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# The contribution of eHealth in closing gaps in primary health care in selected countries of Latin America and the Caribbean

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**ABSTRACT**

**Objective.** *To use a newly developed framework to assess the contribution that eHealth makes to closing gaps in primary health care (PHC) and to providing person-centered, integrated PHC services in Latin America and the Caribbean.*

**Methods.** *The new assessment model for eHealth-enabled primary health care (ePHC) is called the ePHC Assessment Framework. It is based on the National eHealth Strategy Toolkit developed by the World Health Organization and the International Telecommunications Union in 2012, and the Alberta Health Primary Health Care Evaluation Framework. To validate the ePHC Assessment Framework, a pilot study was conducted in 2017 in four locations: the city of Buenos Aires, Argentina, and the countries of Brazil, Costa Rica, and the Dominican Republic.*

**Results.** *The ePHC Assessment Framework was successfully used to evaluate the building blocks of a primary health care–oriented approach to eHealth and the eHealth-enabled enhancements for management of chronic conditions needed to improve prevention and management at PHC centers in the studied locations. The study found that Brazil, Costa Rica, and Buenos Aires are clearly engaged in eHealth initiatives as part of the transformation of PHC to provide person-centered, high-quality services. As for the Dominican Republic, there was not enough evidence to verify the contribution of eHealth in improving PHC in the country.*

**Conclusions.** *It is clear that eHealth helps improve the quality and effectiveness of the prevention and management of chronic conditions at the PHC level. To improve the foundations of ePHC, policymakers should ensure that their national eHealth strategies explicitly identify and establish the opportunities for eHealth to enable an effective PHC system to provide person-centered, integrated, high-quality services.*

**Keywords** Health information systems; primary health care; Latin America; Argentina; Brazil; Costa Rica; Dominican Republic.

In 2005, the World Health Organization (WHO) launched a movement to globally promote universal health care (UHC), with the objectives of improving access to health, reducing the financial risks associated with ill health, and increasing equity (1). The movement has been especially successful in Latin America and the Caribbean (LAC), where a substantial number of countries have achieved outstanding results from adopting UHC in recent years (2). For example, case studies in nine countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Guatemala, Jamaica, Mexico, and Peru) have identified gains made in health care access over the past decade, and all nine countries shared a focus on ensuring that

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quality coverage was reaching the poor and other excluded populations (2).

Research based on data from 10 countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Peru, Uruguay, and Venezuela) showed that a distinguishing feature of the health sector reforms in Latin America has been the strong focus on developing comprehensive primary health care (PHC) as a vehicle for achieving UHC, reducing inequities, and democratizing health through participation (3). Various countries have expanded coverage of PHC services and prioritized targeting of the poorer population segments through supply-side interventions (e.g., expanded coverage, scale-up of services, and defined or guaranteed health benefits packages) and demand-side approaches (e.g., conditional cash transfers to expand access).

UHC schemes alone are not sufficient to face the challenge of promoting an adequate health system for chronic conditions management (CCM) and tackling the high levels of chronic noncommunicable diseases caused by the rapid demographic and epidemiological transitions occurring in LAC (4). PHC has an important role in prevention (e.g., promoting a healthy lifestyle) and in CCM. That is because PHC promotes the integration, continuity, and coordination of care. When effective, PHC systems can provide the foundation for comprehensive, coordinated health services delivery (5).

In spite of the positive results due to implementation of PHC, a recent study (6) in six LAC countries (Brazil, Colombia, El Salvador, Jamaica, Mexico, and Panama) showed that, from the point of view of citizens, there are gaps in the ways in which primary care is organized, financed, and delivered. Further, these gaps are associated with declining health system performance.

Four main dimensions of care were evaluated in the study (6). The first dimension, access to care, varied among the countries. Countries with relatively low financial barriers (such as Brazil and Colombia) tended to have somewhat higher organizational barriers. The second dimension, continuity of care, also differed significantly among the nations. For example, in Brazil (where more than half of the population is assigned to a primary care team based on residence), reports of having a regular provider were much lower than in Mexico (where there are no required provisions to ensure quality of care). With the third dimension, patient-centeredness, the amount of time available for patient consultation was low for most of the countries. The fourth dimension, coordination of care, was a common issue in all six countries. The study recommended urgent attention to PHC performance, especially as the populations of LAC countries continue to age at an unprecedented rate (6).

Deployment of eHealth could make a substantial contribution toward closing the gap in PHC performance. The eHealth term has been defined as "the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health care services, health surveillance, health literature, and health education, knowledge and research" (7). The WHO considers eHealth a global priority for health system development (7). The challenge is to incorporate information and communication technologies (ICTs) to maximize the quality of health care for populations (8). Accomplishing this task requires strategic and integrated action to make the best use of existing capacity, while providing a solid foundation for investment and innovation to achieve the expected long-term health system improvement goals from eHealth initiatives (9). eHealth can be integrated with the overarching goal of providing person-centered health care, which aims to provide health care experiences and services that meet individuals' health-related goals. When there is a continuous, comprehensive, caring approach in primary care, people become empowered and engaged with their health (10).

