

168th SESSION OF THE EXECUTIVE COMMITTEE

Virtual Session, 21-25 June 2021

Provisional Agenda Item 4.4

CE168/11
6 May 2021
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POLICY ON THE APPLICATION OF DATA SCIENCE IN PUBLIC HEALTH USING ARTIFICIAL INTELLIGENCE AND OTHER EMERGING TECHNOLOGIES

Introduction

1. One of the core functions of the Pan American Health Organization (PAHO) from its inception has been to collect, analyze, and distribute information relating to the protection and improvement of public health in Member States in the Americas (1). In alignment with this core function, the Pan American Sanitary Bureau (PASB) seeks to provide technical support and leadership to PAHO Member States on data, information, knowledge management and use related to the “prevention of diseases; the preservation, promotion, and restoration of physical and mental health; and the advancement of measures and sociomedical facilities for the prevention and treatment of physical and mental diseases” (2). Since 1954, Member States have formally agreed to compile, analyze, and share technical data from all countries and territories of the Americas (3).
 2. Considering the exponential growth in data generation, the adoption of public policies for the implementation of approaches to data science that enable interoperable data sharing in public health is a critical component of the digital transformation process. Such policies create opportunities to strengthen and scale up the use of emerging technologies within formal decision-making processes that depend on reliable, timely data. Decisions and actions based on high-quality, linkable, big and disaggregated data by sociodemographic factors and other key social determinants of health have great potential to improve public policy development, leading to cost-effective approaches for supporting patient care and public health planning.
 3. A policy for the application of data science in public health will strengthen the Region’s capabilities to conduct analyses of data related to public health drawn from various sources, including traditional, non-traditional, and unstructured sources. Data science involves computational approaches which incorporate a very wide range of processes, from statistical methods to extract knowledge from big data, modeling and forecasting, including the ingestion of data and approaches like machine learning (ML) and
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artificial intelligence (AI).¹ Rigorous application of data science methodologies can contribute to the availability of more timely, evidence-based information that can enable a better understanding of complex public health challenges.

4. The purpose of this policy is to provide strategic and technical guidance to Member States for the successful development and implementation of data science policies and initiatives that can be utilized in public health through the application of emerging technologies to gather and organize extensive data and information (e.g., health, sociodemographic, medical, and economic data) in a coherent structure. Data science policies and initiatives create an enabling environment to support general and predictive analyses for modeling and forecasting, identifying trends in areas of public health, as well as to identify practical solutions for improving health outcomes.

Background

5. Goal 7 of the Sustainable Health Agenda for the Americas 2018-2030 aims to improve information systems for health (IS4H), which are essential to improve data-driven health policy- and decision-making, measure and monitor health indicators and inequalities, and track progress toward the achievement of universal access to health and universal health coverage. Key commitments made by Member States include improvement of data management and governance, adoption of information and communication technologies in public health, and strengthening of national capacity for building a robust and sustainable infrastructure for data management and analysis (4). Adopting a data science policy and making effective use of the application of emerging technologies in public health are critical to advancing methods and processes in the effort to continuously track and assess progress toward regional targets and goals.

6. Over the last decade, the Americas Region has made important commitments and significant progress toward improving health data management, including the adoption of new technologies and strengthening of information systems for health to enhance interconnectivity and interoperability (5-8).

7. At the end of 2014, the United Nations adopted the concept of the data revolution as an explosion in the volume of data; in the speed with which it is produced, used, and disseminated; in the number of producers, users, and intermediaries; in new forms of origin, such as mobile technologies and the “Internet of things”; and in citizen-generated data and data from other sources (9). Although new technologies open up the possibility for health analyses to draw upon a plethora of data and information that can provide greater insight into complex public health challenges, they need to be supported by robust and clear public policies and priority actions that are based on solid ethical principles for the appropriate use of open data (9).

¹ AI refers to the theory and development of computer systems able to perform tasks normally requiring human intelligence, in order to deliver solutions that can automate routine tasks, draw data-based insights or augment human activities. Additional information available at: <https://www.hhs.gov/sites/default/files/final-hhs-ai-strategy.pdf>

8. In 2018, the heads of state and government, ministers, and other country representatives who participated in the Global Conference on Primary Health Care: From Alma-Ata towards Universal Health Coverage and the Sustainable Development Goals in Astana, Kazakhstan, affirmed that the success of primary health care would be driven in part by technologies and improved health information systems. They agreed to work toward appropriately disaggregated, high-quality data to improve information continuity, disease surveillance and control, transparency, accountability, and monitoring of health system performance, using a variety of technologies to improve access to health care, enrich health service delivery, improve the quality of service and patient safety, and increase the efficiency and coordination of care (10).

