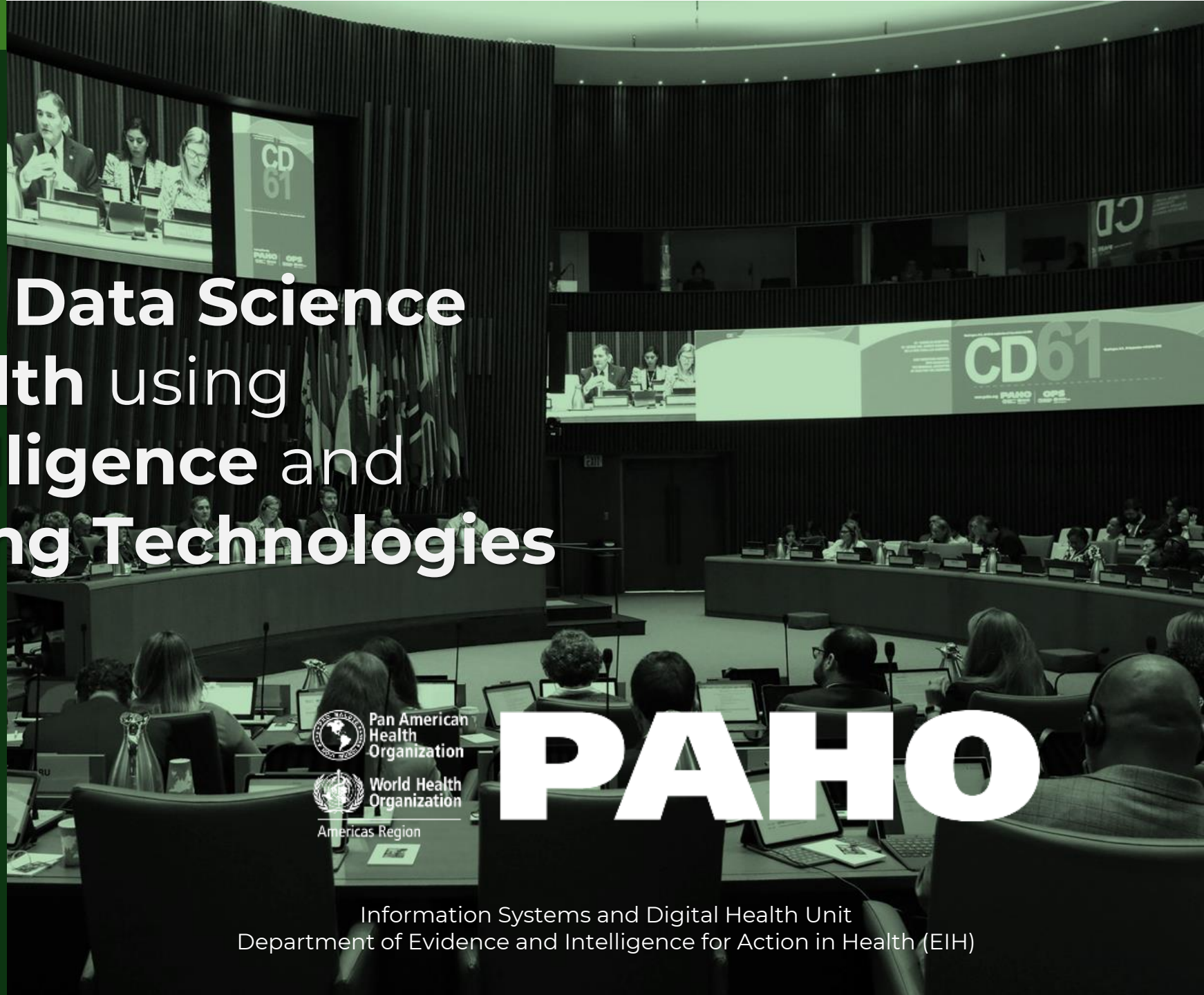

General summary

Application of **Data Science** in **Public Health** using **Artificial Intelligence** and other **Emerging Technologies**

Policy document

10-Minute Briefs

PAHO-EIH *10-Minute Briefs* series is designed to expand knowledge and encourage engagement, making it easier for readers to access essential information quickly and effectively



PAHO

Information Systems and Digital Health Unit
Department of Evidence and Intelligence for Action in Health (EIH)

Introduction

Application of Data Science in Public Health using Artificial Intelligence and other Emerging Technologies

