INFORMATION SYSTEMS FOR HEALTH

Lessons learned and after action review of the implementation process in the Caribbean region

2016–2019

PAHO Pan American Health Organization | World Health Organization

INFORMATION SYSTEMS FOR HEALTH

Lessons learned and after action review of the implementation process in the Caribbean region 2016–2019

Washington, D.C., 2021

PAHO Pan American Health Organization / World Health Organization — REGIONAL OFFICE FOR THE Americas

Information Systems for Health: Lessons Learned and After-action Review of the Implementation Process in the Caribbean, 2016–2019

A PAHO tribute to Dr. Paul Ricketts

"You may consider calling this initiative **Information Systems for Health** instead of Health Information Systems."

A suggestion by the late Dr. Paul Ricketts during a conversation with a PAHO staff member in July 2015.

Paul Ricketts from Dominica, M.B.B.S. from the University of the West Indies, M.Sc. and D.L.S.H.T.M. from the London School of Hygiene and Tropical Medicine. Dr. Ricketts was employed as a medical officer in Dominica from 1986 and became the National Epidemiologist in Dominica in 2001. In February 2016, the Government of Dominica engaged Dr. Ricketts as Special Advisor on Health and Ambassador-at-Large.

Contents

Figures

I. Foreword

In November 2016, Caribbean leaders in health came together in Kingston, Jamaica, to support a vision and strategic framework for advancing Information Systems for Health (IS4H). The High-Level Meeting (HLM) on IS4H has proved to be an important building block toward advancing the vision of universal access to health and universal health coverage, and public health in the Caribbean region, as well as for strengthening national and regional health development, and addressing the Sustainable Health Agenda for the Americas 2018–2030.

The HLM brought together over 70 participants from 16 Caribbean countries, regional and international agencies, and international development partners, including six ministers of health (Barbados, Belize, Grenada, Jamaica, Saint Vincent and the Grenadines, and Suriname); senior CARICOM officials; representatives of CARICOM institutions, United Nations organizations and international financial institutions; and technical personnel from the countries.

I am very proud of this important body of work that began under the vision and leadership of Caribbean Member States and our international partners, supported by PAHO/WHO. The outcomes of the HLM in Jamaica provided the foundation for the development of the Plan of Action for Strengthening IS4H in the Americas 2019–2023, which was approved at the 2019 PAHO Directing Council. The Plan of Action includes strategic lines of action that will improve the capacity of health institutions in Member States to advance toward meeting the targets of the Sustainable Health Agenda for the Americas 2018–2030.

Improving the health and well-being of all individuals, families, and communities in the Americas, and reducing inequities, requires the use of health information to facilitate evidence-based health care and policy-making. The IS4H initiative was created with the vision of implementing universal access to health and universal health coverage in the region through the strengthening of interconnected and interoperable information systems that provide access to quality data, strategic information, and digital health tools for decision-making and well-being.

Countries in the Region of the Americas share many common challenges in strengthening their IS4H. The IS4H Strategic Framework and Plan of Action provides a common vision and set of strategies, as well as a range of tools and supports for addressing these challenges. The IS4H initiative provides an exciting opportunity for collaboration among Member States to meet these common challenges and deliver outcomes that can become public goods for use in the Americas. I am encouraged by the level of collaboration that we have seen under the IS4H initiative, as well as the innovation that has been shared. It is important we consider and build upon this existing work, investment, and knowledge.

In the past four years, PAHO/WHO has provided support for IS4H strengthening through a number of actions and strategies in collaboration with countries under the IS4H Strategic Framework. The IS4H Strategic Framework recognizes the capacities and capabilities required to develop and sustain national information systems for health. The framework goes beyond a focus on just information technology and data management and encompasses a range of strategies that also address governance and management structures and capacities, knowledge management and sharing, and the innovative uses of methodologies, approaches, tools, and digital health technologies.

This document provides an opportunity to review our work together over the past four years and assess what we have learned, in order to extend the successful strategies and to avoid the pitfalls that Caribbean countries have worked to overcome. It also illustrates the shared achievements of the Caribbean subregion in advancing IS4H and lights the way forward for our collective journey. We remain keenly aware of the importance of strong national and regional information systems for health in reaching the targets of the Sustainable Health Agenda for the Americas 2018–2030. In conclusion, I would like to congratulate the Member States in the Caribbean region for their vision and leadership and their contributions to strengthening IS4H for the entire Region of the Americas and look forward to our continued collective achievements.

Dr. Carissa F. Etienne, Director of the Pan American Health Organization

Carissa F. Etienne
Director, PAHO/WHO

"I am encouraged by the level of collaboration that we have seen under the IS4H initiative, as well as the innovation that has been shared. It is important we consider and build upon this existing work, investment, and knowledge."

II.   About the Document

The methodology used in this after action review asks four key questions (Figure 1) about our collective work to identify key lessons for the future:

Figure 1. After action review questions
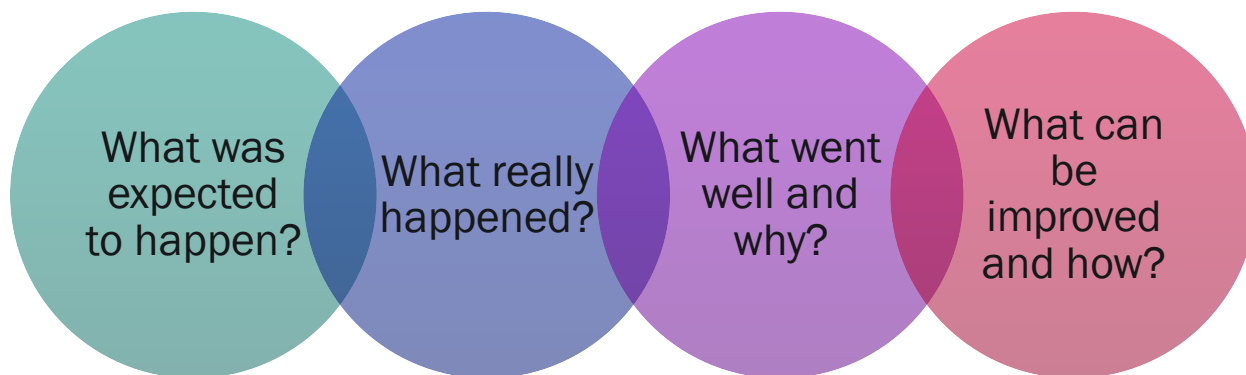
1) What was expected to happen? This section summarizes the key recommendations and strategies identified during the High-Level Meeting in Jamaica.

2) What really happened? Here we review the actual outcomes and achievements over the past four years, including the Plan of Action on Information Systems for Health (IS4H) for the Caribbean, the establishment of the Technical Working Group on IS4H in the Caribbean, the development of the IS4H Toolkit that provides guidance, tools, and templates for strengthening IS4H, technical cooperation activities in 14 countries in the Caribbean, and the establishment of the IS4H Maturity Model assessment tool.

3) What went well and why? This section includes a discussion on key factors that have contributed to the success of the IS4H initiative to date, including the importance of high-level political commitment, alignment with other high-level political instruments, the establishment of a strong conceptual and theoretical foundation for IS4H strengthening, the importance of strategic networks, and the establishment of a trust-based collaboration framework. This section also highlights the successes from 10 projects implemented in countries across the Caribbean supported through US$ 2 million in seed funding for the Region from PAHO. These projects have contributed to development of a range public goods that can be leveraged by countries throughout the Region.

4) What can be improved and how? This final section identifies areas for further development and includes a comprehensive profile of IS4H maturity across the Caribbean subregion. The IS4H Maturity Model is a tool for measuring and benchmarking capabilities across strategic goals of the IS4H framework and provides guidance for countries on where to focus their resources and energies on their journey toward strengthening IS4H. The assessment shows that, as a whole, the Caribbean subregion is now building awareness of IS4H concepts and competences across the three strategic goals of Management and Governance, Knowledge Management and Sharing, and Innovation, but has advanced to focusing on implementing best practices related to the Data Management and Information Technology goal.

III.   Visual Summary

The IS4H initiative was created with the vision of implementing universal access to health and universal health coverage in the Region through the strengthening of interconnected and interoperable information systems that assure effective and efficient access to quality data, strategic information, and information and communications technology (ICT) tools for decision-making and well-being (Figure 2).

Figure 2. IS4H timeline 2016–2020

November 2016

A high-level meeting on information systems with the Caribbean countries was held

January 2017

The IS4H framework and the Maturity Assessment tool were developed in collaboration with a group of experts

December 2017

4th Council of Ministers of the Eastern Caribbean States and the Fort-de-France declaration on IS4H

High-level meeting on information systems with the Central American countries
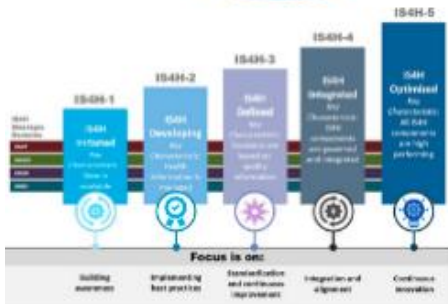
February 2018

The Maturity Assessment tool was developed for measuring progress at the national and subnational levels

October 2018
High-level meeting on information systems with the South American countries

November 2018
Seed money/call for proposals for project implementation at the country level

October 2019
Plan of Action for Strengthening Information Systems for Health in the Americas approved by Member States at the PAHO Directing Council

January 2020
34 projects under implementation (92% implemented)
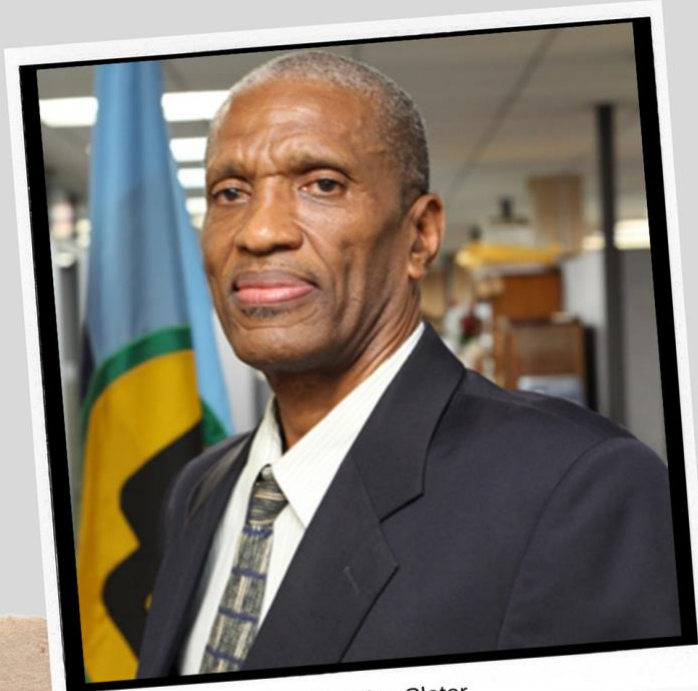
Douglas Slater
Assistant Secretary-General,
Directorate for Human and Social Development,
CARICOM

"IS4H is key to achieve the goal of implementing universal access to health and universal health coverage in the Caribbean region. We need to work together as one team."

IV. Background

Timely, accurate, and quality information on health is critical for decision-making, to enable the development, implementation, monitoring, and evaluation of appropriate health policy, programs, and interventions for population and individual health. Disaggregated health data permit identification of vulnerable populations and health inequities and facilitate the implementation of strategies to address them.

Systems that provide such information have long been a priority for health policymakers and planners, and the Caribbean has a lengthy history of work on health information systems (HIS). Member States of the Caribbean Community (CARICOM) are at varying stages in the development of HIS, moving from predominantly manual to automated systems. The Pan American Health Organization/World Health Organization (PAHO/WHO) committed to work with countries, the CARICOM Secretariat, and development partners in Information Systems for Health (IS4H) initiatives at both the regional and national levels, facilitating dialogue and encouraging expansion from the current priority area of client management systems to other areas critical to health, involving prevention, rehabilitation, and overall improvement of the health system.

Building on existing actions, taking into consideration a 2015 Country Situation Analysis of HIS, and considering the framework of the renewed model on IS4H developed by PAHO/WHO collaborated with the Ministry of Health of Jamaica to convene a High-Level Meeting (HLM) on IS4H in Kingston, Jamaica, in November 2016. The meeting presented a draft strategic plan for a Caribbean Information System for Health, with the vision of strengthening universal access to health and universal health coverage, thus advancing public health in the Caribbean region, strengthening national and regional health development, and addressing the 2030 Sustainable Development Goals. The approximately 70 participants from 16 Caribbean countries, regional and international agencies, and international development partners included six ministers of health (Barbados, Belize, Grenada, Jamaica, Saint Vincent and the Grenadines, and Suriname); senior CARICOM officials; representatives of CARICOM institutions, United Nations agencies—including PAHO/WHO—and international financial institutions; and technical personnel from the countries.

Participants from 16 Caribbean countries, CARICOM, PAHO, and other international organizations

The HLM recognized the need for:

- timely, accurate, and quality information on health to inform decision-making and policy-making, program interventions, and monitoring and evaluation for countries' progress to universal access to health and universal health coverage;
- ongoing national e-Governance initiatives;
- open data and big data solutions; and
- the 2030 Sustainable Development Goals, which focus on addressing inequities and a whole-of-government, whole-of-society, health-in-all-policies, and multisectoral approach to health development.

This approach mandates that IS4H include mechanisms to capture, analyze, report, and use data from both health and non-health sectors, with the participation of government, civil society, and the private sector.

