

PH4H

Pan-American Highway for Digital Health



Enabling Trust for Health Data Exchange

An opportunity for the Latin American and Caribbean region

Executing Agencies

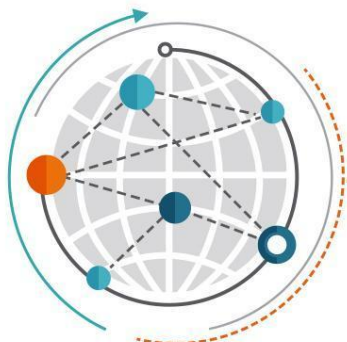


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What is this document about?



It introduces the Global Digital Health Certification Network (GDHCN), analyzes the context of Latin America and the Caribbean (LAC) and proposes strategies for integrating into this network, enabling the secure exchange of health data between countries.

This document is part of the Regional Public Good “Digital Health Trust Network in the LAC Region to Improve Access to Health Services for population in mobility” (RG-T4404), promoted by RACSEL.

What is GDHCN?

It is a global initiative that allows countries to securely verify and exchange digital health certificates, such as vaccination cards or other clinical documents.

This network facilitates global interoperability and is a central part of the Pan American Digital Health Roadmap (PH4H), an initiative of the IDB, PAHO and the countries of the region. Participation is free and voluntary, and is coordinated through PAHO.



Latin America is ready

75% of the countries in the region already have regulations for electronic signatures and the use of digital documents, which opens the door to effective integration into the network.

Key benefits

- ✓ International verification of medical documents
- ✓ Facilitates access to medical care for people in mobility
- ✓ Directory of electronic seals to guarantee authenticity
- ✓ Reduces administrative processes and improves border controls
- ✓ Interoperability with global standards (HL7, ICD-10)
- ✓ Strengthens digital health systems in each country
- ✓ Free and voluntary participation with PAHO/WHO support
- ✓ Boosts the development of services such as electronic prescriptions and shared clinical records

GDHCN is a concrete opportunity to strengthen digital health, empower local services and improve care for people on the move, no matter which country they are in!



1.Introduction

1.1. Background

Public health emergencies have highlighted the importance of real-time health data and demonstrated the potential of digital and interoperable systems to enable the continuous flow of medical information. For instance, during the COVID-19 pandemic, the value of digital health certificates became evident, particularly for verifying vaccination records regardless of their country of origin. The development of interoperable trust networks, supported by regional agreements and robust standards for verifying medical certificates, can be a key strategy to ensure access to quality health services, regardless of a person's location.

The WHO Digital Health Strategy 2025¹ identifies global collaboration and knowledge sharing in digital health as one of its strategic pillars. In this context, the COVID-19 pandemic generated valuable solutions and lessons that should be shared among WHO member states. Building on these principles and leveraging the tools developed during the pandemic, the WHO established the Global Digital Health Certification Network (GDHCN²)—a trust and collaboration network aimed at facilitating the development of digital health services. Participation in this network is voluntary, completely free of charge, and available to all United Nations member states.

At the end of 2024, the Inter-American Development Bank, the Pan American Health Organization, and the member states of Latin America and the Caribbean officially launched the Pan-American Highway for Digital Health (PH4H), with Japan as the first donor. PH4H³ is an initiative that leverages digital tools to ensure that everyone in the region has access to quality health services, regardless of their location. To achieve this, PH4H promotes the idea that patients should own and carry their health data, and that member states should be able to exchange this information securely, efficiently, and in an interoperable manner. In this context, PH4H supports the digital transformation of health services and the use of digital health certificates that can be easily verified and used across member states. The Action Plan to Strengthen Information Systems for Health (IS4H) 2024–2030 was approved by the Executive Committee of the Pan American Health Organization (PAHO) at the end of June 2024, during its 174th session. The plan includes PH4H and the use of the GDHCN.⁴

In this context, the Latin American and Caribbean Network for Digital Health (RACSEL)⁵ plays a strategic role as a regional cooperation network and a driving force in creating the necessary enablers for the digital transformation of the health sector. RACSEL not only facilitates technical coordination among member states but also promotes the development of common frameworks, standards, and interoperable solutions that enable the integration of digital services at the regional level.

