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Reimagining Latin American health systems in the digital era

Elcano Policy Paper

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Abstract

Improving population health is an essential goal of public policy. Health systems must improve the overall health of every person, ensure its equitable distribution and guarantee financial protection in healthcare. Strengthening health systems is, and must be, a strategic priority to achieve these objectives. In this context, Information and Communication Technologies (ICT) are a key tool to enhance efficiency in health services, optimise available resources and improve both the access to and the quality of medical care.

Digital transformation in the healthcare sector

For this to happen it is necessary to foster a digital transformation in the sector –a deep technological, cultural and organisational shift that leads to more effective and efficient health systems–. Advancing this process requires enabling environments and the participation of key stakeholders, as well as strategic planning, governance structures and context-specific analyses to support implementation.

The use of ICT, particularly in the health sector, accelerated significantly during the COVID-19 pandemic. In Latin America and the Caribbean those years saw major progress in the digitisation of processes. Also, regulatory frameworks for telemedicine were strengthened in some countries and the use of digital health services reached unprecedented levels. These developments provided valuable experience and evidence that health systems' digital transformation can help build resilient systems and contribute to achieving universal health coverage.

However, the process also revealed systemic gaps in the region, such as unequal access to technology, concerns about data security and insufficient regulatory frameworks.

A study to reimagine Latin American health systems in the digital era

The primary goal of the *Reimagining Latin American Health Systems in the Digital Era* study was to generate evidence on the barriers and enabling factors to implementing public policies for the digital transformation of the health sector in four countries: Uruguay, Argentina, Chile and Mexico.

The case studies and their analysis were conducted knowing that the selected countries share some common elements but also exhibit important differences in their political systems and economies. For instance, while all four countries can be considered full democracies, Chile and Uruguay have centralised political systems, whereas Mexico and Argentina are federal states. Economically, Uruguay and Chile are classified as high-income countries, while Argentina and Mexico are considered middle-income countries. These and other factors influenced the design and implementation of the analysed public policies and strategies.

The study was carried out with the conviction that digital transformation can significantly advance the health sector's goals achieving them more quickly, efficiently and with greater impact. At the same time, it acknowledged the limited information available on how to guide this transformation through public policy in ways that strengthen health systems.

Moreover, the study did not begin with a fixed policy definition of the digital transformation. Instead, it sought to select cases that incorporated aspects and factors that could be considered part of such a policy. This flexible approach helped clarify the key characteristics of digital transformation, offering insights that may provide valuable guidance for future research projects.

Qualitative methodology with a participatory approach

The research was conducted using a qualitative method with a participatory approach. This involved the creation of a regional network of subject-matter experts. The network co-created four case studies to identify enablers and barriers in the implementation of public policies. After selecting the cases, each country team conducted semi-structured interviews guided by the following research questions, which were adapted to each country's context:

- How were the public policy implementation processes developed and executed?
- How did technical, political, cultural, organisational and financial factors influence the implementation of public policies?
- What enablers and barriers emerged during the implementation of these public policies?

The information obtained from the interview process was analysed using an implementation analysis framework. Such a framework considers: the objectives of the public policies; financial, technical,

cultural, organisational and political factors; the characteristics of the implementing teams; implementation strategies; and approaches for managing key stakeholders.

Research focus: the 'how' of public policy implementation

The focus of our study was on the implementation processes of public policies. This emphasis stems from the recognition that, even when a policy is well designed, various factors during its implementation can either facilitate or hinder its execution. It is important to note that the project does not aim to evaluate the policies themselves or quantify their impact. Instead, it focuses on examining the processes, actors, structures and contextual factors that shape implementation, including any deviations from the original policy intent.

In each country, case selection was guided by the identification of experiences whose characteristics, scope, strategies and implementation processes could provide valuable insights into both lessons learned and challenges faced.

Rather than comparing the design or implementation of the selected cases, the study aimed to offer a broad perspective to identify key factors that influence the implementation of public policies in the health sector.

Specifically, four public policy experiences and strategies targeting the digital transformation of the health sector were analysed:

Country	Public policy / Strategy
Uruguay	*Mi Historia Clínica Digital* (My Digital Health Record)
Argentina	*Estrategia Nacional de Salud Digital* (ENSD)
Chile	*Sistema de Información de la Red Asistencial* (SIDRA, Assistance Network Information System)
México	Sistema de *Información Básica en Salud* (SINBA, Basic Health Information System)

The case study analysis facilitated the identification of lessons learned for each country. Additionally, it enabled the examination of public policy implementation for digital transformation across different contexts and approaches, including centralised versus decentralised strategies, bottom-up versus top-down implementation and reliance on national funds versus international financial resources to sustain the process. Together, these factors provided a broader perspective for a comprehensive analysis.

Among the main recommendations, the following stand out:

1. Elementos esenciales:
   - **Objectives must be clear and address a specific health problem:** there must be a clear understanding of the specific health issue that the digital transformation policy aims to address –it is not about digitising for the sake of digitising–. To this end, objectives should always be aligned with multisectoral national digital transformation processes and focus on improving population health. From this perspective, digital and technological solutions serve as tools to achieve broader health goals, such as more efficient and faster systems with greater coverage and higher quality of services.
   - **Implementation team:** public policy implementation for digital transformation requires teams with well-defined roles, legitimacy to perform their work, flexibility, diverse profiles and the ability to communicate the usefulness and benefits of the policy to various stakeholders.
   - **Conduct diagnostics on the digital transformation maturity status at the subnational level:** to develop implementation strategies that respond to local contexts, digital transformation policies must be based on a clear understanding of the current state of digital transformation at both the national and subnational levels.

2. Decision points for the team –or person– responsible for implementation to consider:
   - **Implementation strategies:** the way policies are implemented can vary depending on the context and needs. In some cases, implementation may follow a top-down approach, while in others it is better –or sometimes the only option– to proceed through negotiation and consensus-building processes. Although these strategies should have a clear structure, they must also maintain flexibility.
   - **Engaging key stakeholders:** Identifying and involving key actors in the implementation process can provide multiple benefits and foster a diverse, multidisciplinary perspective. However, this must always be done without compromising the policy's objectives. Identifying allied individuals or 'champions' within the implementation process is often an effective strategy to ensure the policy permeates health service practices.
   - **Differentiated benefits:** in public policy implementation there will always be groups and individuals who benefit –either directly or indirectly– and others who are 'left out'. Having clear objectives helps guide decision-making and ensures that the groups targeted by the strategies receive benefits. At the same

time, technological solutions must be capable of addressing the needs of different actors, which may not always occur simultaneously.

- **Decisions on tools and products:** digital transformation is a paradigm shift that must go beyond mere 'digitisation'. Decisions should be made with the goal of driving changes in processes, governance structures, workforce training and alignment with health system objectives.

3. Enablers:
    - **Progress and achievements must be showcased at all stages:** to ensure the sustainability of implementation over time, it is important to identify and communicate achievements and benefits in strategic spaces to key stakeholders. Additionally, it is essential to always maintain clarity on who is benefiting from the public policy and how it must be maintained.
    - **Governance structures:** public policies for the digital transformation of health systems must be supported by structures and regulations that clearly define levels of responsibility and ownership of processes. This ensures proper implementation and establishes monitoring, evaluation and accountability mechanisms.
    - **Flexibility for digital transformation:** digital transformation is inherently uncertain. Public policies must remain flexible and be capable of adapting to dynamic processes and contexts without losing sight of their core objectives and the populations they aim to benefit.

Based on the case analysis and findings, we have gained a deeper understanding of both the potential and the 'hows' of implementing public policies for the digital transformation of health systems. We trust that these findings, presented as public policy recommendations, will be useful in guiding the implementation of more efficient and sustainable strategies that contribute to achieving universal health coverage.

1. Introduction

Improving population health is an essential goal of public policy. Health systems must enhance overall health outcomes, ensure equitable distribution and guarantee financial protection in healthcare. Strengthening health systems is a strategic priority for achieving these goals.

In this context, Information and Communication Technologies (ICT) –whose role was accelerated by the COVID-19 pandemic– are a key tool for increasing the efficiency of health services, optimising available resources and improving both access to and quality of health care.

To achieve this, a digital transformation of the health sector is required: a profound technological, cultural and organisational shift that leads to more effective health systems using ICT. Advancing this transformation requires enabling environments, the involvement of key stakeholders, strategic planning, strong governance structures and context-sensitive analyses to support effective implementation.

Such a transformation requires a multisectoral and interdisciplinary approach to develop and adopt public policies, regulatory frameworks and national digital literacy programmes[1].

To make this possible, the transformation must reach multiple components of health systems: health information systems, financing, health workforce, leadership and governance, as well as the provision of medical services and products. While significant conceptual progress has been made on digital transformation, there is still limited information on how countries have operationalised these guidelines and principles.

