Experiences and best practices of Electronic Immunization Registries in Latin America and the Caribbean

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PAHO/WHO

Pan American Health Organization
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REGIONAL OFFICE FOR THE Americas

- **51 countries & territories**
  - 35 Member States
  - 12 Members Participants
  - 4 Associated Members.
- **1,037 M total population**
  - 13.6 M under 1 year old

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Regional Context

Need for Reliable Data

Timely and detailed information is essential for effective immunization program management in the region.

Life-Course Vaccination Approach

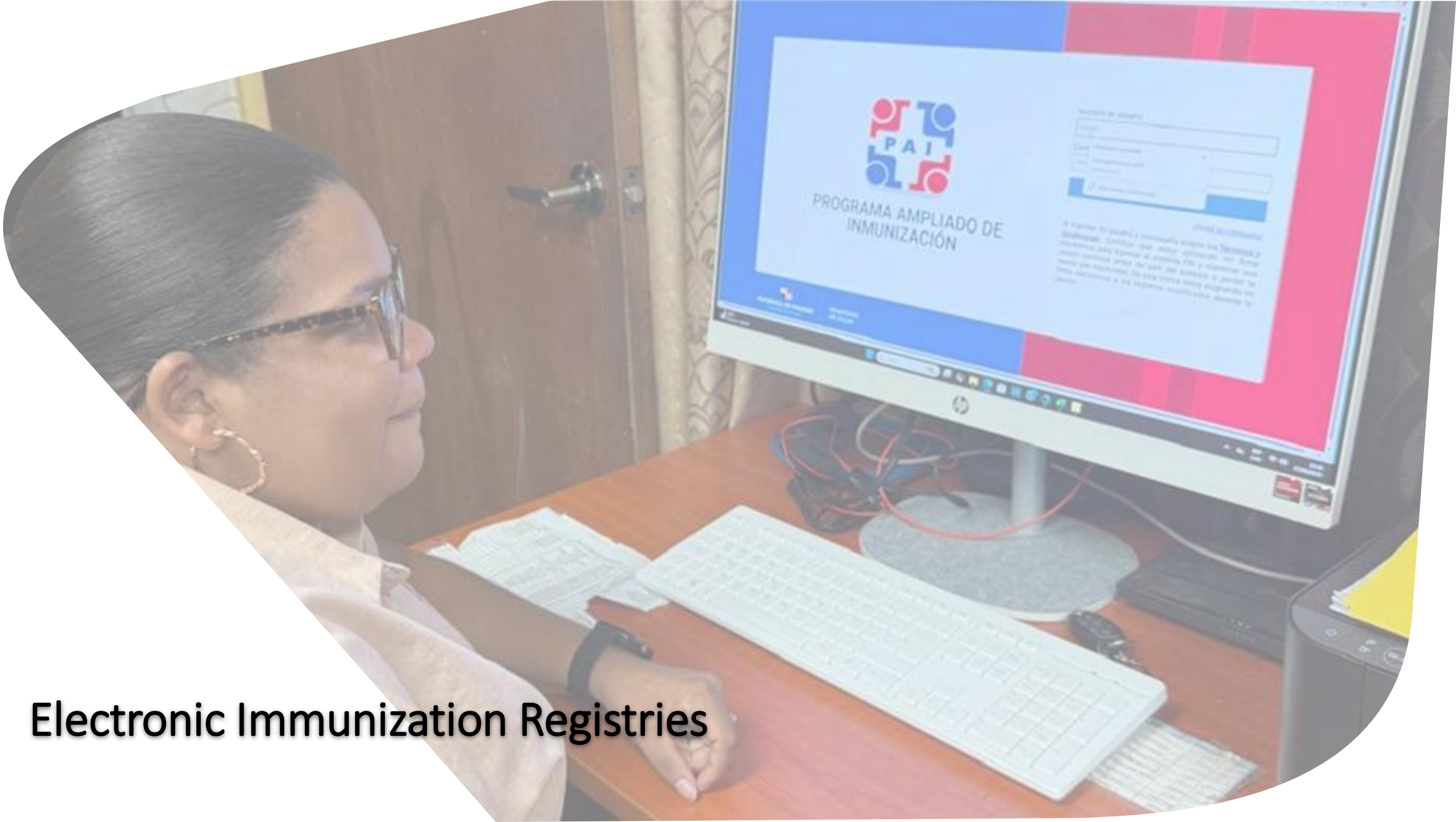
Tracking vaccinations across all life stages requires person-centered, longitudinal data systems instead of childhood-only models.

COVID-19 Digital Acceleration

The COVID-19 pandemic accelerated the adoption of digital tools to handle large immunization data volumes quickly.

Complex Regional Factors

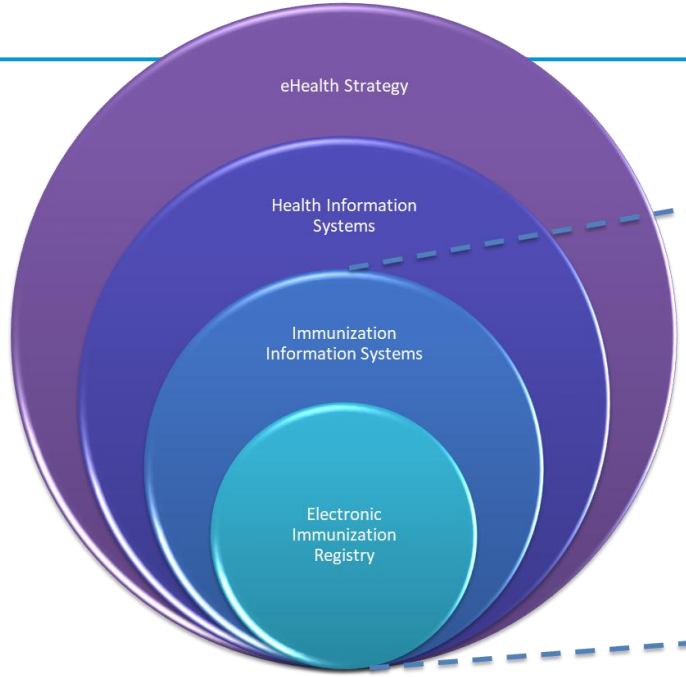
Urbanization, population mobility, and system integration increase immunization delivery complexity in Latin America and the Caribbean.

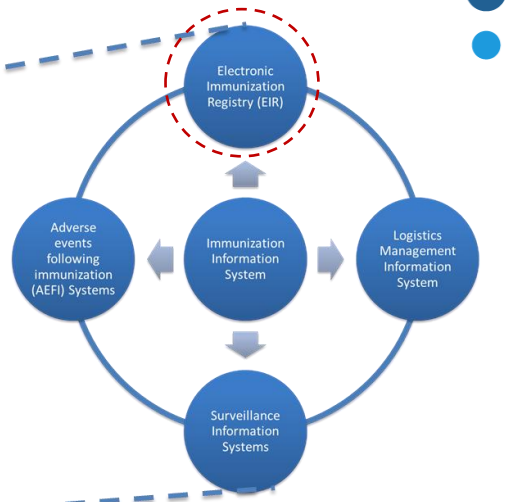


Electronic Immunization Registries

Electronic Immunization Registries

Confidential, population-based systems that aggregate vaccination data from multiple health care providers and can be used in the design and maintenance of effective immunization strategies.





EIR ideal characteristics

Demographic profile

- Comprehensive inclusion of all PAI recipients (vaccinated and unvaccinated), ideally at birth.
- Unique identification of all individuals.

Vaccination Record

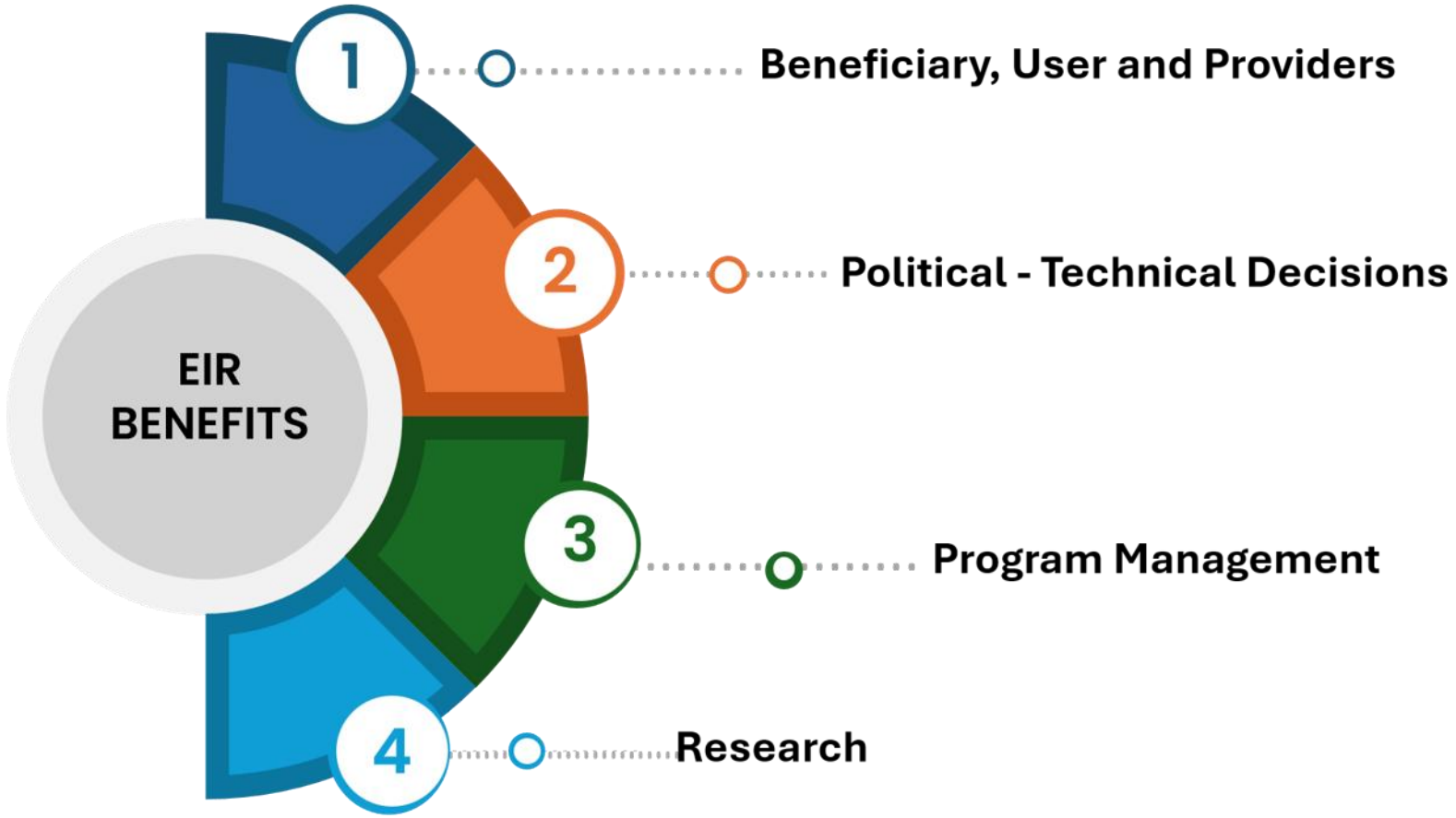
- Information about the vaccine administered.
- Including all vaccination times/events.
- Traceability of vaccines
  - ESAVI/AEFI follow-up.
  - Stock management