Through presentations, guided group work, plenary discussions, and validation of summaries of agreements reached, the HLM identified immediate, medium-term, and long-term outcomes for IS4H in the Caribbean, strategies to achieve them, and possible roles and responsibilities of various entities. The meeting highlighted ongoing initiatives and interventions in countries and lessons and experiences to be shared, with the commitment to analyze, consider, and build on them in the production of regional public goods that would contribute to advances in national and regional IS4H.

The discussions concluded in the collaborative development of a draft Caribbean IS4H Strategic Plan, organized into four strategic goals: Data Management and Information Technologies, Management and Governance, Knowledge Management and Sharing, and Innovation and Performance.

Key agreements and recommendations addressed:

- legislative frameworks and regulations for IS4H, focusing on collection of data from the private sector, privacy, confidentiality, and security;
- alignment with international standards;
- ICT infrastructure, with access to both structured and unstructured data;
- capacity-building and change management strategies at all levels;
- national multisectoral—rather than health sector—approaches to IS4H;
- formal and informal mechanisms for sharing information, lessons learned, and experiences among countries; and
- the Caribbean IS4H Strategic Plan, based on work done at the HLM, as the regional proposal for strengthening IS4H in the Caribbean and mobilizing resources.
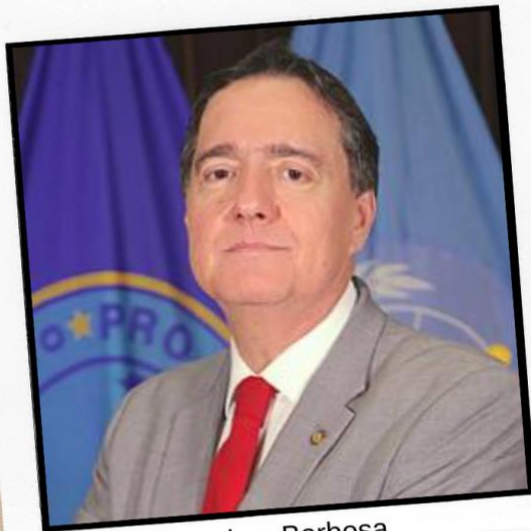
Jarbas Barbosa
Assistan Director
PAHO/WHO

"The IS4H initiative and the Action Plan represent an important milestone for the public health of the Americas as it is the result of a collaborative process with all Member States that began in November 2016 in a High-Level meeting with the Caribbean countries, and that continued in 2017 and 2018 with similar meetings with the countries of Central and South America."

V.   After Action Review

The main objective of this after action review is to help other subregions by sharing the results from successful strategies, actions, and lessons learned and to support countries to avoid the pitfalls that the Caribbean countries worked to overcome.

The IS4H after action review is centered on four questions (Figure 3):

Figure 3. IS4H after action review model
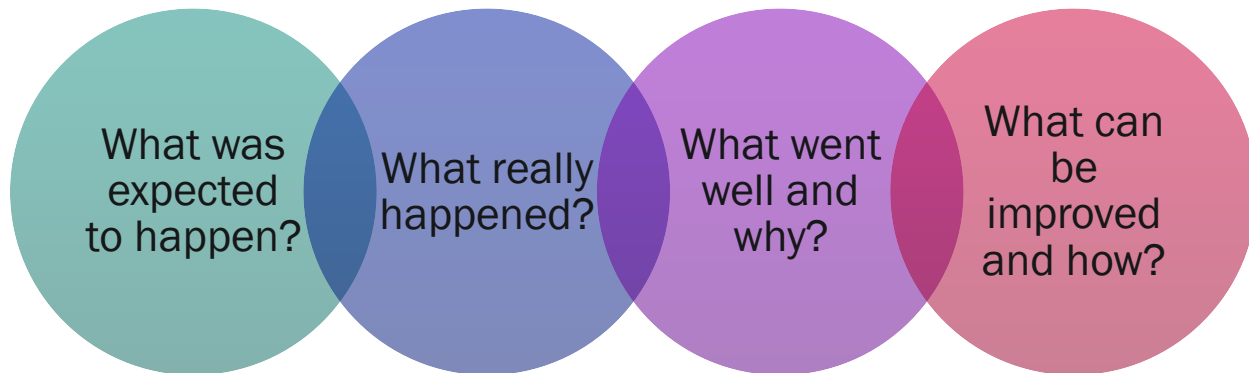
What was expected to happen?

The following statements are the result of the main conclusions and recommendations emanating from the Caribbean High-Level Meeting on IS4H.

1 Development and adoption of a renewed—and collectively agreed—holistic framework for IS4H in the Caribbean, with a clear identification of components amenable to joint work by countries

2 Adoption of a subregional strategic plan for advancing public health, which addresses identified priority actions for presentation to national cabinets and potential funders, to facilitate, respectively, resource allocation and resource mobilization

3 Identification of electronic medical records and hospital management subsystems as short-term IS4H priorities for Caribbean countries

4 Negotiate to expand the IS4H framework to other subregions and to promote the development of a new strategic plan for the Americas

5	Update legislation for, and associated with, IS4H, using model legislation, legal briefs, and/or examples from countries
6	Develop instruments such as an IS4H self-assessment tool, regional guidelines and standards for interoperability, privacy, confidentiality, and security, including knowledge-sharing tools and an IS4H conceptual architecture
7	Conduct countries' IS4H maturity assessment
8	Formalize and implement a Caribbean Technical Working Group (TWG) for IS4H

Caribbean people working together

Carlene Radix
Head of Health, Human & Social Cluster, SSDD.
Organization of Eastern Caribbean States
(OECS) Commission

"The OECS Health Unit welcomes PAHO's Caribbean IS4H roadmap, which supports our need for accessible information for strategic health system governance, and is consistent with CCHIV priorities. We recognize the contribution the Caribbean has made to the region, and look forward to the 2019 Strategy and Action Plan on Information Systems for Health in the Americas"

What was expected to happen? What really happened? What went well and why? What can be improved and how?

IS4H after action review model: "What really happened?"

What really happened?

1 Renewed framework for IS4H

A collectively agreed holistic framework for IS4H was developed, not only for the Caribbean but for the Americas. The IS4H Framework was extensively analyzed and discussed with the three subregions and was translated to the Plan of Action for Strengthening Information Systems for Health 2019–2023, approved by PAHO Member States in October 2019.

Meeting participants analyzing and creating the IS4H Framework, Kingston, Jamaica, November 2016

Marcos Espinal
Director, Communicable Diseases and Environmental
Determinants of Health
PAHO/WHO

"The better data and information systems we have, the smarter the public health response will be."

The IS4H Strategic Framework is built around four strategic goals: 1) Data Management and Information Technologies (DMIT); 2) Management and Governance (MAGO); 3) Knowledge Management and Sharing (KMSH); and 4) Innovation (INNO) (Figure 4). Each goal focuses on key components or capacities that are required for effective IS4H national implementation.

Figure 4. IS4H Strategic Framework with four strategic domains

The IS4H strategic framework was inspired by the Theory of Systems and the CESM Model developed by Mario Bunge, an academic who has written more than 400 papers and 80 books. The CESM model (Bunge, 2004) defines a system as an entity composed of four basic elements: C, E, S, and M. C = Composition: the collection of all parts of s. E = Environment: the collection of non-s elements that act on the components of s or on which some or all of the components of s act. S = Structure: the collection of relationships, in particular links between the components of s, or between them and elements of the environment E. M = Mechanism: the collection of processes that make it behave in the peculiar way it does.

Irad Potter
CMO, Government of the Virgin Islands, Chair of
the Caribbean Technical Working Group for
Information Systems for Health

"To ensure a successful IS4H implementation, It is important to utilize multisectoral collaboration approaches to ensure coverage with other sectors such as telecommunications, planning, education, statistics, and eGovernment initiatives."

2 Subregional IS4H plan of action and road map for advancing public health in the Caribbean

In response to the challenges and gaps identified in the Caribbean and building on their achievements and previous subregional strategies, countries developed and approved a Plan of Action on IS4H for the Caribbean. The main objective of the Plan was to introduce a renewed vision, a framework of action, and a common understanding of the specific components of IS4H. It is aimed at improving decision-making and policy-making mechanisms in the Caribbean through health systems that ensure universal, free, and timely access to quality and open data, and strategic information using the most cost-effective ICT tools. The Plan of Action also aims to align with PAHO/WHO and country eHealth strategies and investments.

Figure 5. Networking for health data
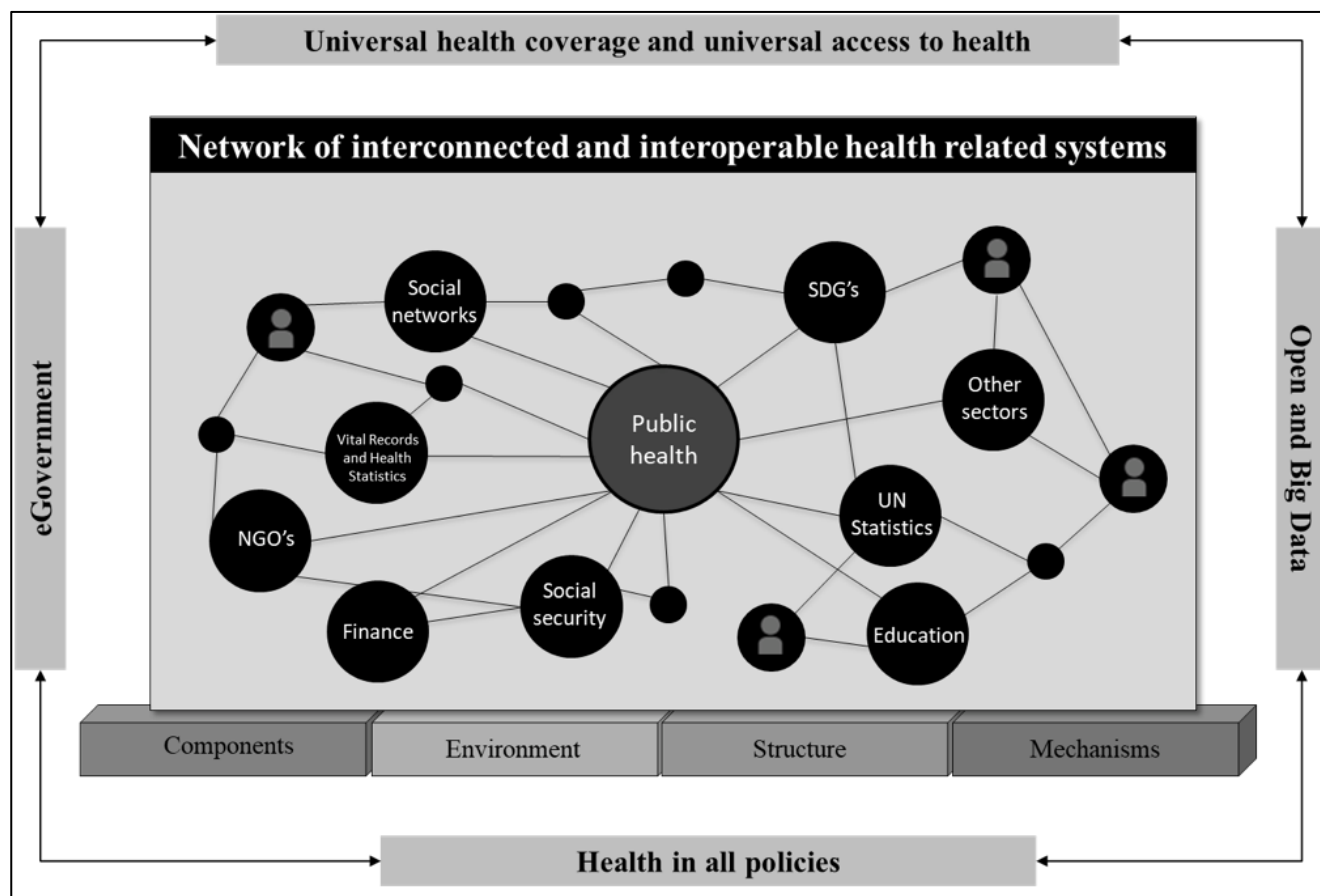
The Plan of Action is framed under four overarching strategic approaches: 1) Universal Access to Health and Universal Health Coverage; 2) Health in All Policies; 3) eGovernment; and 4) Open and Big Data initiatives (Figure 5). This plan considers the existing systems and structures; therefore, it is based on the assumption of incremental strengthening, innovation, and improvement.

The Plan of Action provides a comprehensive road map to the adoption and implementation of standards for interoperable and interconnected systems, ICT solutions, and best practices in health data and information management for improving decision-making.

The road map is envisioned as a planning tool to communicate the processes for strengthening IS4H in the Caribbean. It defines the phases, processes and products, key partnerships, and a timeline for the planned activities. Each phase corresponds to one year starting in September 2017, following the decision from the Council for Human and Social Development (COHSOD).

Particular attention has been given to identify opportunities for subregional cooperation on IS4H in the development of regional public goods. The road map is fully aligned with the CARICOM Caribbean Cooperation in Health (CCH) IV, as the regional framework through which CARICOM Member States cooperate with each other, regional institutions, and development partners to improve the health and well-being of the Caribbean people.

This road map is a collaborative effort of the members of the TWG endorsed by COHSOD in 2015. The TWG comprises CARICOM country representatives and subregional partners, including the Caribbean Public Health Agency (CARPHA) and the University of the West Indies (UWI), PAHO/WHO, and the CARICOM Secretariat. The PAHO/WHO Caribbean Subregional Program Coordination (SPC) has served as the secretariat for the TWG. All partners will continue to work together in driving the actions outlined in the road map.

Caribbean Technical Working Group on IS4H, Barbados, 2018

Rudolph Cummings
Program Manager, Public Health,
CARICOM

"The IS4H framework will support countries to implement a better decision and policy-making mechanism through health-related information systems that ensure universal, free, and timely access to data and strategic information using the most cost-effective ICT tools."