It is essential to understand digital transformation as a paradigm shift. This means going beyond the digitisation of systems or the deployment of apps. It requires enabling –and sustaining over time– processes that drive systemic and structural change in health systems and their services, which necessarily demands a holistic perspective.

In this scenario, to achieve true digital transformation in health systems –one that helps countries move toward universal health coverage (UHC)– it is critical to learn not only from what has worked, but also from the strategies and processes that have enabled such progress. While there is abundant evidence about the potential of digital transformation in the

1 J. Barbosa da Silva, M. Espinal, S. Garcia-Saiso, J. Fitzgerald, M. Marti, E. Bascolo, A.E. Haddad & M. D'Agostino (2024), 'A digital transformation for primary health care', Bull World Health Organ, 1/I/2024, 102(1):2-2A. doi: 10.2471/BLT.23.290726. PMID: 38164335; PMCID: PMC10753283.

health sector, much less is known about how to successfully implement digital transformation policies.

When considering this issue in the context of Latin America and the Caribbean, it is important to recognise that countries in the region share similarities and challenges in their social, political and economic contexts. However, unlike regions such as the EU, these similarities have not resulted in regulatory harmonisation or regional integration processes that would enable the deployment of joint digital transformation strategies.

Given the specific conditions under which public policies are implemented in Latin America and the Caribbean, studying them from a regional perspective poses challenges. Instead, to identify what has worked and document barriers to implementing digital health transformation policies, it is more appropriate to examine cases at the country level rather than the region as a whole.

Moreover, studying the implementation of public policies aimed at improving health through digital transformation must begin with the understanding that it goes beyond government directives or merely digitising processes. On the contrary, it is a complex process that requires the involvement of multiple actors and the analysis of various factors, including political, technical, financial, organisational and cultural aspects.

With this in mind, the study *Reimagining Latin American Health Systems in the Digital Era* was designed and implemented with the objective of generating evidence on the barriers and enabling factors affecting the implementation of digital transformation policies in the health sector.

The project focused on case studies from Uruguay, Argentina, Chile and Mexico. These countries were selected due to their ongoing digital transformation efforts in health and their diverse national contexts. These factors allowed for the identification of both shared elements and differences, such as whether governments are centralised or federal and whether their health systems are integrated or fragmented.

Additionally, our focus was specifically on implementation processes rather than on evaluating the policies themselves. The starting premise was that, regardless of how well-designed a policy may be, implementation can succeed in some cases and fail in others. From this perspective, each country case was selected for its potential to reveal different strategies and influencing factors, as well as to identify barriers encountered and enablers that facilitated the implementation process.

As a result, the selected policies and strategies vary in scope and characteristics. Below are some notable features:

- **Chile:** this case involves a strategy with several years of implementation but has not been studied broadly, making it especially relevant to understand how implementation has evolved over time.
- **Argentina:** given the participation of the implementation team, the case focused on understanding the strategies used during implementation. Working from an 'insider' perspective helped reveal creative and innovative resources employed to advance a national strategy.
- **Uruguay:** this case involves a policy framed within a broader national public policy. Accordingly, the study focused on a relatively small component of a larger process aimed at ensuring the right to access health information.
- **México:** the study analysed a public policy related to the replacement of a health information system for which little documentation was available. Therefore, it was important to understand how implementation unfolded.

The study was guided by the hypothesis that, while there is sufficient evidence on what should be done to achieve digital transformation in support of UHC, we know very little about how to carry it out. For this reason, generating information and identifying lessons learned on the implementation of public policies to digitally transform Latin American health systems through ICT is essential.

2. Context

2.1. The COVID-19 pandemic

The COVID-19 pandemic had profound implications for the ways we work, learn and manage supply chains globally (Adams-Prassl *et al.*, 2020). It also placed ICT at the centre of operations for many public and private sector organisations (Gatautis *et al.*, 2015). Technological innovation has become an integral part of everyday life. While efforts towards digital transformation in health systems predated the pandemic, COVID-19 significantly accelerated digitisation processes. Nonetheless, a thorough analysis is needed to determine whether these changes were deep and sustained over time.

In particular, the pandemic spurred regulatory developments in telemedicine in some countries and digital health service usage reached unprecedented levels. For instance, in Argentina, teleconsultations doubled, reaching 83,000 interactions in public health centres.[2] In Chile, 200,000 teleconsultations were recorded. Similarly, Colombia increased from 1.1 million to 10.6 million telemedicine consultations between 2020 and 2021.[3] Meanwhile, Mexico reported 5.5 million interactions during the same period.[4]

However, these changes also revealed systemic gaps, such as unequal access to technology, concerns about data security and insufficient regulatory frameworks. Increased access to digital services has not come without risks: in Latin America and the Caribbean, challenges remain related to connection security, privacy rights and data protection, among others.

These shifts have also highlighted the need for cultural change within health systems. Resistance to digital tools decreased out of necessity, prompting organisations to rethink workflows, training programmes and trust-building in technology. Nonetheless, persistent barriers –such

2 Government of Argentina (2024), *During the Pandemic, the Number of Public Centers with Telehealth Services Doubled [Durante la pandemia se duplicó la cantidad de centros públicos con servicio de telesalud]*, accessed 30/XI/2024, https://www.argentina.gob.ar/noticias/durante-la-pandemia-se-duplico-la-cantidad-de-centros-publicos-con-servicio-de-telesalud

3 Editorial La República S.A.S. (2024), *The Pandemic Accelerated the Use of Telehealth, and Over 100 Million Virtual Appointments Were Completed [Pandemia aceleró uso de la telesalud y se lograron más de 100 millones de citas virtuales]*, accessed 30/XI/2024, https://www.larepublica.co/especiales/la-salud-despues-del-covid/la-pandemia-acelero-el-uso-de-la-telemedicina-3175267

4 Health Minister, Government of Mexico (2024), *The Use of Telehealth or Telemedicine Advances in Mexico [Avanza el uso de la telesalud o telemedicina en México]*, accessed 30/XI/2024, https://www.gob.mx/salud/prensa/avanza-el-uso-de-la-telesalud-o-telemedicina-en-mexico

as unequal digital literacy and organisational inertia– underscore the importance of continuous cultural adaptation to integrate and sustain innovation.

While the potential of digital transformation is widely recognised, consolidating progress and ensuring it helps health systems in the region achieve their goals requires learning from past actions: identifying persistent gaps and challenges, as well as sharing successes.

2.2. Digital transformation in Latin America

Latin America faces many structural challenges related to the digital transformation of its health systems. One of the region's best-known –and defining– characteristics is its deep inequality. For this reason, it is essential that the implementation and adoption of public health policies be equitable and sustainable to ensure that no one is left behind (García-Saisó *et al.*, 2022).

To gain an overview of the current state of digital health transformation in the region, we provide a summary of results from the Global Digital Health Monitor (GDHM),[5] along with demographic statistics, data on access to electricity, digital transformation and health system indicators (World Bank, 2024).

In Latin America, when looking at the overall indicator (Figure 1), we observe that most countries fall within maturity level 3 (46% of countries) and level 4 (30%), which at first glance may appear to be a positive outcome.

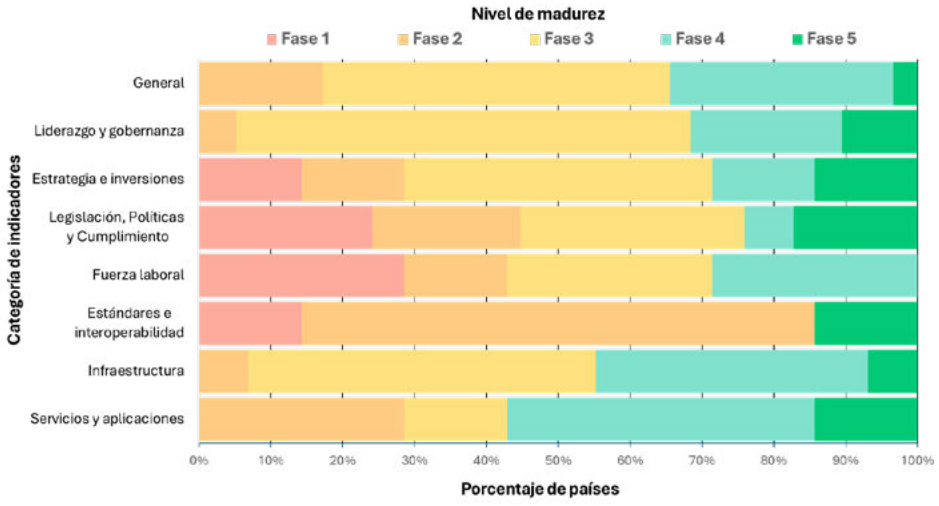
5 The Digital Health Status Report reveals global trends in digital health. The study is based on data provided by participating governments, which are then verified by the GDHM team. This information is used to construct a composite indicator that reflects each country's level of digital health maturity, ranked from highest to lowest.