Person-centered care is a strategy recommended by the WHO (10) to integrate health services, respond to health needs throughout a person's life, and ensure that necessary services reach the most vulnerable. eHealth must be understood as a constituent of care for people, using ICT to innovatively refashion services, improve their quality, and increase access to them, while also meeting the challenge of rising costs in the public and private health care sectors. In the rest of this article, we assess how eHealth-enabled primary health care (ePHC) could help develop person-centered, high-quality health care services in LAC.

Adoption of eHeath initiatives in LAC was first reported in 1986 in Argentina (11), in 1991 in Brazil (12), and in 1994 in Costa Rica (13). A milestone in the institutionalization of eHealth in LAC was the adoption of the Strategy and Plan of Action on eHealth (2012–2017) by the Member States of the Pan American Health Organization (PAHO) (14). That Strategy and Plan of Action aims to contribute to the sustainable development of health systems in the Americas and to use ICT to improve access to and the quality of these health systems. The launch of the National eHealth Strategy Toolkit (9) by WHO and the International Telecommunications Union (ITU) in 2012 facilitated the implementation of PAHO's Strategy and Action Plan by setting guidelines for designing, monitoring, and evaluating the deployment of eHealth strategies. In their answers to WHO's Third Global Survey on eHealth in 2015 (15), 14 of the 19 responding countries from the Americas reported that they have a national policy or strategy for UHC. (While Canada and the United States of America answered the survey, those two countries have been excluded from the general analysis presented in the rest of this article because they are outside LAC.) Of these 14 countries that have a UHC strategy, 10 indicated that they have a national eHealth policy or strategy that explicitly covers key elements of UHC, such as access, quality of care, and cost of care (15).

Recommendations coming out of WHO's 2015 eHealth survey included a call for formulating new eHealth guidance that transcends national UHC strategies and policies and requires a new framework for implementation (16). The model for this framework should include both a set of systemic practices in eHealth and different explanatory dimensions of eHealth beyond technological considerations (e.g., personal, educational, economic, organizational, social, cultural, and institutional factors). The model should also not follow a uniform or sequential pattern. There is a need for rigorous evaluation of existing national policies and strategies, including an analysis of their cost-effectiveness for the design, implementation, and evaluation of eHealth practices.

Given this background, we evaluate how eHealth is being used to close existing gaps in PHC and provide people-centered, integrated health care in LAC. For this purpose, we developed a new

assessment framework, called the ePHC Assessment Framework (17), and piloted it in four selected locations: the Autonomous City of Buenos Aires, Argentina, ("Buenos Aires") and the countries of Brazil, Costa Rica, and the Dominican Republic. The results of this pilot study show the adequacy of the ePHC Assessment Framework for evaluation purposes, as well as the its potential contribution to developing eHealth strategies and policies.

## MATERIALS AND METHODS

The ePHC Assessment Framework (17) aims at supporting evaluation and strategies for applying ePHC to produce person-centered, high-quality health care services in LAC. The ePHC Assessment Framework is based on the National eHealth Strategy Toolkit (9) and the Primary Health Care Logic Model of the province of Alberta, Canada (18). For the implementation of the pilot study, the ePHC Assessment Framework utilized answers to three questions: a) Why is a PHC-oriented approach to eHealth needed? (This influences the setting up of the strategic context of the intervention); b) What will eHealth-enabled PHC achieve? (This is the basis for establishing the ePHC vision); and c) How will eHealth-enabled PHC be assessed? The ePHC Assessment Framework has encompassed the piloting field work and subsequent analytic interpretation. As detailed below, the ePHC Assessment Framework includes two assessment levels: the system level and the delivery site level.

### System level (ePHC foundation)

At the system level, the ePHC foundation specifies components of the ePHC strategy that must be in place to enable PHC system change as part of a national, regional, or local eHealth strategy. At this level, the ePHC Assessment Framework describes the system enablers, that is, elements that allow the ePHC transformational change to occur, which in turn leads to better-quality health outcomes. The components of the ePHC foundation are the same as the ones defined in the National eHealth Strategy Toolkit (9) and can be grouped into the enabling environment and the ICT environment, as described in Table 1.

### Delivery site level (ePHC practice)

The delivery site level refers to ePHC service provision. At this level, the ePHC Assessment Framework describes the delivery enablers and PHC eHealth services, specifying the components and the services required at the PHC practice level to deliver person-centered, high-quality health care services, and how eHealth contributes to improving this level of care. The components and services required to deliver person-centered, high-quality health care services are outlined in the Alberta Primary Health Care Logic Model (18) (Figure 1), which served as the model for structuring the ePHC Assessment Framework for evaluation at the practice level.

The pilot field work was carried out between January and June of 2017 by local experts in Buenos Aires and in Brazil and Costa Rica; for the Dominican Republic, the work was based on second-hand data. The four locations were chosen to represent the Caribbean and Central and South America and allow for understanding the range of implementation of eHealth-enabled PHC. In Argentina, the study focused on Buenos Aires, which was chosen for the uniformity of eHealth deployment there as opposed to the heterogeneity of deployment of eHealth across the country.

