

Promoting Immunization Equity in the Americas

Establishing an Electronic Immunization Registry

URUGUAY

In 2017, Uruguay’s Ministry of Public Health (MPH) implemented a new electronic immunization registry (EIR), the Vaccine Information System (SIV, acronym in Spanish).

Through a case study design drawing from an in-depth document review, semi-structured interviews, and field observations conducted in November 2019, this research

1. Documents the process of planning, adapting, and implementing the SIV;
2. Assesses the impact of the SIV on the EPI immunization strategies;
3. Describes the integration of the SIV with e-government and other systems in the country; and
4. Identifies the challenges faced during the process of implementing the SIV, strategies used to address these challenges, and other considerations that can help optimize the process of implementing the EIR, particularly with respect to the transition between electronic information systems.

This case study aligns with recommendations for systematic monitoring and documentation of EIR implementation experiences and shares lessons learned with other countries as they seek to improve immunization data management and promote overall immunization strategies. This research was made possible thanks to funding provided by the Bill and Melinda Gates Foundation.



The Ministry had a lot of difficulty getting timely, formatted information from the system, and then as you went into the system you saw that there were a lot of deficiencies that it had, at the technological level, at the level of data quality, a very old system that was decades old.

- MPH PARTICIPANT

3,400,000

Population (2018)

47,930

Average annual birth cohort

91%

DTP3 coverage (2018)

97%

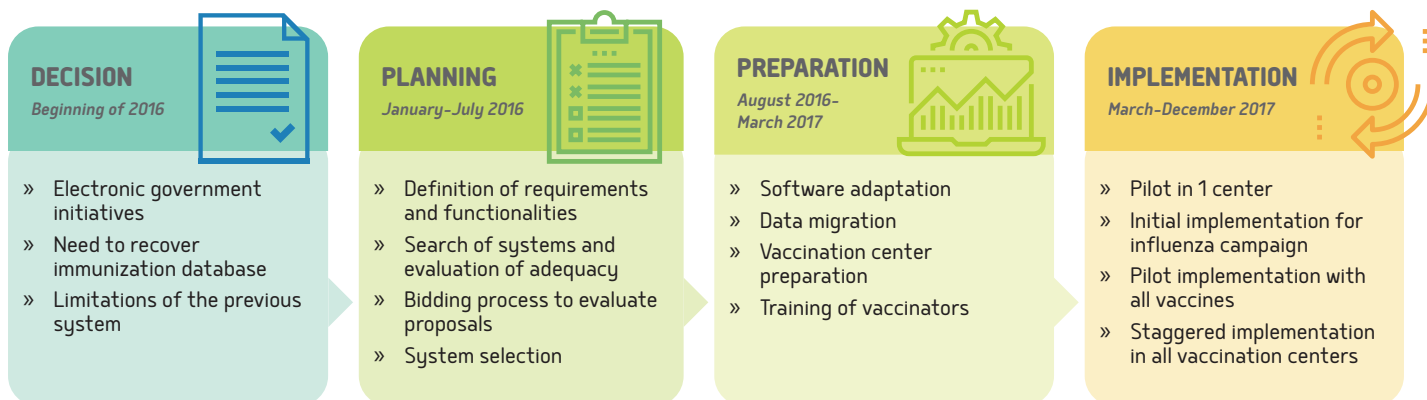
MMR1 coverage (2018)



PROCESS OF ESTABLISHING THE SIV

The main phases and activities involved in the implementation of the SIV in Uruguay are presented below.

Figure 1: Summary of the SIV implementation process



DECISION. Technical and political factors converged in the MPH’s decision to implement a new EIR. The implementation of the EIR was part of e-government initiatives, which **aimed at the digitalization and interoperability of health information systems**. The need for the MPH to have governance over the country’s vaccination registry data and **challenges of the previous registry**, related to technological limitations, delays in loading information, data quality concerns, and timely data extraction, also influenced the decision. The project to establish a new registry was financed through a World Bank loan.