The CARICOM road map is organized into four priority areas, as follows:

Figure 6. IS4H Caribbean Road Map

IS4H CARIBBEAN ROADMAP

PLAN	DELIVER	MONITOR

PARTNERSHIPS AND COOPERATION

PRIORITY AREA 1

GOVERNANCE AND CAPACITY-BUILDING

Priority area 1 is focused on establishing subregional and national strategies, objectives, policies, standards, and tools for managerial and technical coordination among the main stakeholders for interconnected and interoperable systems. Within this context, capacity-building is focused on both the individual and organizational capacity of implementing interconnected and interoperable systems. This area will be developed incrementally through three phases.

PRIORITY AREA 2

DATA MANAGEMENT AND INFORMATION TECHNOLOGIES

Priority area 2 is focused on developing strategies, policies, and standards for interoperable and interconnected systems, as well as enhancing health data management for improving decision-making.

PRIORITY AREA 3

INFORMATION AND KNOWLEDGE MANAGEMENT

Priority area 3 is focused on enhancing the implementation of methodologies and best practices in information and knowledge management to support informed decision-making.

PRIORITY AREA 4

INNOVATION AND PERFORMANCE

Priority area 4 is focused on improving performance through innovation. A supportive environment for innovation development and scaling up requires an integrated approach to eGovernment initiatives. Opportunities for leveraging the benefits of data will be identified and discussed within Caribbean political and technical forums.

NETWORKING FOR HEALTH IN THE CARIBBEAN

The road map is intended to support subregional cooperation on strengthening IS4H, to engage key subregional and international partners while also serving as a platform to align current and ongoing work. The road map is envisioned as a living document, to be revised and expanded through various iterations, reflecting the feedback received during its preparatory phase, as well as in each of its three phases of implementation.

Caribbean Technical Working Group on IS4H, Barbados, 2018

Subregional cooperation mechanisms

The key to the success of the road map lies in the cooperation across CARICOM Member States, subregional partners, and other international partners. The road map will work to engage widely with new and evolving types of partnerships, active at various levels of governance across the subregion.

The activities proposed in the road map will be implemented in alignment with national ICT and CARICOM ICT for development (ICT4D) strategies. The road map for the CARICOM Single ICT Space—approved at the Twenty-Eighth Inter-Sessional Meeting of the Conference of Heads of Government of the Caribbean Community on 16 February 2017, in Georgetown, Guyana—sets a vision for the development of a CARICOM Single ICT Space. The objective of the CARICOM Single ICT Space is to provide the ICT-enabled foundation for enhancing both CARICOM's functional cooperation and fulfilling the social, cultural, and economic imperatives of the region.

Jessie Schut Aine
Sub-regional Program Coordinator for the Caribbean,
PAHO/WHO

"We need a whole-of-government approach towards this common goal of strengthening information systems for health in the Caribbean."

3 IS4H Toolkit

MANAGERIAL INSTRUMENTS	TECHNICAL DOCUMENTS	KNOWLEDGE CAPSULES
National Information Systems for Health Steering Committee and Technical Advisory Groups	MM Country tool (Excel)	Artificial Intelligence in Public Health
Developing a National eHealth Strategy	MM Country tool (questionnaire)	Information Architecture
Assessment Planning Guide	MM Institutional tool (Excel)	Technological Readiness
Short to medium-term IS4H roles	MM Institutional tool (questionnaire)	Data Governance in Public Health
Post description IS4H Manager	MM Excel guide	Interoperability in Public Health
Maturity Assessment and Costing Consultancy TOR	MM Tool version control	Change Management
Functional Assessment Consultancy TOR	Maturity Assessment Levels	Data Disaggregation
FACTSHEETS	Data Management Policy	**INFOGRAPHICS**
Foundations	National Data Governance Framework	IS4H Infographic
Caribbean Collaboration	Monitoring and Evaluation Framework	Tactical Framework
Networking	Guiding Principles	Strategic Framework of Operation
SDGs	Recommendations	General Framework
From Framework to Plan	Maturity Model Basic Recommendations	Blueprint
IS4H and SHAA 2030	Functional Assessment	DMIT
IS4H and POA	Glossary of terms	MAGO
IS4H Maturity Assessment Level Tool	**PRESENTATIONS**	KMSH
IS4H Maturity Assessment Level 1	IS4H Maturity Model	INNO
IS4H Maturity Assessment Level 2		
IS4H Maturity Assessment Level 3		
IS4H Maturity Assessment Level 4		
IS4H Maturity Assessment Level 5		

Amalia del Riego
Unit Chief Health Services and Access, Department of
Health Systems and Services
PAHO/WHO

"Information systems are a key piece to provide timely access and coverage to the needs of the population at the first level of care and particularly in rural, remote or underserved areas."

4 Regional Plan of Action for IS4H in the Americas

Thanks to the process that started in the Caribbean, a Plan of Action for Strengthening IS4H in the Americas 2019–2023 was approved at the 2019 PAHO Directing Council, which contains strategic lines of action to support the implementation of the 2030 Agenda for Sustainable Development. Its purpose, moreover, is to help health institutions in the Member States to advance toward meeting the targets of the Sustainable Health Agenda for the Americas 2018–2030, especially targets 6.1 and 6.2, in alignment with other government initiatives such as open government and e-Government. The plan is organized into four strategic lines of action, as shown in the image below:

Information system management and governance

Data management and information technologies

Information and knowledge management

Innovation, integration, and convergence

High-Level Meeting, Jamaica, 2016

The Plan of Action strengthens and complements the implementation of important mandates of the Member States that include aspects relevant to the achievement of more effective and integrated information systems: The Plan of Action for the Strengthening of Vital Statistics 2017–2022, and the Strategy for Universal Access to Health and Universal Health Coverage, as well as the International Health Regulations. It also considers the convergence of actions and synergies with major networks and initiatives in which the Member States participate, such as the Latin American and Caribbean Network to Strengthen Health Information Systems (RELACSIS); the American Network of Cooperation in the Development of eHealth (RACSEL); and the collaborating centers of the World Health Organization (WHO), in particular the Hospital Italiano de Buenos Aires, a collaborating center in Knowledge Management.

This Plan of Action is designed mainly for health sector institutions at the national and subnational levels. However, given the characteristics of the proposed framework for action, it is important for different entities to be involved in its implementation, including groups of experts (especially from

academia), multilateral and bilateral agencies, nongovernmental institutions, and civil society sectors that not only support the health sector but produce and analyze relevant data for action in public health, such as the data used for standards, population databases, and training materials. The goal of this Plan of Action is to strengthen the activities of Member States, aimed at upgrading health systems using interconnected and interoperable information systems. It will also help the Member States introduce ICT and improve information exchange and the management of structured and unstructured data for the benefit of public health.

5 | Update legislation for, and associated with, IS4H, using model legislation, legal briefs, and/or examples from countries

In collaboration with other partners, a review process began on the existing legislation in the Region that considers aspects of IS4H. The focus of this analysis is being centered, among others, on the key elements shown in the image below:

First IS4H mission, Suriname

Marcelo D'Agostino
Senior Advisor, Information Systems, and Digital Health, Department of Evidence and Intelligence for Action in Health, PAHO/WHO

"IS4H will be a critical success factor to achieve goal 6 of the Sustainable Health Agenda for the Americas 2018-2030: a call to action for health and well-being in the Region (ASSA2030)."

6 IS4H Maturity Assessment Tool

The IS4H Maturity Assessment Tool was collectively agreed with the Caribbean Technical Working Group on IS4H as a new reference framework for guiding countries to define their level of maturity as the basis to develop a national road map. Figure 7 illustrates the five levels of maturity defined to guide the implementation of the national plan.

Figure 7. Maturity Assessment Tool (Conceptual Framework)
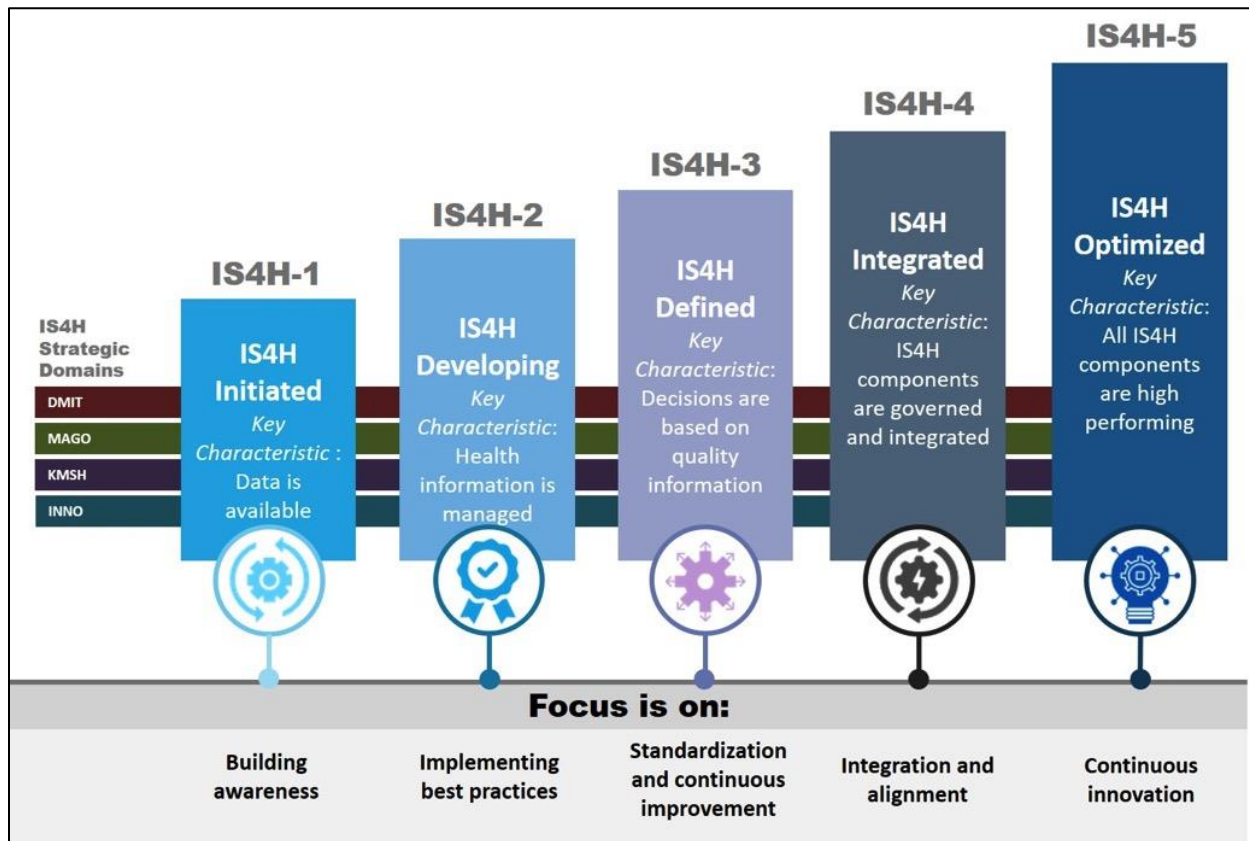
Assessment of the five progressive levels of the IS4H Maturity Model provides the awareness for planning using information systems plans and road maps. Maturity is assessed against key capability characteristics for each strategic goal at each level of the Maturity Model. It is possible for an organization to demonstrate different maturity levels within each strategic goal.

7 IS4H technical cooperation

The IS4H framework, created in collaboration with the Caribbean countries and territories, has already been implemented in more than 18 Member States and is supported by a series of tools and methodologies developed in collaboration with prestigious universities such as Harvard, Utah, UWI, and Illinois, among others, and by the financial and technical support of the United States Agency for International Development (USAID), Canada, and the Inter-American Development Bank.

Maturity assessment tool for information systems for health called attention to prioritize activities in the Caribbean

Meeting on the IS4H initiative, Paramaribo, Suriname, 15 August 2018

An initial evaluation conducted with the first ever IS4H Maturity Assessment Tool called attention to prioritizing activities in open access to timely, accurate, quality data and information on health to inform decision-making and policy-making, program interventions, and monitoring and evaluation, in the context of countries' progress toward universal access to health and universal health coverage; ongoing national eGovernment initiatives; open data and big data solutions; and the 2030 Sustainable Development Goals.

PAHO/WHO is committed to working with all countries in the Americas, the CARICOM Secretariat, and development partners in IS4H initiatives at both the regional and national levels, facilitating dialogue and encouraging expansion from the current priority area of client management systems

to other areas critical to health, involving prevention, rehabilitation, and overall improvement of the health system. Since November 2016, these are the main actions undertaken:

Political and strategic actions
- Caribbean High-Level Meeting (November 2016, Kingston, Jamaica)
- Official CARICOM road map presented at the 2017 COHSOD, Washington, D.C.
- CARICOM road map endorsed by the OECS Commission at its 4th Council of Ministers
- Alignment with the Caribbean Cooperation in Health initiative (CCH IV)
- Central America High-Level Meeting (December 2017, Washington, D.C.)
- South America High-Level Meeting (July 2018, Bogotá, Colombia)
- 2017–2018 IS4H road map and framework presented at the Annual CMO's Meeting
- Coordination and alignment with development partners such as the Inter-American Development Bank, universities, and PAHO/WHO Collaborating Centers.

On-site collaboration and technical cooperation
Anguilla, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Dominica, Guyana, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos.

