverse events following immunization (AEFI)
- Stock and distribution of immunobiologics

Reference Center of Special Immunobiologics (CRIE)
Vaccine utilization and wastage

Large quantities of data but incompatible database systems

* API - System of administered doses. Source: MOH Brazil
How to solve this problem?

- 2009: NIP and the Department of the Ministry of Health Informatics developed a new information system, combining all of the old systems into one.

Unifying the database systems

Source: MOH Brazil
Practical Uses of an Immunization Registry

Evidenciar errores en la calidad del dato que afectaran la estimación de cobertura 😊

Identificar niños con esquema completo para su edad 😊

Monitorear incumplimiento del esquema 😊

Identificar niños parcialmente vacunados!!! 😊😊

Identificar niños no vacunados en plena estación de rotavirus!! 😐

Source: MOH Guatemala
In Bogota, 116,000 children are born each year.

**Vaccination timeliness**

Source: Health Secretariat Bogota
Parents can access the vaccination card and print it without having to go to the vaccination clinic.

Source: Health Secretariat Bogota
Review

Effectiveness of the 7-valent pneumococcal conjugate vaccine against vaccine-type invasive disease among children in Uruguay: An evaluation using existing data

Teresa Picón a, Lucía Alonso b, Gabriela García Gabarrot c, Noelia Speranza a, Mariana Casas d, Fernando Arrieta e, Teresa Camou c, Raquel Rosa b, Lucía Helena De Oliveira f, Jennifer Rabke Verani g ·

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d National Reference Laboratory, Ministry of Public Health, Montevideo, Uruguay
e Surveillance Department, Epidemiology Division, Ministry of Public Health, Montevideo, Uruguay
f Immunization Department, Honorary Commission for the Fight Against Tuberculosis and Other Prevalent Diseases, Montevideo, Uruguay
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h Respiratory Diseases Branch, Division of Bacterial Diseases, Centers for Disease Control and Prevention, Atlanta, USA

ABSTRACT

The 7-valent pneumococcal conjugate vaccine (PCV7) was introduced into the routine immunization program in Uruguay in March 2008 with a 2-dose primary series (given at 2 and 4 months) plus a booster (at 12 months) and a catch-up campaign (two doses given at 15 and 17 months). We used a case-control methodology and existing laboratory surveillance and immunization registry data from Uruguay to evaluate PCV7 effectiveness against vaccine-type invasive pneumococcal disease (VT-IPD). Cases of VT-IPD (with pneumococcus obtained from a normally sterile site) were identified through the National Reference Laboratory. Age- and neighborhood-matched controls were obtained through a national immunization registry in which all children are enrolled at birth regardless of vaccine receipt; all eligible controls were included. Immunization status of cases and controls was assessed through the immunization registry, and conditional logistic regression was used to calculate PCV7 effectiveness. Between April 2008 and February 2010, 44 cases of VT-IPD among children < 5 years were identified; 43 (98%) of those children were located in the registry. Among located case patients, 7 (16.3%) were age-eligible to have received at least one dose of PCV7. A total of 637 matched controls were included. Vaccine effectiveness was 91.3% (95% CI: 46.4, 98.6) for > 1 PCV7 doses and 94.8% (95% CI: 43.1, 99.5) for > 2 PCV7 doses. Using existing data we demonstrated high effectiveness of PCV7 against VT-IPD in Uruguay—a middle-income country using a 2-dose primary series plus a booster dose and a limited catch-up campaign. These data also highlight the utility of surveillance and high-quality immunization registries for evaluating the effectiveness of vaccines.

Published by Elsevier Ltd.
Linking mHealth to EIRs

Source: MOH Guatemala
Health post/ health care worker

- SMS
- MMS
- GPRS

Health facility

District / Department

National Level

Slide by Heather Zortnetzer, SSI
Access to Data

1. Web application
2. Mobile application
3. Paper flow

Slide by Jan Grevendonk, PATH
Innovations

Mobile Data Entry Clerk: An Innovative Idea Worth Exploring

In the context of project Optimize, the Ministry of Public Health and Social Welfare of Guatemala proposed and developed guidelines for the use of mobile data entry clerks. Each clerk would be responsible for visiting closest health facility with access to Internet. Each clerk would be required to possess a valid driver’s license, maintain up-to-date antivirus software on his or her computer equipment, and sign in and sign out all equipment. Clerks would work under the direct supervision of a municipal health authority and in coordination with health officials.