PLANNING. The planning phase for the adoption of the new EIR was **led by a group of officials from different public agencies**, composed of representatives from the Office of Planning and Budget (OPB), the agency of the Presidency of the Republic responsible for formulating national plans and policies, the Expanded Program on Immunizations (EPI) and the MPH’s e-government. The preparation activities consisted of defining the **characteristics that the new system should have in order to meet local needs** and selecting **the system to be implemented**.

MPH officials selected the Computerized Vaccination System of the Community of Valencia, Spain, which worked *online* and with free software. **The characteristics of the system were evaluated in a mission to Valencia**, in which compliance with MPH-defined functionality requirements was evaluated and **necessary adaptations for use in Uruguay were identified**. Subsequently, a **bidding process was held between two options**: 1) modification of the existing EIR system to the newly-defined requirements, and 2) adaptation of the system in Valencia. In July 2016, the MPH selected the SIV, which would be made available free of charge by the Community of Valencia through an agreement with the country.

PREPARATION. The **software adaptation** process required modifications at the system level, to adapt it to the operation of the country’s computer systems, including connection to the database of the National Directorate of Civil Identification (DNIC, acronym in Spanish), and the adaptation of the system to different browsers. **The databases were housed in the MPH’s Interoperability Platform and the SIV was integrated with the Business Intelligence tool used by the MPH to process information system data**. For the changes in the user interface of the EIR, a commission was formed composed of officials from the EPI and the MPH’s government area, officials and vaccinators from the EPI’s executive branch (CHLA-EP) and technical teams. **This commission carried out the adaptation of the SIV to the country’s vaccination program, which was complemented by the feedback from end-users**.

We made a list of the functionalities that we wanted to review if the system in Valencia fulfilled them. So it was a form where they, as part of the work of the mission, had to come and complete the form and sign it, and well, they took about a week reviewing the system, seeing all the particularities, went to vaccination centers. Upon their return, we received the document, the form with the level of compliance, at the functional level, that the system could have according to the needs originally proposed by the ministry.

– MPH PARTICIPANT

During the preparation phase it was decided to **securely migrate data from the previous registry to the SIV**. The data migration process between the two systems was electronic, beginning during the initial launch of the new system and continuing through the first years of implementation of the SIV. Likewise, **efforts were made to equip the vaccination centers** with the necessary hardware (computers and printers), at the expense of the providers, and to guarantee access to the internet and the authorization of users so that vaccinators could access the system. Finally, different **outreach and training activities** were carried out for the vaccinators, such as teleconferences and in-person trainings, reference manuals, and other materials were generated for the vaccinators, such as a user's manual, quick guides, and video tutorials that were uploaded to the MPH's website.

When this system started they held a meeting and invited us to participate, to see how we could improve it. The whole program was presented, it had many screens. Then they tried to reduce the screens. And it all came out, all the ideas of all the people who went, who invited us. They explained to us how it was going to work and asked us what things we could do to improve the system.

– A VACCINATOR

IMPLEMENTATION. The SIV implementation began in the vaccination centers with the influenza vaccination campaign in March 2017, a decision based on the need to complete system adaptation. The **decision to initiate the use of the SIV during an influenza vaccination campaign prioritized familiarization with the system by vaccinators, who were required to register only that vaccine**. After initial implementation, a **pilot test was conducted in several vaccination centers, where the SIV was used to register all types of vaccines**. In October 2017, **phased implementation of the SIV** for the registration of all vaccines throughout country's vaccination centers began. **During the system transition period, some vaccination centers registered on paper and the records were subsequently entered into the SIV, while others used the previous system and then electronically migrated the data**. By 2018, all of the vaccination centers were recoding the vaccination data through the SIV, and in June 2018, it was decided to end the migration of data from the previous system.