9. Convened by PAHO's Director, Caribbean health leaders came together in Kingston, Jamaica, in November 2016 to co-create a vision, a subregional plan, and a strategic framework for advancing information systems for health in the Americas (11). Based on the experience of the discussions and collaboration with the Caribbean countries, subsequent high-level meetings were held in 2017 with the Central American countries and in 2018 with the South American countries, followed by regional high-level discussions leading to the approval of the Plan of Action for the Strengthening of IS4H by the 57th PAHO Directing Council in October 2019 (5). Additionally, the Fourth Meeting of the Council of Ministers of the Organization of Eastern Caribbean States endorsed a resolution on the same topic.

10. In February 2021, during the Information Systems for Health Conference "From the Evolution of Information Systems for Health to the Digital Transformation of the Health Sector," representatives of the countries of the Americas engaged in dialogue and reflection on their experiences with their information systems and digital health during the last four years and in particular during the COVID-19 pandemic. During three virtual sessions, they reflected on the need for timely, accurate, high-quality, disaggregated data and critical information and knowledge on health to inform decision- and policy-making, program implementation, monitoring, and evaluation in the context of countries' progress toward universal access to health and universal health coverage (8).

11. During the development of the Strategic Plan of the Pan American Health Organization 2020-2025 (12), Member States and PASB recognized the importance of setting standards for documenting primary and secondary data sources for impact indicators, as defined in the compendium of impact indicators (13), as well as ensuring wide availability and access to regional estimates for the impact indicators. The regional impact indicators have evolved over time to include greater data disaggregation, which enables health equity measurement within the Region and the various subregions as progress toward regional targets is tracked over time.

Situation Analysis

12. The COVID-19 pandemic has highlighted the importance of timely and secure access to critical data and accurate and reliable information, but another of the lessons learned from the pandemic has been the critical and urgent need for digitalization of the health sector. The pandemic has pointed out the effects on country response within the Region when registered health statistics (e.g., deaths, health service delivery data, etc.) are produced in a manner that is incomplete, non-interoperable, not machine processable, and/or delayed. Many countries face challenges with their data management systems, such as knowledge management and data and report dissemination, insufficient data quality, and data that are unavailable or inaccessible.

13. The results of the information systems maturity analysis conducted in the 49 countries and territories of the Region under the IS4H initiative framework show that there are great opportunities for better health data management, but also challenges in relation to governance and regulatory issues, critical levels of disaggregation, cybersecurity, and ethical use of information and data, in particular when using artificial intelligence to process open datasets (8).

14. The countries of the Region lack sustainable integrated and interoperable information systems for health that allow them to capture, process, and share open and disaggregated data in real time. Additionally, integrating data on sociodemographic, economic, political and geographic elements with health information into intelligence analysis remains a challenge. As such information is not uniformly available or linked across information systems, both within the health sector and in other sectors that have an impact on population health (e.g., agriculture, economy, education, commerce, sanitation, etc.) Access to this information is essential for public health insight, and digitized systems can provide greater opportunities for interoperability.

15. Likewise, the health sector is lacking in interoperability health data standards, in normative instruments and in human resources with the data science competencies required to achieve an improved public health response and to deliver more equitable care to the population. Normative instruments to ensure that data and information flow seamlessly and securely where and when necessary are also missing. Additionally, there is a lag in terms of capabilities, not only for the management of information and data integration tools, but also for conducting analysis, interpretation of results and communication of risks and products of health intelligence.

16. Considering PAHO Member States' awareness and commitments as outlined in the mandates for strengthening information systems for health, digital health, vital statistics, critical data management, and core indicators, and considering that the United Nations has embraced these concepts since 2014, this document urges countries and territories to adopt comprehensive policies on data science in public health with a view to developing the requisite foundational basis, knowledge, and capacity to capture, process, secure, use, and share timely, open, disaggregated data and strategic information in a sustainable and ethical

manner and to harness the potential of artificial intelligence and other emerging technologies (5).