Reports

- Coverage and Program indicators
- Consolidation of data at different administrative and geographical levels.
- Data and information about people with pending vaccines.
- Data that feeds graphical visualizations and risk maps.

System

- Data entry closer to the vaccination event (in time and place)
- Flexibility/adaptability and scalability to integrate new modules, vaccines, and schedules.
- Data security and privacy protection.



Contribute to the reduction of errors in data entry and calculation in health indicators

Improve the efficiency of processes and information flows

Help identify problems and opportunities to improve the use of material resources and humans

Allow the aggregation and disaggregation of data and indicators by management levels

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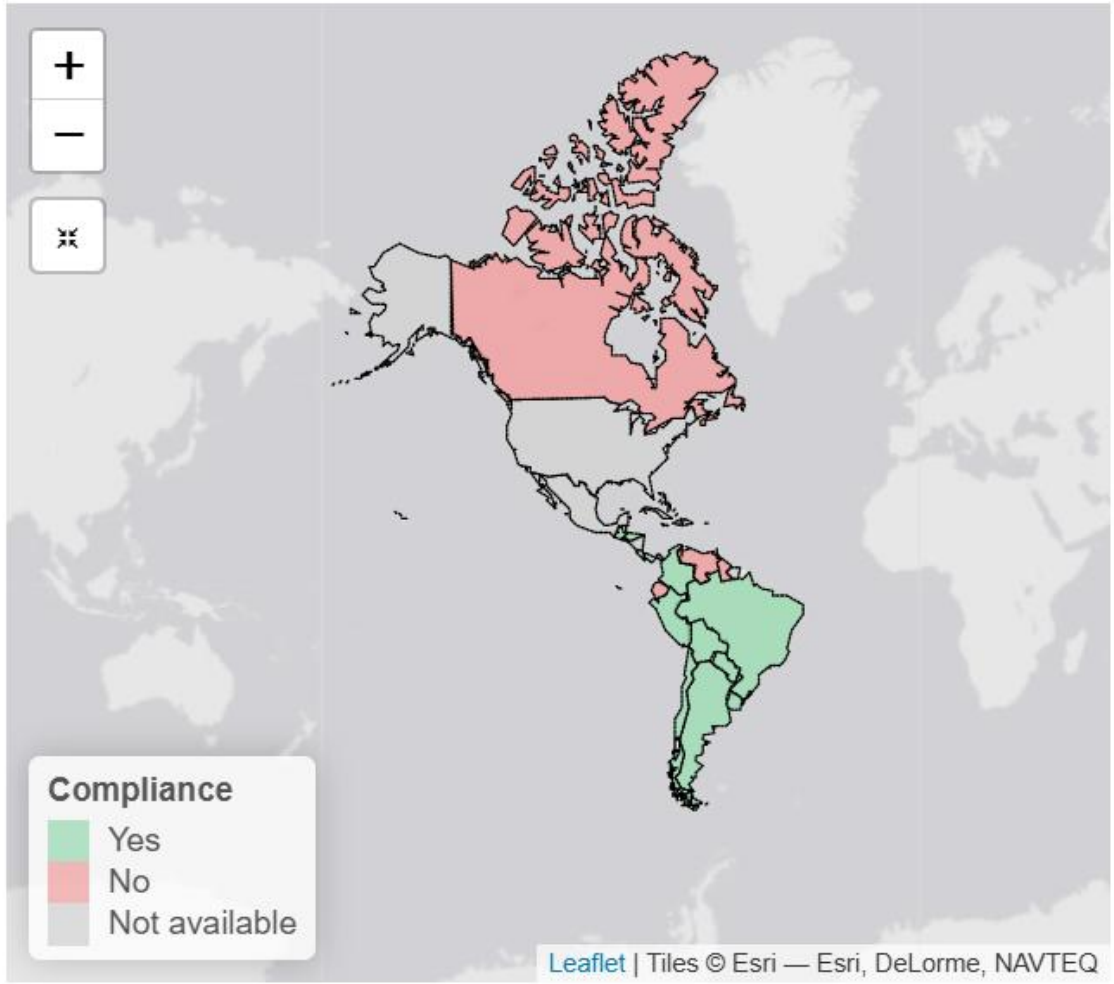
Current Implementation Status in the Region – EIR in numbers

29 Countries and Territories*

*** JRF 2024**



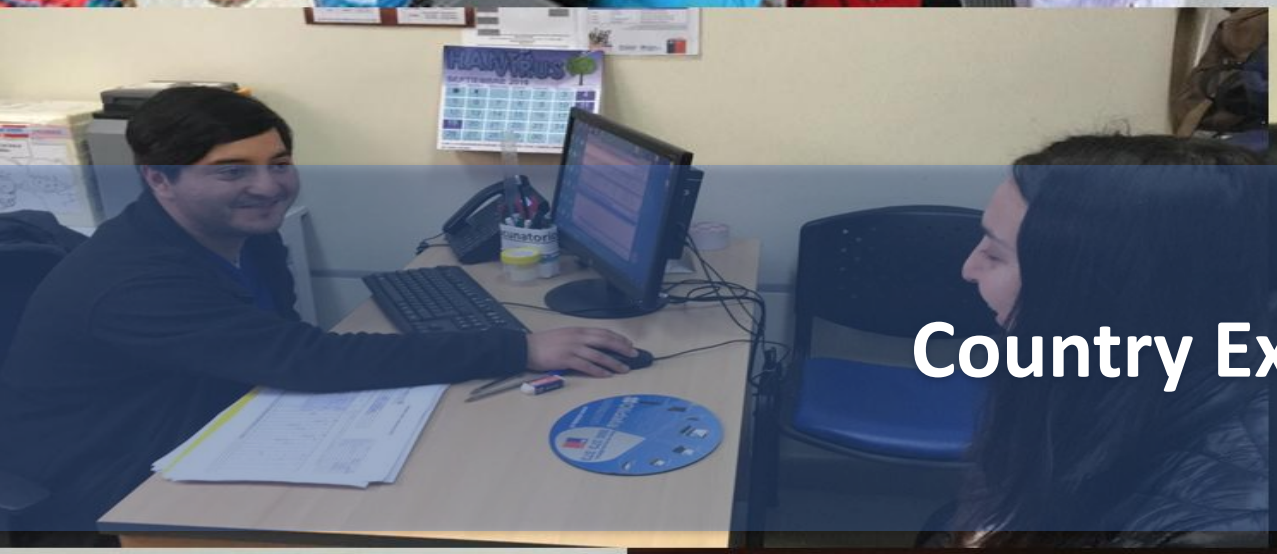
Diagnostic of the EIR in the Region – 2023 (n=23)

86% of the EIRs considers the entire life course

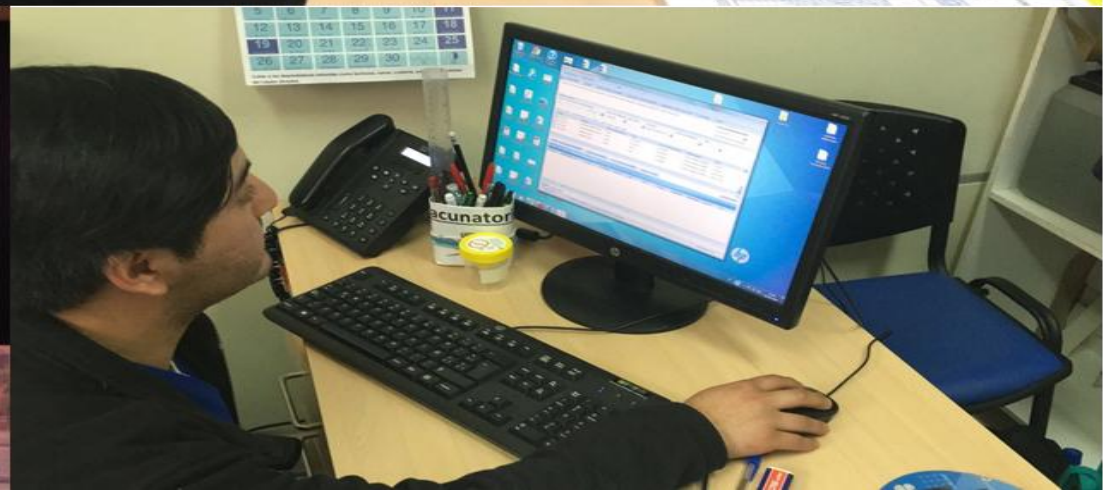
33% of the EIR considers all public and private health centers and social security