Figure 1. Overall maturity level of the digital health status in Latin America and the Caribbean, 2023

Source: the authors based on GDHM data

However, when we disaggregate the indicator into its seven categories[6] (Figure 2), differences in maturity levels across the categories become evident. From this perspective, the categories of 'Strategy and Investment', 'Legislation, Policy and Compliance' and 'Standards and Interoperability' stand out due to the low maturity levels observed in many countries.

Figure 2. Breakdown of digital health indicator categories by maturity level in Latin America, 2023



Source: the authors based on data from the GDHM

6 (1) Leadership and governance; (2) strategy and investment; (3) legislation, policy and compliance; (4) workforce; (5) standards and interoperability; (6) infrastructure; and (7) services and applications.

Another barrier highlighted by the GDHM indicator is that, in every category, there are countries that either do not report data or lack the necessary information to do so: in some cases up to 23 countries in the region fail to report.

According to the GDHM the countries analysed in this study (Argentina, Chile, Mexico and Uruguay) are all classified at maturity level 4 overall. However, Mexico and Uruguay show information gaps –either due to non-reporting or lack of available data– in four out of the seven categories. A breakdown of each category reveals the following:

- **Leadership and governance:** data is available for all four countries. Chile and Mexico show less progress compared with Argentina and Uruguay.
- **Strategy and investment:** data is only available for Argentina and Chile. Argentina reports the highest maturity level, while Chile is at level 3.
- **Legislation, policy and compliance:** Chile is at level 4, while the other three countries are at level 5.
- **Workforce:** no data is reported for Mexico and Uruguay. Argentina is at level 4 and Chile is at level 3.
- **Standards and interoperability:** no data is reported for Mexico and Uruguay. Both Chile and Argentina are at a low maturity level (level 2).
- **Infrastructure:** Argentina is at level 3, while the other three countries are at level 4.
- **Services and applications:** no data is reported for Mexico and Uruguay. Argentina reports level 2 and Chile is at level 4.

From this initial data, we can observe that:

- Although all four countries share the same overall maturity level, there are significant differences in the reporting of key indicators.
- Uruguay and Mexico have several missing data points.
- Argentina and Chile show more progress in some indicators and report data across all categories, although both still have room for improvement in the Standards and Interoperability and Digital Services categories.
- Advancing digital health will require all countries to strengthen their data reporting capabilities.

It is important to note that although data is not reported for several countries within the GDHM framework, this does not necessarily mean that the data is unavailable in official sources. However, conducting a comprehensive review of each country's data falls outside the scope of this project.

2.3. Digital transformation in health: opportunities and challenges

There have been significant conceptual advances in understanding what digital transformation should look like in the region. Nonetheless, there is still limited information on best practices or case studies related to the implementation of public policies aimed at transforming health systems.

Put differently, while the potential of digital transformation in health systems is well understood and there is evidence of progress and achievements, there is still a lack of knowledge about how to ensure its successful implementation.

As part of this research project, a literature review was conducted. Although the review identified grey literature on best practices in digital transformation, evidence remains scarce on what works –and what does not– when implementing public policies in this field. Some materials were found from the Inter-American Development Bank and national research centres in specific countries across the region.

This literature highlights several areas where ICTs offer opportunities to strengthen health systems, including:

- Quality of services
- Care management
- Telemedicine
- Mobile health
- Capacity development
- Administrative simplification

Taken together, these elements point to the many potential benefits of digital transformation. However, implementation also brings important challenges. It is therefore essential to examine the challenges within the scope of digital health policies and programmes.

According to recent scientific evidence (Iyamu *et al.*, 2022; Mumtaz et al., 2023), the main challenges fall into two broad categories:

- Technical challenges:
  - Data reliability
  - Fragmented information systems
  - Gaps in leadership and workforce capacity
  - Infrastructure deficiencies

  - Lack of operational standardisation
  - Security and protection issues
  - Privacy concerns
- Non-technical challenges:
  - Ethical and legal considerations
  - Health equity and access
  - Policy and governance frameworks
  - Limited financial and institutional resources
  - Misinformation and infodemic risks
  - Cultural resistance and values

Although the potential of digital transformation is clear, the complexity of its implementation must not be underestimated. Recognising these challenges offers a general framework to consider when designing and implementing public policies and digital health programmes.

Across Latin America, several policies and initiatives are already working towards advancing the digital transformation of the health sector –often with technical and financial support from international cooperation agencies–. Analysing these initiatives through public policy implementation frameworks and considering the challenges mentioned above, can help identify what has worked and shed light on what still needs to be addressed.

3. Reimagining Latin American health systems in the digital era

The *Reimagining Latin American Health Systems in the Digital* Era project was designed and implemented with two main objectives: (1) to contribute to the existing body of evidence; and (2) to set a precedent for best practices and key enablers needed for digital transformation in Latin America and the Caribbean.

The following section outlines the project's methodology, its guiding principles and the analytical framework under which the work was carried out.

3.1. Methodology and project stages

The research was conducted using a qualitative methodology based on semi-structured interviews with key stakeholders. In addition, a network of experts was established in each country, enabling the co-creation of four case studies to better understand the processes involved in implementing public policies for the digital transformation of health systems.

The project was carried out in several stages:

a) Country selection:

Four countries were selected (Uruguay, Argentina, Chile and Mexico) based on the following criteria:

- Significant progress in digital transformation.
- Existing cooperation with local experts.
- Diversity in political and economic context.

Differences in the countries' legal and territorial organisation were considered, as these directly impact the design, implementation and operation of public policies. Accordingly, the study included two countries with centralised political systems (Chile and Uruguay) and two with federal systems (Argentina and Mexico).

It is important to note that the policies analysed are not the only examples of digital health transformation initiatives in the selected countries; nevertheless, they represent a diverse range of policies that enrich the study and allow both the collection of lessons learnt and the identification of barriers and enablers that may guide future efforts to implement public policies for digital transformation.

b) Creation of an expert network:

A regional network was established, composed of experts with diverse and complementary professional profiles. The network included digital health specialists and individuals with direct experience in digital transformation, such as medical professionals familiar with the selected healthcare systems (the full list and profiles of network members appears in Annex 1).

The purpose of creating the network was to foster knowledge co-creation through the analysis of the case studies, aiming to illustrate the enablers and barriers in public policy implementation.

Through collaborative working sessions, the network contributed to:

- Selecting a public policy or programme in each country to be studied.
- Collectively selecting the key topics to be addressed in each case.
- Mapping key stakeholders involved in each public policy or programme.
- Contextualising each public policy from the perspective of local experts.

c) Definition and adaptation of research questions:

Using qualitative methods, a series of research questions were formulated and addressed to obtain the information needed for the analysis:

- What were the public policy implementation processes like?
- How did technical, political, cultural, organisational and financial factors influence the implementation of public policies?
- What enablers and barriers were encountered during the implementation of these public policies?

These research questions were adapted to each country's context. A more detailed review of each case is provided below.

d) In-person and virtual workshops:

Based oOnce the network and country teams were established, workshops were held to:

- Better understand the specific objectives of each public policy.
- Map the key stakeholders involved.
- Identify important topics to explore during the semi-structured interviews.

e) Data collection:

Based on the research questions, detailed interview guides were developed for each case. Key stakeholders were contacted and interviewed using semi-structured questionnaires. All interviews were recorded and transcribed for subsequent analysis using ATLAS.ti software.

f) Results analysis and case study development:

Each case study was subjected to a thematic analysis following the completion of interviews and the systematic organisation of the collected information. The analysis was conducted using the framework outlined in the subsequent section. The preliminary findings from this phase were subsequently presented to the expert network for review and feedback.

g) Regional expert meeting on digital transformation in health systems:

After the case studies were completed and analysed, a group of international experts was invited to a meeting where the results were presented and discussed to identify key recommendations. Over three days of work, participants were able to:

- Collaboratively discuss the objectives and key factors influencing the implementation of the analysed strategies and public policies.
- Examine the common barriers and enablers shared across the four countries.
- Reflect on the key lessons learned to develop a set of public policy recommendations.

The meeting also featured panel discussions involving a diverse group of experts from governments, academia, the private sector and international organisations. These panels helped enrich the analysis conducted by the research technical team and country teams by providing broader insights and experiences.

3.2. Research principles and analytical framework

In addition to the elements previously described, two research principles were established to guide the project:

3.2.1. Health systems approach

Health systems must shift from an acute-focused perspective to a long-term care approach centred on the needs of the people they serve. For this to happen, health systems should be resilient and able to adapt to new contexts in order to respond to the ever-changing needs of the population.