PAHO–Virgin Islands collaboration

IS4H expert
Paula Otero

Trinidad and Tobago, national dialogue for IS4H implementation in collaboration with the IDB

PAHO–Trinidad and Tobago collaboration

IS4H expert Daniel Doane

Curaçao, assessment of the current state of the information systems for health, March 2019

PAHO–Curaçao collaboration

IS4H expert Jose F. Salm Jr.
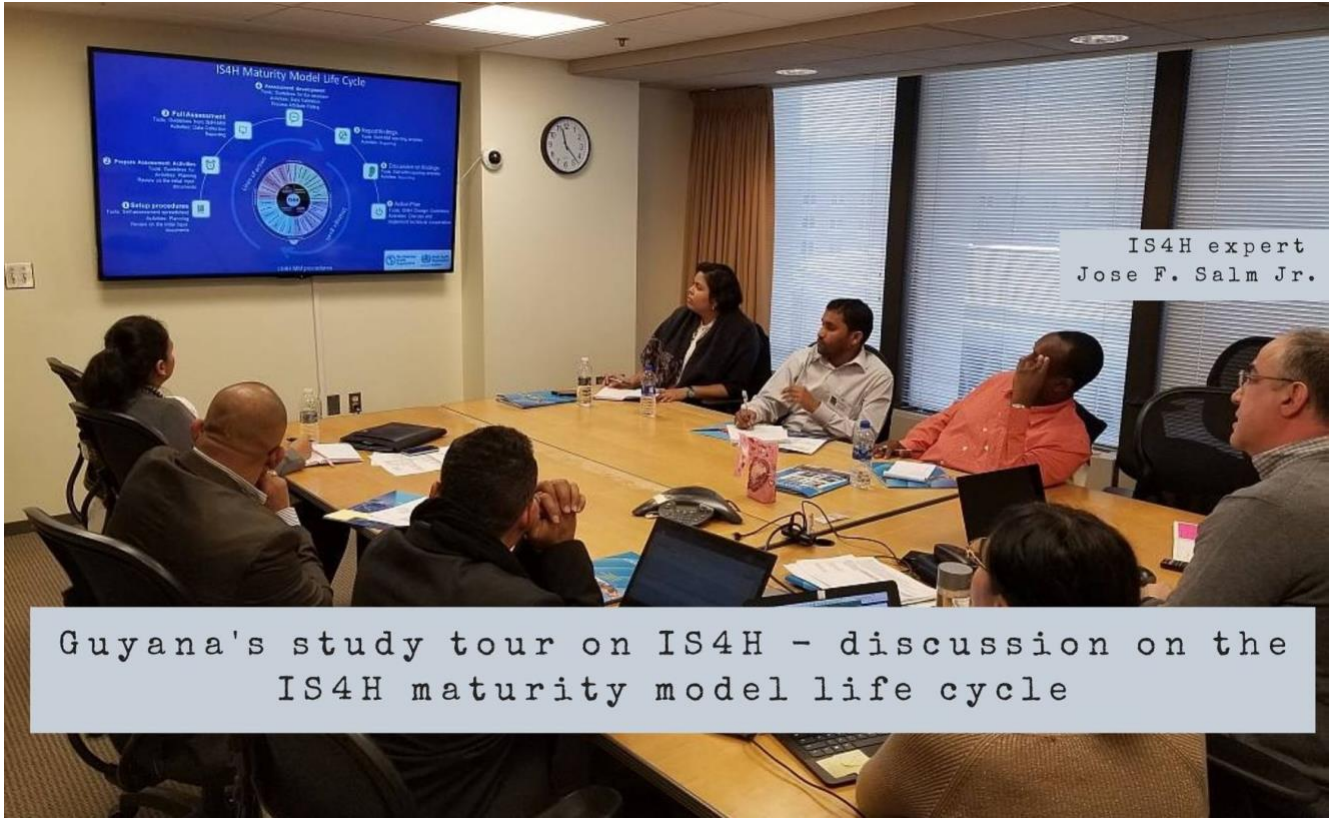
Guyana's study tour on IS4H - discussion on the IS4H maturity model life cycle

PAHO–Guyana collaboration

IS4H expert Patricia Ruiz

Caribbean experience as a model and reference for South American countries, Colombia, 2018

Caribbean–South America collaboration

Dr. Michele Roofe
Jamaica, MOH
focal point for
IS4H

Jamaica, 2016, discussion on IS4H national plan and road-map in collaboration with IDB

PAHO–Jamaica collaboration

Dr. Yuri Quintana
IS4H expert

Roster of experts meeting analyzing tools and subsystems to be adopted by Caribbean countries

James Fitzgerald
Director, Department of Health Systems
and Services
PAHO/WHO

"Strong and sustainable Information Systems for Health are critical to achieve universal access to health and universal health coverage."

8 Caribbean Technical Working Group on IS4H

Following the recommendations of the High-Level Meeting on IS4H, the PAHO/WHO Caribbean Subregional Program Coordination, in partnership with CARICOM, organized a meeting of the Caribbean Technical Working Group (TWG) on IS4H in order to discuss the implementation of the Strategic Plan and agree on a road map for the next years.

The TWG on IS4H, endorsed by CARICOM in 2015, was established to support a subregional approach on strengthening IS4H and develop an agreed work plan. The work plan was aligned with the new IS4H framework and strategic plan endorsed at the High-Level Meeting. The TWG meets and works on behalf of CARICOM with the support of PAHO/WHO and other stakeholders.

Meeting of the Caribbean Technical Working Group on IS4H, Barbados, 2018

The TWG consisted of a core group of volunteer expert representatives with experience from the Caribbean Member States, NGOs, and regional and international organizations working in specific areas including: health information management; policy and planning; epidemiology; project management; ICT; health economics; human resources in health; and health informatics. The TWG is anticipated to has 14 core members, all of whom have voting rights. In addition to the core TWG members, experts and stakeholders are invited to participate in specific TWG meetings and discussions as necessary.

The TWG has proved key to enhancing opportunities for countries for information-sharing, capacity-building, sharing and maximizing the use of available resources, and establishing common standards and guidelines. The TWG has the role of supporting the implementation of the road map and strengthening subregional cooperation mechanisms. The integration of the TWG in regional networks related to IS4H, including the Latin American and Caribbean Network to Strengthen Health Information Systems (RELACSIS) and eHealth regional networks, will contribute to the implementation of the road map through establishing synergies of the planned and ongoing work in the Caribbean. Technical officers from PAHO/WHO, CARPHA, and other organizations represent their organization in the TWG and are expected to serve as liaison between their organization and the TWG.

The non-UN and CARPHA TWG members are primarily identified based on their technical expertise and are not representing their country or organization in the TWG. At the same time, however, it is assumed that they will share relevant information with stakeholders in their countries, share the points of view of Member States' stakeholders with the TWG, and advocate for Member State buy-in.

TWG functions

- Serve as a platform for technical discussion regarding the strengthening of IS4H in the Caribbean by:
    - Facilitating renewed IS4H strengthening initiatives that are evidenced-based and reflective of the specific needs and priorities of countries in the Caribbean;
    - Facilitating renewed IS4H strengthening initiatives based on shared country experience, analysis, knowledge, and lessons learned/best practice;
    - Providing an opportunity to align and coordinate IS4H strengthening efforts and investments among countries and technical and donor agencies;
    - Identifying opportunities and innovative approaches for sharing and coordinating human, technical, and financial resources within the Caribbean subregion;
- Advocate and facilitate synergies between strengthening IS4H in the Caribbean and other relevant global, regional, and national stakeholders, initiatives, and programs;
- Recommend, promote, and update new tools, guidelines, and methodologies developed at the international level for adoption in the Caribbean subregion;
- Provide guidance to PAHO/WHO and other key stakeholders through review of relevant documents/materials and formulation of recommendations for the strengthening of IS4H and its application to policy, programs, and services.

Figure 26 - Members of the Caribbean Technical Working Group on IS4H

Caribbean Technical Working Group on IS4H Members			
Name	Title	Organization	Country
Irad Potter (Chairperson)	Chief Medical Officer	Ministry of Health and Social Development	British Virgin Islands
Sheralin Monrose	Senior Systems Analyst	NHMIS Unit, Ministry of Health	Saint Lucia
Lisa Llewellyn	Coordinator Health Information System	Ministry of Health, Wellness and the Environment	Saint Vincent and the Grenadines
Peter Ricketts	Special Advisor to the Minister for Health and Cabinet	Ministry of Health	Dominica
Michele Roofe	Senior Medical Officer (Health Informatics)	Ministry of Health	Jamaica
Ian Smith	Director Information Technology	Ministry of Health	Belize
Malcolm Webster	Director	Health Authority of Anguilla	Anguilla
Wayne Labastide	Laboratory Information Systems Specialist	NGO Caribbean Med Labs Foundation	Trinidad and Tobago
Esther Bissessarsingh	Health Information & Data Analysis	Caribbean Public Health Agency	Trinidad and Tobago
Rudolph Cummings	Program Manager, Health Sector Development	CARICOM Secretariat	Guyana
Roger McLean	Senior Health Economist	Health Economics Unit, UWI	Trinidad and Tobago
Technical Secretariat			
Jessie Schutt-Aine	Subregional Program Coordinator	Caribbean Subregional Program Coordination	Barbados
Marcelo D'Agostino	Senior Advisor, Information Systems for Health (IS4H)	PAHO/WHO Department of Evidence and Intelligence for Action in Health	Washington D.C., USA

Sebastián García Saisó
Director, Department of Evidence and Intelligence
for Action in Health
PAHO/WHO

"Public health emergencies show the importance and relevance of Information Systems for Health. Today the entire region of the Americas is benefiting from this initiative that began in the Caribbean"
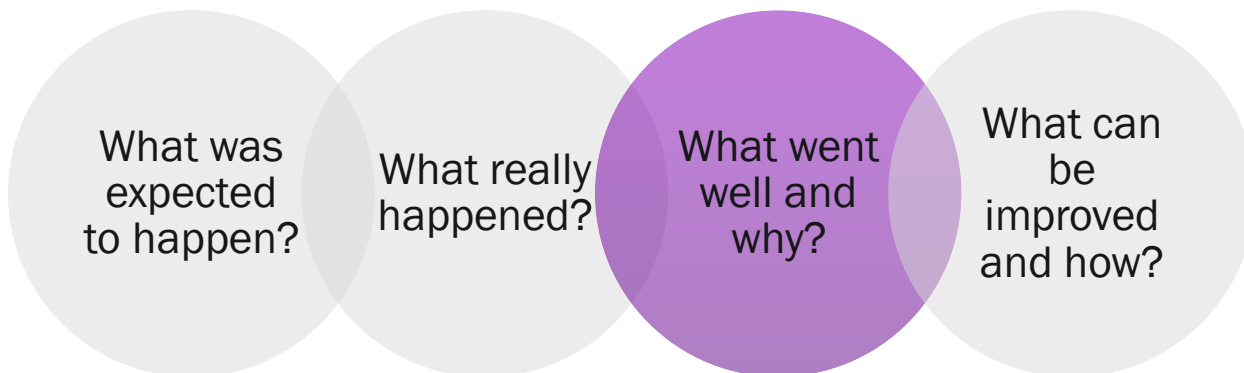
IS4H after action review model: "What went well and why?"

What went well and why?

1 High-level political support

High-level political support is a critical factor for successful implementation of IS4H at the country level and is a key element in working toward the 2030 Agenda for Sustainable Development and the Sustainable Development Goals.

PAHO Director
Dr. Etienne, PAHO Director, stated PAHO's commitment to working with countries on IS4H. She noted that the region made progress in attaining the Millennium Development Goals (MDGs) and is now addressing the SDGs. Health as a human right is a priority, and universal access to health and universal health coverage together are a major contributor to the progressive realization of this right. In turn, IS4H are important for the achievement of universal access to health and universal health coverage, to ensure that vulnerable and underserved populations are counted and reached. The PAHO Director emphasized the need to build on what exists in countries, involve those working in the system at all levels in its development, and resist the superimposition of externally developed systems on systems that are already in place. She noted that funding for IS4H is a challenge, but given its importance, innovative strategies would have to be found.

Country authorities
Ministers and high-level authorities from the Caribbean highlighted the importance of phased implementation, legislative framework, SOPs, data dictionary, human resources, capacity-building, and the participation of the private sector, the latter to provide a more complete picture of the health situation. A legislative framework that would expand required private-sector reporting to include health data other than notifiable communicable diseases—which it currently obtains—would be highly desirable. In addition, determination of national requirements and standards for recording

patient visits, whether in the public or private sector, would facilitate reporting and analysis. Barbados identified funding as a priority, and Belize requested an external evaluation of its system, while Jamaica highlighted electronic medical records, reduction in accident & emergency and surgical waiting times, and telemedicine as priorities to be addressed through IS4H.

High-level subregional policy agreements

Member States globally competitive in the development of the digital health ecosystem

opportunities for collaboration and cooperation among Member States

PAHO Director, CARICOM Secretary of Health, and ministers of health at the Jamaica meeting on IS4H

Political agreements

High-level subregional policy agreements, especially those of CARICOM, the Council of Ministers of Health of Central America and the Dominican Republic (COMISCA), the Andean Health Organization (ORAS), and the Amazon Cooperation Treaty Organization (ACTO), have stressed the importance of coordinating data capture to foster innovation to make the Member States globally competitive in the development of the digital health ecosystem. Member States are at different levels of development in this area, and this will be considered, as will opportunities for collaboration and cooperation among Member States, in order to guarantee that everyone benefits from the regional development of IS4H.

Noreen Jack
PAHO Representative in Belize, co-organizer of IS4H's launch event in Jamaica
PAHO/WHO

"It has been great to see what the IS4H initiative has become and how its implementation has expanded and well-received by all the countries and territories in the Americas."