As a strategic partner of the PH4H, RACSEL promotes the adoption of the GDHCN by member states, facilitating the implementation of interoperable digital services that optimize the flow of information and ensure continuous, high-quality care for all people across borders.

¹ <https://www.who.int/publications/i/item/9789240020924>

² <https://www.who.int/initiatives/global-digital-health-certification-network>

³ <https://worldhealthorganization.github.io/smart-ph4h/>

⁴ <https://www.paho.org/en/documents/ce174r3-plan-action-strengthening-information-systems-health-2024-2030>

⁵ www.racsel.org

1.2. Purpose and Scope of the Document

The objective of this document is to analyze the current situation of the countries in Latin America and the Caribbean (LAC) and to propose strategies so that, with the support of RACSEL, they can join the GDHCN and carry out cross-border transactions.

To achieve this objective, the document:

1. **Explains what the GDHCN is and how it can be leveraged in the region.**
2. **Details the requirements for joining the GDHCN.**
3. **Identifies areas of opportunity and strategies for regional collaboration.**
4. **Proposes priority actions and recommendations to strengthen the region's digital health systems and maximize the benefits of interoperability.**

This document is specifically designed mainly for decision-makers in the health sector, but it will also be valuable for staff in other sectors who interact with population health information. The aim is to help them understand the vision, scope, and potential of how the use of a global health directory to support the mobility, accessibility, timeliness, and quality of health services for populations that move between countries. In addition to technical details, it provides strategic and practical information to help stakeholders understand the value of these initiatives and seek the necessary support for their implementation.

This approach promotes regional integration, improves health connectivity, and lays the foundation for a robust and connected digital health system in the region.

2. Context and Current Situation

The need for establishing cross-border trust mechanisms for government-issued documents is well documented by the International Civil Aviation Organization (ICAO), which manages the infrastructure required to validate electronic passports. The Electronic Passport⁶ simplifies the transit of international travelers by enabling data verification through electronic means. Behind this solution lies an international trust network and a Public Key Directory (PKD) managed by ICAO.

The solution developed by ICAO clearly demonstrated the potential to be replicated in support of verifying vaccination credentials for international travelers during the COVID-19 pandemic. This led to the creation of several initiatives—among them, the trust network managed by the World Health Organization (WHO).

2.1. WHO GDHCN Initiative

During the COVID-19 pandemic, several initiatives were developed to create and validate electronic vaccination records internationally. These include:

⁶ <https://www.dhs.gov/e-passports>

1. The Regi-Trust project⁷, which began under the name Global COVID-19 Certificate Network (GCCN), was initially managed by the Linux Foundation and is currently overseen by the UNDP. This solution uses the Domain Name System (DNS) to facilitate the discovery of digital health services across countries and regions around the world.
2. SMART Card⁸, a project managed by the Vaccination Credential Initiative, developed an open standard for sharing an individual's vaccination record. The standard has been adopted and remains in use in the United States, Canada, and Japan.
3. SMART Trust⁹, the global trust network for digital health certification services (GDHCN), is a WHO initiative that started as the European Union's Green Certificate (DDCC) and included an open standard for sharing an individual's vaccination record. This standard has been adopted and continues to evolve in the Latin American region through the LACPASS project, which includes participation from 16 countries. The initiative is positioned as a key resource to support the development of digital health services beyond COVID-19.

The GDHCN/Smart Trust has been widely adopted by European countries¹⁰, where a legal framework already exists for the exchange of health records among EU member states¹¹. With support from the WHO, and despite the absence of a cross-border legal framework, countries in other regions of the world are also connecting to and benefiting from this network.

3. The GDHCN for the Latin America and Caribbean Region

As part of the PH4H initiative, RACSEL is implementing the Trust Network for Migrant Populations project (RG-T4404), which aims to create interoperable health digital services that enable continuity of care for population in mobility. This includes the design and development of reference documents and software to facilitate the use of clinical data that a patient may present in any country across the LAC region.