These efforts must always aim to strengthen and achieve the core objectives of health systems: improving health outcomes, enhancing financial protection and addressing the needs and preferences of the population. Furthermore, digital transformation can help build resilient health systems and contribute to achieving universal health coverage.

Understanding the challenges associated with health systems from a systemic perspective is key to digital transformation. This means viewing transformation as a series of technology integration processes across areas that include the individual dimension of users, as well as collective and structural aspects.

In other words, for the transformation of health systems to be profound, it is necessary to ensure cultural changes, legislative reforms, a rethinking of regulatory frameworks, innovation in financing mechanisms and progress in user awareness.

3.2.2. Implementation approach

From the perspective of public policy implementation, the primary objective is to understand the factors influencing the processes and outcomes of implementation. This involves answering key questions such as what worked, why it worked and how policies and programmes function in real-world settings.

When discussing implementation, it is crucial to acknowledge the existence of implementation gaps –the disparity between what is intended to be done and what is actually carried out–. Accordingly, the field of public policy implementation research focuses on understanding how a policy can be executed as designed. It is important to emphasise that this field does not evaluate the impact or effectiveness of the policy itself.

Recognising that the implementation of public health policies is inherently complex –particularly when aiming for structural change– successful implementation depends on the cooperation of diverse actors and organisations. Such a cooperation is necessary to communicate objectives clearly, secure adequate resources and manage both cooperation and conflicts that may arise throughout the process.

3.2.3. Implementation analysis framework

To study the implementation of public policies, it is essential to understand the context and other factors influencing the process. Specifically, for the contextual analysis, the framework proposed *in Institutionalization and Sustainability of Donor-funded Quality Assurance Initiatives: The case of Honduras* (Annex 2) was selected.

This framework is based on several conceptual models that explore the implementation and sustainability of initiatives (Villalobos-Dintrans, 2017). It identifies four key dimensions to consider when analysing public policy implementation:

- Public policy objectives.
- Financial factors.
- Technical factors.
- Culture and structure.

To broaden the scope of the analysis, three additional dimensions were incorporated beyond those proposed by Villalobos-Dintrans (2017):

- Political factors.
- Implementation teams.
- Implementation strategies.

The framework highlights that any public policy encounters both enablers and barriers during implementation. These enablers and barriers relate to one or more of the following dimensions:

- **Objectives:** establishing clear objectives is essential. It is also important that policy designers, implementers and beneficiaries are aligned. This dimension concerns whether the intervention is justified and relates to the shared perception among all parties involved about the existence of a significant public policy problem and the effectiveness of the proposed solution to address it.
- **Financial factors:** this dimension assesses whether the available budget is sufficient to finance the policy as designed. It may also include perceptions regarding whether the proposed solution is the most efficient way to solve the identified problem.

- **Technical factors:** the capacities of the implementing institution must match the technical requirements of the policy for successful implementation. This dimension also considers any necessary organisational changes to carry out the project.
- **Culture and structure:** refers to the organisational culture and the challenges associated with implementing policies aimed at changing it. For example, this includes understanding the need for legal or regulatory reforms to support a new policy, as well as resistance to change within organisations.
- **Political factors:** involves the analysis of power dynamics, conflicts of interest and the broader political context as factors influencing implementation.
- **Implementation teams:** examines the characteristics, technical skills and expertise of the teams responsible for carrying out the policy.
- **Implementation strategies:** refers to actions designed to improve implementation, such as training, monitoring, audits, feedback mechanisms and adaptations to the local context.

Adapted framework from P. Villalobos Dintrans & T.J. Bossert (2017)

To better understand which actors participate and their roles during implementation, we mapped out the situation using the framework of actor categories in public health policy implementation (Campos & Reich, 2019). All actors and their roles were analysed based on the profiles described in the Consolidated Framework for Implementation Research (Damschroder *et al.*, 2022) (see Annex 3).

Specific interview guides were then developed for each case, grounded in the research questions and the public policy implementation analysis framework. Semi-structured interviews were conducted with key actors previously identified through the mapping process. These interviews were recorded and transcribed for subsequent thematic analysis using ATLAS.ti software.

4. Case studies: key findings

Due to the varied contexts, specificities and complexities of each country in Latin America and the Caribbean it was more appropriate to study the cases individually rather than as a single regional entity. However, the analysis allowed us to identify shared lessons learned and common challenges that can serve as references for future policy interventions in Latin America.

The study focused on the processes of public policy implementation, starting from the premise that despite good policy design, implementation can be effective in some cases and not in others. Therefore, the policies or programmes selected for each country included elements useful for analysing different strategies and implementation scenarios. This approach also made it possible to observe various barriers encountered and enablers that supported the process.

It is important to note that the goal of the study was not to compare the design or implementation of the cases, but rather to provide a broad overview that offers insights into what works and what does not when implementing health public policies.

Specifically, we considered four public policies and strategies aimed at the digital transformation of health systems:

Country	Public policy/Strategy	Components/Objectives
Uruguay	*Mi Historia Clínica Digital* (My Digital Health Record, My DHR)	Mi HCD aims to 'ensure equitable access for citizens to their clinical information, regardless of the healthcare provider they are affiliated with –whether public or private–. In this way, individuals can exercise their enshrined right to access their health information with the same security guarantees and whenever they wish'.[7]

7 Agency for Electronic Government and the Information and Knowledge Society (Agencia de Gobierno Electrónico y Sociedad de la Información y del Conocimiento), 2021.

Argentina	*Estrategia Nacional de Salud Digital* (ENSD) (National Digital Health Strategy, NDHS)	Reduce disparities in the access to health services across jurisdictions and coverage types, ensuring that all individuals receive equitable, high-quality care that upholds their right to health, regardless of their place of residence or socioeconomic status.
Chile	*Sistema de Información de la Red Asistencial* (SIDRA) (Health Network Information System, SIDRA)	Digitisation of standardised processes, both clinical and administrative: • Clinical support for patient care. • Direct clinical care of patients. • Administrative and logistical support.
México	*Sistema de Información Básica en Salud* (SINBA) (Basic Health Information System, SINBA)	Ensure the availability of higher-quality information at a lower production cost for health programmes and Seguro Popular. Generate evidence to: (1) evaluate health programmes; (2) plan public policies; (3) allocate resources based on evidence; and (4) ensure accountability.

In each country, sociodemographic conditions directly impact the implementation and adoption of digital transformation public policies. These factors include, for example, generation gaps, connectivity levels and Internet access. Consequently, the policies and strategies selected for each country have different characteristics and scopes.

Additionally, the selection of countries and cases provided a variety of scenarios that helped deepen the understanding of which factors act as enablers or barriers to implementation in different contexts (see Annex 5 for a summary).

Studying the cases individually made it possible to extract lessons learned and to identify barriers and enablers within each of the dimensions considered for analysis.[8] This individual approach also allowed for the examination of digital transformation policy implementation across diverse contexts and approaches: centralised versus decentralised strategies, bottom-up versus top-down implementation and reliance on national versus international financial resources to sustain implementation. This provided a broader perspective for a comprehensive analysis.

Below we present the main findings regarding factors that acted as enablers or barriers to implementation (Annex 4 provides contextual data and detailed information about the public policies analysed in this study). These findings serve as the basis for outlining public policy recommendations aimed at the digital transformation of health systems.

The study concludes that strategies must always be tailored to local contexts and institutional capacities, as well as to the political organisation of each country (unitary vs federal systems).

8 For a complete list of enablers and barriers by country, see Annex 4.

For instance, analysing two federal countries (Argentina and Mexico) allowed the identification of two distinct implementation strategies: a top-down approach in one case and a negotiation- and dialogue-based approach between central and subnational governments in the other. Specifically, Mexico adopted a top-down strategy, while Argentina relied on persuasion and negotiation across government levels. In contrast, the unitary governments of Chile and Uruguay highlighted the importance of effectively communicating the policies' content, objectives and scope –even in contexts where strategies and directives can be more easily transmitted across implementation levels–.

In some cases, clear and concrete objectives were identified, although they were not always explicitly linked to health-related goals. This was observed in Chile and Mexico; however, in Mexico, the policy was part of a broader national framework –the National Digital Strategy–. In contrast, Argentina's National Digital Health Strategy (ENSD) was directly connected to universal health coverage, while Uruguay's explicit objective focused on enhancing people's right to access their clinical information.

The cases also varied in the extent of diagnostic assessment and context analysis conducted prior to implementation. For example, Mexico and Chile showed gaps in understanding the maturity level of digital transformation at the national level –and in Mexico's case, also at the subnational level–.