Harnessing Data Science for Public Health

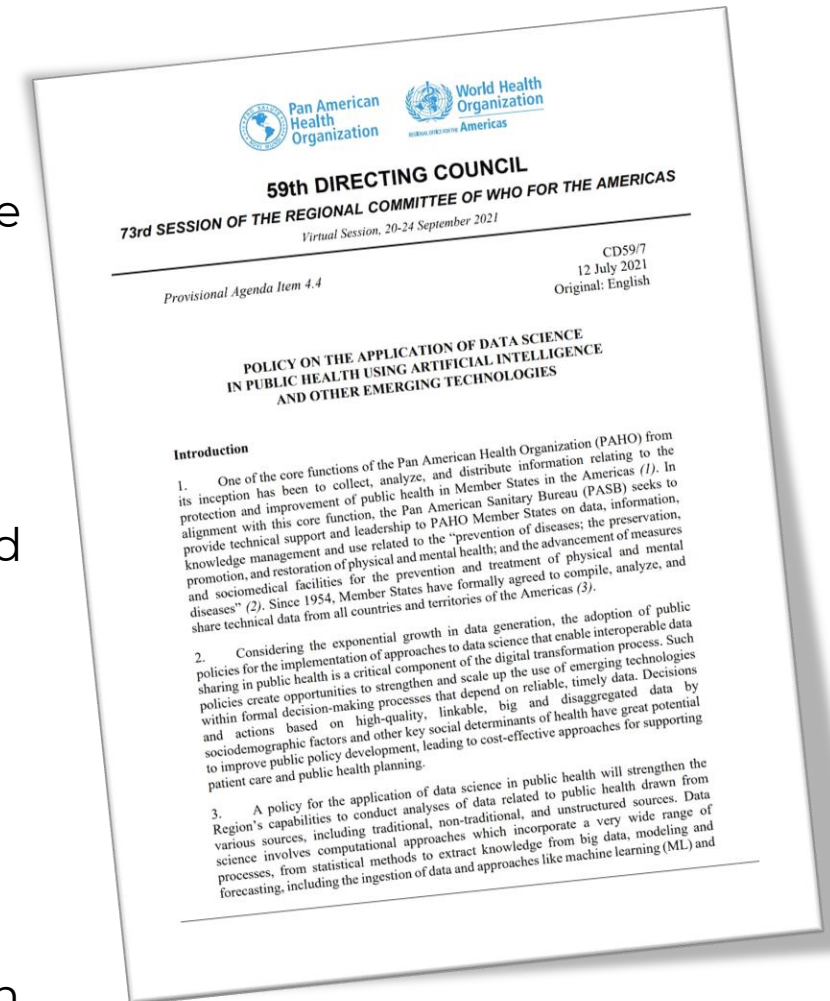
- PAHO emphasizes the critical role of data science in advancing public health by utilizing emerging technologies such as AI and machine learning to analyze vast, diverse datasets for evidence-based decision-making.

Empowering Member States with Innovative Policies

- Data science policies enable Member States to strengthen health systems by integrating traditional and non-traditional data sources, supporting predictive modeling, trend analysis, and innovative public health interventions.

Driving Better Health Outcomes Through Data

- These efforts aim to improve health outcomes by fostering cost-effective approaches for patient care, public health planning, and policy development through reliable and timely data.



Background

Strengthening Health Data Systems in the Americas

Goal 7 of the Sustainable Health Agenda 2018-2030 focuses on improving IS4H for data-driven decisions, health equity, and universal health coverage, supported by enhanced governance, digital tools, and infrastructure.