By joining the GDHCN trust network, participating member states can make use of its two main areas of work, which include:

- **Digital Seals Directory:** This service allows authorities to publish their digital seals and consult those published by other health authorities to verify the origin of the documents presented by an individual. These seals can be linked to a National Certification Authority, although this is not required by WHO. This flexibility facilitates participation by countries in the region, as it is not necessary for them to have implemented specific regulations on digital seals and signatures.

What is a digital seal? A digital seal is an electronic signature made on behalf of a legal entity

⁷ <https://www.sparkblue.org/Regi-TRUST>

⁸ <https://smarthealth.cards/en/>

⁹ <https://smart.who.int/trust/index.html>

¹⁰ <https://smart.who.int/trust/#participants>

¹¹ https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space_en

or organization (such as a Health Authority) on documents issued to patients¹². The digital seal replaces the traditional wet stamp and allows verifiers to confirm that a digital document—such as a PDF medical prescription—was issued by an authorized entity

- **Design of Interoperable Digital Documents and Services:** The GDHCN provides a collaborative space for countries to work in a coordinated manner and adopt international standards, such as HL7¹³ and ICD-11¹⁴, among others, in the development of digital medical services and documents. As a result of this collaboration, implementation guides are expected to be developed and published on the WHO's official website for PH4H¹⁵. This also includes the identification of health services and priority use cases for the region, and the application of WHO's analysis and design framework, known as the SMART Guidelines¹⁶, for the creation of digital services and documents.

Important: Patient information will not be withheld from WHO and neither other health organizations. The Global Digital Health Certificate Network (GDHCN) only validates a certificate's legitimacy and its consistency with defined standards.

In this context, PH4H is positioned as a key initiative for the region to leverage available resources and collaborative spaces, promoting the development of agreements and digital services that enable the exchange of data between national and international health systems. These agreements and shared standards will be outlined in implementation guides and implemented through software solutions designed for use by health authorities and providers across the region.

From an international regulatory perspective, the solutions developed within PH4H—leveraging the GDHCN—are essential to ensuring the universal right of access to health care, regardless of a person's nationality. This is particularly crucial for migrant populations, as it enables the continuity and quality of medical care they receive. Furthermore, the GDHCN aligns with the WHO SMART Guidelines initiative, which is a comprehensive set of reusable digital health components (including interoperability standards, code libraries, algorithms, and technical/operational specifications). By utilizing these components, the guidelines fundamentally transform the adaptation and implementation process, ensuring fidelity and accelerating adoption. The SMART Guidelines ultimately offer a five-step pathway to advance the use of best clinical and data practices, even in environments without full digital maturity.

3.1. Current Status of the LAC Region

During the preparation of this report, no technical or legal requirements were identified that could potentially become a barrier to the integration of the countries in the region. However, it is essential to assess whether they are prepared to utilize GDHCN's services and collaborative environment

To evaluate the current situation in the region, a survey was conducted with health authorities from LAC (Annex A), which was answered (Annex B) by twelve countries: Argentina, Bahamas, Belize, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Jamaica, Paraguay, Suriname, and

¹² <https://ec.europa.eu/digital-building-blocks/sites/display/DIGITAL/eSignature>

¹³ <https://www.hl7.org/>

¹⁴ <https://icd.who.int/browse10/2019/en>

¹⁵ <https://worldhealthorganization.github.io/smart-ph4h/>

¹⁶ <https://www.who.int/teams/digital-health-and-innovation/smart-guidelines>

Uruguay. The survey was designed to obtain a high-level overview of the use of electronic documents and seals by the region's health authorities.

The survey results indicate that the majority of the responding countries - eight out of the twelve - have legislation regulating the creation of electronic signatures and manage software development using a code manager such as GitHub¹⁷ or similar. Likewise, with three exceptions, the countries generate electronic medical documents. The use of electronic seals in health documents is limited, as shown in Table 1.