Figure 8. IS4H aligned with high-level political instruments

CCH IV Strategic Priorities and Outcomes on Information Systems

- Regional health information systems policy & Regional data sharing and ethics policy
- Resource mobilization strategies for reaching non-traditional funders & Partnership and resource mobilization for health
- Data and evidence for decision making and accountability
- Common training programs for health and other personnel
- Monitoring and Evaluation

CCH IV

Caribbean Cooperation in Health Phase IV (CCH IV) | Summary of the Regional Health Framework 2016 - 2025

Regional Public Goods for Sustainable Health Development

Caribbean Public Health Agency
CARPHA

CARICOM

Caribbean Technical Working Group for IS4H

WORKING for HEALTH in the CARIBBEAN

PAHO/WHO SUBREGIONAL COOPERATION STRATEGY · 2016-2019

The Caribbean Subregional Cooperation Strategy

Pan American Health Organization

- Regional IS4H Framework and Program of work
- Sub regional Roadmap for the Caribbean endorsed by COHSOD and the OECS Council of Ministers
- Investment case model for Development Partners
- Call for Project Proposals for awarding grants to IS4H project implementation at local level
- Public goods for Data, Information and Knowledge Management such as: Data sharing agreements, National Policies, Concept notes for resource mobilization, Assessment tools, Knowledge Management methodologies
- Monitoring and evaluation framework based on Objectives and Key results) and Key Performance Indictors
- Digital literacy program for sub regional trainings (RELACSIS model)
- Multisectoral collaboration with other sectors such as Telecommunications, eGovernment, Planning, Education, Development partners, Statistics, among other key IS4H enablers
- Onsite visits to Anguilla, BVI, Bermuda, Belize, Dominica, Guyana, Jamaica, Suriname
- IS4H framework shared with and endorsed by Central America and South America's countries
- IS4H regional platform and knowledge hub with a roster of experts
- Regional open Data portal for Health Data Sets

IS4H (PAHO) response

3 Strong foundations

The IS4H Conceptual Framework (Figure 9) was inspired by the Theory of Systems and the CESM Model developed by Mario Bunge, an academic who has written more than 400 papers and 80 books. The CESM model (Bunge, 2004) defines a system as an entity composed of four basic elements: C, E, S, and M. C = Composition: the collection of all parts of s. E = Environment: the collection of non-s elements that act on the components of s or on which some or all of the components of s act. S = Structure: the collection of relationships, in particular links between the components of s, or between them and elements of the environment E. M = Mechanism: the collection of processes that make it behave in the peculiar way it does.

Figure 9. Conceptual Framework based on the CESM Model
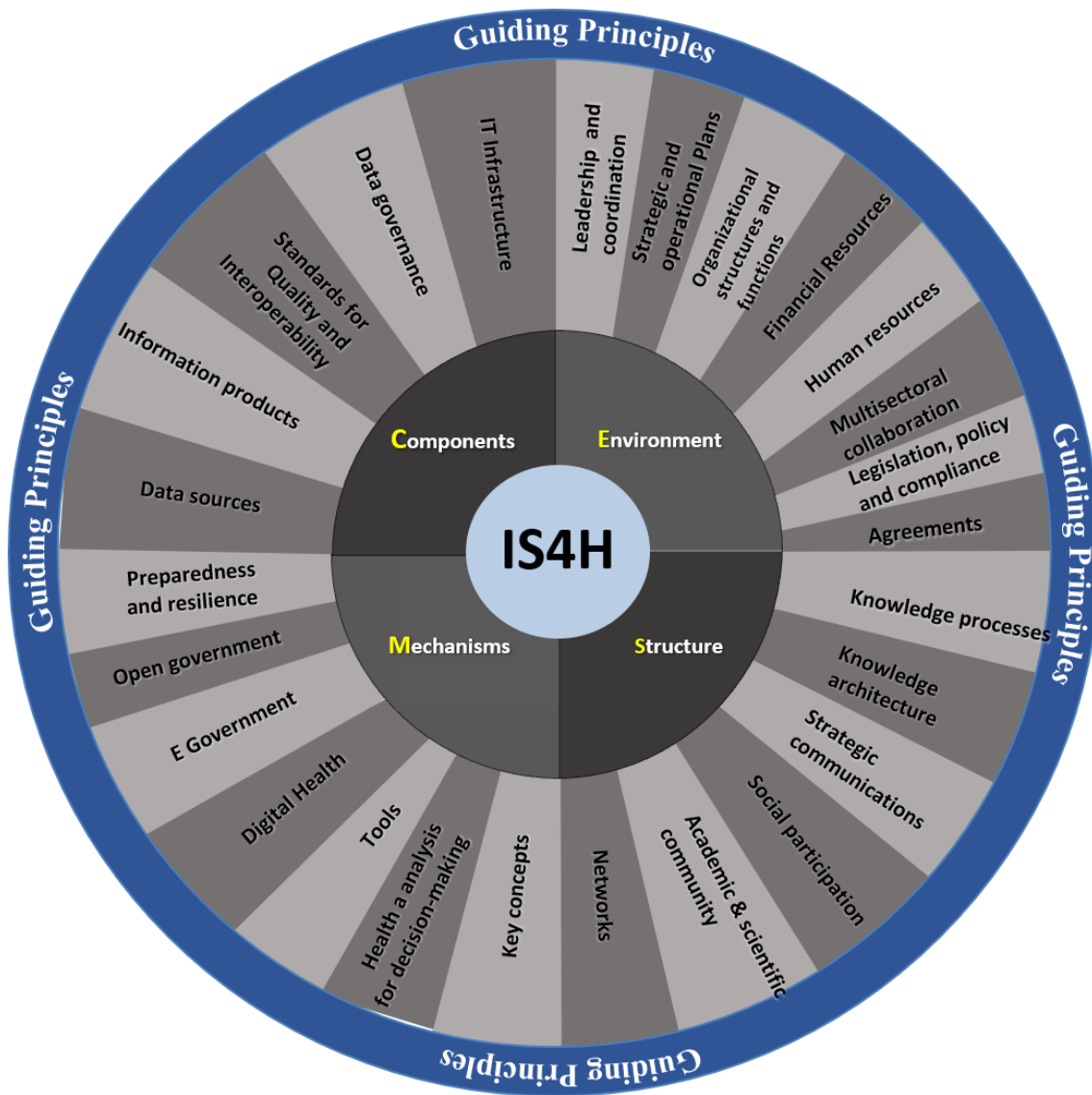
This conceptual model was the basis of all technical, political, and strategic discussions to define a solid, sustainable, and scalable action framework, considering the different realities of the countries and their institutions.

Figure 10. IS4H foundations

Information Systems for Health

FOUNDATIONS

DEFINITION

IS4H = A mechanism for managing interoperable systems with open data that come from different sources and that are ethically used, through effective ICT tools, to generate strategic information for the benefit of public health

VISION

Implement universal access to health and universal health coverage in the Region strengthened through interconnected and interoperable health-related systems that assure the effective and efficient access to quality data, strategic information, and ICT tools for decision-making and well-being

GOAL

To implement a better decision-making and policy-making mechanism through health systems that ensure universal, free, and timely access to data and strategic information using the most cost-effective ICT tools

Figure 11. IS4H strategic networks

The Caribbean Technical Working Group on Information Systems for Health, endorsed by CARICOM, coordinates the implementation of the IS4H Roadmap for the Caribbean

Development and Technical partners that supports the implementation of the IS4H initiative in the Americas

PAHO and WHO Collaborating Centers supporting the IS4H implementation

Sub regional bodies and other organizations that collaborates in the IS4H implementation in the Americas

Academic institutions that supports the implementation of the IS4H initiative in the Americas and the development of conceptual models and tools

Successful case study: Collaboration between PAHO/WHO and the WHO Collaborating Center Department of Health Informatics, Hospital Italiano de Buenos Aires

The Department of Health Informatics (DHI) of the Hospital Italiano de Buenos Aires (HIBA) started to look for international collaborations and was involved in projects such as ACTION-Grid: International Cooperative Action on Grid Computing and Biomedical Informatics, which was part of the VII Framework Program for Research and Development of the European Union. It also participated in the Global Partnership Program (GPP) that was coordinated by the American Association of Medical Informatics (AMIA) with funding from the Bill and Melinda Gates Foundation, which aims to address the deficiencies in IT systems applied to the health of low-income countries to foster ability of local institutions to introduce health information systems. In 2009, HIBA was part of the project that was recognized with a grant from Fogarty/NIH Informatics Training for Global Health (ITGH), with the objective of developing a training program in global health informatics, combining the existing strengths in the DHI and its collaboration with the Department of Medical Informatics and Clinical Epidemiology (DMICE) of Oregon Health & Science University (OHSU), to develop a new approach to clinical and translational research informatics and establish HIBA as an international leader in biomedical and academic research in health informatics.

In 2012, PAHO/WHO made an agreement with HIBA to get support on improving public health in the Region of the Americas. The proposal aimed to collaborate with PAHO in programs that were oriented to the development of health information systems, the use of standards and services terminology, and education in health informatics, since these objectives were aligned with the Action Plan for eHealth 2012–2017 that Member States endorsed for the Region at that time. After two years of collaboration, in 2014 HIBA was designated as a PAHO/WHO Collaborating Center, and in 2018 the collaboration was approved to continue until 2022.

In order to provide support on the implementation of the eHealth Strategy among Member States and the adoption and use of standards, HIBA has collaborated in:
- The design of the IS4H initiative;
- The development of the IS4H Maturity Model Assessment tool that helps to provide an in-depth assessment of the organizational capacity related to governance, data management, digital transformation, innovation, and knowledge management, which was approved by PAHO Directing Council in October 2019;
- Assessing countries in Electronic Health Records (EHR) implementation;
- Implementing the IS4H Maturity Model Assessment tool in countries.

5 Trust-based model

Figure 12. IDB–PAHO collaboration

IDB–PAHO IS4H Collaboration Framework
A collaborative framework to strengthen IS4H in the Americas

Coordinated actions
The execution of activities is based on the agreements established jointly and will respond to the road map agreed among the parties.

Monitoring and evaluation
A common monitoring and evaluation framework is used for settling, communicating, and analyzing short-term results in project implementation and for establishing a measurable value that demonstrates how effectively institutions or project team are achieving the national goals for having integrated national IS4H.

Convergence Collaboration

A trust-based model

Coherence
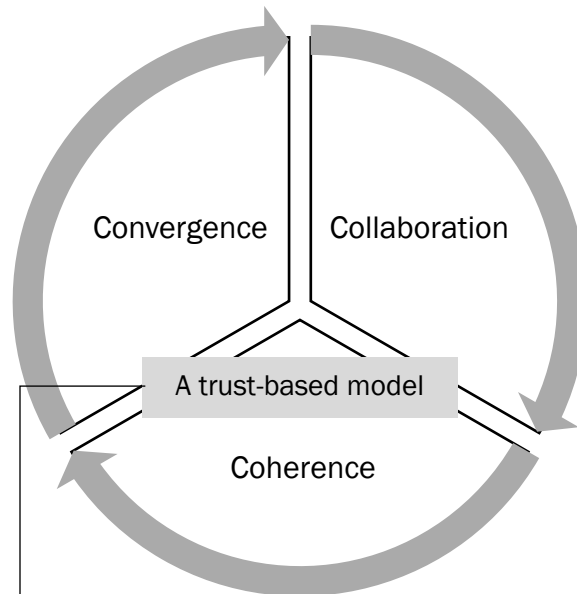
Shared vision
Universal access to health and universal health coverage in the region will be strengthened through interconnected and interoperable health-related information systems that assure effective and efficient access to quality data, strategic information, and ICT tools for decision-making and well-being.

Common framework
IDB and PAHO agreed to work together under a shared vision and common framework for strengthening national information systems and digital health initiatives.

Strategic planning
Strategic decisions are taken collectively and based on the needs of the countries. Priorities, investments, and actions are executed through a road map agreed among all the parties involved.

Technical alignment
Technical actions are focused on data management and information technologies; management and governance; innovation and performance; and knowledge management and sharing.

This framework of collaboration between the Inter-American Development Bank and the Pan American Health Organization is the result of a successful partnership conducted for collaborating with Jamaica, Paraguay, and Suriname.

54

PAHO–IDB One Stop Shop collaboration
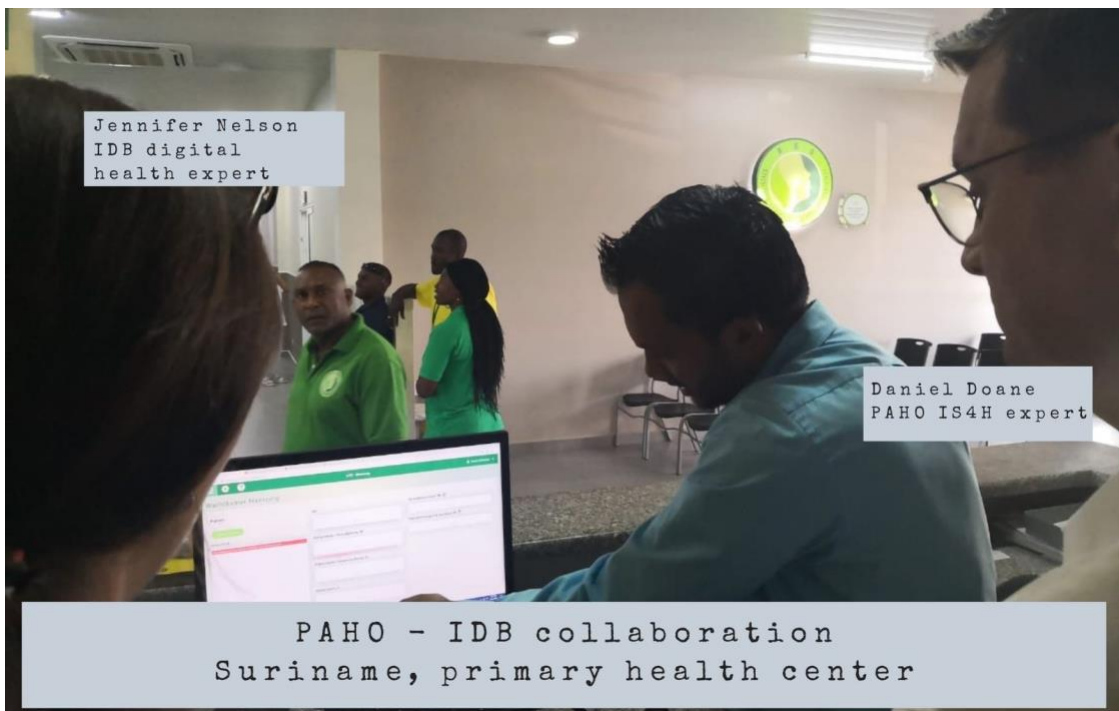
PAHO–IDB Suriname RGD collaboration

Figure 13. PAHO IS4H Call for Proposals summary

DEFINITION

IS4H is a mechanism for managing interoperable systems with open data that come from different sources and that are ethically used, through effective ICT tools, to generate strategic information for the benefit of public health.