52% of the eEIR allows electronic vaccination certificates to be issued

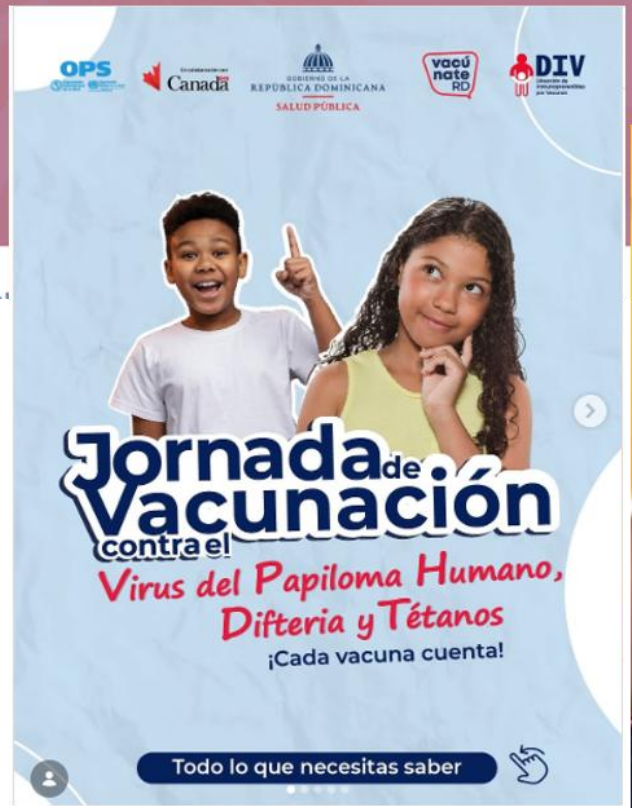
57% of the EIR interoperates with the Civil Registry and/or vital statistics and incorporates live births

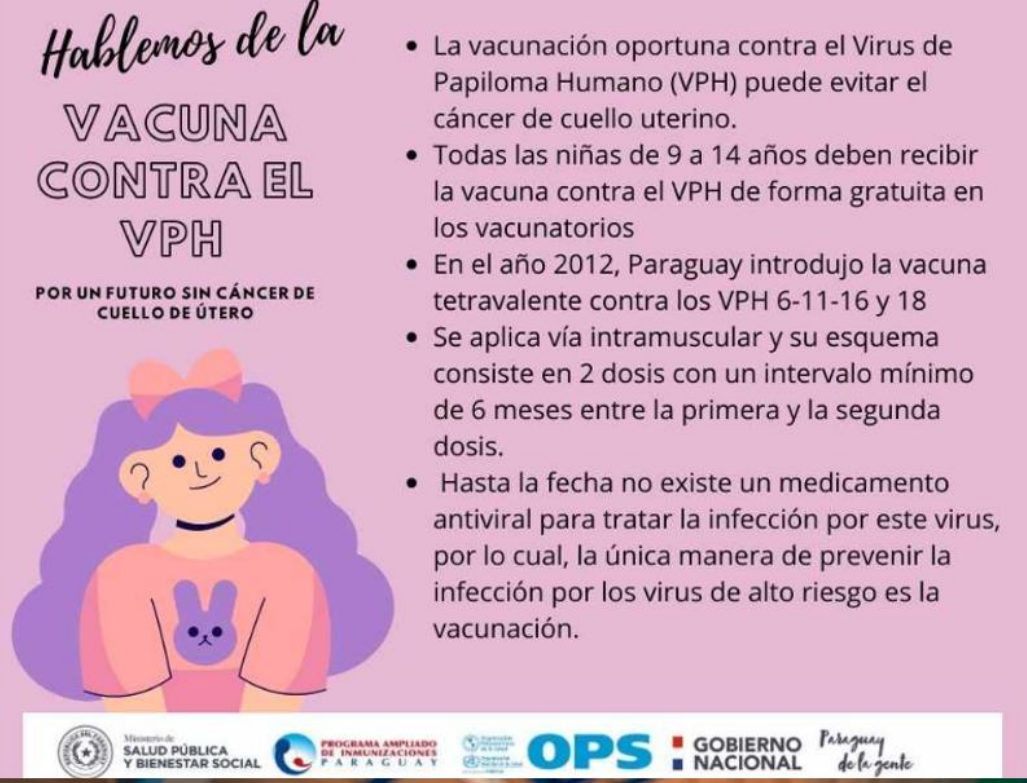


Country Experiences



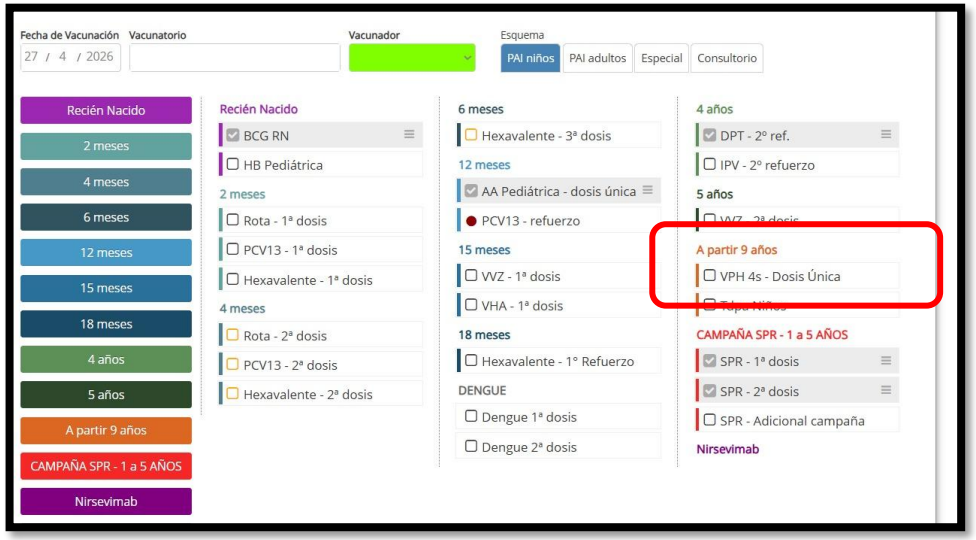
Vacuna Escolar
Nonavalente contra
Virus Papiloma Humano VPH



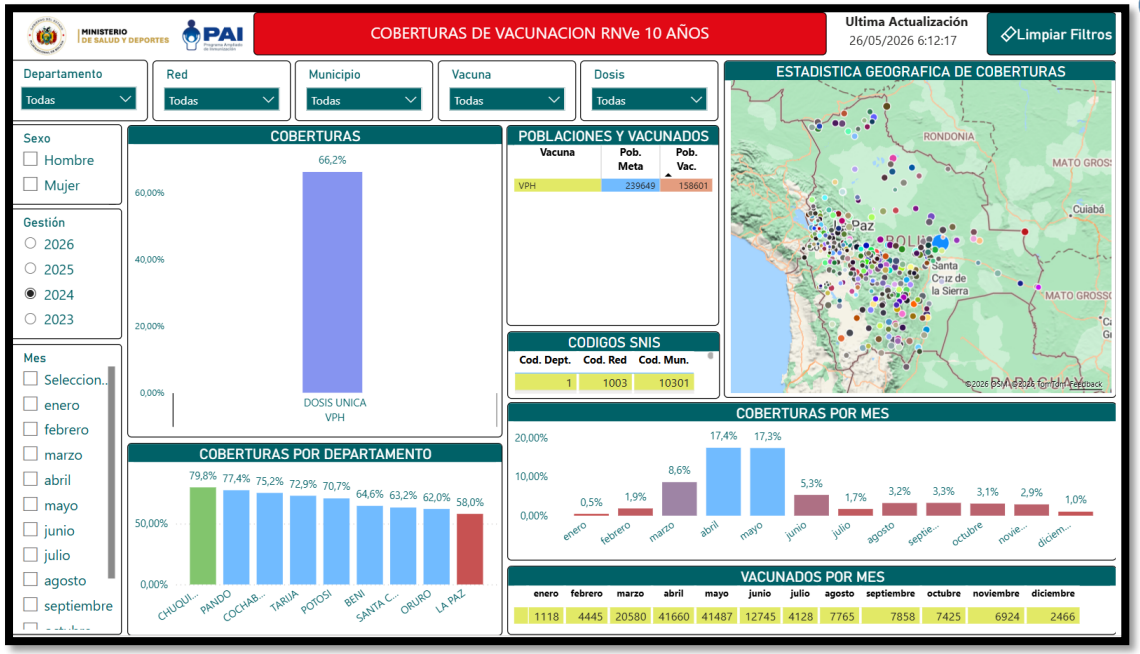


EIR and HPV vaccination

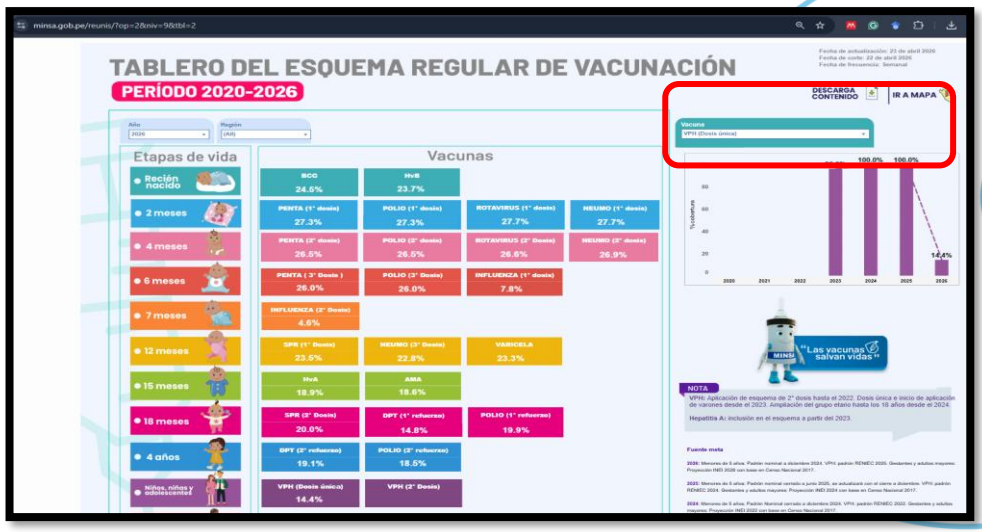
Paraguay – Data Collection



Bolivia – Data visualization



Ecuador – Data visualization



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Chile
2014-2018: Cohort data analysis for HPV Vaccination

- HPV vaccine coverage has been analyzed from the school strategy and birth cohort.