Table 1: Use of electronic seals in health documents in LAC countries

Country	Electronic documents	Electronic Seals	Electronic signature law	National Certification Authority
Argentina	No	No	Yes	Yes
Bahamas	No	No	Yes	No
Belize	Yes	No	No	No
Colombia	Yes	No	Yes	Yes
Costa Rica	Yes	No	Yes	Yes
Ecuador	Yes	No	Yes	Yes
El Salvador	Yes	Yes	Yes	Yes
Guatemala	Yes	Yes	Yes	Yes
Jamaica	No	No	No	No
Paraguay	Yes	No	Yes	Yes
Surinam	Yes	No	No	No
Uruguay	Yes	Yes	Yes	Yes
TOTAL	9	3	9	8

3.2. Regional challenges and opportunities

The **GDHCN** provides a directory for the publication of electronic seals of health authorities at the global level, as well as collaborative services that allow the validation of digital health documents or certificates issued nationally, across countries, or at the regional level.

This creates opportunities such as:

1. Continuity of care for mobile populations. The digital verification of these types of health documents helps people who, for different reasons, must move across countries and

¹⁷ <https://docs.github.com/en/get-started/start-your-journey/about-github-and-git>

need to access health information services when they are in a country other than their own. For example, presenting their vaccination status, a summary of their health condition, or accessing the dispensing of medications, among others.

2. Verification of health certificates at the global level. The use of the WHO seals directory, through countries that join the GDHCN network, enables the implementation of validation services for digital health documents that have been signed with electronic seals by health authorities. This allows both the origin and integrity of these documents to be verified, adding value to various digital health services.
3. Regional collaboration. To maximize the benefits of the GDHCN, it is necessary to identify priority health services and design interoperable documents. This collaborative effort requires the active participation of countries in the region, leveraging the space provided by the PH4H trust domain. The region already has collaboration networks, such as RACSEL¹⁸, the Electronic Government Network (Red-Gealc)¹⁹, and the Civil Registry Network (CLARCIEV)²⁰, which can contribute to this effort.
4. Development of digital capacities. The use of electronic signatures and seals represents an important step forward for the region. However, since not all documents are currently being electronically sealed and not all countries are using them, there is an opportunity to strengthen capacities that promote their adoption through GDHCN services. The aim is to benefit mobile populations, given that all countries in the region signed the IS4H 2024–2030 Action Plan, which sets the goal of joining the GDHCN.

On the other hand, the use of the GDHCN presents several challenges, such as:

5. Centralized and distributed management of health authorities. Some countries in the region, such as Argentina, have a federal model where each province manages its own health system. The current design of the GDHCN seal directory assumes that there is a single national health authority (Ministries of Health) in each country, responsible for signing all health documents or certificates. Therefore, it is necessary to evaluate the administrative and technical implications of each case or establish delegation mechanisms.
6. Adoption of electronic signature and seal mechanisms. While most countries have legislation regulating the use of electronic signatures and seals, these laws have not translated into more electronic documentation or into the implementation of national authorities for electronic signatures or schemes that enable their use and adoption. One of the main limitations is that health authorities often lack the technical capacity or the prioritized budget to manage and administer electronic signature and seal services. Although this can represent a barrier, progress is being made, and for those countries that have not yet started, it is necessary to support them in their adoption and implementation, given that this is an essential component for enabling digital health services supported by the GDHCN.
7. Design and development of digital health services. The availability of a global GDHCN directory administered by WHO will enable the implementation of interoperable cross-border digital health services. Defining the scope of these services requires a multidisciplinary approach to identify regional needs and align them with international standards in areas such as public health, access and coverage, sustainability, and workflows, among others. In addition, this effort demands effective coordination within health authorities, mainly involving mission-driven health areas and not solely technology areas. This coordinated approach ensures that the services developed address the needs of all areas, especially the core health functions.

¹⁸ <https://racsels.org/>

¹⁹ <https://www.redgealc.org/>

²⁰ <https://clarciev.com/en/>

4. Regional vision

The Latin America and Caribbean region, with the technical support of RACSEL and through PH4H, will work on creating interoperable documents and services using the design framework, addressing regional needs aligned with WHO standards, and sharing best practices for the development of digital health services.

4.1. Regional Value Proposition

There are two clear areas of opportunity for participating countries when they join the GDHCN:

- a) **Regional Strengthening:** The WHO trust registry enables the validation of health documents issued by national health authorities and reinforces the provision of digital services for the population within countries. In addition, participation in the Pan-American Highway for Digital Health allows countries to benefit from the experience of other members, building their capacities through the adoption and application of best practices for the development of digital health services.
- b) **Regional integration:** Through the PH4H, countries can engage in developing new digital services and interoperable health documents that apply international standards. Collaboration and coordination among countries make it possible to harmonize communication mechanisms and reach agreements on the use of these documents. This ensures continuity of care for patients who cross borders.