17. This policy presents an opportunity to apply data science techniques to the field of public health. It will support innovation in managing routine health and surveillance information that is based on open, high-quality, disaggregated data, produced and monitored in real time through cost-effective digital solutions. Without these advancements, timely access to critical data and reliable health information will remain limited, which will have a negative impact on the ability of health authorities to monitor future health patterns and trends and to plan and develop timely and appropriate responses. It is necessary to establish metrics and design methodologies for the construction of indicators to measure changes at least in these three domains: the determinants of health, the health system and the health status of the population.

Proposal

18. This policy is established to provide strategic and technical guidance to Member States for the development and implementation of data science policies and initiatives that can be utilized in public health through the adoption of emerging technologies to assess extensive health, sociodemographic, medical, and economic data, including unstructured data and information, and to provide insight into more effective modeling and forecasting exercises, data-driven policy- and decision-making and interventions, identification of health barriers and catalysts, and practical solutions for improving health outcomes. It will also advance the effort to establish internationally agreed standards for health data management and build capacity in the Region to create an enabling environment for improving health analysis and making use of big data analytics in policy- and decision-making processes.

19. The application of this policy and its contextualization in line with national health priorities should be guided by the following principles: people-centeredness, ethical and human rights grounding, transparency, human data protection and privacy, scientific integrity, widely adopted data-related standards, open and shareable algorithms, and non-discriminatory and human-controlled technology. Member States should consider the adoption of international standards, technical guidelines, and best practices for policies related to the application of AI for data science in public health. In addition, a national policy should help mitigate issues of introducing bias, privacy or confidentiality concerns, particularly for disadvantaged, marginalized, and underrepresented groups.

Priority Actions

20. *Regulatory frameworks.* Regulatory frameworks must try to achieve a fair balance in the relationships between organizations and individuals through ethical parameters that may include the right to be informed, the right to access, and the right to be forgotten (14), among others. It is also fully recognized that the regional regulatory environment is changing fast, with some countries implementing the recent European Union General Data Protection Regulation (GDPR) or GDPR-like data protection legislation. Issues such as

data protection, the dividing line between what is public and what is private, who owns personal data, what rights can be assigned through consent, and responsibility for the loss or improper use of the data (e.g., for purposes other than public health, such as commercial or marketing purposes) must be considered, as well as how to ensure that data sharing for biomedical research can continue to power scientific discovery, where significant protections are in place for individuals but where GDPR, as an unintended consequence, has delayed and prevented biomedical research collaborations with international partners.

21. *Data governance.* Starting from the premise that health data governance can support and strengthen all the steps of the data cycle—acquisition, storage, processing, protection, disposal (when needed), and data sharing—it is essential for countries to undertake efforts to support data management maturity assessments. It is important to review policies on health data governance and related issues; identify health data management processes, including an inventory of technical standards for the adoption of technologies and/or technical guidelines related to health data management; and conduct a mapping of information flows for health data management to ensure effective and efficient data management processes for better-informed decisions and evidence-based policy-making at various levels of government (15).

22. *Data disaggregation.* Data disaggregation² by sociodemographic variables such as sex, geo-political area, ethnicity, education, and other social determinants of health at all levels provides information that enables comprehensive analyses to address health inequalities and identify barriers to and drivers of positive health outcomes in order to more effectively advance the effort to leave no one behind. Special attention must be given to data standardization and weighting within algorithms as data are generated, mined, validated, archived, and utilized. Policies that provide for data disaggregation at all levels will support the development of inclusive and effective approaches to improve the quality, availability, accessibility, and use of data to inform decision-making processes.

23. *Ethical use of data.* Data management frameworks should be adapted to sociocultural contexts and public health priorities in relation to, where applicable, data ownership, privacy, anonymity, consent, data validity, public benefit, autonomy and transparency, among other ethical considerations. In the light of both new and traditional ethical concerns related to data, it is essential to develop a common agenda and ethical framework in order to manage new developments, including an ethics infrastructure, that enables collaboration among key stakeholders (16).

24. *Ethical use of artificial intelligence and other emerging technologies.* The appearance of artificial intelligence with new machine learning techniques and the use of algorithms to carry out activities and generate new knowledge have given rise to a set of new ethical and legal concerns related to the potential damage that can be caused by data

² Disaggregated data refers to numerical or non-numerical information that has been (1) collected from multiple sources and/or on multiple measures, variables, or individuals; (2) compiled into aggregate data—i.e., summaries of data—typically for the purposes of public reporting or statistical analysis; and then (3) broken down in component parts or smaller units of data.

misuse, privacy and security breaches (especially when sensitive data are involved), selection bias, perpetuation of inequities and lack of transparency in data collection, research, and dissemination. To promote the ethical use of ML, by encouraging the use of unbiased and representative data for training, testing and validation, and by promoting transparency and explainability is a key element for algorithm design and implementation. Ethical analyses must be developed for the use of both data, including big data (BD), and emerging technologies such as machine learning, the Internet of things (IoT), and cloud computing (CC), specifically for public health purposes. These analyses must include proposals for preventing, minimizing, and managing identified risks.