- **Follow-up of the 2005 birth cohort:** the largest number were vaccinated in 2014, but they continue to be vaccinated even in 2018, reaching 90% coverage.

- **2014:** 5,510 girls refused the HPV vaccine, the following year 1,461 decided to get vaccinated and 350 did so in 2016.

VPH 1a dosis								
AÑO	EDAD							
2014	11	10	9					
2015	12	11	10	9				
2016	13	12	11	10	9			
2017	14	13	12	11	10	9		
2018	15	14	13	12	11	10	9	
Proy. INE cohorte	118.452	116.424	115.198	115.181	117.636	121.005	123.849	827.745
período vacunación \ año nac.	2003	2004	2005	2006	2007	2008	2009	Total
2014-01	3	0	2	0	0	0	0	5
2014-02	2	0	0	0	0	0	0	2
2014-03	2	1	1	0	0	0	0	4
2014-04	7	1	0	0	0	0	0	8
2014-05	3	2	1	0	0	0	0	6
2014-06	9	6	0	0	0	0	0	15
2014-07	6	3	3	0	0	0	0	12
2014-08	128	539	338	2	0	0	0	1.007
2014-09	2.340	24.009	14.595	7	1	2	1	40.955
2014-10	2.425	25.859	15.135	15	3	8	2	43.447
2014-11	688	5.764	3.121	2	1	0	0	9.576
2014-12	109	613	363	0	0	0	0	1.085
2015-01	18	42	36	2	0	0	0	98
2015-02	17	22	14	0	0	0	0	53
2015-03	8	11	12	0	0	0	0	31
2015-04	12	11	11	12	0	0	0	46
2015-05	12	9	64	22	1	0	0	108
2015-06	11	5	16	4	0	0	0	36
2015-07	2.288	1.049	1.600	930	0	1	1	5.869
2015-08	44.279	21.365	30.396	16.901	19	7	6	112.973
2015-09	33.654	16.345	21.968	11.899	17	12	7	83.902
2015-10	6.630	3.215	4.366	2.385	1	1	1	16.599
2015-11	1.561	699	982	448	0	1	0	3.691
2015-12	214	113	173	105	0	0	0	605
2016-01	31	18	28	18	1	0	0	96
2016-02	24	12	23	10	0	0	0	69
2016-03	16	12	23	8	0	0	0	59
2016-04	15	1	7	11	1	0	1	36
2016-05	14	6	15	40	25	0	0	100
2016-06	8	9	28	160	101	0	0	306
2016-07	14	14	16	88	67	0	0	199
2016-08	1.393	858	1.806	12.971	7.282	10	1	24.321
2016-09	2.470	1.551	3.115	20.858	11.899	17	9	39.919
2016-10	1.723	1.109	2.181	14.667	7.812	20	1	27.513
2016-11	772	452	906	5.253	2.758	6	3	10.150
2016-12	236	167	273	1.495	833	0	0	3.004
2017-01	13	18	27	85	46	0	0	189
2017-02	17	7	8	58	23	0	0	113
2017-03	8	9	11	28	17	0	0	73
2017-04	9	4	9	23	16	1	0	62
2017-05	13	4	4	15	10	1	0	47
2017-06	5	5	3	34	201	139	0	387
2017-07	9	5	4	23	166	97	0	304
2017-08	51	93	330	2.133	15.639	8.829	20	27.095
2017-09	97	152	516	3.385	22.376	12.067	50	38.643
2017-10	88	144	531	3.134	18.551	9.390	34	31.872
2017-11	36	64	161	973	4.695	2.253	14	8.196
2017-12	11	11	28	108	525	270	0	953
2018-01	11	12	10	30	63	39	0	165
2018-02	4	13	11	16	38	26	2	110
2018-03	10	17	9	13	43	88	24	204
2018-04	13	12	15	29	102	589	277	1.037
2018-05	11	7	10	5	16	65	48	162
2018-06	9	9	9	11	15	140	109	302
2018-07	16	15	21	22	122	649	360	1.205
2018-08	43	82	208	784	5.273	38.020	20.126	64.536
2018-09	27	50	121	433	2.613	18.869	9.922	32.035
2018-10	33	38	66	235	1.439	8.715	4.385	14.911
2018-11	12	18	19	59	240	1.408	583	2.339
2018-12	11	14	13	25	43	225	109	440
Acumulado	101.699	104.695	103.762	99.974	103.094	101.965	36.096	651.285
COBERTURA	86%	90%	90%	87%	88%	84%	29%	79%
			88%					
			promedio cohortes 2003-2007					

Chile: Refusals (patient request)

Chile monitored the rejections through two analysis:

- Rate of HPV vaccination: rejections/(vaccinated + rejections)
- Refusal reverted: EIRs allow follow-up with individuals who initially declined vaccination, enabling targeted communication and dose recovery.

The rejection rate: rejections/(vaccinated + rejected)

Año/nivel escolar	2014	2015		2016	
	1° dosis (4°básico)	1° dosis (4°básico)	1° dosis (6° y 7° básico)	1° dosis (4°básico)	1° dosis (6° y 7° básico)
Rechazos	5.510	5.832	9.253	9.565	3.793
vacunadas 2015	1.461				
vacunadas 2016	353	1.566	1.986		
vacunadas 2017	92	481	421	1.830	514
% de alumnas que revierten su decisión	**34,59%**	**35,10%**	**26,01%**	**19,13%**	**13,55%**

Fuente: RNI base de datos 12 de mayo de 2019

Advanced Uses

Interactive Dashboards

Mature EIR systems enable real-time monitoring through interactive dashboards tracking vaccination coverage and performance.

GIS Data Integration

Integration of EIR data with GIS allows spatial analysis to identify underserved areas and support microplanning efforts.

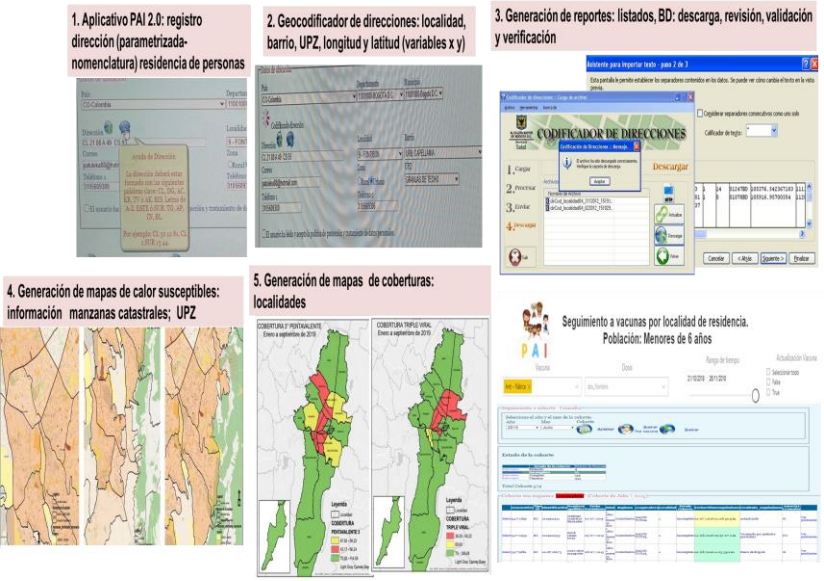
Electronic Vaccination Certificates

Electronic certificates improve record portability, transparency, and public trust in vaccination programs.

Examples of countries using EIR data

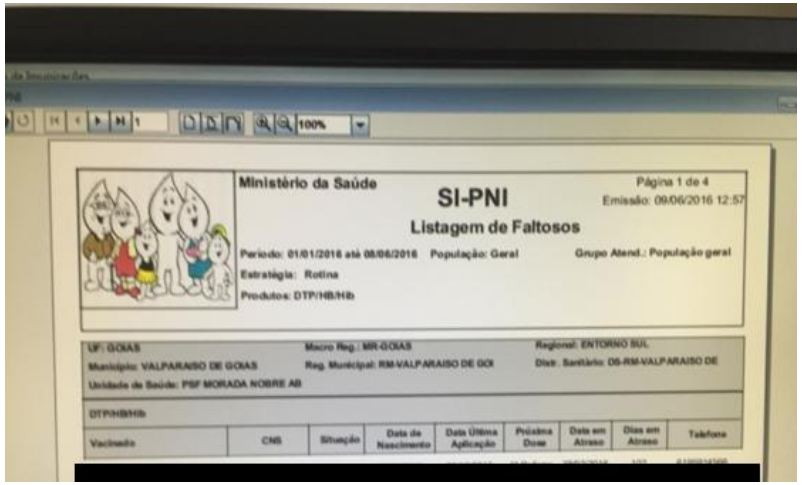
Bogota, Colombia.

Use of GIS integrated with the EIR



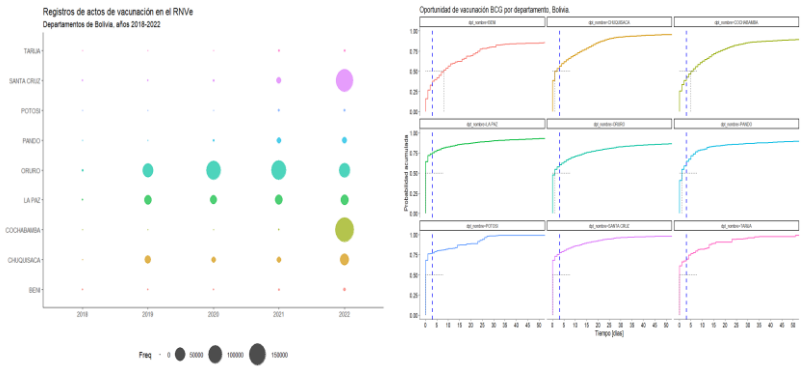
Brazil.