4.2. Roles and responsibilities

To maximize country participation in the GDHCN, the PH4H manages a collaborative space where cooperating organizations and health authorities from the region converge.

- I. **WHO/PAHO:** Provides a direct link to the GDHCN through its country offices and facilitates communication with health authorities. It also offers guidelines and reference documents for identifying priority health programs in the region, as well as the metrics and indicators that health authorities must report. This information serves as the starting point for the design of digital health services.
- II. **RACSEL:** Provides technical assistance to help countries join the GDHCN; supports the creation of interoperable digital health services; and facilitates spaces for the exchange of experiences among countries.
- III. **Health authorities:** They work with PAHO and RACSEL to join the GDHCN and actively participate in PH4H, applying the design framework to the defined use cases or those established by the SMART Guidelines. This collaboration results in the development of implementation guides and reference libraries that can be adopted by all participating countries.

The roles of these actors are summarized below:

- **WHO/PAHO:** Guides the identification of priority health areas and information models for the region.

- RACSEL: Provides technical assistance and supports capacity strengthening for national technical teams.
- Health authorities: Join the GDHCN, participate in the design process through the PH4H, and adopt and implement interoperable digital services.

5. PH4H Trust Domain

Within the GDHCN framework, a trust domain is a space where health services are documented. This documentation covers aspects such as functional requirements, use cases, data dictionaries, workflows, regulations, and information models. Each domain describes digital documents that participating countries can verify, ensuring their interoperability and validity. For instance, the trust domain for the vaccination certificate is the COVID-19²¹ trust domain.

Following the same structure, a trust domain has been created for PH4H.

5.1 Scope of the PH4H trust domain

Through the collaborative space of the PH4H trust domain, and by applying WHO's framework for digital health service analysis and design (SMART Guidelines), countries in Latin America and the Caribbean (LAC) will be able to agree on, document, and share guidance and solutions for the implementation of digital health services. These services will focus on the production of interoperable documents to facilitate integration and continuity of care across the region. The goal of this collaboration is to create detailed implementation guides and software solutions that help stakeholders adopt and use interoperable services and documents.

As an example, the vaccination certificate hosted under the COVID-19 trust domain (DDCC)²² provides an implementation guide that allows interested health authorities to adopt and implement this solution.

PH4H aims to replicate this model for the following clinical services and clinical documents:

Digital Vaccine Certification

- COVID-19 (or globally required vaccines for travel/work)
- Yellow fever / Polio
- Routine childhood vaccinations
- Routine adult vaccinations

Digital Certification of Health Documents

- Medical prescriptions

²¹ <https://worldhealthorganization.github.io/ddcc/>

²² https://smart.who.int/ddcc/functional_requirements.html

- Laboratory results
- Medical certificates
- Birth certificates
- Death certificates

International Patient Summary

- Migrant
- Tourist
- Student

Digital Certification of Professional or Educational Credentials

- Health workforce credentials (e.g., professional registration)
- Educational credentials

Cross-Border Telehealth

- Provider-to-provider (e-consult/second opinion)
- Remote diagnostic interpretation (imaging, etc.)
- Patient-to-provider

Public Health

- Surveillance
- Research

Digital Certification of the Integrity of the Medicine and Supply Chain

- Medicine supply chain validation

For each of the topics identified within PH4H, coordinated work will be carried out with participating countries to produce implementation guides and reference software. This will enable standardization and facilitate interoperability among the region's health authorities.

5.2. Regional Technical Maturity Model

Based on the assessment of progress among countries using tools for secure information exchange, it is clear that member states in the region are at different levels of maturity in implementing solutions that can leverage the PH4H framework. Taking into account the technical requirements for joining the GDHCN, and to facilitate the participation of countries, the following tool is proposed to measure the maturity level of member states' health services.