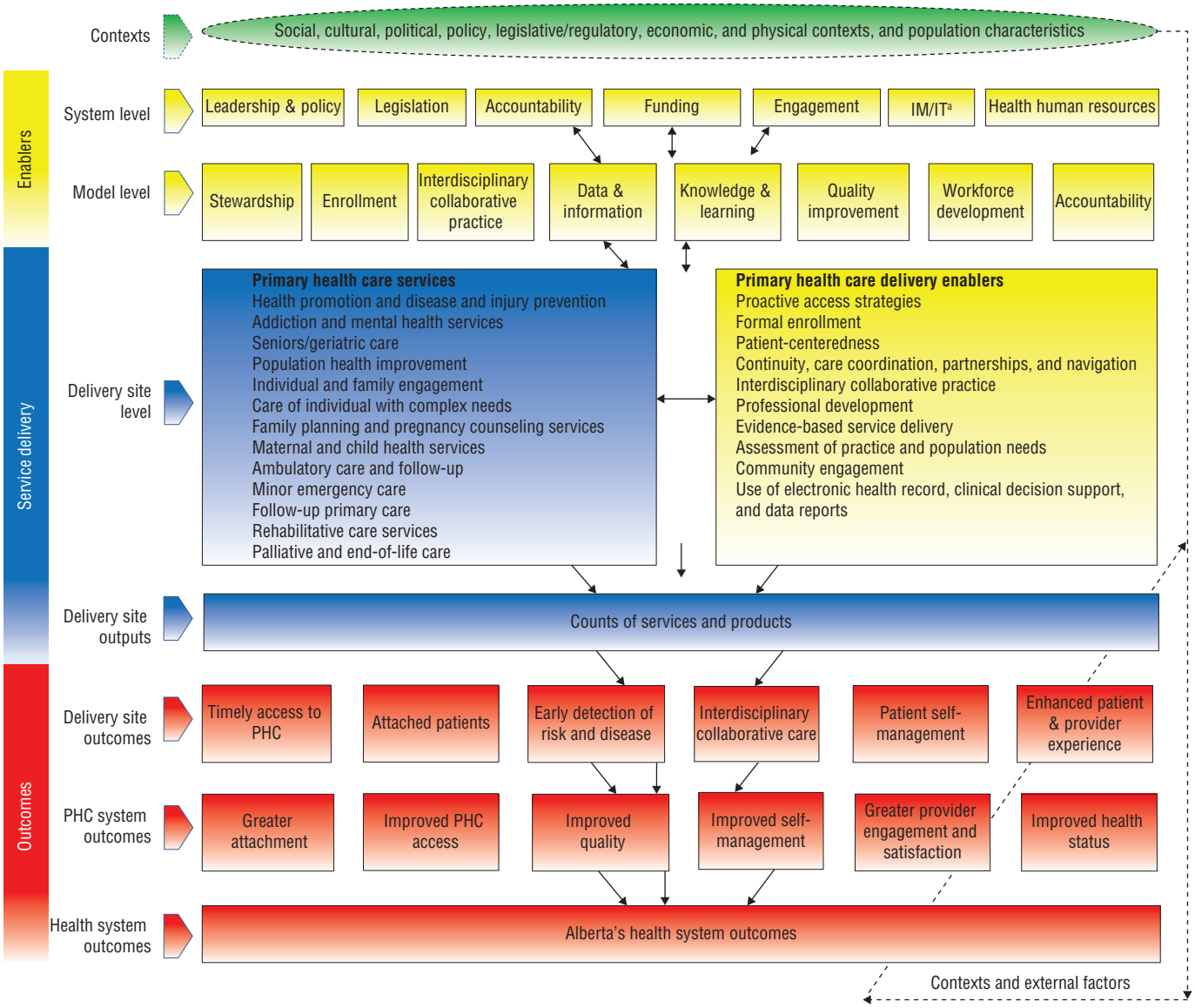
In Argentina, Brazil, and Costa Rica, local experts performed the data collection. Before that data collection, the local experts attended workshops to become acquainted with the ePHC Assessment Framework, as well as a questionnaire and data collection principles