The famous, massive flu campaign was decided on for the launch [of the SIV]. The idea was that people would become familiar with the system in a very easy way, which was to enter just the flu vaccine and nothing else ... and besides, from the point of view of the system, it was the first thing we could have operational, because you simply had to have the vaccine you could enter, the risk groups, and no address was requested, no phone. It didn't load too many items and could be a way for people to begin to using the system.

– EPI PARTICIPANT

We use the national video conference system a lot, for us it is very useful because it reaches the whole country from the central level (...) And there we did, first, the training. We did the tutorials, and they were assembled, the heads of the vaccination centers were brought to the CHLA-EP, we set up work tables, and then we put them to play with the system, we made teams, and then they replicated it in their workplaces.

– EPI PARTICIPANT

IMPACT OF SIV ON IMMUNIZATION ACTIVITIES

BENEFITS. Informants mentioned a positive impact of the implementation of the SIV on the country's immunization activities. The benefits mentioned included the **availability of the vaccination history online**, the **simplification of the registration of the vaccination acts**, the **strengthening of data quality**, and the reduction of duplications, among other aspects. For the MPH authorities, the implementation of the SIV also meant acquiring control and management of vaccination data, which **improved the timeliness and availability of information** on vaccination activities.

AREAS FOR IMPROVEMENT. Informants mentioned the importance of **advancing the design and implementation of new functionalities to the SIV to optimize the planning of immunization activities** at the departmental level and in the vaccination centers, the **strengthening of the data flow from the central level**, the **standardization of some procedures** that are carried out following different criteria among the vaccination centers, and **improving the systematic monitoring of the quality of data** entered in the system.

The strength I see in the SIV is the possibility of having the full immunization record on each person nationwide, their history, which in the past, was not available with the cards.

– A VACCINATOR

Sometimes, due to lack of time, it would be good to maybe have a module that assess data quality.

– MPH PARTICIPANT

CHALLENGES ENCOUNTERED

INITIAL RELUCTANCE OF KEY PLAYERS TO CHANGE THE SYSTEM AND ADOPT THE SIV, associated with familiarity with the previous system and aversion to change

Strategic Response: Incorporation of political actors from the beginning of the decision-making process, in the selection of the new system, and in the adaptation of the program's functionalities, and engagement of end-users in the system adaptation process

DELAYS AND DIFFICULTIES IN ADAPTING THE SOFTWARE, linked to the complex process of tailoring the SIV to the country's needs and consideration of vaccinators' preferences, as well as limited technical support from the program's developers

Strategic Response: Prioritization of some functionalities and adaptations and delayed integration of others (such as a module for stock management)

THE LACK OF A UNIQUE IDENTIFIER IN THE PREVIOUS SYSTEM and deficiencies in migration planning made it difficult to retrieve vaccination histories in the new system

Strategic Response: Partial migration based on a unique identifier to avoid duplication of patient records and manual retrieval and recovery of records from the previous system's database

POOR DATA QUALITY IN THE YEAR OF TRANSITION TO THE NEW SYSTEM which made the reconstruction of immunization coverage data difficult due to comparability problems

Strategic Response: Consensual decision by the country not to report official vaccination coverage for the year of implementation of the SIV

FACILITATORS

POLITICAL SUPPORT FROM THE AUTHORITIES OF THE MPH AND INTER-INSTITUTIONAL COLLABORATION from different government departments and the commitment of the actors involved

THE COUNTRY'S E-GOVERNMENT POLICIES allowed the availability of a resource infrastructure for the implementation and operation of the SIV

BUDGETARY SUPPORT for the implementation, adaptation and maintenance of the SIV that allows for continued modifications and improvements of the system

SOLVENCY OF THE TECHNICAL COMPUTER EQUIPMENT that ensured the interoperability and integration of the SIV with other systems in the country

END-USER PARTICIPATION AND CONTINUOUS FEEDBACK IN THE ADAPTATION OF THE SOFTWARE facilitated the acceptance of the system and continuous improvements for the user experience



One lesson learned, but a positive one, is the strong political support that we had, at a ministerial level, but also throughout the national e-government level.