Table 2: Maturity Model for participating countries in PH4H

Level	Milestone	Resources required
Level 0	Health services deliver Physical documents to their user.	Procedures and Regulations of the Health Authority
Level 1	Health services deliver Digital documents to their user	Custom-developed software for the Health Authority's use cases
Level 2	Health services deliver electronically sealed documents to their users. Integration with the GDHCN.	Custom-developed software for sealing and verifying electronic documents.
Level 3	Documents are delivered using syntactic standards (HL7 FHIR or others) and models agreed upon within PH4H.	Data structures adapted to local needs using FHIR or another standard
Level 4	Documents are delivered using semantic standards (national catalogs, LOINC, ICD-10, etc.) that are regulated at the national level. Additionally, standards (HL7 FHIR) and models agreed upon within PH4H are applied.	Regulations on standardized vocabularies, creation of FHIR profiles, and implementation guides.

5.3. Opportunity costs

RACSEL's objectives include supporting countries in assessing and strengthening their capacities to advance through the proposed maturity levels. Participation in PH4H is a key enabler for countries to adopt regional and international standards (Level 3 of the maturity model) and to benefit from cross-border communication (Level 4 of the maturity model). Conversely, countries that do not engage in these initiatives will have limited access to regional collaborative experiences and shared resources, which may widen the gap in their progress toward the digitalization of health services. To ensure the region advances together, RACSEL has identified concrete lines of action to be addressed with countries, which are essential for consolidating the production rollout of PH4H.

5.4. Priority Action Lines

Given the opportunities offered by PH4H and the existing gaps among countries in the region, the following four priority actions have been identified:

1) Join GDHCN: Joining GDHCN is free and voluntary. National health authorities should collaborate with PAHO to complete the application and provide the technical evidence of membership, according to the process described in Annex C.

B) Strengthening the capacity to sign documents: The country survey (Annex A) revealed the need to support countries implementing electronic sealing of their health digital documents. The PH4H work plan addresses this need by providing generic reference software for sealing and verifying electronic documents.

C) Adopt PAHO/WHO recommendations: For each of the topics identified by PH4H, it is necessary to review and adopt the WHO reference documents. For example, in the area of immunizations, the Immunization Agenda 2030²³ includes specific indicators and targets that countries must consider in their national strategies and the IS4H²⁴ action plan.

D) Strengthen organizational enablers: Health authorities in the region play a leading role in designing and adopting digital services. The adoption of international recommendations and information management standards requires effective governance within each health authority. In this regard, PH4H will continue assessing the organizational capacities of health authorities to develop guidelines and regulate their use. These assessments can also serve as an indicator of the maturity level that each Member State must achieve.

6. Conclusions and recommendations

Joining the GDHCN and participating in the PH4H initiative provides countries with a unique opportunity to optimize their health systems. This includes reducing administrative processes, strengthening border controls, and expanding the information available to professionals during medical consultations. The GDHCN not only lays the foundation for sustainable international collaboration in health but also accelerates the development of interoperable documents such as vaccination certificates, patient summaries, cross-border electronic prescriptions, insurance records, and even medical histories, among others.

The GDHCN is a valuable resource that, when combined with PH4H, offers an unprecedented opportunity for LAC countries to strengthen their health systems in an integrated and coordinated manner. This opportunity is even more crucial in the current context, where the digital transformation of the health sector is already underway and innovative solutions are needed to ensure continuity of care for the population—especially for migrants and vulnerable communities.

This document has identified areas of opportunity that need to be addressed for countries in the region to fully benefit from the GDHCN. Therefore, it is recommended that countries, with the support of RACSEL, continue working to:

²³ <https://www.who.int/teams/immunization-vaccines-and-biologicals/strategies/ia2030>

²⁴ <https://www.paho.org/es/documentos/plan-accion-para-fortalecimiento-is4h>

- a. **Develop technical capacities** to produce interoperable, electronically sealed digital documents that facilitate the cross-border flow of data and can be verified by health service providers both within and outside a country.
- b. **Strengthen institutional capacity** to adopt international guidelines and develop regulations that enhance standardization of data produced by public health programs.
- c. **Leverage regional solutions** collaboratively created by countries in the region to reduce development and implementation costs of digital services, allowing each country to advance according to its maturity level.