In the Americas, electronic data system and in those where having computers and Internet in each health post may not be feasible. However, possible risks include accidents, robberies, and loss of data. A program using mobile data entry clerks has yet to be evaluated in the field in the Americas.

Immunization Information Systems
Clinical Decision Support

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States: 201

For those who fall behind or start late, see the catch-up schedule.
Potential Problems with Admin Coverage and with Immunization Registries

**Administrative (aggregated data)**
- Errors (voluntarily and involuntarily) recording vaccine doses
- Errors in aggregating data
- Errors in data entry
- Inaccurate denominators
- Not including doses given by the private sectors or other providers

**Immunization Registry**
- Errors (voluntarily and involuntarily) recording vaccine doses
- Errors in data entry
- Incomplete registry or duplicates
- Not including doses given by the private sectors or other providers
## Lesson Learned – EIRs take time

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<th></th>
<th>2007</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td><strong>WEB</strong></td>
<td>Análisis, modelamiento y diseño del sistema.</td>
<td>Construcción del aplicativo WEB.</td>
<td>Pruebas, ajustes TRES (3) módulos priorizados WEB.</td>
<td>Pruebas, ajustes al WEB.</td>
<td>Pruebas, ajustes a incidencias en marcha WEB.</td>
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<td>3 meses (Oct-dic)</td>
<td>Capacitación</td>
<td>Capacitación</td>
<td>Mejoramiento en la infraestructura</td>
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<td>Fortalecimiento talento humano.</td>
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<td>Implementación en 1493 de 2732* puntos a implementar.</td>
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<td><strong>DES CONECTADO</strong></td>
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<td>Definición y construcción del Desconectado TRES (3) módulos priorizados</td>
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<td>Mejoras al Desconectado.</td>
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*Source: MOH Colombia*
Lesson Learned – IT Developments have cycle: Skipping a step may affect quality and/or costs and/or time.
Lesson Learned – EIR implementation must be closely monitored

- Process
- Data quality
- Problems faced by users
Open Research Questions

• Impact of EIR on program performance in different settings

• Usefulness of data for performance monitoring

• Feasibility of implementation and maintenance
  o How to make sure that systems become institutionalized in the health system and are sustainable
While more research is needed, registries can also produce the data that is required for effective research into:

- Vaccine effectiveness
- Vaccine hesitancy
- Vaccine safety
- Equity
- Program efficiency
Acknowledgments

• Countries of the Americas
  ◦ In particular, immunization programs
• PAHO: Immunization, Health Analysis and Statistics and KMC
• WHO
• Partners (CIDA, CDC, BMGF, UNICEF, GAVI, TEPHINET, IMeCA, Optimize)
Thank You!!

www.paho.org/immunization
EXTRA SLIDES
OFF-LINE - APLICATIVO DESCONECTADO

INTERNET

WEB

SINCRONIZACIÓN

DESCONECTADO

CORREGIMIENTO TARAIRA

SECRETARIA DE SALUD DE VAUPES

Source: MOH Colombia
Challenges – EIRs

• Understanding that this is a loooong process: development and implementation
• Costs – development, implementation and maintenance
• Need for frequent updates
• Training, training, training
• Acceptability and transition from current systems to nominal ones (current systems “work”)
• Risk of having an incomplete registry
• Confidentiality – risks of misuse of personal data
Challenges – EIRs

• Legal basis

• Data flow and data security: where to enter the data, (hardware, maintenance, security), data transmission (connectivity) or timely database consolidation if not on-line, managing duplicates

• Time for data entry – particularly new records [VIDEO]

• Implementing a process for monitoring registry implementation
  o Data quality checks (by facility and data entry person)
  o Issues with the software itself
  o Usefulness for vaccinators, workflow and workload
Lesson Learned – The EIR must be useful for vaccinators and the local level

- The registry should facilitate planning activities and tracing defaulters
- Data entry should be as close to vaccination delivery as possible in time and place
- The form to record information should facilitate data entry