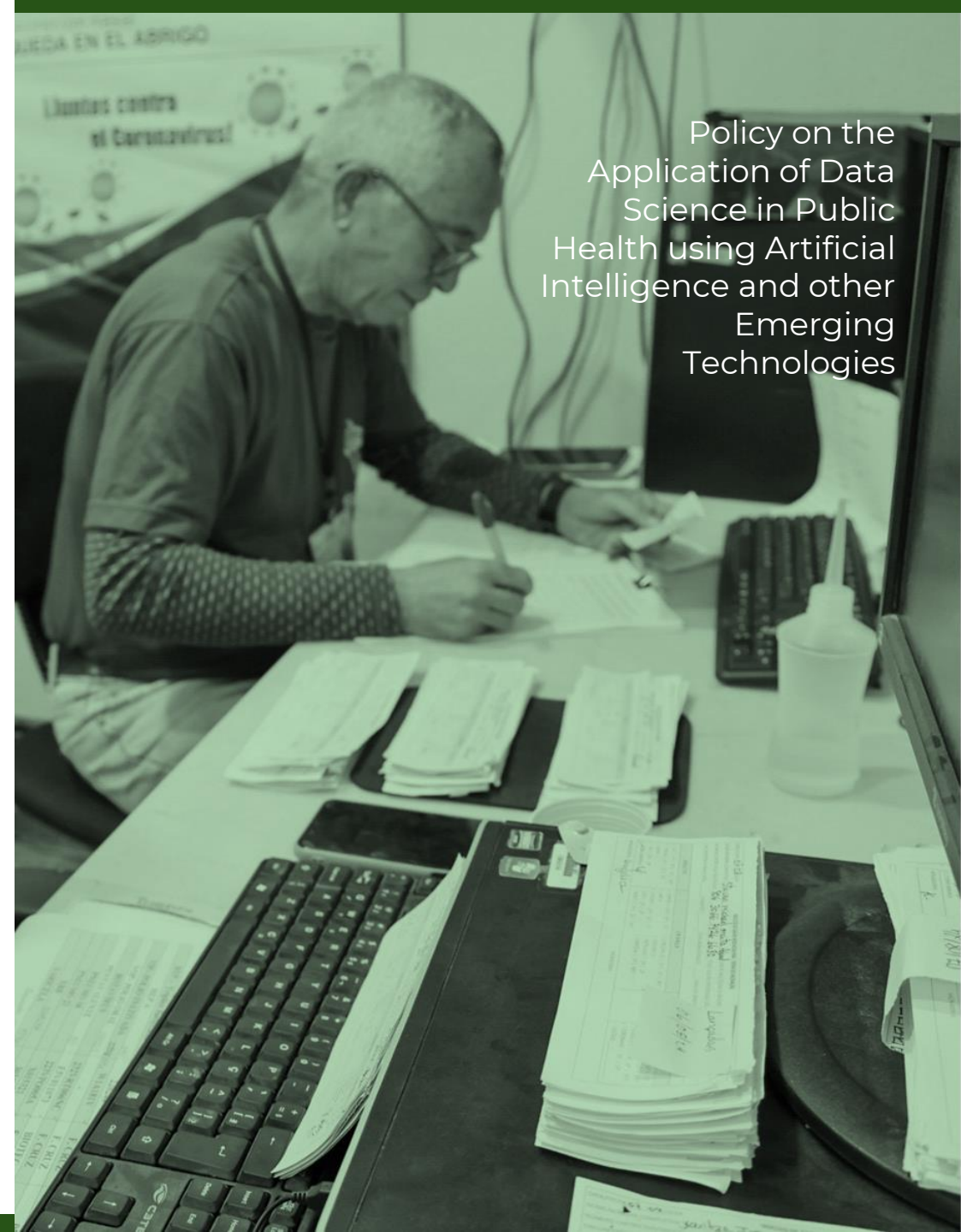
Regional Progress and Commitments

Significant advancements include adopting technologies, fostering interoperability, and approving the 2019 Plan of Action for IS4H, following high-level discussions across the Americas.

The Role of Emerging Technologies

The data revolution and digital tools enable better decision-making, surveillance, and service delivery, but require ethical policies and high-quality, disaggregated data to track health equity and achieve regional goals.