List of unvaccinated children



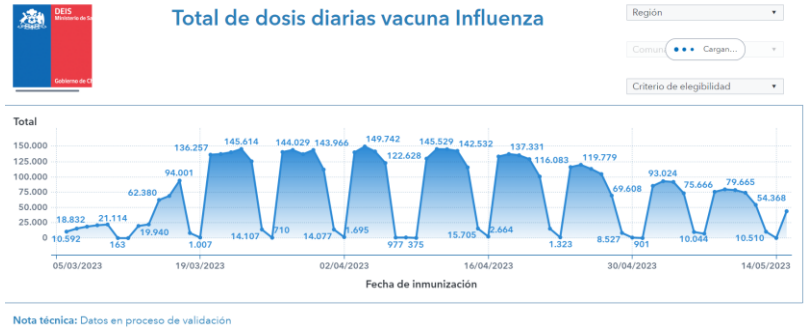
Bolivia.

Analyses using EIR



Dashboard

Chile. Influenza vaccine monitoring

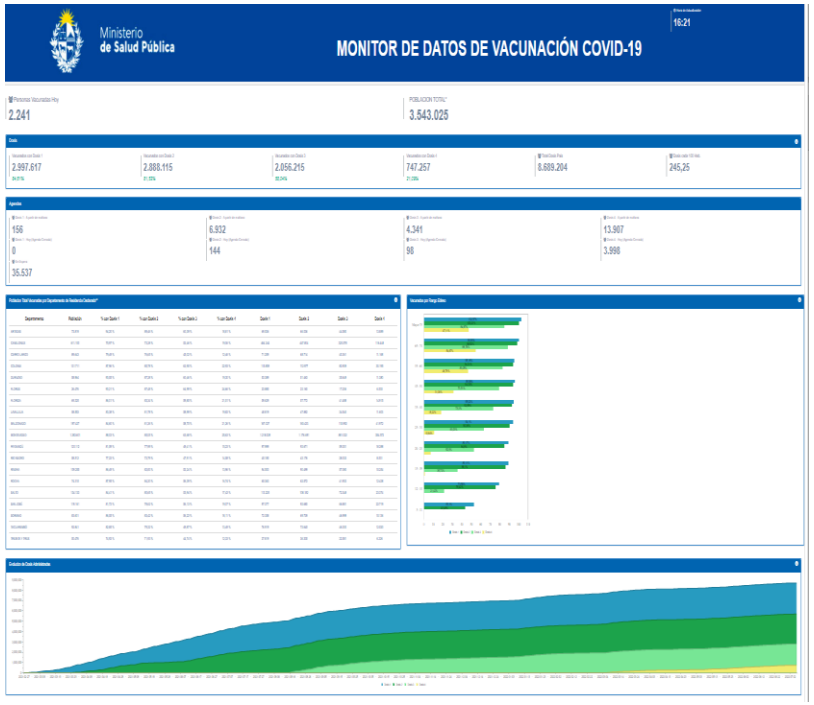


Porcentaje de avance de vacunación, según criterio de elegibilidad

Criterio de elegibilidad	Total Población	Vacunados 1° y única dosis	Avance de vacunación
Niños y niñas de 6 meses a 5 años de edad	1.296.324	688.501	53,11%
Escolares de 1° a 5° año básico	1.264.185	857.823	67,86%
Enfermos cronicos de 11 a 64 años de edad	2.005.039	1.112.980	55,51%
Personas mayores de 65 años y más	2.664.128	1.287.024	48,31%
Embarazadas	231.109	66.473	28,76%
Estrategia Capullo	44.271	7.384	16,68%
P. de salud: Privado	108.759	97.572	89,71%
P. de salud: Público	327.922	285.824	87,16%
Trabajadores de avícolas y de criaderos de cerdo	38.831	29.558	76,12%
Trabajadores de la educación preescolar y escolar hasta 5° añ...	247.775	227.488	91,81%
Otras prioridades	656.358	191.375	29,16%

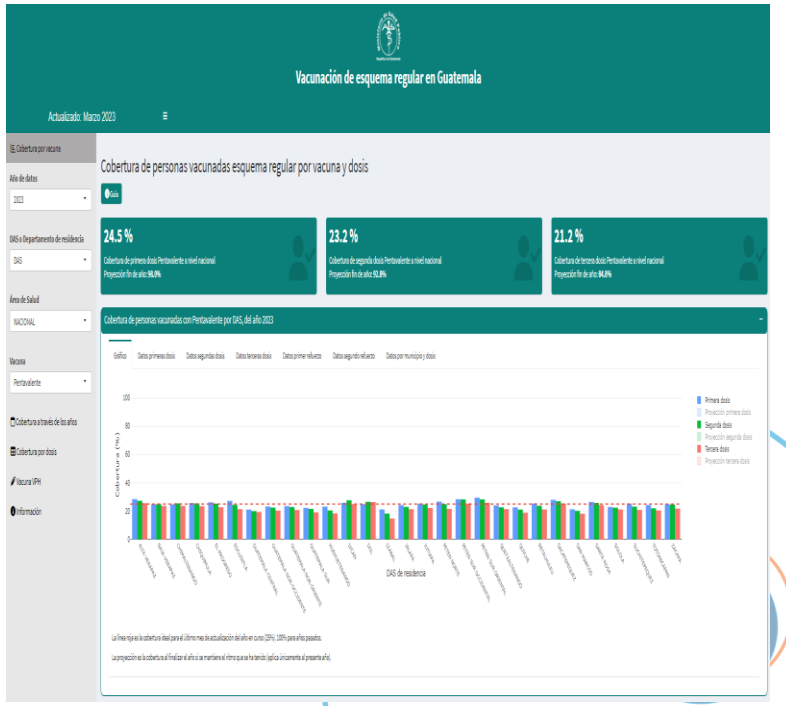
https://informesdeis.minsal.cl/SASVisualAnalytics/?reportUri=%2Freports%2Freports%2F3279bfc4-8460-4707-9b8c-15f8935aa77b&sectionIndex=0&sso_guest=true&reportViewOnly=true&reportContextBar=false&sas-welcome=false