**TABLE 1. Components of the eHealth-enabled primary health care (ePHC) foundation**

| Component | Role | Description |
|---|---|---|
| Leadership, governance, and multisector engagement | Enabling environment | • Direct and coordinate eHealth at the national level; ensure alignment with health goals and political support; promote awareness and engage stakeholders.<br>• Use mechanisms, expertise, coordination, and partnerships to develop or adopt eHealth components (e.g., standards).<br>• Support and empower required change, implement recommendations, and monitor results for delivery of expected benefits. |
| Strategy and investment | Enabling environment | • Ensure a responsive strategy and plan for the national eHealth environment. Lead planning, with involvement of major stakeholders and sectors.<br>• Align financing with priorities; donor, government, and private sector funding identified for the medium term. |
| Legislation, policy, and compliance | Enabling environment | • Adopt national policies and legislation in priority areas; review sectoral policies for alignment and comprehensiveness; establish regular policy reviews.<br>• Create a legal and enforcement environment to establish trust and protection for consumers and industry in eHealth practices and systems. |
| Work force | Enabling environment | • Make eHealth knowledge and skills available through internal expertise, technical cooperation, or the private sector.<br>• Build national, regional, and specialized networks for eHealth implementation.<br>• Establish eHealth education and training programs for health work force capacity-building. |
| Standards and interoperability | Enabling environment | • Introduce standards that enable consistent and accurate collection and exchange of health information across health systems and services. |
| Infrastructure | Information and communication technology (ICT) environment | • Form the foundations for electronic information exchange across geographical and health sector boundaries. This includes the physical infrastructure (e.g., networks), core services, and applications that underpin a national eHealth environment. |
| Services and applications | ICT environment | • Provide tangible means for enabling services and systems and access to and exchange and management of information and content. Users include the general public, patients, providers, insurance companies, and others. The means may be supplied by government or commercially. |

***Source:*** Based on the National eHealth Strategy Toolkit (9).

**FIGURE 1. Primary Health Care (PHC) Logic Model of Alberta, Canada**




[a] IM = information management; IT = information technology.
***Source:*** *Primary Health Care Evaluation Framework* (18).

that followed it. Because of the lack of firsthand data from the Dominican Republic, the authors had to rely on secondary sources, mainly from the WHO (16), to answer the questionnaire and collect data.

## RESULTS AND DISCUSSION

The results are presented below in two subsections, on: 1) the ePHC foundation for the four locations individually and 2) the ePHC-enhanced chronic condition prevention and management assessment.

### ePHC foundation

**Brazil.** The Brazilian health system, the Unified Health System (SUS), is a comprehensive, universal, equitable, operationally and administratively decentralized health system that is implemented nationwide, with well-established legislation, culture, practices, and principles, and operating on a large scale. The experience gained in the development and use of health information systems (HISs) in the SUS facilitated the definition of the vision and the goals to be achieved with the Brazilian national eHealth strategy (19). The objective of using eHealth in this strategy is to improve the quality of, and expand access to, health care by certifying health care teams, streamlining care, and improving the flow of information to support health decisions. This includes support for clinical decisions, health surveillance, regulation, health promotion, and management decisions.

The Brazilian PHC eHealth strategy is essential for primary care at the system and practice levels. The aim is to reduce workers' workload going for the collection, management, and use of information in these levels of care. A key part of

this effort is the e-SUS AB software. That software, which is distributed for free to every PHC unit, feeds information to the national information system. There is still no explicit alignment between the goals of the PHC policy and the role of eHealth in transforming primary care to provide high-quality, person-centered services and the deployment of the e-SUS AB software.

The local experts found that Brazilian stakeholders are not yet fully engaged with the eHealth strategy. This is especially true for managers and health care professionals, because the strategy has not yet been implemented at all levels of the SUS, including the states and municipalities.

Concerning the infrastructure, the foundation for electronic information exchange across geographical and health-sector boundaries is being implemented through the SUS eHealth platform. The information system at the national level is named SISAB. At the practice level, the Brazilian Health Ministry provides two versions of the e-SUS AB software for free: a basic version and an advanced version with an electronic patient record (EPR).[1]

As of early 2017, 5 274 out of 5 570 (95%) of the Brazilian municipalities were running the e-SUS AB software. Of those e-SUS AB users, 85% run the basic version and 15% run the advanced version. The remaining 5% of municipalities were running third-party software that complies with the e-SUS AB's requirements.

**Buenos Aires, Argentina.** Many initiatives related to implementing eHealth have been deployed in Argentina. The implementation of electronic health records (EHRs) has been successful in the city of Buenos Aires, facilitated by the availability of funding, highly trained management in public health and informatics, and a strategy for computerization of hospitals (11). That success in Buenos Aires has not been equaled in the rest of the country, which was the reason our study was conducted only in that city.

In Buenos Aires, eHealth is clearly established as an enabler of PHC, and there is a responsive strategy and plans for having an eHealth-enabled PHC system. The objectives include developing a solid management structure; promoting patient enrollment, with a low rate of errors; and demonstrating interdisciplinary collaborative practice within eHealth. The strategy is aligned with important health goals for Buenos Aires. The HIS ensures access to and continuity of care because all patient information can be accessed by health professionals at the point of care, thus reducing fragmentation. The HIS also establishes more efficient mechanisms for coordination and integration among units of the same or different levels of care. Stakeholders are aware of and engaged in the local eHealth policy.

Deployment of eHealth in Buenos Aires is regulated by the EHR law. That law: 1) protects the privacy of personally identifiable data of individuals, irrespective of whether it is in a paper or digital form; 2) governs the sharing of digital data between health professionals in other health services in the country through the use of an EHR; 3) allows individuals electronic access to their own health-related data in the EHR; and 4) allows individuals to specify which health-related data from their EHR can be shared with health professionals of their choice.