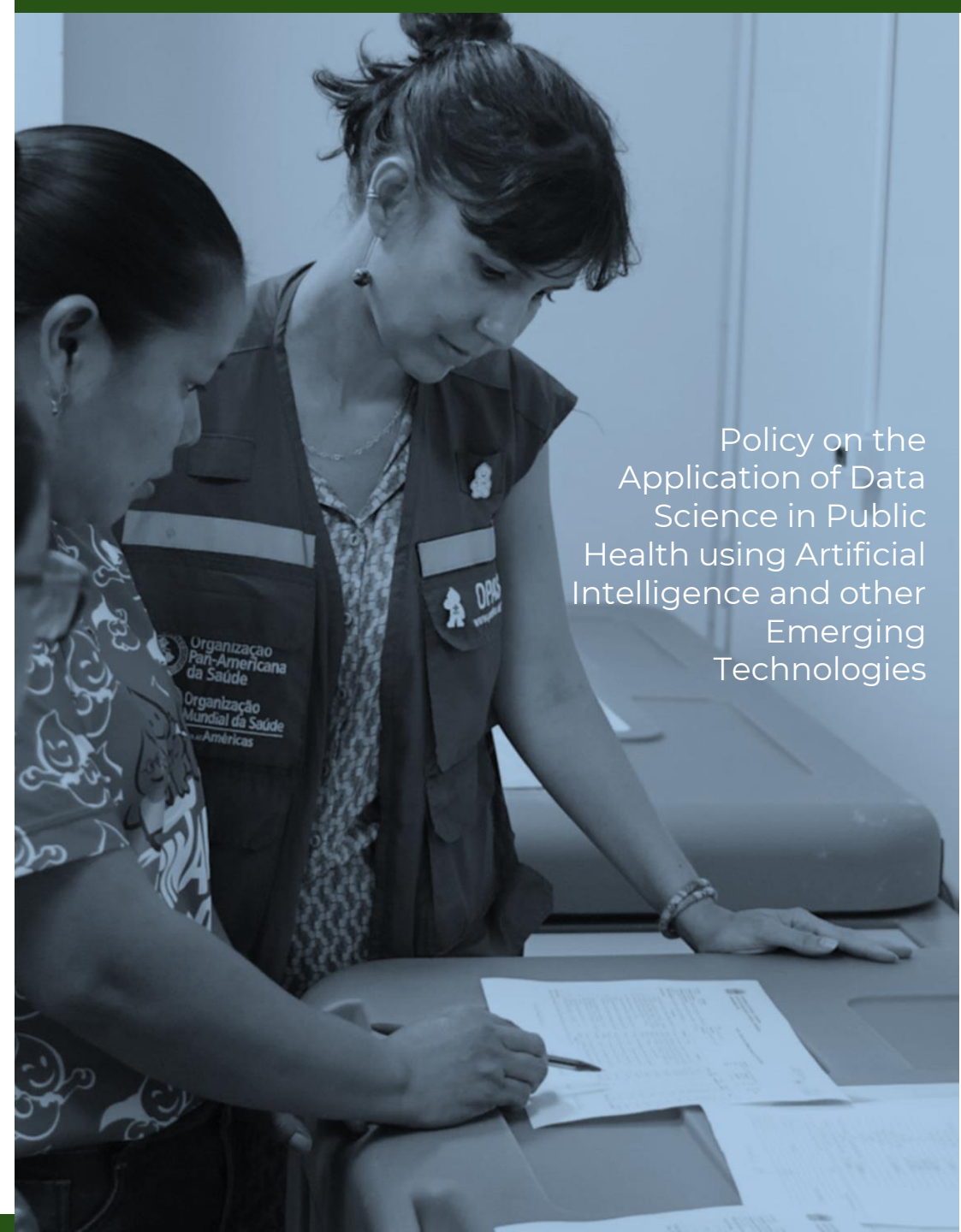
Policy on the
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Situation Analysis

- **The Urgent Need for Digital Transformation in Health**
The COVID-19 pandemic exposed gaps in data quality, interoperability, and timeliness, highlighting the need for modernized, digital health systems across the Region.
- **Opportunities and Challenges in Health Data Systems**
IS4H maturity analysis shows potential for better governance, cybersecurity, and ethical AI use, but interoperable systems integrating health and socioeconomic data are still lacking.
- **Building Capacity and Standards for Health Data**
Countries require stronger standards, tools, and workforce competencies in data science to ensure effective and equitable health responses.
- **The Way Forward**
Member States should adopt data science policies to enable real-time, disaggregated data use, leveraging AI and emerging technologies for improved public health outcomes.

[Full text here](#)