Uruguay. COVID-19 vaccine monitoring



https://monitor.uruguaysevacuna.gub.uy/

Guatemala. Routine Immunization



https://tableros.mspas.gob.gt/vacunacionesquemaregular/

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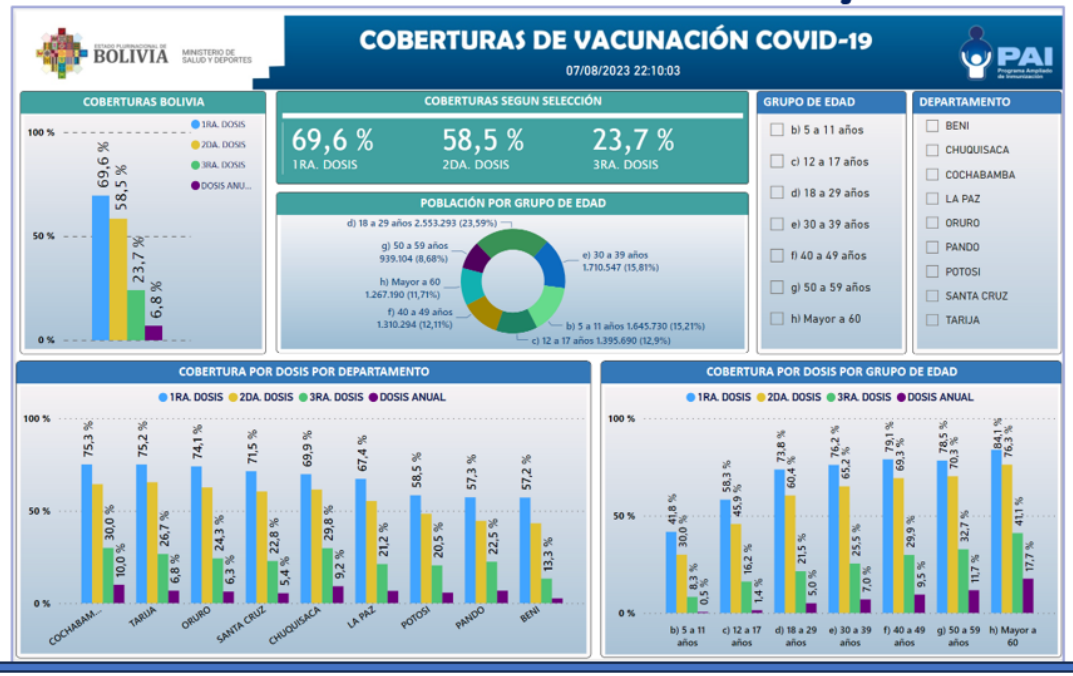
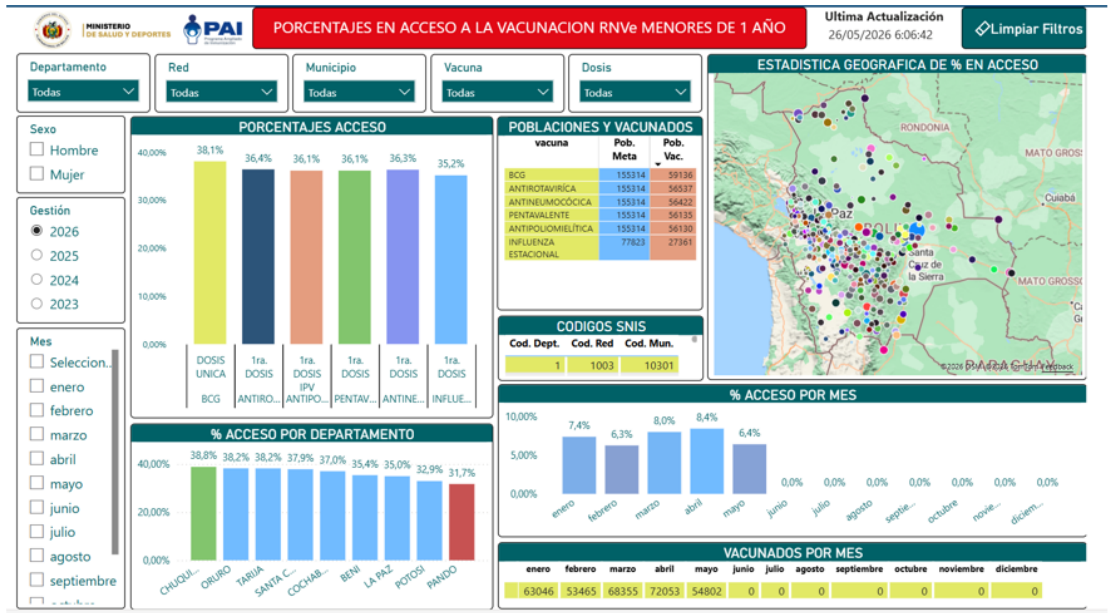
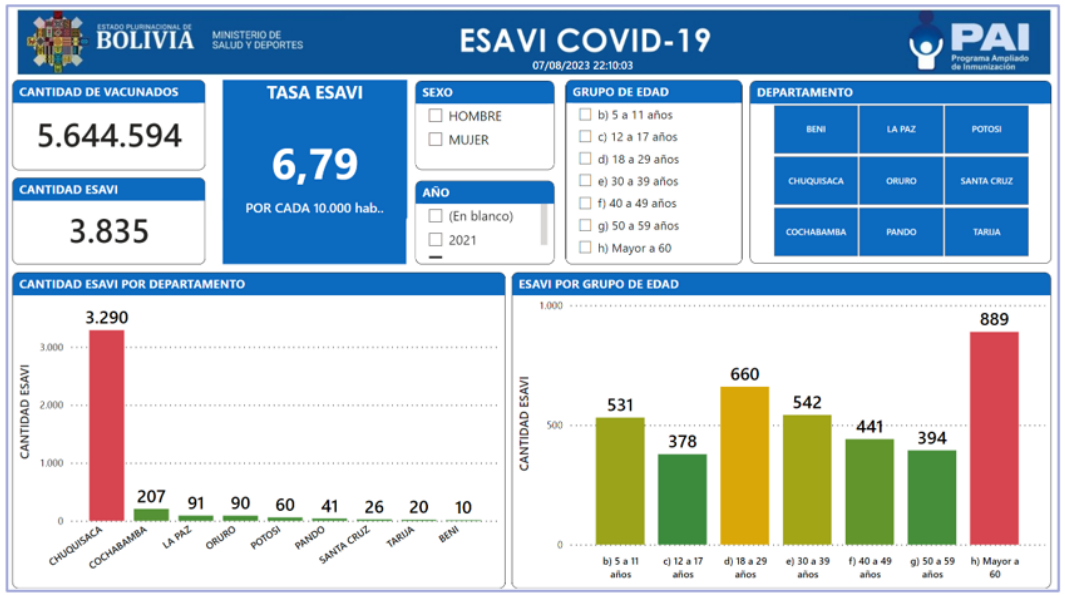
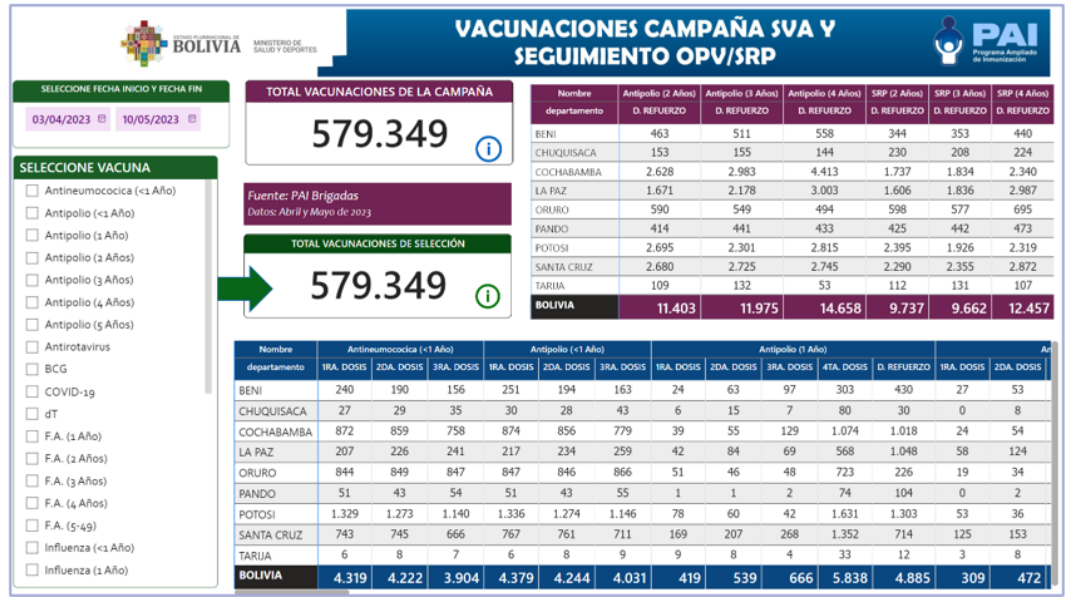
Bolivia - Data analysis







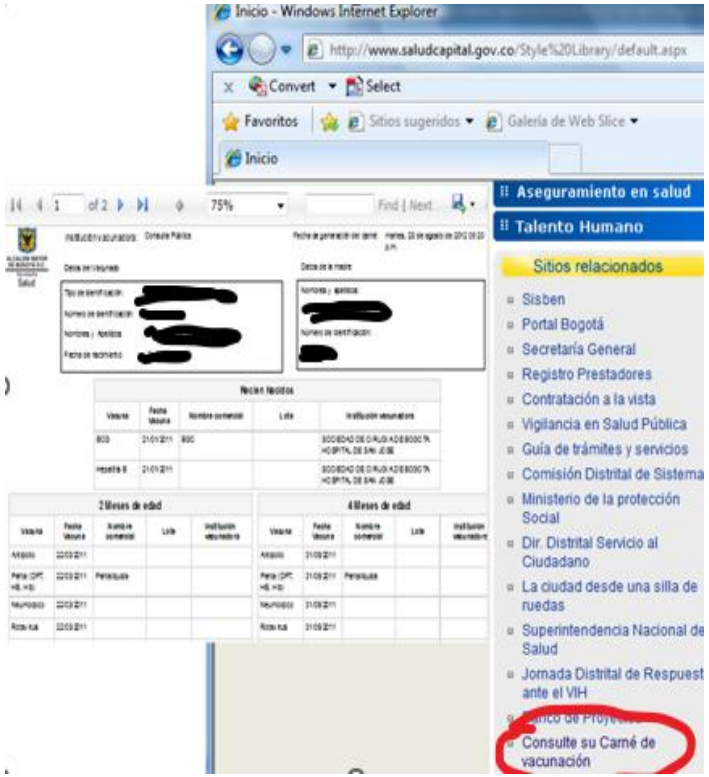


Nombre departamento	Antipolio (2 Años) D. REFUERZO	Antipolio (3 Años) D. REFUERZO	Antipolio (4 Años) D. REFUERZO	SRP (2 Años) D. REFUERZO	SRP (3 Años) D. REFUERZO	SRP (4 Años) D. REFUERZO
BENI	463	511	558	344	353	440
CHUQUISACA	153	155	144	230	208	224
COCHABAMBA	2.628	2.983	4.413	1.737	1.834	2.340
LA PAZ	1.671	2.178	3.003	1.606	1.836	2.987
ORURO	590	549	494	598	577	695
PANDO	414	441	433	425	442	473
POTOSI	2.695	2.301	2.815	2.395	1.926	2.319
SANTA CRUZ	2.680	2.725	2.745	2.290	2.355	2.872
TARIJA	109	132	53	112	131	107
BOLIVIA	11.403	11.975	14.658	9.737	9.662	12.457

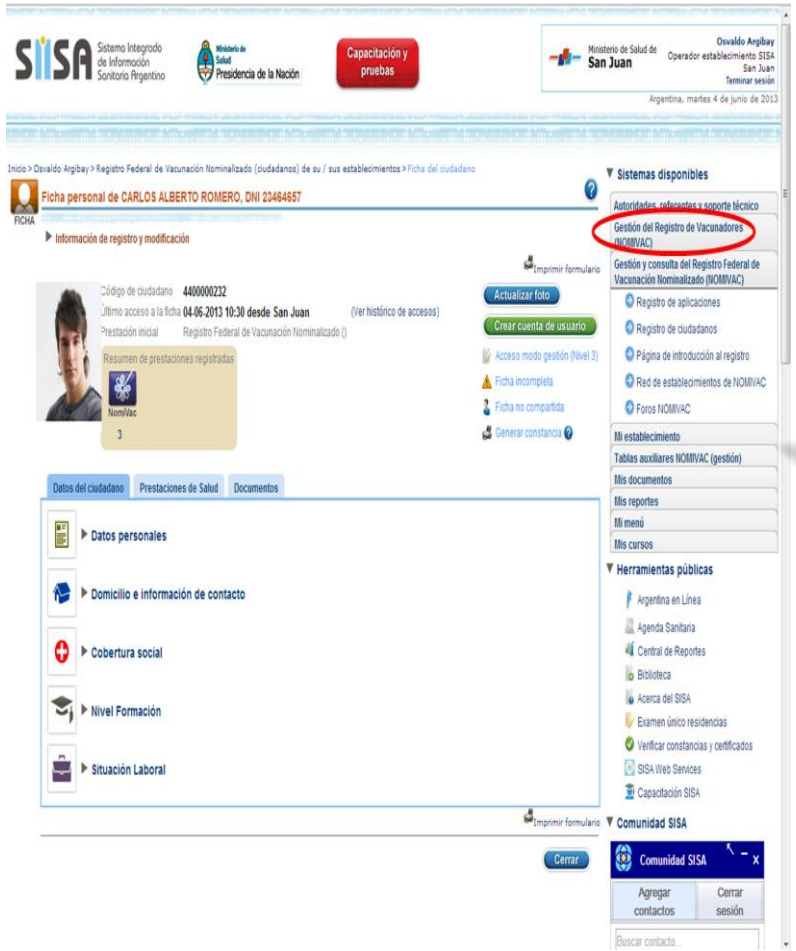
Nombre departamento	Antineumococica (<1 Año) 1RA. DOSIS	2DA. DOSIS	3RA. DOSIS	Antipolio (<1 Año) 1RA. DOSIS	2DA. DOSIS	3RA. DOSIS	Antipolio (1 Año) 1RA. DOSIS	2DA. DOSIS	3RA. DOSIS	4TA. DOSIS	D. REFUERZO	Ar 1RA. DOSIS	2DA. DOSIS
BENI	240	190	156	251	194	163	24	63	97	303	430	27	53
CHUQUISACA	27	29	35	30	28	43	6	15	7	80	30	0	8
COCHABAMBA	872	859	758	874	856	779	39	55	129	1.074	1.018	24	54
LA PAZ	207	226	241	217	234	259	42	84	69	568	1.048	58	124
ORURO	844	849	847	847	846	866	51	46	48	723	226	19	34
PANDO	51	43	54	51	43	55	1	1	2	74	104	0	2
POTOSI	1.329	1.273	1.140	1.336	1.274	1.146	78	60	42	1.631	1.303	53	36
SANTA CRUZ	743	745	666	767	761	711	169	207	268	1.352	714	125	153
TARIJA	6	8	7	6	8	9	9	8	4	33	12	3	8
BOLIVIA	4.319	4.222	3.904	4.379	4.244	4.031	419	539	666	5.838	4.885	309	472