VISION

Implementing universal access to health and universal health coverage in the Region will be strengthened through interconnected and interoperable health-related information systems that assure effective and efficient access to quality data, strategic information, and ICT tools for decision-making and well-being.

IS4H
PROJECT SUMMARY

CALL FOR PROPOSALS

- PAHO's contribution = US$ 2 million
- 172 projects presented by 40 countries from 3 subregions
- 37 awarded projects contributing directly to the SHAA2030 for the Americas
- US$ 40,000 awarded for each project

CRITERIA FOR PARTICIPATION

- Applications of non-state actors were considered according to PAHO rules and procedures such as FENSA.
- The proposal must be from public institutions at national or subnational levels from countries of the Americas. Public universities were also eligible to apply. Applications were required to include an official letter of support from the national-level Ministry of Health that supports the project.
- Proposals should be focused on strengthening preexisting health programs, strategies, or policies.

INTERPROGRAMMATIC WORK

Participation of multiple departments, specialized centers, collaborating centers, and country offices for project implementation and monitoring.

172 PROJECTS PRESENTED BY 40 COUNTRIES FROM 5 SUBREGIONS

CALL FOR PROPOSALS PROJECT SUBMISSION

Legend:
- North America
- Central America
- South America
- Caribbean
- Andean

Pie chart values: 10%, 10%, 37%, 24%, 19%

Bar chart:

Country	Value
Suriname	8
Montserrat	1
Guadeloupe	1
Grenada	1
Saint Vincent and the Grenadines	1
Antigua and Barbuda	1
Guyana	1
Venezuela	2
Virgin Islands (UK)	4
Jamaica	3
Ecuador	2
Curacao	6
Honduras	6
Dominican Republic	3
Cuba	6
Trinidad and Tobago	2
Guatemala	2
Costa Rica	5
Nicaragua	1
Bermuda	3
Panama	3
Chile	12
Bolivia	2
Colombia	24
Paraguay	2
Peru	4
Brazil	20
Mexico	17
Uruguay	2
Argentina	25
United States of America	1

Figure 14. Call for Proposals by subregion and country

Call for applications for project implementation in the Americas

37 awarded projects
27 countries and territories

EXAMPLES OF PROJECT IMPLEMENTATION ON CARIBBEAN COUNTRIES

Dominican Republic

Dominican Republic now has its Cancer Registry Unit

The Dominican Republic has inaugurated the first Cancer Registry unit, located in the Department of Health Sciences of the Autonomous University of Santo Domingo (UASD), which means an important advance in the health records systematization.

Guyana

Expansion of telemedicine in Guyana

Develop a community of practice for telemedicine to provide teaching and counselling around complex cases.

Suriname

Digital health technology in Suriname being used to manage patients in remote communities

In support of a PAHO/WHO grant from Information Systems for Health (IS4H), a new solar-powered, web-based patient management information system has been developed by Medical Mission (MM).

Suriname

Suriname develops a National Surveillance System for NCDs and Risk Factors

A project from the Bureau of Public Health (BOG) of the Suriname Ministry of Health, to identified variables to monitor five of the most relevant NCDs and their risk factors in the country, and to subsequently build a national NCDs database.

Antigua and Barbuda

Strengthened health information systems in Antigua and Barbuda are helping to combat HIV/AIDS, TB, and NCDs

Expand the electronic case-based information system to capture relevant data needed too monitor, analyze, report and disseminate for HIV, Tuberculosis and NCDs interventions.

British Virgin Islands

Technology made vector control more efficient in the BVI island of Tortola

This project deployed technology solutions to gather, track, and analyze critical health data to drive a better program on vector control.

Jamaica

The Caribbean looks to build capacity on the Open EHR reference model and develop specific core archetypes

Caribbean Member States and the Caribbean Public Health Agency (CARPHA) are troubled by the lack of a standard or set of standards for health data and especially for transforming the data from manual form into electronic form and achieving universal interoperability.

British Virgin Islands

On the British Virgin Islands, a Mobile Application for detailed investigation of critical CDs

This project aims to replace the manual process that hospitals, private and public clinics and other sentinel sites, are following to deliver reports to the Ministry of Health about cases of Measles/Rubella, HIV, TB and Polio.

Trinidad and Tobago

Self-diagnostic tool for the secondary prevention of Cardiovascular Diseases among Trinbagonians

The University of Trinidad and Tobago (UTT) is working on a project to provide evidence for preventative cardiovascular disease management using the web and mobile platforms.

St. Vincent and the Grenadines

St. Vincent and the Grenadines is digitizing the Medical Records Department at the Milton Cato Memorial Hospital

The Ministry of Health scanned and converted 30,000 paper health records into standardized electronic medical records to enable better provision of health services through equity, efficiency and effectiveness in coordination with patient care and participation

$ 40,000 DOLLARS WERE AWARDED TO EACH OF THE 10 WINNING PROJECTS FROM THE CARIBBEAN REGION
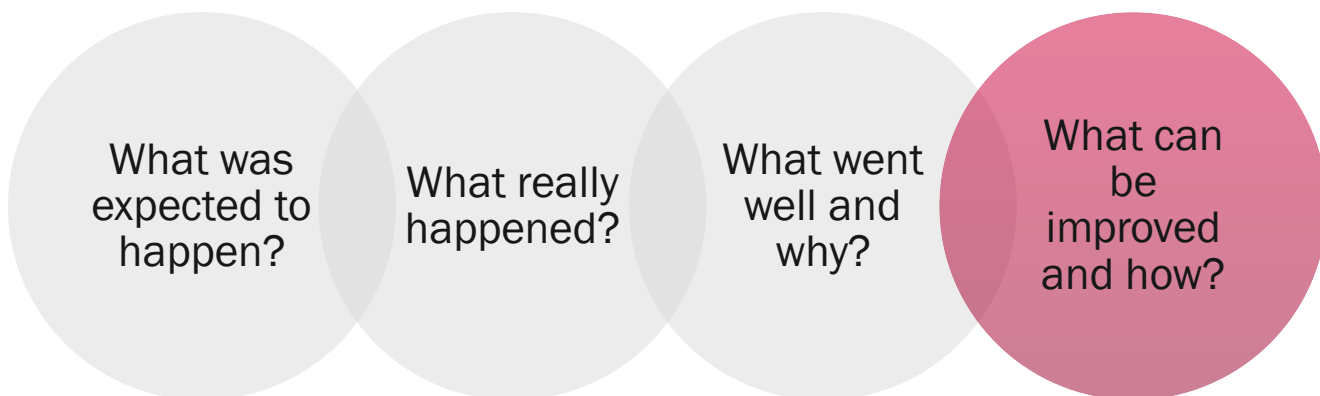
IS4H after action review model: "What can be improved and how?"

What can be improved and how?

What?	How?
Data management and information technologies	By adopting international standards for data management and interoperability
Management and governance	By adopting guiding principles, policies, and official governance mechanisms for data and information management
Knowledge management and sharing	By implementing a digital literacy program as an ongoing mechanism to strengthen human resources skills to work within the Information Society
Innovation	By determining the maturity of the countries' information systems for health as a first step in identifying gaps and needs

VI. Plan of Action for Strengthening Information Systems for Health 2019–2023

Figure 15. Convergence with the IS4H Regional Plan

Plan for the Americas

Strategic line of action 1: Information systems management and governance

Objective: Strengthen the management and governance mechanisms of information systems for health

Strategic line of action 2: Data management and information technologies

Objective: Promote the development of interconnected and interoperable information systems

Strategic line of action 3: Information and knowledge management

Objective: Promote the production and exchange of technical and scientific information to support the operation of information systems

Strategic line of action 4: Innovation, integration and convergence

Objective: Establish a network of institutions and experts to advise PAHO and the Member States on the introduction of innovative models for the development of information systems

Improve human resources training in all aspects of information systems for health

Approved at the 57th Directing Council, 71st Session of the Regional Committee of WHO for the Americas

VII.   Analysis of Preliminary Results

Figure 16 presents the general findings of the preliminary results of the maturity assessment conducted on the Caribbean countries. It shows that most countries are on levels 1 and 2, which means that some of them are starting to build awareness of the importance of strengthening IS4H and implementing best practices. However, we must continue working toward having standardized and continuous improvement to allow quality, informed decision-making, component integration, alignment and governance, permanent innovation, and high performance.

Figure 16. Results by strategic areas and levels

PERCENTAGE OF COUNTRIES BY STRATEGIC AREAS (SPLIT BY LEVELS)

	DMIT	MAGO	KMSH	INNO
■ Level 4 to 5	0%	0%	0%	0%
■ Level 3 to 4	0%	0%	0%	0%
■ Level 2 to 3	41%	34%	44%	28%
■ Level 1 to 2	59%	66%	66%	72%
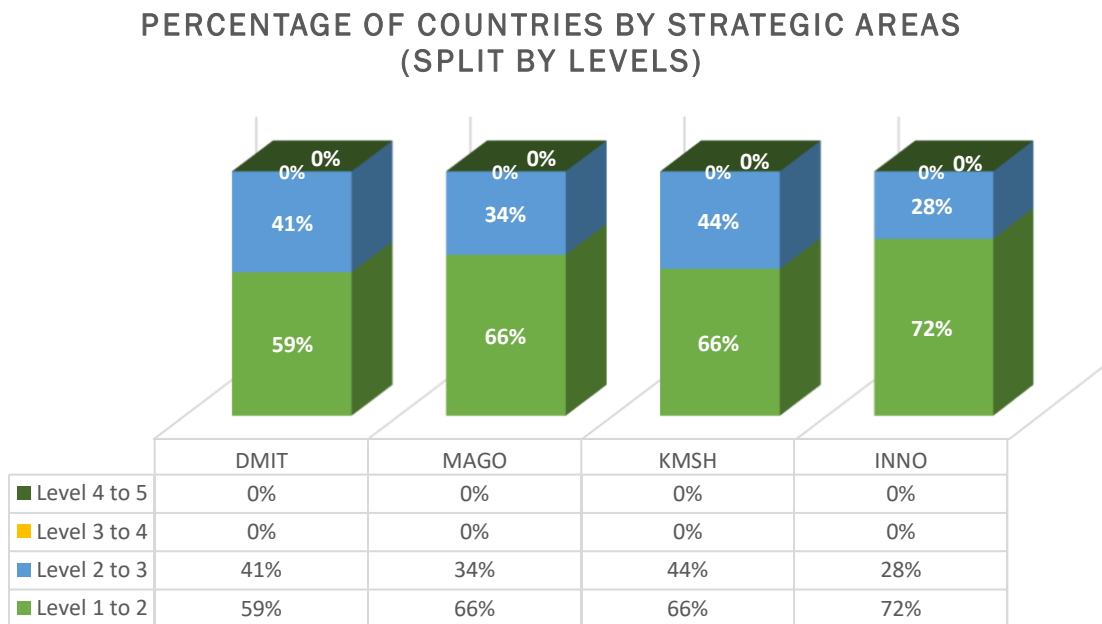
Data Management and Information Technologies (DMIT)