This work is already underway, more countries in the region continue to join the effort, and RACSEL remains committed to supporting the region's progress.

Glossary

LAC: Latin America and the Caribbean (LAC).

Electronic signature: Refers to the encryption applied to a digital document which guarantees the integrity of the document and non-repudiation of the natural or legal person who signed the document.

SMART Guidelines: A methodology developed by the WHO to facilitate the analysis and design of digital health services.

GitHub: Software code and development manager, available online, which facilitates collaborative work between different teams.

GDHCN: The trusted network managed by WHO, which was built during the COVID19 pandemic to facilitate the verification of vaccination certificates.

WHO: World Health Organization.

PAHO: Pan American Health Organization.

PH4H: Initials of the Pan American Highway for Digital Health.

RACSEL: Latin American and Caribbean Digital Health Network.

Electronic Seal: Refers to the electronic signature issued in the name of an institution. See Electronic Signature.

SMART Guidelines: See SMART guidelines.

SMART trust: See GDHCN.

SMART PH4H: The name given by WHO to the PH4H project.

References and resources

1. Dominio COVID19 (DDCC) de la OMS
<https://worldhealthorganization.github.io/smart-trust/>
2. Marco de análisis y diseño de servicios digitales en Salud (Guías SMART)
<https://www.who.int/teams/digital-health-and-innovation/smart-guidelines>
3. Dominio Smart PH4H de la Ruta panamericana de la salud,
<https://worldhealthorganization.github.io/smart-ph4h/>
4. Plantilla de repositorio para unirse a la GDHCN
<https://github.com/WorldHealthOrganization/tng-participant-template>
5. Agenda de Inmunización 2030
<https://www.who.int/docs/default-source/immunization/strategy/ia2030/ia2030-document-en.pdf>

Annex A: Survey of the countries' current state

Within the framework of the Pan American Health Route (PH4H) project, countries in the region are connecting to the trust network for health services managed by WHO. The WHO Trust Network facilitates the validation of documents electronically. This increases the security of clinical documents and accelerates the adoption of digital medical services. This network is voluntary, completely free and available to member states of the United Nations.

To measure capabilities and opportunities for improvement, the following questionnaire collects information about the situation of each country. It is recommended that it be answered by the person responsible for developing digital services.

Name of person completing the form:

Position:

Name of the Institution or Ministry:

About electronic documents:

1. Currently the institution issues electronic documents such as proof of live birth, death certificate, medical prescriptions, etc?
2. If yes, are these documents electronically sealed? (the electronic seal refers to the electronic signature affixed on behalf of the institution)
3. If your answer was no, are there plans to issue electronic documents in the short term, which ones?

About the regulatory environment

4. Is there a law in the country that regulates the use of electronic signatures and seals*?
5. Is there an entity in the country, commercial or public, that manages the issuance of electronic signature certificates?
6. If your answer to the previous question is affirmative, does your institution currently have a budget allocated for the purchase of certificates?

About security management and key management:

7. Does the development team manage a code repository (GitHub or similar)?
8. Within the systems development team, are internationally recognized certificates generated and managed? If your answer is affirmative, please select the corresponding uses:
 - a. Certificates are generated with Let's Encrypt (HTTPS for a public domain)
 - b. Certificates are purchased from an international provider (HTTPS for a public domain)
 - c. Certificates are purchased from an international provider for other services (please explain)
9. Within the systems development team, are self-signed certificates generated and managed**? If your answer is affirmative, please select the corresponding uses:
 - a. To secure SSH access to your servers using public keys
 - b. To authenticate calls to internal APIs
 - c. To authorize access to systems from specific computers.
 - d. Other use case (please explain)
10. What are the main challenges that the systems development team has in generating and managing certificates?
 - a. Gaps in experience/technical know-how
 - b. Staffing gaps to manage these tasks
 - c. Need to attend to other priorities
 - d. Other challenges (please explain)

*Electronic Signatures belong to an individual/person, electronic seals are signatures that belong to institutions.

**Self-signed certificates are those that have been created in a local environment using tools such as OpenSSL and that cannot be validated outside the local environment.