The researchers in the field made various other significant observations about the situation in Buenos Aires:

- Patient safety and quality of care are addressed by the EHR law and are based on data quality, data transmission standards, and clinical competency criteria.
- The local identification management system allows for unique and unequivocal identification of patients and providers, so as make the electronic health information consistent.
- The EHR law governs the sharing of personal and health data between research entities.
- There is in-service training for professionals, as well as a multidisciplinary residency program focusing on HISs.

**Costa Rica.** Costa Rica's National eHealth Plan for 2013–2017 (22) has been implemented. It was designed in accord with the PAHO Strategy and Plan of Action on eHealth (2012–2017) (14). The strategic objectives of Costa Rica's eHealth Plan cover interinstitutional and intersectoral electronic operation and integration; introduction of a model of information exchange among institutions to improve the value and agility of services for citizens; strengthening health technologies in EHR, distance education, telehealth, and HIS; and establishing processes for alignment and interoperability.

The national eHealth strategy is coordinated by a steering committee. The Costa Rican Social Security Fund (CCSS) is responsible for the implementation of the EHR system, which is already 80% implemented in the PHC system.

In the field study, the experts also found that:

- Financing is aligned with the priorities of the health system.
- There is a law regarding EHRs, but its application is not effective and currently there is no mechanism to regulate and control personal data privacy.
- There is a national identification management system. It allows for unique and unequivocal identification of patients and providers and contributes to consistency in the electronic health information.
- There is a dermatology telemedicine program, which provides education for specialists and supports the analysis of cases.
- There is some resistance from health care professionals to adopting technology for eHealth-enabled PHC.
- In the area of eHealth capacity-building, there are not enough efforts to train health information technology (IT) professionals, and more participation from academia is needed.

**Dominican Republic.** A report on the state of health services and care coverage in the Dominican Republic (23) indicates that significant health reform was implemented in 2001. The reform aimed at addressing many issues, including inequities; lack of financial protection; high out-of-pocket payments; high utilization of private providers even by the poor populations paying out of pocket; lack of accountability of doctors at public facilities; governability

[1] The field researchers identified deployment of health information systems such as electronic patient records (EPRs) and electronic health record (EHRs). The term electronic patient record refers to an electronic version of a traditional paper-based patient record. It contains a patient's medical history (including diagnoses, medications, immunizations, family medical history, etc.) as well as contact information (20). The term electronic health record encompasses more functions than the EPR. EHRs are specifically designed for information sharing among various types of providers (who may be located in a number of settings (primary care, inpatient, emergency department, abroad)) and between providers and patients (21).

concerns; and deficient quality and efficiency (24). The reform was successful in many ways, particularly in terms of affiliating more people with the Family Health Insurance (SFS) program and organizing financing. However, the reform was not sufficient to solve issues related to the provision of services, especially in primary care and for the poor (23).

In 2015, a new law included the creation of national health services for the coordination of the regional health services. The law aimed at strengthening the first level of care as a gateway for accessing health services in the public network, with geographic affiliation (23).

According to information in a 2011 WHO report on eHealth (25) that was based on reporting from a selected group of eHealth expert informants in the country, the Dominican Government had enacted legislation related to the legal and ethical frameworks for eHealth, such as sharing health-related data using EHRs.

More recent information on eHealth in the Dominican Report appears in a country profile contained in a 2016 WHO report (16). Among the key findings of that profile are that:

- The country has not implemented a national eHealth strategy,
- There is no national EHR system.
- Existing regulations address patient safety and quality of care based on data quality, data transmission standards, or clinical competency criteria.
- Existing regulations govern the sharing of personal and health data between research entities.
- There is no national telehealth program, but some local and international services are available.
- Health sciences students receive training in eHealth, and health professionals receive in-house training in eHealth.

### Assessment of ePHC-enhanced chronic condition prevention and management in the four locations

The components of ePHC-enhanced chronic condition prevention and management in the four locations studied are described in Table 2. The main results of the assessment indicate that Buenos Aires, Brazil, and Costa Rica have implemented policies aiming at encouraging the use of eHealth technologies to enhance chronic condition prevention and management in PHC and enabling readiness, proactivity, and productive interaction among patients and the community. There was no supporting evidence regarding chronic conditions management in PHC for the Dominican Republic. Only Buenos Aires reported creation of health-related social networks to contribute to community empowerment and engagement in the prevention of chronic conditions.

Buenos Aires, Costa Rica, and the Dominican Republic deploy eHealth to support self-management of chronic conditions, by means of call centers to facilitate interaction between the patient and the health care team and to promote health messages as part of health campaigns. Brazil is implementing a patient portal to improve patient engagement for self-management.

As for the health care delivery system, Buenos Aires, Brazil, and Costa Rica have deployed EHRs to support involvement of the population in their own care and for the provision of person-centered care. To promote continuity of care, Buenos Aires and Costa Rica have used appointment reminder messages.