Implementation strategies differed as well. In Argentina, the multidisciplinary implementation team developed communication plans, built consensus with provincial authorities and created a roadmap for next steps. Conversely, in Chile, no evidence was found of prior implementation strategy planning. The implementation team –composed almost entirely of IT experts– focused on issuing instructions and securing funding but did not initially incorporate additional strategies such as change management.

Similarly, in Mexico, the implementation team did not deploy many strategies to engage with the states. Although they secured funding for the system –which facilitated implementation– there were no identifiable change management efforts.

Another notable finding was the creativity demonstrated by some implementation teams when facing resource constraints, particularly financial ones. While Chile, Mexico and Uruguay had sufficient resources, Argentina lacked specific funds allocated to the policy, which posed a clear barrier. Nonetheless, Argentina's team adapted by optimising existing programmes, aligning external funding sources to support the policy, effectively communicating the strategy's goals and vision and launching pilot projects that advanced implementation.

In contrast, although Chile and Uruguay had adequate funding from the beginning, which helped facilitate implementation, there was no evidence of change management or communication strategies, which became significant barriers.

The case studies also raised several new research questions:

- What role does the private sector play in the digital transformation of health?
- What roles can other sectors –such as academia– assume and what responsibilities do they have to ensure that digital transformation benefits public health?
- How can implementation teams be strengthened or supported to guarantee the continuity of public policies despite political changes?
- How can the sustainability of effective policies be ensured through changes in government administrations?
- Under what conditions is it appropriate to promote the digital transformation of health systems and when might such efforts prove counterproductive?

A key issue emerged from the case analyses: data and its use are not solely technical challenges, they are also deeply political and social. For example, in Uruguay, there was a clear tension between improving access to data and safeguarding data protection. In Argentina, data has become a source of friction between the national government and provincial authorities, with provinces resisting efforts to grant the central government full access. Ultimately, data use has become a critical pressure point that may hinder progress in digital transformation. To address this challenge, ethical considerations must be incorporated, particularly regarding who owns the data, who can access it, under what circumstances and for what purposes.

Another area that was not deeply explored in the case studies is equity. However, digital transformation policies must be designed and implemented in ways that do not exacerbate existing inequalities. This includes prioritising the needs of the most vulnerable populations and ensuring that the benefits of digitalisation are equitably distributed.

Despite the differences between the cases, the methodology and co-creation approach used to develop them made it possible to identify barriers and facilitators that were common across settings and that may serve as valuable references for future policy initiatives. Below we present a synthesis of some of these cross-cutting elements:

Enablers	Barriers
• Addressing problems that are relevant to key stakeholders through digital transformation policies. • Aligning public policy objectives with broader health-related goals. • Forming multidisciplinary teams with diverse experience, including those working in the field, within health units and on implementation teams. • Ensuring strong local leadership to drive implementation forward. • Securing flexible budgets that allow for adaptation during implementation. • Developing and strengthening local capacities for policy implementation. • Building consensus and generating political support across different levels of government and institutions. • Deploying gradual or scaled implementation strategies to adapt to local conditions. • Providing continuous training and support for implementation teams. • Designing and executing communication strategies that make expected outcomes visible and understandable. • Developing and sharing a clear, step-by-step implementation plan (roadmap).	• Lack of assessments to determine the maturity level of digital transformation at national and subnational levels. • Weak alignment with broader national digitalisation and connectivity strategies. • Absence of strategic planning and guiding documents outlining a clear implementation roadmap. • Inadequate infrastructure (eg, equipment, software) to support the implementation of policies and strategies. • Administrative and bureaucratic rigidity that limits the flexible use of resources. • Generational gaps and resistance to change among local stakeholders. • Limited dialogue and coordination between different levels of government. • Insufficient resources allocated to indirect implementation costs, such as training, equipment procurement and change management. • Design of overly complex systems that are poorly adapted to local contexts and the needs of end users. • Absence of governance structures to coordinate and sustain implementation over time.

The overall analysis raises an open question for future research: what exactly constitutes a digital transformation public policy and what criteria must be met for an initiative to be defined as such? In other words, what distinguishes actions that go beyond mere digitisation and instead represent a paradigm shift, one that transforms processes, governance structures, workforce development and aligns with broader health system goals.

5. Public policy recommendations

Although each case study presents unique characteristics and took place in different contexts, it is possible to identify common elements that can be translated into public policy recommendations.

A key insight is that –regardless of contextual differences or variations in political systems– certain components are essential for successful implementation:

- **Clear objectives aligned with health-related challenges:** before implementation begins, there must be clarity about the specific health-related problems the digital transformation policy is intended to address. Based on this diagnosis, the strategy should be articulated and supported by documents that provide a roadmap for implementation. A central question must be posed: what public health challenges does digital transformation aim to solve? Two key aspects are crucial here: first, that policy objectives are directly linked to health system goals; and second, that digital health initiatives are integrated into broader, multisectoral national digital transformation efforts. It is essential to emphasise that digital transformation is not an end in itself but a meta-enabler –a strategic means to achieve broader public health outcomes beyond technical upgrades or digitisation alone–.
- **Implementation teams:** digital transformation policies require well-defined implementation teams with legitimacy across institutional levels and governance spaces. These teams must be flexible and composed of individuals with diverse skill sets and professional backgrounds. Two elements are essential to ensure their effectiveness: (1) a clear understanding of the policy's objectives; and (2) confidence in the policy's value and impact, so that the team can convincingly engage and mobilise other stakeholders. For this reason, ongoing training and the development of leadership capacities at all levels of implementation are fundamental.
- **Diagnostic assessment of digital transformation maturity at the subnational level:** implementation strategies must be grounded in a clear and realistic understanding of the digital transformation maturity at both national and subnational levels. This enables the development of context-sensitive

implementation approaches. While adequate funding is important, strategic resource management –focused on the most urgent needs– is critical for success. Furthermore, financial sustainability must be considered from the outset and built into long-term planning.

The research also found that implementation processes often reach critical decision points. These are moments when implementation teams must make key choices about how to proceed, such as how to allocate resources, prioritise actions, engage stakeholders or adapt to unforeseen challenges. These decisions not only determine the immediate next steps but also shape the trajectory of the implementation process, influencing which options remain available later on and which become unviable. In this way, the implementation path is not fully predetermined; rather, it is constructed through a series of strategic choices made along the way.

- **Implementation strategies:** in some contexts, directive implementation may be effective, while in others, negotiation or consensus-building yields better results. The findings suggest that both approaches should be evaluated based on the specific context and adapted over time to enhance effectiveness. It is also important to acknowledge that while strategies require structure, they must remain flexible to respond to emerging needs and circumstances.
- **Engaging with key stakeholders:** the involvement of various actors is essential for successful public policy implementation. However, who is involved, when, how and for what purpose may vary across cases and over time. Mapping key stakeholders and tailoring narratives to their interests and contexts can foster effective engagement, without compromising the policy's core objectives. This mapping should also ensure diversity and multidisciplinary representation to prevent the digital transformation process from being framed solely through a technical lens.
- **Communication:** effective implementation requires robust communication strategies at different stages to convey the benefits, milestones and impacts of the policy. As audiences shift over time –from local actors and users to decision-makers– communication strategies and formats must be adapted to ensure relevance and clarity.
- **Differentiated beneficiaries:** implementation of public policies generates varying impacts across different groups. Choosing a particular solution may benefit one group (eg, healthcare workers) while excluding others. This highlights the importance of having clear objectives and carefully designed communication strategies to explain that the exclusion of certain groups is not necessarily a failure, but a strategic prioritisation.
- **Gradualness vs scale:** in some instances, a gradual (step-by-step) approach to implementation can foster greater adoption

and long-term success than full-scale rollout from the start. Gradual implementation allows time for learning, demonstrating and communicating benefits in real time, refining strategies at a lower cost and ultimately scaling up with higher likelihood of success.

- **Deciding on tools and products:** digital transformation in health systems must move beyond simple digitisation and towards a more comprehensive paradigm focused on process development, governance structures, workforce training and alignment with system-wide health goals. These foundational processes should guide the selection of appropriate digital tools, not the other way around.
- **Use of incentives to drive implementation:** identifying and leveraging incentives that are meaningful to local implementation teams can significantly facilitate progress. These incentives –financial or otherwise– can motivate participation, build commitment and enhance the likelihood of successful outcomes.