Data sources: According to data sources, 55% of countries sometimes obtain data from few sources and largely use paper-based methods, although a few simple electronic tools like spreadsheets may be used for some data sources (Figure 17). Data frequently have limited utility because of quality or disaggregation issues. Some indicator definitions are defined but not easily accessible or shared. Also, 44% of countries do not collect data and some data are available from external estimations (international organizations).
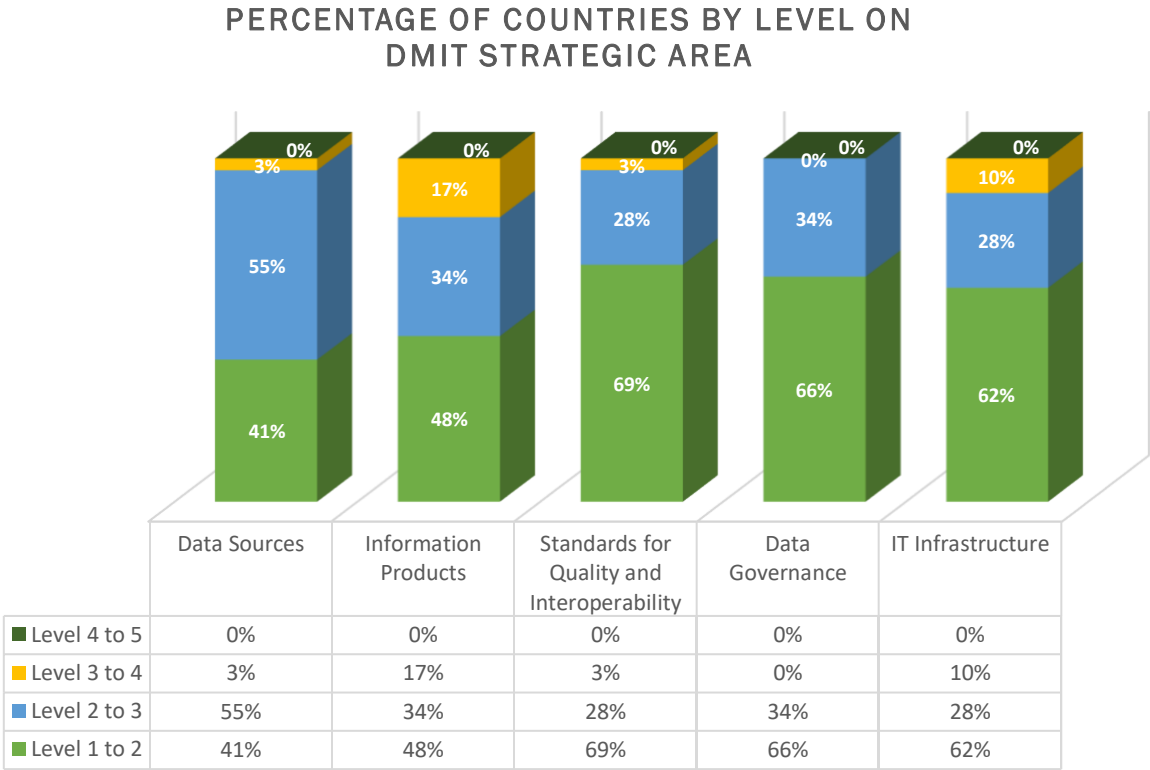
Information products: For 48% of countries, some information products are generated, but not routinely, and require intensive work and use of resources. Data are not readily shared across units, with stakeholders, or the public. Sharing data frequently requires permission from senior levels. Indicator generation largely relies on data from surveys, censuses, and other ad hoc studies.

Standards for quality and interoperability: 69% of the countries have few, if any, formal data standards enforced.

Data governance: For data governance, 66% of countries have few, if any, best practices for data management implemented. Data management is largely ad hoc. There are no formal mechanisms for decisions about data quality and standards.

IT infrastructure: In this case, 62% of countries do not have basic tools and technology (hardware, software, Internet connectivity) widely available.

Figure 17. Results by DMIT strategic area

PERCENTAGE OF COUNTRIES BY LEVEL ON DMIT STRATEGIC AREA

	Data Sources	Information Products	Standards for Quality and Interoperability	Data Governance	IT Infrastructure
■ Level 4 to 5	0%	0%	0%	0%	0%
■ Level 3 to 4	3%	17%	3%	0%	10%
■ Level 2 to 3	55%	34%	28%	34%	28%
■ Level 1 to 2	41%	48%	69%	66%	62%

Management and Governance (MAGO)

Leadership and coordination: For 66% of the countries, accountability and decision-making for IS4H components are distributed across different units within national health authorities, and investments and activities are not coordinated (Figure 18).

Strategic and operational plans: 55% of the countries do not have a current national health system strategic plan, and IS4H components are not reflected in operational plans.

Organizational structure and functions: Some IS4H functions are formally defined and performed, but there are significant gaps in the case of 79% of the countries.

Financial resources: For 52% of the countries, IS4H activities/resources are not formally identified in program/unit budgets; while it is sometimes possible to secure one-time financial resources for IS4H investments, required investments are difficult to sustain.

Human resources: 59% of the countries have little awareness about the human resources requirements to support IS4H.
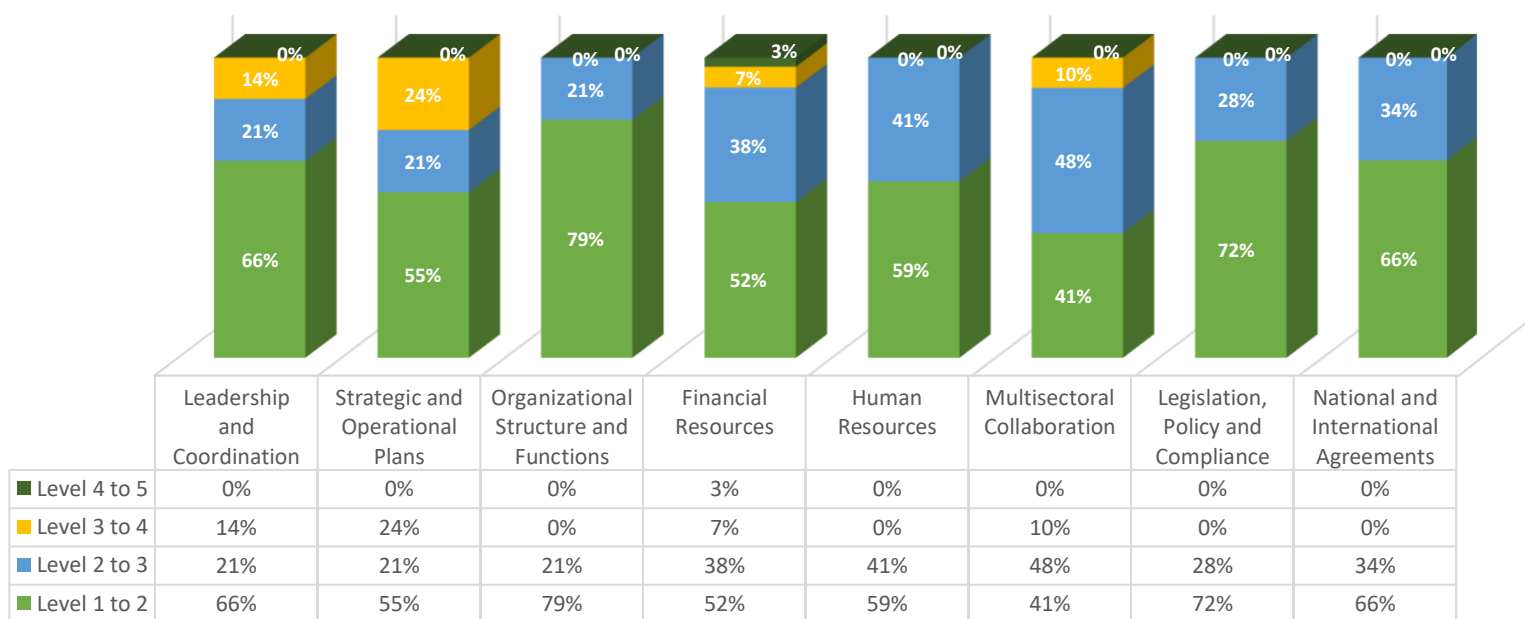
Multisectoral collaboration: There are some relationships with other public sector stakeholders for some specific information and service needs for 48% of the countries; however, engagement and coordination are ad hoc.

Legislation, policy, and compliance: 72% of the countries have some awareness about the gaps in legislation, policy, and compliance mechanisms that create barriers to the effective use of IS4H, but specific gaps and needs have not been formally documented.

National and international agreements: 66% of the countries have some awareness of data and reporting obligations under national and international agreements, but little capacity to meet obligations.

Figure 18. Results by MAGO strategic area

PERCENTAGE OF COUNTRIES BY LEVEL ON MAGO STRATEGIC AREA

	Leadership and Coordination	Strategic and Operational Plans	Organizational Structure and Functions	Financial Resources	Human Resources	Multisectoral Collaboration	Legislation, Policy and Compliance	National and International Agreements
■ Level 4 to 5	0%	0%	0%	3%	0%	0%	0%	0%
■ Level 3 to 4	14%	24%	0%	7%	0%	10%	0%	0%
■ Level 2 to 3	21%	21%	21%	38%	41%	48%	28%	34%
■ Level 1 to 2	66%	55%	79%	52%	59%	41%	72%	66%

Knowledge Management and Sharing (KMSH)

Knowledge processes: For 79% of the countries, knowledge sharing in the organization is ad hoc and organizational knowledge resides with key individuals rather than on repeatable processes documented in unit descriptions, job descriptions, policies, and SOPs (Figure 19).

Knowledge architecture: 69% of the countries consider knowledge management as a need, but there is limited knowledge and expertise in this matter. Although some basic knowledge management technologies and tools are available (physical library of internal resources, shared drives), they are not consistent or organized. Accessing organizational knowledge is time-consuming and difficult.

Strategic communications: 59% of the countries have routine public health communications on national priority issues (e.g., healthy lifestyle, vector control). Data and information typically flow only from source to the central level.
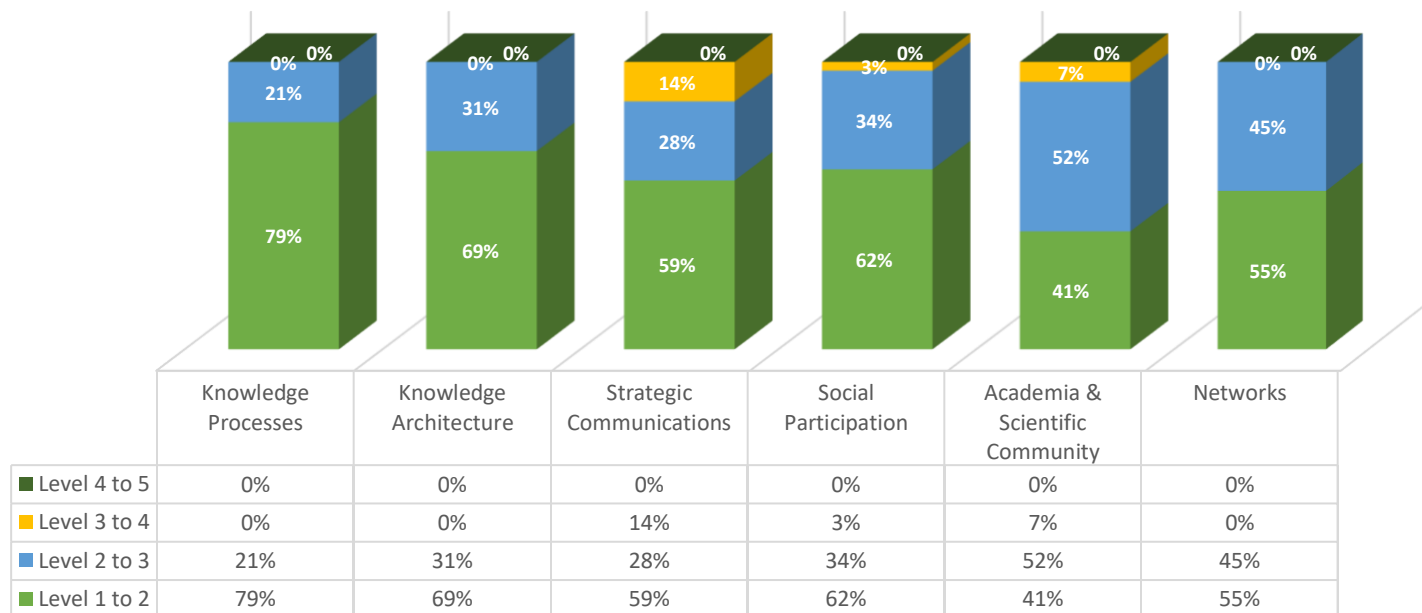
Social participation: Communication with civil society and the public is typically one-way (e.g., through websites and advertising) for 62% of the countries.

Academia and scientific community: In this case, 52% of the countries reflected that relations with academia are fluid, informal, and on demand.

Networks: Networks for knowledge sharing are typically ad hoc and informal for 55% of the countries.

Figure 19. Results by KMSH strategic area

PERCENTAGE OF COUNTRIES BY LEVEL ON KMSH STRATEGIC AREA

	Knowledge Processes	Knowledge Architecture	Strategic Communications	Social Participation	Academia & Scientific Community	Networks
Level 4 to 5	0%	0%	0%	0%	0%	0%
Level 3 to 4	0%	0%	14%	3%	7%	0%
Level 2 to 3	21%	31%	28%	34%	52%	45%
Level 1 to 2	79%	69%	59%	62%	41%	55%

Innovation (INNO)

Key concepts: 72% of countries' leadership and staff are not familiar with IS4H concepts (Figure 20).

Health analysis for decision-making: Around 52% of countries' data typically flows from sources to central decision-makers for health analysis, but little health information is available for decision-making at the local level. There is evidence that data and information are routinely used to support policy and management decision-making.

Tools: In 66% of the countries, basic tools are routinely used for health analysis (e.g., spreadsheets, MS Access).