EHRs for management of clinical information systems are unevenly implemented across the four locations. Buenos Aires has implemented EHRs in 100% of PHC, whereas Brazil has done so in 15% and Costa Rica in 80%. For the Dominican Republic, EHR data was not available. These findings highlight Buenos Aires as a potential benchmark for other regions of Argentina as well as for other LAC countries.

### Main findings on the ePHC foundation

Buenos Aires, Brazil, and Costa Rica are engaged in building the ePHC foundation as part of the transformation of PHC to provide person-centered, high-quality services, as shown by the main findings compiled in Table 3. Unfortunately, due to the lack of comprehensive, firsthand information about deployment of eHealth in the Dominican Republic, secondary sources of data were used. This made it impossible to develop a full picture of eHealth implementation in that country.

### Main findings on ePHC-enhanced chronic condition prevention and management

The information on the eHealth enhancements of the components of the PHC-based CCM at the delivery site are synthesized in Table 4. We can expect that eHealth will further contribute to improving the quality and effectiveness of the prevention and management of chronic conditions at the PHC level in the studied locations, except for the Dominican Republic, where eHealth should be integrated into strategic policymaking.

## CONCLUSIONS

The pilot study shows that two countries (Brazil, Costa Rica) and the city of Buenos Aires have established solid ePHC foundations, enablers, and services. In combination, these mechanisms improve the efficiency of PHC and help to promote person-centered, high-quality PHC systems.

In the Dominican Republic, there has been a lack of local expertise dedicated to data gathering. In spite of a few mentions of telehealth deployment and some reporting of a national eHealth strategy, there was no evidence that the country has advanced in any strategic planning regarding eHealth. However, the Dominican Republic could leap ahead by following benchmark examples of eHealth, such as with the systems in Brazil and Buenos Aires.

The ePHC Assessment Framework is a valuable tool to evaluate the deployment of eHealth, as it can be adapted to varying national, regional, and local contexts of PHC delivery.

Following on from our assessment work, as a way to improve the ePHC foundation, we recommend that policymakers assure that their national eHealth strategies explicitly identify and establish the opportunities for eHealth to enable an effective PHC system and to provide person-centered, integrated, high-quality services.

The strategic guidelines and planning tools for eHealth policies developed by international organizations, such as the WHO, ITU, and PAHO, are important for successful delivery of national, regional, and local ePHC policies. Our study shows that policymakers—and the populations they represent—stand to benefit, especially when implementing policies to use ICT to promote quality, access, equity, and efficiency in the health sector and related sectors in a country, region, or city.

**TABLE 2. Assessment of chronic condition prevention and management enhanced by eHealth-enabled primary health care (ePHC) in four locations in Latin America and the Caribbean, 2017**

| Chronic condition management component | Location | | | |
|---|---|---|---|---|
| | Buenos Aires, Argentina | Brazil | Costa Rica | Dominican Republic |
| PHC system enhancements | There is evidence of policy foundation to encourage the use of eHealth technologies aligned with the goal of enhanced chronic condition prevention and management in PHC, aimed at enabling this level of care to be prepared and proactive and to foster productive interactions with persons and community. | The policy foundation encourages use of eHealth technologies aligned with the goal of achieving enhanced chronic condition prevention and management in PHC, aimed at enabling readiness and proactivity and fostering productive interactions with persons and community. | There is evidence of policy foundation to encourage the use of eHealth technologies aligned with the goal of achieving enhanced chronic condition prevention and management in PHC, aimed at enabling this level of care to be prepared and proactive and to foster productive interactions with persons and community. | There was no evidence of the policy foundation to encourage use of eHealth technologies and its alignment with chronic condition prevention and management in PHC. |
| Community enhancements | Adoption of social networking brings in the possibility of creating an online community and health-related social networks, which may contribute to community empowerment and engagement with the prevention of chronic conditions. | Not reported | Not reported | Information not available |
| Self-management support enhancements | The following eHealth-enabled strategies and/or services may contribute to improving patient engagement for self-management:<br>• Implementation of health call centers is a proactive access strategy that encourages engagement by facilitating interaction between the patient and the health care team, along the care continuum.<br>• Promotion of health messages as a part of health promotion campaigns contributes to improving health literacy. | Implementation of a patient portal may help improve patient engagement for self-management. | The following eHealth-enabled strategies and/or services may help improve patient engagement for self-management:<br>• Implementation of health call centers is a proactive access strategy that encourages engagement by facilitating interaction of the patient and the health care team, along the care continuum.<br>• Promotion of health messages as a part of health promotion campaigns contributes to improving health literacy. | The following eHealth-enabled strategies and/or services may help improve patient engagement for self-management:<br>• Implementation of health call centers is a proactive access strategy that encourages engagement by facilitating interaction of the patient and the health care team, along the care continuum.<br>• Promotion of health messages as a part of health promotion campaigns contributes to improving health literacy. |
| Delivery system design enhancements | The following eHealth-enabled strategies and/or services may help improve the delivery system design:<br>• Tools to help manage patient appointments enable proactive access to PHC services.<br>• The electronic health record (EHR) system supports formal enrollment of the served population, constituting the basis for population health management strategies.<br>• Person-centered EHRs provide clinical information to support design of more personalized care.<br>• Appointment reminder is a care coordination tool and contributes to the continuity of care.<br>• Adoption of population health management tools contributes to the adequate provision of care, considering the difference of health care needs of subpopulations. | The following eHealth-enabled strategies and/or services may help improve the delivery system design:<br>• The EHR system supports formal enrollment of the population, constituting the basis for population health management strategies.<br>• Adoption of SOAP-[Subjective, Objective, Assessment, and Plan] and problem-oriented medical records helps achieve person-centered care.<br>• Person-centered EHR provides clinical information to support the design of more personalized care<br>• Adoption of population health management tools contributes to the adequate provision of care, considering the differences in health care needs among subpopulations. | The following eHealth-enabled strategies and/or services may help improve the delivery system design:<br>• The EHR system supports formal enrollment of the served population, constituting the basis for population health management strategies.<br>• EHRs provide clinical information to support the design of more personalized care.<br>• Appointment reminders are a care coordination tool and contribute to the continuity of care. | Information not available |
| Decision support | Adoption of telehealth improves the clinical decision process; for example, access to the most current evidence-based clinical guidelines contributes to better outcomes. | Adoption of telehealth improves the clinical decision process; for example, access to the most current evidence-based clinical guidelines contributes to better outcomes. | Not reported | Information not available |
| Clinical information systems enhancements | Implementation of EHRs in 100% of the PHC centers helps assure safe and secure health information access and exchange between health care providers and patient/caregivers. | Implementation of EHRs in 15% of the PHC centers helps assure safe and secure health information access and exchange between health care providers and patient/caregivers. | Implementation of EHRs in 80% of the PHC centers helps assure safe and secure health information access and exchange between health care providers and patient/caregivers. | Information not available |
| Education enhancements | Adoption of eLearning programs contributes to professional development. | Adoption of eLearning programs contributes to professional development. | Adoption of eLearning programs contributes to professional development. | Adoption of eLearning programs contributes to professional development. |