Finally, a series of enabling factors were identified that can help ensure successful implementation:

- **Strategic use of resources:** having sufficient resources and flexible structures for their allocation is an important enabler. However, financial resources alone do not guarantee success. In some cases, their absence can even stimulate intersectoral cooperation and strategies to secure funding. For example, in Argentina, careful planning proved more critical than budget availability.
- **Show progress and achievements at every stage:** digital transformation is a long-term process. To ensure its sustainability, it is vital to identify short- and medium-term achievements and impacts. Clear understanding of who benefits from the policy –users, organisations, political actors– and who holds decision-making power is essential. Developing business cases helps communicate what is gained and by whom. Strategically showcasing achievements builds trust, manages resistance and reinforces stakeholder commitment over time.
- **Consider local contexts and resources:** digital transformation processes –especially in federal systems– must account for the maturity level and resources of local governments and stakeholders. Pre-implementation assessments should evaluate capacities, bureaucratic processes, enabling factors, barriers, available resources and infrastructure at all implementation levels. This approach promotes equity for users and subnational entities responsible for management, while actively involving local actors to transform potential barriers into enablers and strengthen alliances for sustainability.

- **Governance structures:** public policies on digital transformation require governance frameworks that clearly define responsibilities and ownership of processes. Such structures are essential to ensure proper implementation, enable monitoring and evaluation and guarantee accountability throughout.
- **Flexibility for digital transformation:** implementation processes must be flexible to facilitate the adoption of digital transformation policies. Nonetheless, flexibility should not lead to 'drift'. Clear objectives must serve as a guiding framework. Flexibility allows adaptation, efficient resource use and recognises the inherently dynamic and evolving nature of digital transformation.

An important conclusion that emerged from discussions with experts is the need to systematically document implementation processes. Doing so ensures that decisions made throughout implementation are intentional and facilitates learning from both successes and failures. There was a broad consensus regarding the current lack of such documentation.

In conclusion, based on the analysis of the cases and findings, we now have a deeper understanding not only of the potential of public policy implementation for digital transformation of health systems, but also of how to effectively carry it out. We trust that these findings, presented as public policy recommendations, will support the development of more efficient and sustainable strategies that advance universal health coverage through high-quality and equitable health services.

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Appendices

Appendix 1. Profile of the expert team and advisors

Argentina:

Adolfo Rubinstein, PhD is a physician who graduated from the Faculty of Medicine at the University of Buenos Aires (UBA). He has a Master's degree in Clinical Epidemiology from the Harvard School of Public Health (Boston, US) and a diploma in Health Economics from the University of York (York, UK). He also earned a PhD in Public Health from UBA. Dr Rubinstein has founded, collaborated with and led various institutions related to the health sector. He is currently a researcher and visiting professor at several academic institutions, including the Bernard Lown Program for Cardiovascular Health at the Harvard T.H. Chan School of Public Health. Additionally, he serves as Director of the Centre for Health Policy Implementation and Innovation (CIIPS) at IECS.

Cintia Cejas, MSc has a Bachelor's degree in Political Science from the Pontifical Catholic University of Argentina (UCA) and a Master's degree in Social and Health Sciences from the Latin American Faculty of Social Sciences (FLACSO). She specialises in the management of health-related projects, programmes and policies. She has held various roles in public health, coordinating efforts to implement health policies in Argentina. She is currently the Coordinator of the Centre for Health Policy Implementation and Innovation (CIIPS) at the Institute for Clinical and Healthcare Effectiveness (IECS) in Argentina, as well as Director of the Centre for Artificial Intelligence and Health for Latin America and the Caribbean (CLIAS).

Alejandro López Osornio, MD is a family doctor and specialist in medical informatics, trained at the Italian Hospital of Buenos Aires. He is a global consultant in digital health and interoperability and a former member of the World Health Organisation (WHO) Digital Health Technical Advisory Group. He has held leadership positions in public health institutions and has advised digital health projects in Argentina and several other countries for more than 15 years. He is currently a senior consultant at the Centre for Health Policy Implementation and Innovation (CIIPS) at the Institute for Clinical and Healthcare Effectiveness (IECS).

Daniel Rizzato Lede, MD is a physician who graduated with honours from the National University of Cuyo. He is a specialist in Internal Medicine (HB-UBA) and Health Informatics (IUHIBA). Dr Rizzato Lede has extensive experience in digital health implementation and public health management. He has served as a consultant for various international organisations on digital transformation and has participated in numerous regional and international initiatives in this field. He is currently an International Consultant for the Pan American Health Organisation (PAHO) and a researcher at the Centre for Health Policy Implementation and Innovation (CIIPS) at the Institute for Clinical and Healthcare Effectiveness (IECS).

Uruguay:

Erik Nadruz, PhD has a Doctor of Medicine degree from the Latin American Centre for Human Economy University Institute (CLAEH). He is a staff physician at the Evangelical Hospital of Montevideo, the Cantegril Sanatorium and the SEMM Mautone Sanatorium in Maldonado. Additionally, he is a full Professor and Director of the Human Physiology Department at the Faculty of Medicine of UCLAEH.

Mónica Correa Juliani, BSc has a Bachelor's degree in Nursing, a Master's degree in Digital Health Management from OBS Business School (Spain) and a postgraduate degree in Health Services Management from the Catholic University of Uruguay. She currently serves as Deputy Head of the Research and Teaching Department at the National Directorate of Health of the Armed Forces.

Alejandra Ferrari Ugarte, PhD has a Doctor of Medicine degree from the University of the Republic and is currently pursuing a Master's degree in Health Policy at the Latin American Centre for Human Economy University (CLAEH). She is a specialist in Nephrology from the University of the Republic and in Health Services Management from CLAEH University. She currently serves as Head of the Nephrology Department at Sociedad Médica Universal. Additionally, she is a faculty member in the Health Services Management Specialisation programme at CLAEH University.

Chile:

May Chomali, MD is a medical doctor specialised in public health and has a diploma in hospital management. With over 30 years of experience, she has led healthcare organisations and networks in both the public and private sectors. She currently serves as Executive Director of the National Centre for Health Information Systems (CENS) in Chile.

Eric Rojas, PhD is an engineer specialising in computing and is an academic in clinical informatics. He is a Professor in the Department of Clinical Laboratories at the Faculty of Medicine and at the Institute of Biological and Medical Engineering at the Pontifical Catholic University

of Chile. Additionally, he leads the Quality area at CENS. His research focuses on health informatics.

Félix Liberona Durán, MSc is a Public Administrator with a Master's degree in Geography from the University of Chile. For over 10 years he has worked at the intersection of science and society, managing R&D&I projects and leading technology transfer initiatives using participatory and transdisciplinary methodologies at the national and international levels. He currently serves as Executive Deputy Director at CENS.

Pablo Villalobos Dintrans, DrPH is an economist, researcher and consultant specialising in public policies and public health. He is an associate professor and researcher at the Faculty of Medicine and Health Sciences at Universidad Mayor and an associate researcher at the Millennium Institute for Caregiving Research (MICARE) and the Global Network of Long-Term Care (GNLTC) of the World Health Organisation (WHO). He has a Master's degree in Economics and Public Policy from the Pontifical Catholic University of Chile, a Master's degree in Economics from Boston University and a Doctor of Public Health (DrPH) from Harvard University.

México:

Lina Sofía Palacio Mejía, PhD has a Doctorate in Population Studies from El Colegio de México and a Master's degree in Demography from El Colegio de la Frontera Norte. She currently coordinates the Public Health Intelligence Unit at the Research Centre for Evaluation and Surveys (CIEE) of the National Institute of Public Health (INSP), Cuernavaca campus, Mexico. Additionally, she serves as the full Academic Coordinator of the Master's Programme in Public Health with a concentration in Biostatistics and Health Information Systems, offered in-person at INSP.

Mónica Armas Zagoya, MD is a Medical Surgeon and has a Master's degree in Political Marketing Management. From 2006 to 2024 she served as the State Deputy Director of Information and Telehealth of Zacatecas. She currently works as a technical advisor for a Health Jurisdiction. Her work focuses on electronic clinical records, productivity analysis and innovation in telemedicine, tele-education and teleconsultation projects aimed at expanding access to health services in remote populations.

Juan Eugenio Hernández Ávila, PhD has a Master's degree in Biostatistics from Johns Hopkins University and a Doctorate in Epidemiological Sciences from the National Institute of Public Health (INSP). Since joining INSP in 1995 he has held key positions including Director of Medical Informatics and Geography, leading the development of information technologies. He has led numerous research and technology development projects. Currently, he is a researcher in the Public Health Intelligence Unit at the Research Centre for Evaluation and Surveys (CIEE), National Institute of Public Health (INSP), Cuernavaca campus, Mexico.

Expert advisory team:

Michael Reich, PhD. has a PhD in Political Science from Yale University (1981), after earning degrees in Molecular Biophysics and Biochemistry and completing a Master's in East Asian Studies, also at Yale. He is the Taro Takemi Professor Emeritus in the Department of Global Health and Population at the Harvard T.H. Chan School of Public Health. His research focuses on the political dimensions of public health policy, including health system strengthening and reform, access to medicines and pharmaceutical policy and the political economy of the policy-making process. He has extensive research experience on health systems in Japan and Mexico spanning several decades. Dr Reich is the founding editor-in-chief of *Health Systems & Reform* journal, which published its first issue in January 2015.