25. *Emerging technologies.* Technical guidelines and international standards must be adopted, adapted, or developed to apply ML/AI algorithms, tools, and systems in order to extract knowledge and intelligence from structured and unstructured data in public health. Rules and normative instruments for the adoption of open standards, governance, accountability and transparency structures must be developed for data analytics infrastructure that employs machine learning and big data analytics techniques in policy- and decision-making. Capacities must be developed to enable the use of data science and emerging technologies in research, innovation, public policy, and ethical analysis in public health. The computer resources infrastructure on which these technologies rely must also be put in place.

26. *Big data analytics.* The extraction of knowledge from large datasets, supported by AI solutions, will significantly improve the analysis of large amounts of data (structured and unstructured) to uncover hidden patterns, correlations, and other insights. The analysis of large volumes of data will allow authorities and workers in the health sector to identify, analyze, and predict people's social behavior.

27. *Renewed health analysis.* National public health priorities should promote the use of ML, BD, IoT, and CC as innovative tools and methods for compiling public health intelligence and improving and streamlining data processes for descriptive, prospective, and predictive health-related analyses to generate information for decision-making. In addition, priorities should include strategies and actions that allow the generation of the necessary data, information, knowledge and intelligence for the timely prevention, response and recovery from health challenges and in support of evidence base decision-making.

Promotion of Policy Action and Stewardship

28. In order to ensure an effective policy implementation process, it is essential to implement substantive interventions that employ an interdisciplinary and multi-stakeholder approach to the adoption of emerging technologies and the management of the entire data lifecycle. These interventions should include the following: *a)* identification of data gaps, including critical levels of variables for disaggregation; *b)* adoption of international standards for data processing, with an emphasis on interoperability, security, ethical use, and disaggregated data management; *c)* implementation of data management frameworks

that are supported by emerging and modern technologies; and *d*) digital literacy programs aimed at ensuring appropriate, ethical, and secure use of open datasets.

29. A critical factor for success is the implementation of communications and change management strategies for promoting the benefits of data science in the context of public health. It must be made clear that the use of data science techniques and methods in public health will add value to traditional epidemiological surveillance and health analysis and afford an opportunity to make the best use of data, information, knowledge, emerging technologies, and know-how available to tackle public health challenges in a dynamic and potentially open environment, in particular when confronting public health emergencies of international concern.

30. Identifying champions of data science use for public health and disseminating success stories on how data science has been applied to meet challenges in public health will help promote the purpose and utility of the policy. Highlighting success stories that demonstrate harmonized collaboration between data management systems and data science will provide a holistic perspective on how to address public health data challenges.

31. An analysis of information from the usage of existing data science tools, such as dashboards, data visualizations, and big data analytics, can provide insight into how end users in public health use information, which will further inform data science efforts and identify areas that are lacking.

Strategic Partnerships for Open and Secure Data Sharing and AI Adoption

32. In order to incorporate data science into public health, it will be important to build partnerships through a network of institutional and individual experts throughout the Region, with special attention to subregions. Initial action must involve existing data science specialists and centers of excellence throughout the Region and create a forum for interdisciplinary engagement in all aspects of public health that are directly and indirectly associated with the health sector.

33. This area of intervention seeks to promote effective, ethically grounded, and secure open datasets at all levels in accordance with international standards, national and local rules and regulations, and robust criteria for the production of public health databases and dashboards with quality data.

Capacity Development at all Levels

34. Efforts should be made to incorporate data science at all levels in order to effectively implement data-driven decisions and policies. Special emphasis should be placed on accelerating the adoption of technical guidance for the use of open AI-based algorithms, blockchain technology, and systems to extract knowledge and intelligence from structured and unstructured data in public health.

35. A capacity assessment and mapping should be conducted in countries within the health and other sectors, academic institutions, and the private sector to identify existing data science expertise and immediate potential opportunities to build data science capacities and create networks. In addition, an effort should be made to promote the adoption of an interprogrammatic and intersectoral approach to the design of technical and professional data science for public health curricula.