***Source:*** The authors, based on research data.

**TABLE 3. Main findings on the eHealth-enabled primary health care (ePHC) foundation in four locations in Latin America and the Caribbean, 2017**

| ePHC foundation | Main findings |
|---|---|
| Leadership and governance | • There are eHealth and health information system strategies, some of which assure the participation of PHC representatives in their governance.<br>• Stakeholders are being engaged in eHealth initiatives. |
| Legislation and policy/Strategy and investment | • Legal framework and investment for eHealth are in the policymakers' interest. |
| Work force | • eHealth capacity programs are being executed. |
| Information and communication technology (ICT) infrastructure | • ICT infrastructure is being constructed to support the implementation of the applications. |
| Services and applications | • Electronic health record (EHR) systems are being deployed at the PHC level at a large scale; for example, in Buenos Aires, 100% of PHC units are running an EHR system. |

***Source:*** The authors, based on research data.

**TABLE 4. Main findings on eHealth-enabled primary health care (ePHC) enhanced chronic condition prevention and management in four locations in Latin America and the Caribbean, 2017**

| Chronic condition management component | Main finding |
|---|---|
| PHC system enhancements | Most of the studied countries showed evidence of a policy foundation to encourage the use of eHealth technologies aligned with the goal of enhancing chronic condition prevention and management in PHC aimed at enabling this level of care to be prepared and proactive and to foster productive interactions with persons and the community. |
| Community enhancements | In most of the studied countries, adoption of social networking increases the possibility of creating online communities and health-related social networks that may contribute to community empowerment and engagement on the prevention of chronic conditions. |
| Self-management support enhancements | Several eHealth-enabled strategies and/or services were identified that may improve patient engagement for self-management. |
| Delivery system design enhancements | Several eHealth-enabled strategies and/or services were identified. |
| Decision support | In most of the studied countries, telehealth activities improve the clinical decision process, contributing to better outcomes. |
| Clinical information systems enhancements | In Buenos Aires, Brazil, and Costa Rica, electronic health record systems deployed by PHC centers are creating the needed conditions to assure safe and secure health information access and exchange between health care providers and patients/caregivers. |
| Education enhancements | eLearning programs are creating the needed conditions to contribute to professional development. |

***Source:*** The authors, based on research data.

We recommend a broader adoption of the ePHC Assessment Framework as a tool for policymakers and academics to evaluate eHealth systems. This would improve the quality and adequacy of ePHC policies. Furthermore, if the dissemination and promotion of the ePHC Assessment Framework is done by international organizations (such as the Community of Latin American and Caribbean States (CELAC), WHO, PAHO, and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC)), those entities could push for an LAC-wide approach to eHealth, by sharing best practices and joint actions to advance an eHealth initiative.