Digital health: 52% of the countries' health care delivery and services are largely manual processes. Assessing digital technologies in health includes health information systems at national/subnational level to identify areas of improvement.
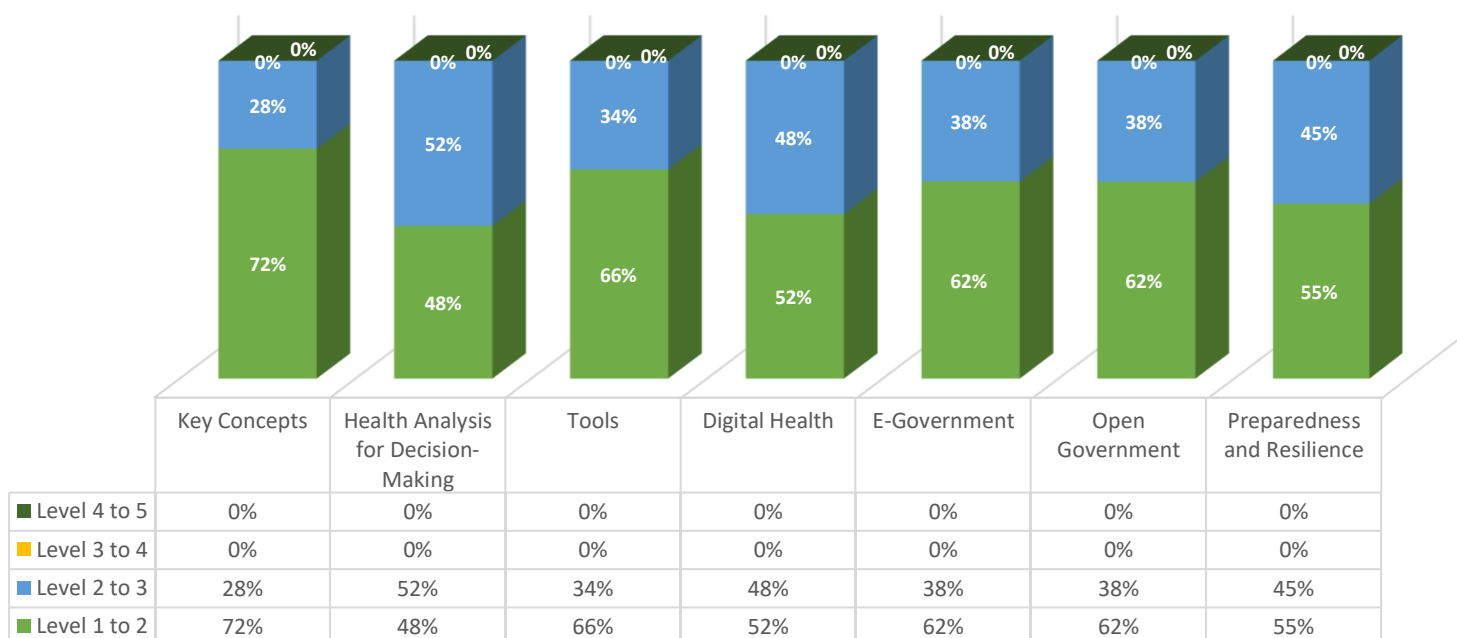
E-government: E-government is not on the national agenda of 62% countries.

Open government: The concepts of open government are new to 62% of countries' leadership.

Preparedness and resilience: 55% of the countries have manual and electronic health information systems that are vulnerable to failure in the event of a natural disaster or other catastrophic event. Limited data are available to support disaster response.

Figure 20. Results by INNO strategic area

PERCENTAGE OF COUNTRIES BY LEVEL ON INNO STRATEGIC AREA

	Key Concepts	Health Analysis for Decision-Making	Tools	Digital Health	E-Government	Open Government	Preparedness and Resilience
Level 4 to 5	0%	0%	0%	0%	0%	0%	0%
Level 3 to 4	0%	0%	0%	0%	0%	0%	0%
Level 2 to 3	28%	52%	34%	48%	38%	38%	45%
Level 1 to 2	72%	48%	66%	52%	62%	62%	55%

VIII.   IS4H Maturity Assessment Recommendations

The table below identifies potential targets for the Caribbean region and its stakeholders to advance from the current IS4H Maturity Level 2. The recommendations that follow are based on the current maturity level assessment and the activities and investment required to move to the target maturity level.

Strategic area	Maturity level	
	Actual	Target
Data Management and Information Technologies (DMIT)	2	3
Management and Governance (MAGO)	2	3
Knowledge Management and Sharing (KMSH)	2	3
Innovation (INNO)	2	3

Data Management and Information Technologies (DMIT)

Data sources (Level 2 to 3)	- Identify the information needs for key ministry of health (MOH) stakeholders (e.g., MOH leadership, program leads, planners) and other stakeholders (health facility administrators and clinicians) and - Include information reporting requirements (indicators, data sets) in service level agreements (e.g., hospital, NGOs). - Identify key health data sources from which it is critical to obtain routine data and information; this must include: - New data sources - Data sources randomly collected - Data sources routinely collected. - Document and mandate standards for indicator definitions and key data elements. - Establish a shared schedule for data collection according to technical and political needs. - Conduct an exercise to develop and implement a shared schedule for: - data collection according to technical and political needs - real-time availability of data to support decision-making.
Information products (Level 2 to 3)	- Develop the conceptual architecture for a national health information exchange platform: - Business architecture (roles, responsibilities, and functions) - Define the electronic collection method from all data sources identified - Strengthen data collection through automated process - Conduct data prioritization and mapping exercise. - Identify and prioritize information requirements (health indicators, health system performance indicators): - Include information reporting requirements (indicators, data sets) in service level agreements (e.g., hospital, NGOs). - Start the development of a data sharing framework (what information is shared? with whom? under which agreements or authority?): - Establish a data flow map to start sharing information products with stakeholders and health facilities.
Standards for quality and interoperability (Level 1 to 2)	Adopt a data quality framework.

Data governance **(Level 1 to 2)**	• Start the development of a data governance framework (see IS4H Governance Framework): o Map present and future data flows. • Start the development of a national data management policy.
IT infrastructure **(Level 1 to 2)**	• Conduct an ICT in health readiness assessment for the MOH and the health facilities of key delivery partners. • Initiate a rapid high-level due diligence assessment of the national health information system (with regions) to determine a possible integrated implementation.

Management and Governance (MAGO)

Leadership and coordination
(Level 1 to 2)
	• Start the establishment of a formal multisectoral IS4H Strategic Governance and Technical Advisory Structure:
	   o Identify the key individual national health authorities (MOH, regional health authorities, health facilities)
	   o Identify the key decisions that need to be coordinated by the IS4H Strategic Governance and Technical Advisory Structure.

Strategic and operational plans (Level 1 to 2)	• Use the recommendation from this assessment to develop a national IS4H plan of action with short- to medium-term costing and resource requirements:
	   o Create road map and budget to achieve IS4H future state
	   o Identify national health system strategic plans in which IS4H could be addressed
	   o Identify individual units/departments/facilities' operational plans in which to include components of IS4H
	   o Develop a road map for addressing IS4H into national and individual operational and strategic plans.

Organizational structure and functions
(Level 1 to 2)
	• Start a process for rationalizing accountability, roles, and responsibilities for IS4H functions:
	   o Identify actual IS4H-related functions through the PAHO IS4H Functional Assessment Tool and Methodology
	   o Identify critical needs/gaps on IS4H implementation-related functions
	   o Develop a road map for capacity-building/realignment to rationalize functions and decision-making
	   o Appoint IS4H Program Lead and short-term project team.
	• Define organizational functions for:
	   o Information Technology Management
	   o Information Management and Analysis
	   o Health Informatics
	   o Knowledge and Performance Management
	   o Conduct IS4H Functional Assessment in order to identify essential IS4H functions that must be performed in the country.
	• Invest in technical support for the development and implementation of a change management strategy in support of IS4H capacity-building.

Financial resources **(Level 1 to 2)**	• Identify the IS4H activities from individual unit/program that need to be incorporated in annual budgets of national health authorities. • Identify the financial resources requirements to effectively sustain IS4H with the correspondent operational budget, where to be included.
	• Develop a medium- to long-term organizational structure and human resources strategy:

Human resources **(Level 2 to 3)**	○ Identify/document human resource constraints for planning, implementing, and managing IS4H through applying the PAHO IS4H Functional Assessment Methodology ○ Develop a road map for addressing IS4H human resources needs. • Establish with adequate stakeholders a strategic plan for ensuring the existence of academic undergraduate education capacity in country. • Add change management and project management skills/functions to IS4H implementation team (short-term) and program team (longer-term).
Multisectoral collaboration **(Level 2 to 3)**	• Start a process of enabling multisectoral collaboration for IS4H: ○ Identify other public sector stakeholders that are key for specific health information and service needs ○ Develop engagement activities to enable collaboration among sectors ○ Develop a road map for multisectoral collaboration establishment.
Legislation policy and compliance **(Level 1 to 2)**	• Conduct analysis and remediate gaps in legal/regulatory framework focusing on: ○ Protection of personal health information (privacy) ○ Mandatory reportable diseases and conditions.
National and international agreements **(Level 1 to 2)**	• Create a health agreements commission to start the process of accomplishment of national and international health agreements: ○ Identify national and international health agreements actually in place ○ Identify national and international health agreements that are not being addressed ○ Identify individual unit/program that should be involved with the in-place and future agreements ○ Develop a road map for addressing in-place and future agreement needs.

Knowledge Management and Sharing (KMSH)

Knowledge processes **(Level 1 to 2)**	• Implement basic knowledge-management mechanisms within MOH to initiate knowledge sharing (e.g., lessons learned, communities of practice): ○ Identify, based on knowledge-management needs, which existent methodologies would be integrated for knowledge management and sharing.
Knowledge architecture **(Level 1 to 2)**	• Start implementing organizational learning culture: ○ Identify individual unit/program that could be knowledge management champions in the organization ○ Develop a road map to be a learning organization.
Networks **(Level 1 to 2)**	• Identify and participate in regional and subregional IS4H communities of practice (e.g., RELACSIS, IS4H Technical Advisory Group).
Academia/scientific community **(Level 1 to 2)**	• Identify and establish a road map for the establishment of formal national, regional, and subregional relationships with academic/research institutions: ○ Identify which academia and research health institutions are in country ○ Select and establish contact with those academia and research health institutions with which relations should benefit public health issues ○ Discuss collaboration issues with academia and research health institutions.
Strategic communications **(Level 1 to 2)**	• Strengthen the use of communication mechanisms within MOH to begin relations with public and stakeholders (dynamic website, social networks). • Start the development of a communication strategy.
Social participation **(Level 1 to 2)**	• Start a process for social engagements in public health through social media and formal roles on governance bodies and advisory groups.

Innovation (INNO)

Key concepts (Level 1 to 2)	• Develop a capacity-building road map for staff knowledge strengthening on IS4H knowledge. • Develop a training road map for staff digital literacy.

Tools (Level 1 to 2)	• Run Maturity Model on the national Electronic Health Records (EHR) system: country and maturity level report with recommendations.
	• Identify health analysis tools requirements to enable data analysis and the development of information products/key indicators (see DMIT recommendations above):
	    ○ Analyze existing health analysis tools in place
	    ○ Identify gaps in health analysis
	    ○ Identify learning opportunities.

Health analysis for decision-making (Level 1 to 2)	• Start the implementation of a health analysis for decision-making road map/strategy
	    ○ Identify data that need to be available for reports and health status outcomes generation
	    ○ Identify health analysis focus needs for decision-making
	    ○ Map data flows needed to support decision-making
	    ○ Map data availability needs.

Digital health (Level 1 to 2)	• Conduct a Digital Health assessment, to identify:
	    ○ Tools implementation needs
	    ○ Digital Health road map considering focus movements:
	        ▪ digitizing manual processes
	        ▪ improving operational efficiencies
	        ▪ transforming models of care
	        ▪ improving patient safety and quality of care
	        ▪ supporting population health approaches
	        ▪ facilitating targeted communications to individuals
	        ▪ stimulating demand for services/access to health information
	        ▪ improving decision support mechanisms /telemedicine
	        ▪ enabling population health management
	        ▪ rapid response to disease incidents and public health emergencies.

e-Government (Level 1 to 2)	• Ensure health sector is fully engaged in e-Government planning and initiatives.
Open government (Level 1 to 2)	• Sensitize stakeholders on the benefits of open data.

Preparedness and resilience (Level 1 to 2)	• Create a preparedness commission to improve response and resilience actions:
	    ○ Identify multisectoral health stakeholders
	    ○ Identify basic approaches for critical areas to ensure business continuity in the case of disaster
	    ○ Identify key datasets to be available to support disaster response
	    ○ Develop a road map to ensure a growing improvement in the area.

IX. Annexes

Annex 1. Plan of Action for Strengthening Information Systems for Health 2019–2023
Available [here](#)

Annex 2. IS4H Portal
Available from: https://www.paho.org/ish

Annex 3. Framework
Available from: https://www.paho.org/ish/index.php/en/is4h-basics

Annex 4. Toolkit
Available from: https://www.paho.org/ish/index.php/en/toolkit

Annex 5. Maturity Assessment Tool
Available from: https://www.paho.org/ish/index.php/en/about-mm

Annex 6. Readiness Assessment Tool for Telemedicine
Available from: https://www.paho.org/ish/index.php/en/telemedicine

Annex 7. Caribbean High-Level Meeting Report
Available [here](#)

Annex 8. Central America High-Level Meeting Report
Available [here](#)

Annex 9. South America High-Level Meeting Report
Available [here](#)

This publication reviews the work of the Pan American Health Organization (PAHO) with the countries of the Caribbean subregion and assesses the lessons learned to extend successful strategies and avoid obstacles. It also illustrates the shared achievements of the Caribbean subregion in advancing information systems for health (IS4H) and lights the way ahead on this shared journey. To identify key lessons for the future, this after-action review discusses four questions about the collective work done: What was expected to happen? What really happened? What went well and why? What can be improved and how?

In the past four years, PAHO has provided support for IS4H strengthening through actions and strategies in collaboration with countries under the IS4H strategic framework. The IS4H initiative was created with the vision of implementing universal access to health and universal health coverage in the Region through the strengthening of interconnected and interoperable information systems that assure effective and efficient access to quality data, strategic information, and ICT tools for decision-making and well-being.

The vision and leadership of the Member States in the Caribbean have contributed to the strengthening of IS4H for the entire Region of the Americas. PAHO remains keenly aware of the importance of strong national and regional information systems for health in reaching the targets of the Sustainable Health Agenda for the Americas 2018–2030.

PAHO

PAHO SALUTE NOVI MUNDI

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

www.paho.org/ish