36. Gender balance and representation of indigenous peoples, Afrodescendants, and members of other ethnic groups, based on national contexts, should always be considered in order to ensure ethical, equitable, and culturally appropriate use of data science techniques and methods for policy- and decision-making, without leaving anyone behind.

Monitoring and Evaluation

37. This policy on the application of data science in public health using artificial intelligence and other emerging technologies will contribute to the achievement of the objectives of the PAHO Strategic Plan 2020-2025 and the Sustainable Health Agenda for the Americas 2018-2030. The monitoring and evaluation of this policy will be aligned with the Organization's results-based management framework and with its performance monitoring and evaluation processes. After five years, in 2026, an evaluation will be conducted to identify strengths and weaknesses in the policy's overall execution and factors contributing to its successes and failures. A progress report with the results of the evaluation will be presented to the Governing Bodies.

Action by the Executive Committee

38. The Executive Committee is invited to review the information presented in this document, provide any comments it deems pertinent, and consider approving the proposed resolution presented in Annex A.

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168th SESSION OF THE EXECUTIVE COMMITTEE

Virtual Session, 21-25 June 2021

Provisional Agenda Item 4.4

CE168/11
Annex A
Original: English

PROPOSED RESOLUTION

POLICY ON THE APPLICATION OF DATA SCIENCE IN PUBLIC HEALTH USING ARTIFICIAL INTELLIGENCE AND OTHER EMERGING TECHNOLOGIES

THE 168TH SESSION OF THE EXECUTIVE COMMITTEE,

(PP) Having considered the *Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies* (Document CE168/11),

RESOLVES:

(OP)1. To recommend that the 59th Directing Council adopt a resolution in the following lines:

POLICY ON THE APPLICATION OF DATA SCIENCE IN PUBLIC HEALTH USING ARTIFICIAL INTELLIGENCE AND OTHER EMERGING TECHNOLOGIES

THE 59TH DIRECTING COUNCIL,

(PP1) Having considered the *Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies* (Document CD59/ __);

(PP2) Bearing in mind Member States' commitments with regard to the strengthening of information systems and data-driven solutions for improving health analysis and forecasting;

(PP3) Recalling the principles enshrined in the report commissioned by the United Nations Secretary-General on mobilizing the data revolution for sustainable development;

(PP4) Considering the need to accelerate progress towards the adoption of emerging technologies in all levels of the health sector;

(PP5) Observing that Member States in the Region of the Americas have officially affirmed their commitment to health data management with the highest level of quality since 1954;

(PP6) Recognizing the cross-cutting nature of this policy and its complementarity with the objectives of the PAHO Strategic Plan 2020-2025 and the Sustainable Health Agenda for the Americas 2018-2023,

RESOLVES:

(OP)1. To approve the Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies (Document CD59/___);

(OP)2. To urge Member States, in accordance with their national contexts, needs, vulnerabilities, and priorities, to:

- a) Strengthen institutional and health worker capacity at all levels to implement data science tools and methods, supporting, among other things, the appropriate management of big data, information, and knowledge through the application of emerging technologies to improve and streamline data processes for descriptive, prescriptive, and predictive health-related analyses to inform decision-making processes;
- b) Increase, promote, and support the participation of Indigenous peoples, Afro-descendants, and members of other ethnic groups, in the development and implementation of data science policies, considering data biases due to gender differences and other factors;
- c) As appropriate, prepare and implement national and subnational policies, plans, programs, and interventions informed by on the regional Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies, making the necessary resources and legal framework available and focusing on the needs of at-risk populations in situations of vulnerability;

(OP)3. To request the Director to:

- a) Provide technical support to Member States for the development and implementation of a regional roadmap for the incorporation of data science techniques and methods at the national, subregional, regional, and inter-institutional levels and facilitate technical cooperation both with and among countries for the preparation and implementation of their national policies;
- b) Prioritize technical cooperation to assist countries in strengthening health analysis capacity, including the use of artificial intelligence and other emerging technologies;
- c) Facilitate access to open educational materials, tools, networks, and scientific information for improving health worker capacity for data management and health analysis and for the use of artificial intelligence and other emerging technologies;
- d) Report periodically to the Governing Bodies on the progress and challenges encountered in the implementation of this regional policy, as well as its adaptation to specific contexts and needs.