Annex B: Health authorities who answered the survey

	País	Nombre	Puesto	Institución o Ministerio
1	Argentina	Fernando Iglesias	Director de Interoperabilidad, Estándares y Desarrollo	Ministerio de Salud de la Nación
2	Bahamas	David Strachan	Technical Project Manager IS4H	Ministry of Health & Wellness
3	Belize	Lily Guerra	Health Planner	Ministry of Health and Wellness
4	Colombia	Leandro Chaves Vergara	Contratista	Ministerio de Salud y Protección Social
5	Costa Rica	Laura Blanco	Jefe Sistemas de Salud	Caja Costarricense de Seguro Social
6	Ecuador	Adriana Abad	Analista de Proyectos de TI	Ministerio de Salud Pública
7	El Salvador	Rodrigo Najarro	Director de Tecnologías de Información y Comunicaciones	Ministerio de Salud
8	Guatemala	Roger Martínez López	Director de Tecnologías de la Información	Ministerio de Salud Pública y Asistencia Social
9	Jamaica	Keisha Barwise	Clinical Informatics Officer	Ministry of Health and Wellness
10	Paraguay	Lourdes Ariel	Directora General, Director de Sistemas (DGTIC)	Ministerio de Salud Pública y Bienestar Social
11	Suriname	Richard Mendes	IS4H Program Director	Ministry of Health (IS4H)
12	Uruguay	Jimena Hernández	Directora de Salud Digital	AGESIC

Annex C: Requirements for joining the trust network managed by WHO

Under the PH4H project, countries are invited to join the health services trust network managed by the World Health Organization (WHO) and its regional office for the Americas - the Pan American Health Organization (PAHO). This network is voluntary, completely free of charge and available to United Nations countries. GDHCN/PAHO facilitates the validation of documents electronically. This increases the security of clinical documents and accelerates the adoption of digital medical services.

Below are the technical and administrative requirements that UN countries must complete to join the network. Requisitos Para Unirse a la Red de Confianza Administrada por la OMS

Registry

1. **Clone the Participating Country Repository:** It is necessary to create a private GitHub repository to share the country's cryptographic keys with WHO/PAHO. To facilitate the creation of this private repository, it is recommended to clone this template repository, which contains instructions and examples of the cryptographic keys that will be shared.
2. **Generate a PGP Key:** To ensure the security of the repository and the information shared, a PGP key must be used to sign the contents of the repository. This page describes how to generate and use a PGP key in the GitHub repository. This video demonstrates the process of generating the PGP key and how to obtain its ID.
3. **Submit a Letter of Intent:** A letter of intent (English version) must be completed and submitted to the PAHO country office. This letter should be presented by the national health authority recognized by PAHO and must include the URL of the private GitHub repository and the PGP key ID created in the previous step.

Integration Tests

0. **Generate Test Certificates:** The repository contains scripts to generate the certificates that will be shared in the repository. Before running the certificate generation, make sure to edit the country template with the appropriate values.
1. **Register Country Certificates:** Once the certificates are generated, they must be saved in the private repository within a new folder. It is recommended to copy the folder named "onboarding/DCC" and rename it to "onboarding/PH4H." The existing PEM files in this folder should be edited to store the certificates generated in the previous step.
2. **Share Repository with PAHO:** Since the country repository is private, the PAHO user must be granted access to the certificates. Make sure to add the user **TNG-BOT-DEV** with read-only permissions

About Certificate Management

- WHO provides several recommendations for certificate management, including the use of elliptic curves and avoiding the use of self-signed certificates in production environments. These recommendations are not mandatory requirements validated by PAHO/WHO that would prevent integration into the network
- If the country has a certification authority that complies with national legislation, it is recommended to use those certificates. If the country does not have such infrastructure, self-signed certificates may be used to join the PAHO/WHO trust network.
- Regardless of how certificates are generated, it is the responsibility of the national health authority to safeguard and ensure the security of the private key used to sign documents issued to health service users.
- If necessary, a member country may share multiple validation keys within the PAHO/WHO trust network. If the health authority uses different keys to sign different documents, the corresponding public keys must be published for use by other network members.

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