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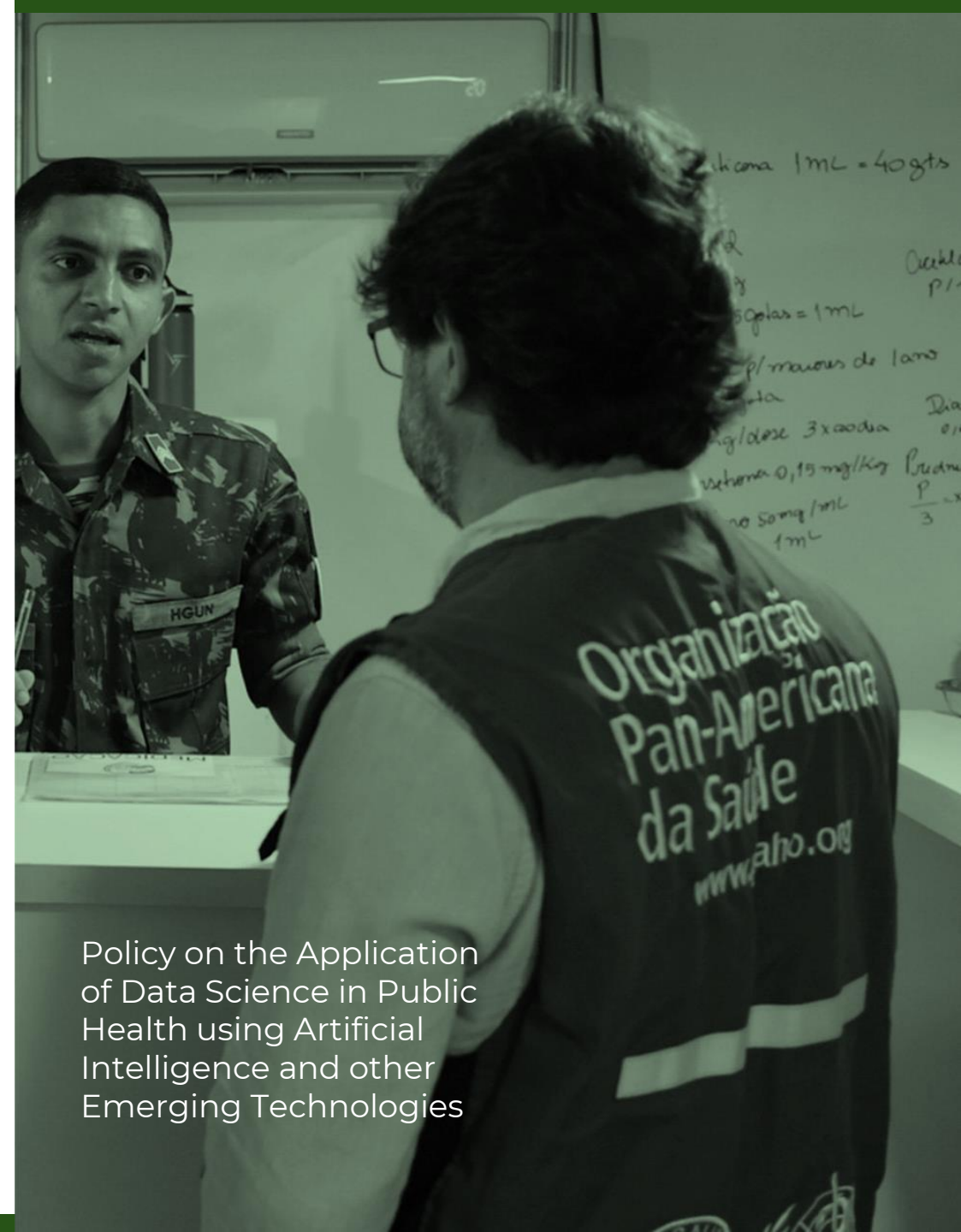
Proposal

● Strategic Guidance for Data Science in Public Health

This policy provides technical guidance for adopting data science and emerging technologies to analyze extensive health and socioeconomic data, support data-driven decisions, and improve health outcomes. It also promotes international health data standards and regional capacity-building for advanced health analysis and big data applications.

● Guiding Principles for Implementation

Member States will contextualize this policy according to national priorities while adhering to principles such as people-centeredness, ethical grounding, transparency, data protection, cybersecurity and human-controlled technology. Adopting international standards and mitigating bias, privacy, and confidentiality concerns, especially for vulnerable populations, are essential for equitable implementation.



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Priority Actions

● **Regulatory Frameworks**

Develop fair and ethical regulatory frameworks addressing rights like access and data protection while ensuring robust guidelines for data sharing, ownership, and biomedical research partnerships.

● **Data Governance**

Strengthen governance by assessing data management maturity, adopting interoperability standards, and mapping data flows to support evidence-based policymaking.

● **Data Disaggregation**

Prioritize disaggregated data by sociodemographic variables to address health inequalities and inform inclusive, data-driven policies.