Country examples utilizing EIR
Electronic Vaccine certificate for the Routine Immunization

Bogota, Colombia.
Routine vaccination



Argentina.
Routine vaccination



ISCI | NirseCL

HOME REPORT STRATEGY METODOLOGY TEAM EN

Evaluation of the effectiveness and impact of Nirsevimab in Chile

The purpose of NirseCL is to evaluate the impact of including nirsevimab in the winter campaign in 2024 in Chile on the prevention of respiratory infections caused by Respiratory Syncytial Virus (RSV) in children.

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New Borns (NB)

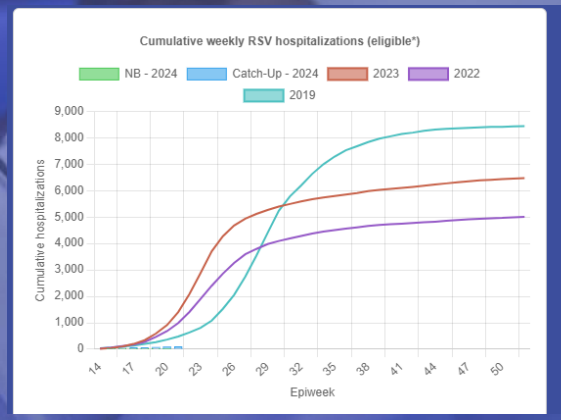
Born from April 1st of 2024 to September 30th of 2024.

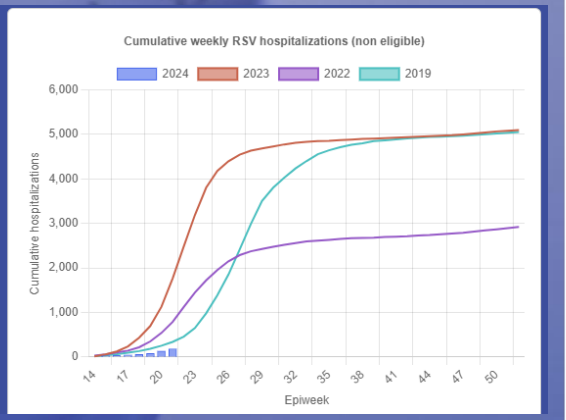
Coverage 98.0%

Catch-Up

Born from October 1st of 2023 to March 31st of 2024.

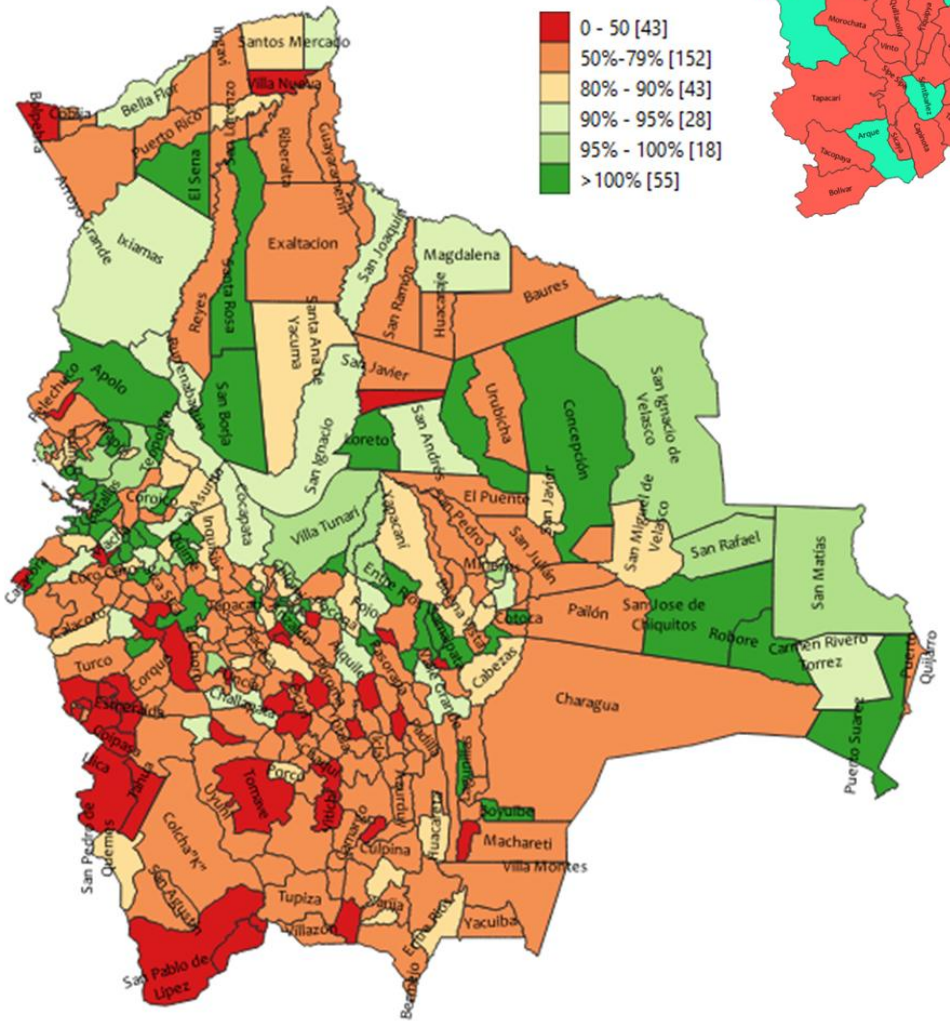
Coverage 85.6%

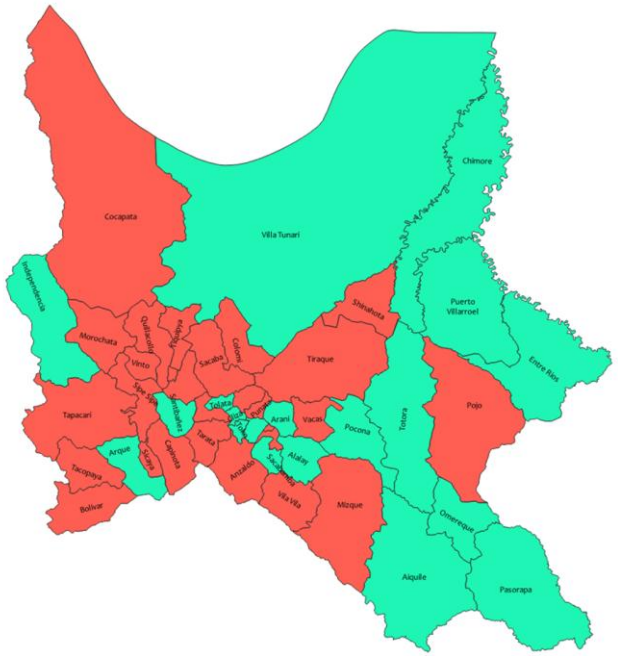


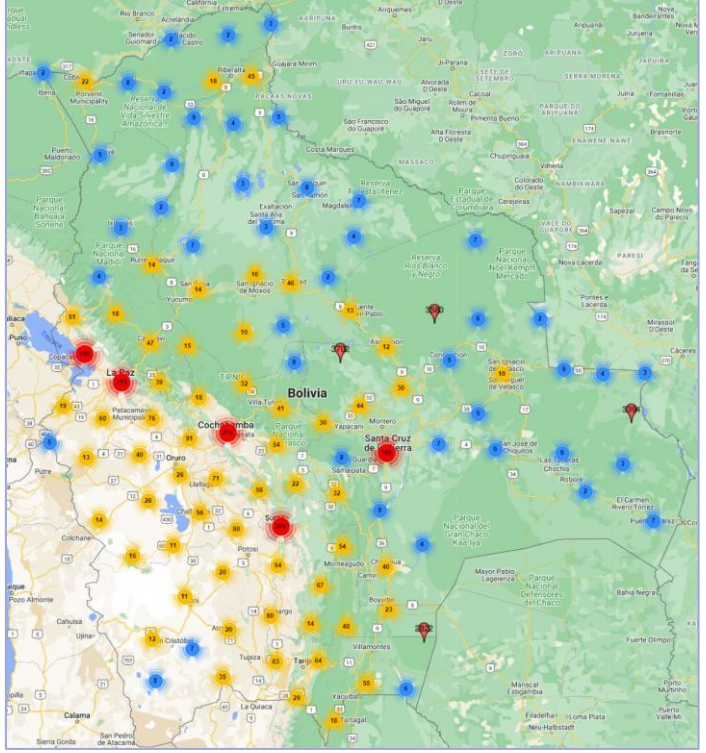


NirseCL (isci.cl)

Geographic Analysis



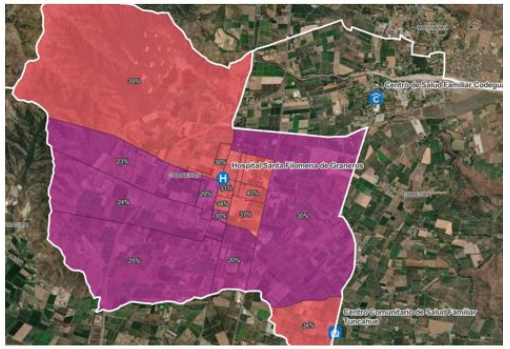




Niveles de Vacunación

Muestra el detalle de la población del **Registro Social de Hogares** inmunizada para Influenza y Virus Respiratorio Sincicial (VRS), con desagregación por **unidad vecinal**.