Pedro Alonso Fernández, PhD has a Doctor of Medicine degree from the University of Barcelona. He is a Professor of Global Health at the Faculty of Medicine and Health Sciences, University of Barcelona and a consultant in the Department of International Health at Hospital Clínic-University of Barcelona. In 1996 he promoted the creation of the Manhiça Health Research Centre in Mozambique. He served as Director of the Global Malaria Programme at the World Health Organisation (WHO) from 2014 to 2022 and was the founding director of the Barcelona Institute for Global Health. He played an active role in establishing the European & Developing Countries Clinical Trials Partnership (EDCTP). During his tenure at WHO he coordinated global efforts to control and eliminate malaria, leading the development of technical recommendations for endemic countries.

Sebastián García Saisó, MSc is a Medical Surgeon graduated from the Faculty of Medicine at UNAM, with a specialisation in Public Health certified by CONACEM. He has a Master of Science degree in Health Policy Planning and Financing awarded jointly by the London School of Economics and Political Science and the London School of Hygiene and Tropical Medicine, University of London. Additionally, he has completed studies in Patient Safety and Quality offered by the Institute for Healthcare Improvement (IHI) in the US and the Tecnológico de Monterrey. He has held prominent roles such as Director of Special Medical Projects at the National Medical Arbitration Commission of the Ministry of Health and Advisor Coordinator for the Undersecretariat for Integration and Development of the Health Sector. He currently serves as Director General of Quality and Health Education at the Ministry of Health.

Marcelo D'Agostino, MSc is the Senior Advisor for Information Systems and Digital Health at the Department of Evidence and Intelligence for Action in Health at the Pan American Health Organization (PAHO), where

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Appendix 2. Framework proposed in the text *Institutionalisation and Sustainability of Donor-funded Quality Assurance Initiatives: The Case of Honduras*

Dimension	Examples
Objetives	***Alienation***
	Are the objectives clear?
	To what extent do the policy objectives reflect the needs and priorities of implementers and beneficiaries?
	Relevance
	What evidence is there regarding the importance of the problem the policy seeks to address?
	What are the arguments justifying that the proposed policy is the most appropriate solution for the identified problem?
Financial factors	***Resource availability***
	¿Qué recursos financieros están disponibles para la implementación de la What financial resources are available for the policy's implementation?
	How has long-term financing been planned to ensure the policy's sustainability?
	Efficiency
	How has the policy's cost-benefit relationship been evaluated?
	What mechanisms are in place to ensure that resources are used efficiently and effectively?
Technical factors	***Technical capacity***
	What technical capacities are necessary for the policy's implementation?
	To what extent do the institution and implementers have the capacity to meet the policy's technical requirements?
	Infraestructure
	¿What infrastructure and equipment are required for the policy's effective implementation?
	What changes or improvements to existing infrastructure are necessary to support the policy's implementation?
Culture and structure	***Organisational changes***
	What organisational changes are needed to implement the policy?
	How has resistance to change been addressed within the organisations affected by the policy?
	Context
	¿What legal or regulatory changes are necessary for the policy's implementation?
	How has the impact of these changes on existing practices and procedures been assessed?

Appendix 3. Framework on actor categories in public health policy implementation (Campos & Reich, 2019)

Categories	Descripctions
Stakeholder groups	Associations of individuals or organisations interested in the topic or solution. They often seek to influence, resist or promote the policy's implementation to protect their interests. Examples include the private sector, pressure groups, civil society, non-governmental or non-professional organisations, professional associations, media and others.
Public servants	Individuals who perform government work, ranging from ministries to frontline workers (commonly known as 'street-level bureaucrats'), including personnel from various agencies and departments.
Responsables de las decisiones financieras	Son aquellos responsables de las decisiones financieras y del presupuesto dentro del sistema.
Líderes políticos	Son representantes de los poderes ejecutivo y legislativo, así como partidos políticos, que buscan garantizar su compromiso en la aplicación de las políticas.
Beneficiarios	Son aquellos que se beneficiarán, directa o indirectamente, de la política o la solución.
Actores externos	Son agentes externos u organizaciones asociadas que se interesan por el tema y que pueden financiar políticas de salud con la posibilidad de influir en la implementación, especialmente en países de ingresos bajos.

Appendix 4. Contextual information for each public policy studied

4.1. Uruguay: Mi Historia Clínica Digital (Mi HCD)

Country: Uruguay

Public Policy Name: My Digital Medical Record (Mi HCD)

Context: Uruguay is recognised as a global leader in digital transformation, a status achieved through a comprehensive, equitable, inclusive and sustainable state policy implemented over the past two decades. Central to this effort has been the Agency for Electronic Government and the Information and Knowledge Society (AGESIC), established in 2005, which has played a pivotal role in coordinating policies and regulations that promote digital inclusion, transparency and information security. Among these initiatives, the Salud.uy programme stands out, having transformed the health sector through the implementation of the National Electronic Health Record (HCEN) with a significant level of maturity. The My Digital Medical Record (Mi HCD) application was developed within the framework of this broad and far-reaching policy.

Public policy content: Mi HCD aims to ensure equitable access for citizens to their clinical information, regardless of whether they are affiliated to public or private healthcare providers. This enables individuals to exercise their fundamental right to access their information with consistent security guarantees and at any time they choose.

Population: all individuals aged 18 and older who are part of the Integrated National Health System (SNIS).

Digital identification methods: Access to Mi HCD requires a digital identification method with an advanced security level, ensuring that personal information is accessed with the same guarantees as would be provided during in-person consultations.

Application usage: According to data from the Inter-American Development Bank, between September 2019 and June 2021, the application recorded 43,431 accesses from 7,206 users, out of a potential user base of approximately 2.7 million people (Friedmann, 2022).

Components / Intervention (goods and services): Through the Mi HCD application, users have access to:

- **My medical history:** users can consult information recorded in the HCEN by healthcare providers where they have received care. Eventually, it will be possible to review the full history of all healthcare encounters.
- **Access and permissions:** citizens can control which SNIS providers have access to their digital clinical information and monitor it. Access can be partial, allowing a selected provider to access the information for a specified period.
- **Access history:** users can view which providers have accessed their Electronic Health Record and when.
- **Application user guide**.

4.2. Argentina: *Estrategia Nacional de Salud Digital* (National Digital Health Strategy)

Country: Argentina

Public policy name: National Digital Health Strategy (2017-19)

Context: In 2016 the Argentine government initiated efforts to advance Universal Health Coverage (UHC). The strategy was structured around three main pillars: primary care centred on family and community health teams; the development of interoperable information systems; and improvements in the coverage and quality of health services. It was within this framework that the National Digital Health Strategy (ENSD) was launched.

Public policy content: The ENSD aimed to strengthen Universal Health Coverage by promoting the digital transformation of the health system and enhancing the access to and quality of healthcare through interoperable information systems across all Argentine provinces. Launched in 2018, the ENSD sought to connect health services nationwide, facilitating better care coordination.

Population: The policy targeted citizens, including users and patients, as well as public healthcare providers and health professionals. A subsequent phase expanded to include national health insurance schemes and private healthcare providers.

Components / Intervention (goods and services):

- Public healthcare facilities were to be equipped with connectivity and an interoperable electronic health record (EHR) system that spans different systems and jurisdictions, enabling the recording of and access to patient histories.
- Individuals would have the ability to set privacy controls for the transfer of their clinical information and that of dependents across systems, as well as to monitor such data transfers and access.

- Health professionals would gain access to comprehensive health information generated nationwide at all levels of care and subsystems for their patients, through the EHR system.
- Innovative tools would be made available to individuals to facilitate interaction with the health system, including online appointment scheduling, patient portals and mobile applications.
- Telehealth networks were to be implemented to support remote consultations and second opinions.
- National registries and programmes, such as vaccination records, epidemiological surveillance and health statistics, would be supported by timely, accurate and complete data aligned with interoperability standards.
- Health organisations would access reliable data to inform decision-making and operational management.
- The system would facilitate electronic billing and reimbursement processes.
- Health professionals would have decision-support tools to identify risks and opportunities in patient care.
- A legal and regulatory framework was to be established to remove barriers to adopting new technologies in healthcare processes.