● **Ethical Use of Data and AI**

Establish ethical frameworks for data ownership, privacy, and transparency. Ensure algorithms are unbiased and representative, with clear strategies to prevent misuse and minimize risks

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Priority Actions *(cont...)*

- **Leveraging Emerging Technologies**

Adopt international standards for applying AI and ML in public health, while building infrastructure and capacity for ethical and effective data use.

- **Big Data Analytics**

Utilize AI solutions to analyze large datasets, uncover patterns, and predict social behavior to enhance public health insights and actions.

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- **Renewed Health Analysis**

Promote AI, big data, IoT, and cloud computing for predictive health analyses, supporting timely prevention, response, and evidence-based decisions.

Promotion of Policy Action

● **Interdisciplinary Interventions for Effective Implementation**

Employ a multi-stakeholder approach to address the data lifecycle through:

- Identifying data gaps and disaggregation needs.
- Adopting international standards for data processing with a focus on interoperability, security, and ethics.
- Implementing data management frameworks supported by modern technologies.
- Launching digital literacy programs to promote ethical and secure data use.

● **Communications and Change Management**

- Promote the benefits of data science in public health by demonstrating its value in enhancing traditional epidemiological surveillance and health analysis, especially during emergencies.

● **Champions and Success Stories**

- Identify and highlight data science champions and success stories to showcase the impact of harmonized data management and science on public health challenges.

● **Insights from Existing Tools**

- Leverage analysis of dashboards, data visualizations, and big data analytics to understand end-user needs and refine data science efforts.



Strategic Partnerships for Open and Secure Data Sharing and AI Adoption

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[Full text here](#)

- 
- **Building Regional Networks**
 - Establish partnerships with data science specialists, centers of excellence, and institutional and individual experts across the Region, with a focus on interdisciplinary collaboration in public health.
 - **Promoting Open and Secure Data**
 - Support the creation of ethically grounded, secure open datasets aligned with international standards and local regulations, ensuring quality data for public health databases and dashboards.



Capacity Development at all Levels

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Incorporating Data Science Across Sectors

- Accelerate the adoption of AI-based algorithms, blockchain, and data systems to extract insights from structured and unstructured public health data.

Assessing and Building Expertise

- Conduct capacity assessments across health, academia, and the private sector to identify existing expertise and opportunities for developing data science networks and curricula with inter-programmatic and intersectoral approaches.

Ensuring Equity and Inclusion

- Promote gender balance and representation of indigenous peoples, Afro descendants, and other ethnic groups to ensure ethical, equitable, and culturally appropriate use of data science in public health decision-making.

Key messages



Policy on the Application of Data Science in Public Health using Artificial Intelligence and other Emerging Technologies

- **Data Science as a Public Health Imperative**
Leveraging data science and emerging technologies is essential for modernizing health systems, improving decision-making, and addressing health inequities.
- **Inclusive and Ethical Use of Data**
Policies must ensure data-driven approaches are equitable, culturally sensitive, and prioritize the protection of privacy and human rights.
- **Capacity Building for Digital Transformation**
Strengthening digital literacy and workforce skills across sectors is critical to effectively implementing data science in public health.
- **Strategic Partnerships for Innovation**
Collaboration with regional experts, institutions, and interdisciplinary teams is key to fostering innovation and enhancing secure, open data sharing.
- **Harnessing AI and Emerging Technologies**
AI, big data analytics, and other technologies must be used strategically to enhance public health intelligence and drive evidence-based interventions.

[Full text here](#)

The Data Science policy in *Plain English*

- **Improving Health Data for Better Care**

Tools like artificial intelligence and big data help uncover patterns in health information, leading to better prevention and treatment options.

- **Protecting Privacy and Using Data Safely**

Strong rules ensure health information is secure, used fairly, and benefits everyone.

- **Closing Gaps in Health Access**

Strengthening how health data is collected and shared ensures that care reaches everyone, including underserved communities.

- **Building Skills for the Digital Era**

Equipping health workers and communities with digital skills allows for smarter decisions and better health outcomes.

- **Ensuring Fair and Ethical Technology**

New technologies like AI must be carefully designed and used to guarantee fairness, transparency, and safety in public health.

- **Creating Smarter Health Solutions**

Better health data systems empower governments to make informed decisions and deliver accessible, quality health care to all.

- **Spotting and Solving Health Challenges Faster**

Detailed health data helps predict trends, address issues sooner, and improve responses to emergencies.

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Thank you

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