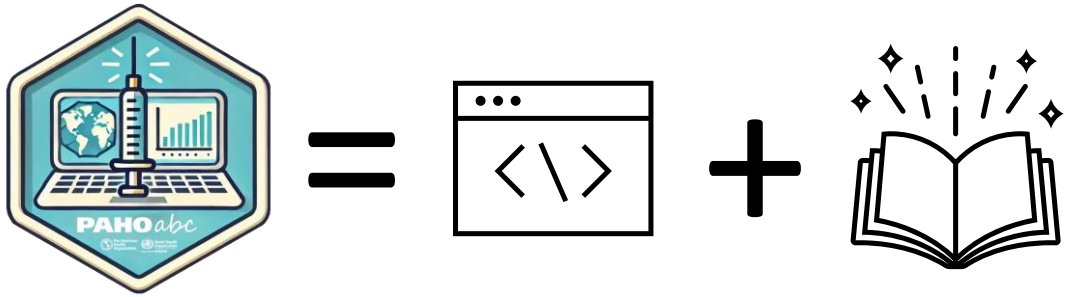
La georreferenciación de los casos se realiza mediante el cruce de información del Registro Nacional de Inmunizaciones con el Registro Social de Hogares, lo que permite identificar la unidad vecinal de residencia de la población objetivo y agrupar los datos para su visualización territorial.

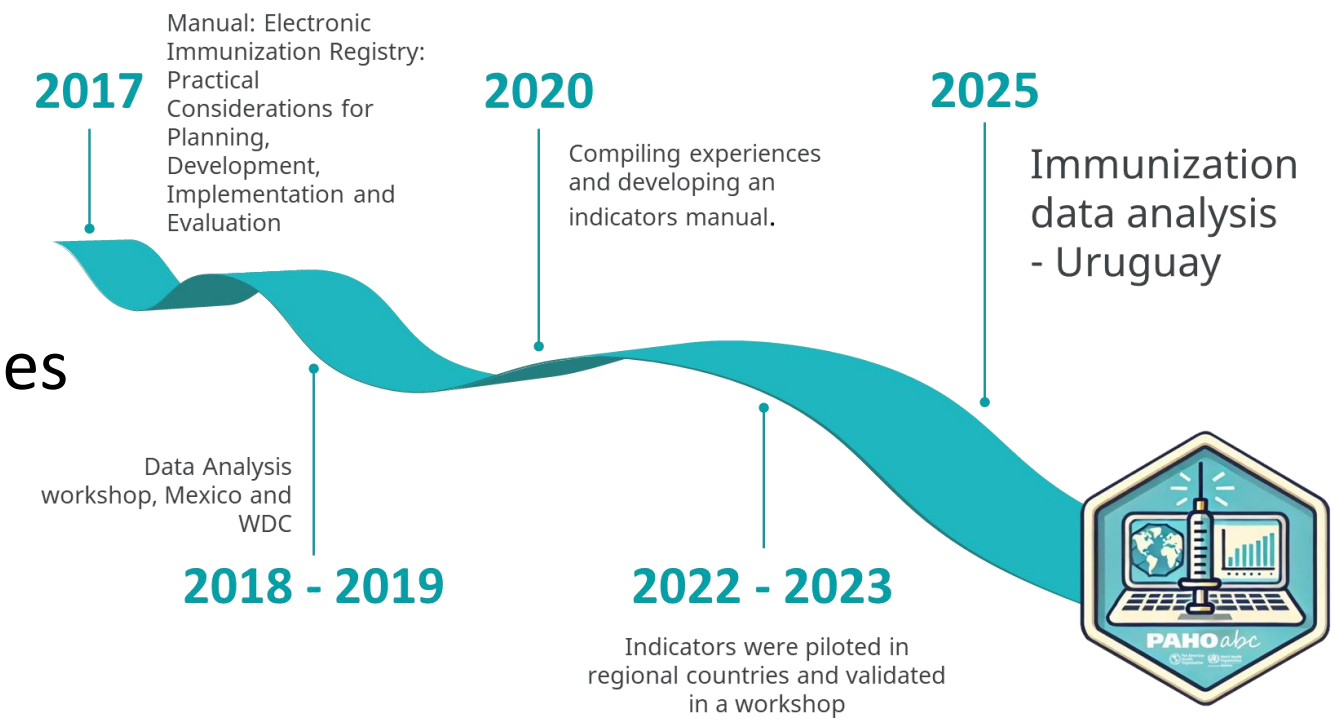


Por lo tanto, es información de carácter referencial que aproxima los niveles de vacunación a nivel subcomunal

PAHOabc

- Standardized Immunization Data Analysis Framework
  - Handbook of indicators
  - R Analysis Package
  - Technical support
- Working together with countries to share knowledge and experiences





PAHO Technical Cooperation

Standardized Frameworks

PAHO develops standardized frameworks and indicators to ensure consistent immunization data analysis across countries.

Analytical Tools

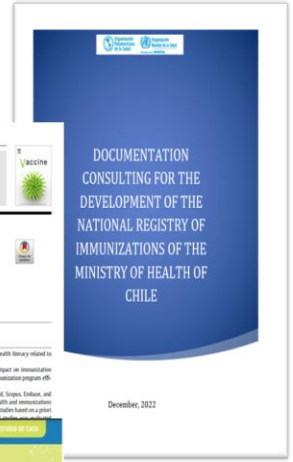
PAHO provides cost-effective R-based analytical tools offering alternatives to commercial software for data processing.

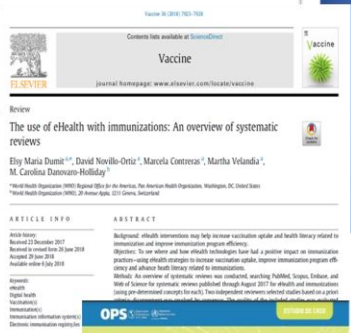
Capacity Building

PAHO supports capacity building through training, mentoring, and knowledge exchange to enhance effective data use.

https://campus.paho.org/en/course/electronic-immunization-registry

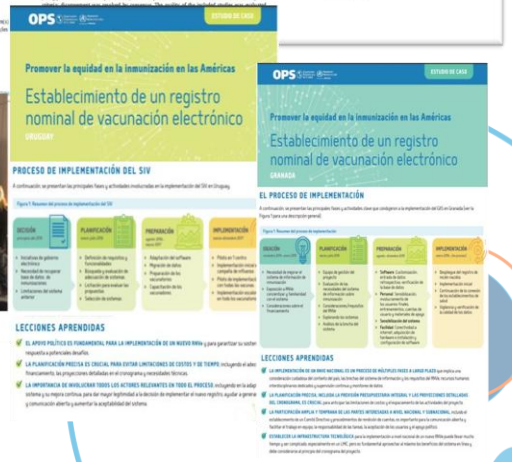
Participants at the EIR workshop in Argentina, September 2017. Credit: PAHO/WHO





Participants sharing experiences with EIR systems in Chile, August 2017. Credit: PAHO/WHO

Regional Meeting on Digital Transformation of the Health Sector



PAHO Pan American Health Organization World Health Organization Americas

PAHO 120th ANNIVERSARY

Lessons learned

Important factors to have in mind

- Shared vision among countries and even among regions
- Governance
- Differences and synergies between EIR and HMR
- Need for a Regulatory framework
- eHealth Policy
- Life course stages
- Guarantee the maintenance and sustainability
- Respond to the local level
- Promote the information from the EIR
- DQ Monitoring and Evaluation in an EIR
- Transition period and Change management
- Delete the paper?
- Promote the use of mobile technologies
- Feasibility of the EIR implementation in the countries.

Strengths

Better and more homogeneous coverage

Reducing inequities

Improve program management

Better data quality

Better access to data

Better vaccine stock management

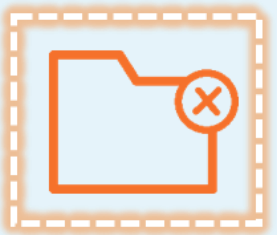
Population access to their Vaccination records

Challenges

Infrastructure limitations: internet, electricity

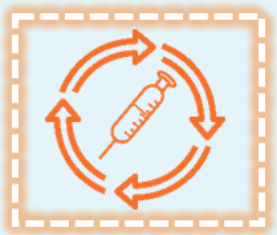
Governance and regulation

Digital literacy

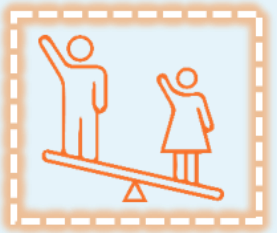


Deployments without in-depth review or pilots / evaluation.

Integration Training



Implementation of interventions without considering end users and / or health impact.



Inequalities in digital access

EIR Experiences

- Peru:
  - https://www.youtube.com/watch?v=1_2RALbi6iA
    https://www.youtube.com/watch?v=UDhH4WF4E2E
- Bogota, Colombia:
  - https://www.youtube.com/watch?v=uGcjILgvmig&t=23s
- Colombia:
  - Optimización de sistemas de información de inmunizaciones y vigilancia de inmuno-prevenibles
- Bolivia:
  - https://www.youtube.com/watch?v=pDJAdJoqTxM&t=54s

Thank you!
Merci!
Muchas gracias
Muito Obrigada

Pan American Health Organization
World Health Organization
Americas
PAHO