4.3. Chile: *Sistema de Información de la Red Asistencial* (SIDRA, Health Care Network Information System)

Country: Chile

Public Policy Name: Health Care Network Information System (SIDRA)

Context: Between 2004 and 2006 Chile launched an action plan to strengthen its Digital Agency and promote the adoption and use of ICT across all ministries —including the Ministry of Health— in order to support the country's broader state modernisation goals. This plan was key in enabling the implementation of SIDRA. Additionally, a health reform enacted in 2005 aimed to guarantee access to quality and timely healthcare for the population. SIDRA was aligned with both initiatives by modernising the management of healthcare processes and improving the timely and efficient access to health services. Since its launch, SIDRA has faced several challenges, including a lack of technical interoperability that led to efforts focused on process standardisation, interoperability and the integration of health systems.

Public policy content: The Health Care Network Information System (SIDRA) was launched in 2008. It was designed to digitise and automate the main clinical and administrative processes of healthcare facilities, with the long-term goal of operating at a national level (Ministry of Health, 2013; Villavicencio-Cárdenas, 2016).

The strategy envisioned 'a health network integrated across all levels of care through clinical and administrative information systems, with data captured at the source, in real time and with quality standards to optimise management and decision-making' (Basaes-Valdivia, 2014).

SIDRA aimed to improve the quality, safety and efficiency of healthcare by integrating, articulating and coordinating efforts through the generation and availability of information for all actors involved in patient care, supported by Information and Communication Technologies (Ministry of Health, 2013a).

This general goal was accompanied by several specific objectives:

- Streamline patient care processes to improve the quality of the healthcare network and user satisfaction.
- Modernise clinical record-keeping processes to move towards the establishment of an Electronic Health Record (EHR), aiming to increase the security and availability of information.
- Provide a single, secure, standardised and integrated source of information.
- Reduce duplicate records through interoperability.
- Apply change management principles to improve and streamline user adoption processes.
- Ensure the quality of the information recorded in the healthcare network.

Population: SIDRA is intended for clinical, technical and administrative personnel, as well as for the beneficiaries of public healthcare services.

Components / Intervention (goods and services): Since its launch, SIDRA has been gradually implemented as a strategy centred on the digitisation of standardised clinical and administrative processes (Ministry of Health, 2013).

SIDRA aimed to digitise and strengthen processes related to:

- **Clinical support for patient care**, such as medication dispensing, diagnostic procedures and organ donation.
- **Direct clinical care**, such as primary care, emergency services and patient management.
- **Administrative and logistical support**, such as pharmacy supply, cleaning and laundry services, sterilisation and equipment maintenance.

4.4. México: *Sistema de Información Básica en Materia de Salud* (SINBA, Basic Health Information System)

Country: México

Public Policy Name: Basic Health Information System (SINBA)

Context: In Mexico, modernising health information systems has been a priority over the past decade. In 2013 the Office of the Presidency launched the National Digital Strategy, which aimed, among other goals, to promote digitalisation across the public sector. Between 2011 and 2019 a transition plan was developed to create a new system designed to transform and digitalise health information management. The system, named the National Basic Health Information System (SINBA), was intended to replace the older National Health Information System (SINAIS), which had been established in the early 2000s.

Although the planning and implementation of SINBA took place between 2011 and 2019, its current status remains unclear and detailed public documentation regarding its implementation and impact is lacking, underscoring the importance of its analysis.

Public policy content: SINBA was implemented by the Ministry of Health with the goal of employing digital systems to record, store and generate reports using data from the entire health system, including other service providers and the private sector. The system was designed to gradually replace the National Health Information System (SINAIS). Planning occurred between 2011 and 2012, with implementation continuing until 2019. Some components remain in operation today but are not covered in this analysis.

The primary objective of SINBA was to ensure the availability of higher-quality information at a lower production cost for health programmes and the Seguro Popular public health insurance programme.

This aimed to generate evidence to support:

- Evaluation of health programmes.
- Public policy planning.
- Resource allocation based on evidence.
- Accountability mechanisms.

Population: SINBA was intended for a broad range of users across the health system, including frontline healthcare personnel, administrative staff, mid-level decision-makers and statistical departments.

Components / Intervention (goods and services): SINBA was organised around three core components:

SINBA was organised around three core components:

- **Technological Platform (e-SINAIS):** focused on migrating and digitising existing subsystems and integrating them into a unified platform to more efficiently address information needs.
- **Integrated System for Health Information Quality (SICIS):** a coordinated set of guidelines, procedures and technological applications aimed at continuously improving the quality of health data. This included the development of dashboards and detailed reports for regular and disaggregated monitoring of data quality.
- **Information Governance and Personal Health Data Protection Model (MGIyPDPS):** a regulatory framework managed by a Collegiate Body to establish and enforce standards and mechanisms for managing health data. The framework was designed to standardise criteria and procedures for producing, collecting, integrating, processing, systematising, exchanging, evaluating and disseminating health information.

Appendix 5. Barriers and enablers by country

Table 1. Barriers identified in the case studies

Country	Barriers
Argentina	• Lack of connectivity in some provinces and remote areas. • Insufficient financial resources and administrative hurdles that hindered the continuity and scaling of digital solutions. • Lack of an available IT solution to offer. • Administrative challenges related to procurement and contracting. • Resistance from health personnel, especially from those who did not perceive short-term benefits compared to the workload involved in implementation. • Absence of a robust financial framework to sustain the systems over the long term, which limited the impact of the strategy. • Success of ministerial resolutions in supporting implementation was not enough to replace the need for a sustained economic foundation.
Chile	• Its design was not clearly linked to the objectives of the Chilean health system, nor was it a strategy aimed at solving specific health problems. • Lack of interoperability, the absence of shared languages and terminology servers, as well as shortages of equipment and infrastructure, posed major challenges in the early stages of implementation. • Administrative rigidity that limited the use of resources resulted in the system's inability to keep pace with technological advancements. • There was resistance among health personnel to adopt technology in their work. • Lack of specialised and interdisciplinary training posed a challenge for system implementation. • Changes in administration and political leadership hindered implementation, as shifting government priorities disrupted continuity. • Lack of dialogue and consideration from the central government towards regional governments made it difficult to adapt the system to local contexts. • There are different views regarding the reasons for acceptance of the system; some believe it has been adopted more out of obligation than perceived usefulness.
Mexico	• National level secured funding, but resources were not transferred to the states. • Implementation began with the most complex subsystem and the vendor delivered faulty software, which had to be redone. • Purchase of servers was not considered and the existing ones lacked the capacity to operate SINBA. • There were no policy documents, only technical operation manuals for the platform.

Country	Barriers
Uruguay	• Unaccounted indirect costs. • Prioritising security over accessibility. • Existing healthcare provider portals for patients overlap with features of Mi HCD. • Lack of comprehensive process maturity. • Generational gap. • Lack of digital education for all stakeholders involved. • Lack of multidisciplinary intra-institutional inclusion of key actors. • Governance space limited to listening and discussion.

Tabla 2. Enablers identified in the case studies

Country	Enablers
Argentina	• Alignment between the expansion of universal health coverage and the strategy's objective. • The strategy helped build a shared vision of digital transformation at both central and provincial levels, generating consensus on the need for and usefulness of a data interoperability and standardisation system. • Teams included experts and technical staff from the private sector as well as trusted individuals with experience in public management. • Having free and open-source tools (SNOMED CT) facilitated the adoption of standards and interoperability. • Leadership of the implementation team and their ability to establish collaborative relationships with provinces and international institutions was key to: - Overcoming technical barriers. - Promoting a shared, long-term vision for inclusive and sustainable digital transformation in the health sector.

Country	Enablers
Chile	• Centralised governance and inter-ministerial dialogue facilitated the coordination and progress of SIDRA. • Gradual strategy with controlled testing allowed learning from mistakes and scaling implementation. • Implementation of standards such as HL7 and SNOMED improved interoperability and data management. • A robust digital architecture was developed, providing extensive connectivity across the country. • International standards were adopted to overcome the lack of interoperability and information management. • Choosing a gradual implementation strategy based on controlled testing facilitated scaling of the strategy. • From the beginning, SIDRA has had sufficient budget allocations for its implementation. • In response to administrative rigidity, local health centres and hospitals developed their own strategies to face budgetary challenges. • Creation of specific areas and departments dedicated to the implementation within health centres and hospitals was key for the adoption of SIDRA. • Leadership, motivation and resilience of local teams have been fundamental in the process. • Evolution of legal frameworks at various times has facilitated interoperability. • Centralised leadership and management, as well as inter-ministerial dialogue, have significantly driven the implementation of SIDRA.
Mexico	• Initially, it gained high-level federal support through a strategic communication effort. • Funding gaps were addressed by aligning SINBA's goals with those of other government agencies. • A multidisciplinary team with strong experience in the health system led implementation. • Some states developed electronic records compatible with SINBA, easing integration.
Uruguay	• Sufficient budget for the design and maintenance of the application.

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