Report on the Financial and Administrative Implications of the Proposed Resolution for PASB

1. Agenda item: 4.4 - Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies

2. Linkage to [Program Budget of the Pan American Health Organization 2020-2021](#):

Outcome 21: Increased capacity of Member States and the Pan American Sanitary Bureau to generate, analyze, and disseminate health evidence and translate knowledge for decision making at national and subnational levels.

Work toward this outcome focuses on the development and implementation of mechanisms (policies, standards, tools, etc.) for the generation, dissemination, and preservation of, and access to, scientific and technical data, information, and evidence for policy- and decision-making in the health sector at all levels. It also considers the adoption of normative and technical instruments to enable the generation, dissemination, and preservation of, and access to, open sets of scientific and technical data in full coordination with open government initiatives.

3. Financial implications:

a) Total estimated cost for implementation over the lifecycle of the resolution (including staff and activities):

The estimated cost of implementing this policy over the period 2021-2022 will be US\$ 3,000,000. This estimate includes expenditures for technical and administrative staff as well as for direct technical cooperation activities to support the implementation of national plans and policies on information systems for health. The estimated funding gap is 20% of the total amount. Meeting the goals of this regional policy will require Member States' commitment and investment in its implementation, together with support from collaborating centers and relevant partners.

Areas	Estimated cost (in US\$)
Human resources	1,200,000
Training	950,000
Consultants/service contracts	500,000
Travel and meetings	100,000
Publications	150,000
Supplies and other expenses	100,000
Total	3,000,000

- b) Of the estimated cost noted in a), what can be subsumed under existing programmed activities?**

Of the estimated cost, 40% could be subsumed under existing programmed activities.

4. Administrative implications:

- a) Indicate the levels of the Organization at which the work will be undertaken:**
All levels of the Organization (regional, subregional, and country) will participate in activities to implement the regional policy, in keeping with their defined responsibilities.
- b) Additional staffing requirements (indicate additional required staff full-time equivalents, noting necessary skills profile):**
It will be necessary to work with experts in a network and engage in formal collaboration with institutions of excellence, strengthening current initiatives and taking advantage of existing capacities in Member States. Additional posts will not be needed.
- c) Time frames (indicate broad time frames for the implementation and evaluation):**
Time frames for the implementation and evaluation activities are aligned with those established in the Organization's strategic and operational planning—that is, with the biennial programs and budgets and with the Strategic Plan, following the schedule adopted by the Governing Bodies

Analytical Form to Link Agenda Item with Organizational Mandates

1. Agenda item: 4.4 - Policy on the Application of Data Science in Public Health Using Artificial Intelligence and Other Emerging Technologies
2. Responsible unit: Department of Evidence and Intelligence for Action in Health (EIH)
3. Preparing officers: Dr. Sebastian Garcia Saiso, Mr. Marcelo D'Agostino, Ms. Adrienne Cox
4. Link between Agenda item and the Sustainable Health Agenda for the Americas 2018-2030: Goal 7: Develop capacity for the generation, transfer and use of evidence and knowledge in health, promoting research, innovation and the use of technology.
5. Link between Agenda item and the Strategic Plan of the Pan American Health Organization 2020-2025: <i>Outcome 21:</i> Data, information, knowledge, and evidence
6. List of collaborating centers and national institutions linked to this Agenda item: <ul style="list-style-type: none"> • United States Centers for Disease Control and Prevention (CDC) Public Health Science and Surveillance Division • University of Pelotas, Brazil • The George Alleyne Chronic Disease Research Centre, Caribbean Institute for Health Research at the University of the West Indies; • University of Illinois Center for Health Informatics (PAHO/WHO Collaborating Center for Information Systems for Health).
7. Best practices in this area and examples from countries within the Region of the Americas: <ul style="list-style-type: none"> • Argentina: Big Data aplicada al sector Salud en Argentina: Centro Interdisciplinario de estudios en Ciencia, Tecnología e Innovación http://www.ciecti.org.ar/ • Brazil DATASUS https://datasus.saude.gov.br/ • Canada Data Science Network for the Federal Public Service (DSNFPS) https://www.statcan.gc.ca/eng/data-science/network • México: Ciencia de Datos y Salud 2020 https://cienciadedatos.conacyt.mx/ • United States CDC Data Science and Public Health https://www.cdc.gov/injury/data/data-science/index.html • United Nations Global Pulse: United Nations Secretary-General's initiative on big data and artificial intelligence for development, humanitarian action, and peace https://www.unglobalpulse.org/