– EPI PARTICIPANT

LESSONS LEARNED

- ✓ **POLITICAL SUPPORT IS ESSENTIAL FOR THE IMPLEMENTATION OF A NEW EIR** and to ensure its sustainability and response to potential challenges
- ✓ **ACCURATE PLANNING IS CRUCIAL TO AVOID COST AND TIME CONSTRAINTS**, including adequate funding, detailed schedule projections, and technical requirements
- ✓ **THE IMPORTANCE OF INVOLVING ALL RELEVANT ACTORS IN THE ENTIRE PROCESS**, including in the adaptation of the system and its continuous improvement, to give greater legitimacy to the decision to implement a new registry, to help generate trust and open communication, and to increase the acceptability of the system

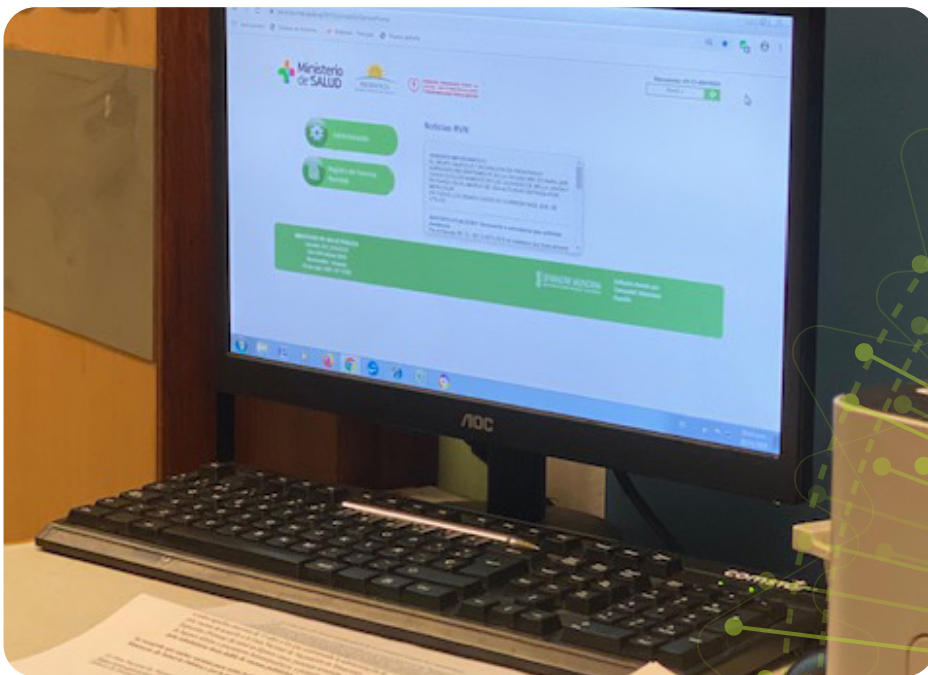


Photo credit: PAHO

CONCLUSIONS

More than three decades after the establishment of their first immunization registry, Uruguay continues to be a pioneer in EIR implementation in the Region and in the world. The strong political support and commitment of various stakeholders and the advances of the e-government policy in the country made the recent implementation of the SIV possible in all the vaccination centers of the country, both public and private.

The participatory process of adapting the system to the country's needs allowed for the design of a system that is widely accepted and used. Although system interoperability issues complicated the migration of immunization registry data, participants in this study highlighted a variety of benefits as a result of the implementation of the SIV, including integration of the SIV with the civil registry database, simplification of registries and management activities in the vaccination centers, strengthening of data quality, and the availability of the vaccination history of all persons online, among others. Uruguay's experience provides valuable lessons at the political, financial, and technical levels, which may be useful for other countries in the Region of Americas and other regions of the world.



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