The question of whether the ePHC foundation, enablers, and services really contribute to improving the efficiency of PHC, by preventing and managing chronic conditions, fell outside the scope of this study. Further studies and refinement of the ePHC Assessment Framework would be needed to address this issue.

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**RESUMEN**

## La contribución de la *eSalud* al cierre de brechas en la atención primaria de salud en algunos países de América Latina y el Caribe

***Objetivo.*** Usar un marco formulado recientemente para evaluar la contribución de la *eSalud* al cierre de brechas en la atención primaria de salud (APS) y la prestación de servicios de APS integrados y centrados en la persona en América Latina y el Caribe.

***Métodos.*** El nuevo modelo de evaluación de la atención primaria de salud facilitada por la *eSalud* (APSe) se denomina *Marco para la evaluación de la APSe*. Se basa en el *Conjunto de herramientas para una estrategia de eSalud nacional* elaborado por la Organización Mundial de la Salud y la Unión Internacional de Telecomunicaciones en el 2012, y el *Marco de evaluación de la atención primaria de salud* de Alberta. En el 2017 se realizó un estudio piloto con el fin de validar el *Marco para la evaluación de la APSe* en cuatro lugares: una ciudad, Buenos Aires (Argentina), y tres países, Brasil, Costa Rica y República Dominicana).

***Resultados.*** El *Marco para la evaluación de la APSe* se usó con éxito para evaluar los elementos fundamentales que deben abordarse al aplicar la *eSalud* en la atención primaria de salud y las mejoras que se obtienen por medio de la *eSalud* para el tratamiento de trastornos crónicos, lo que resulta necesario para mejorar la prevención y el tratamiento de enfermedades en los centros de APS de los lugares estudiados. En el estudio se llegó a la conclusión de que Brasil, Costa Rica y Buenos Aires están ejecutando iniciativas de *eSalud* como parte de las actividades realizadas con el fin de transformar la APS para que se presten servicios de buena calidad centrados en la persona. En cuanto a República Dominicana, no hubo suficientes datos para comprobar la contribución de la *eSalud* en la mejora de la APS en el país.

***Conclusiones.*** Está claro que la *eSalud* ayuda a mejorar la calidad y la eficacia en la prevención y el tratamiento de trastornos crónicos a nivel de la APS. Para mejorar las bases de la APSe, los responsables de las políticas deben asegurarse de que en sus estrategias nacionales de *eSalud* se establezcan y se definan explícitamente las oportunidades para la *eSalud* facilite un sistema eficaz de APS con el fin de prestar servicios integrados, de alta calidad y centrados en la persona.

**Palabras clave** Sistemas de información en salud; atención primaria de salud; América Latina; Argentina; Brasil; Costa Rica; República Dominicana.

**RESUMO**

## Contribuição da saúde digital para diminuir a defasagem na atenção primária à saúde em países selecionados da América Latina e Caribe

***Objetivo.*** Utilizar uma estrutura recém-desenvolvida para avaliar a contribuição da saúde digital em diminuir a defasagem na atenção primária à saúde (APS) e na prestação de serviços de APS integrados centrados na pessoa na América Latina e no Caribe.

***Métodos.*** O novo modelo de avaliação da atenção primária à saúde capacitada com saúde digital (APS digital) é conhecido como estrutura de avaliação da APS digital. Ela está embasada no conjunto de instrumentos da estratégia nacional de saúde digital desenvolvido pela Organização Mundial da Saúde e União Internacional de Telecomunicações em 2012 e na Estrutura de Avaliação da Atenção Primária à Saúde de Alberta. Para validar a estrutura de avaliação da APS digital, um estudo piloto foi realizado em 2017 em quatro países: cidade de Buenos Aires, na Argentina, e no Brasil, Costa Rica e República Dominicana.

***Resultados.*** A estrutura de avaliação da APS digital foi usada com bons resultados para avaliar os componentes principais do enfoque de atenção primária à saúde orientado à saúde digital e os aperfeiçoamentos capacitados pela saúde digital na conduta de problemas crônicas necessários para melhorar a prevenção e o controle nas unidades de APS nos locais estudados. Verificou-se que o Brasil, a Costa Rica e a cidade de Buenos Aires estão claramente investindo em iniciativas de saúde digital como parte da transformação da APS para prestar serviços de alta qualidade centrados na pessoa. Em relação à República Dominicana, não havia evidências suficientes para comprovar a contribuição da saúde digital para melhorar a APS no país.

***Conclusões.*** É evidente que a saúde digital contribui para melhorar a qualidade e a efetividade da prevenção e controle das doenças crônicas ao nível da APS. A fim de melhorar as bases da APS digital, os responsáveis por políticas devem assegurar que sejam claramente identificadas e estabelecidas as oportunidades para a saúde digital nas estratégias nacionais de saúde digital a fim de capacitar um sistema de APS efetivo a prestar serviços integrados de alta qualidade centrados na pessoa.

**Palavras-chave** Sistemas de informação em saúde; atenção primária à saúde; América Latina; Argentina; Brasil; Costa Rica; República Dominicana.