

Framework for Development and Implementation of Digital Health Policies to Accelerate the Attainment of Sustainable Development Goals: Case of Kenya eHealth Policy (2016-2030)

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Background and Purpose: Most countries in Africa and the world are adopting electronic health (eHealth) interventions seeking to overcome health challenges such as shortage of skilled health workers, and burden of disease. However, due to lack of a clear policy on adoption, implementation and utilization of these systems, we are experiencing disjointed deployment initiatives all-over Africa. To address this gap, this paper proposes a framework for the development and implementation of digital health policies.

Methods: To identify documents relating to digital health policies and strategies, we conducted a desk review using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The sample frame was the entire population comprising of 54 African countries most of whom are members of the World Health Organization (WHO).

Results: The study identified 27 documents that qualified to be considered as policy, strategy or action plan. The meta-analysis of the documents revealed that 18 countries (33%) have digital health strategies but only 8 (15%) have policies. The results further revealed that out of the 27 documents analyzed, 82% of them are strategies or action plans while 36% are policies.

Conclusions: Despite the fact that Africa serves as the test-bed for most digital health intervention, over 67% of the countries do not have policies. This is unfortunate because, lack of a digital health policy exposes a country to violations of privacy and unethical practices.

Keywords: *Digital health*, eHealth; Framework, Innovation, Meta-analyses, mHealth, Observatory, Policy, PRISMA, Strategy.

1 Introduction

Countries in Africa are adopting digital technologies to overcome challenges in the health sector such as shortage of clinicians, burden of disease, and injuries [1]. In Kenya, a study conducted by Njoroge et al. [2] showed that over 69 eHealth systems ranging from mHealth to telemedicine have been deployed across the country. However, the study indicates that there is duplication of efforts in the deployment of the implementation of most of the systems leading to wastage of resources [3]. We argue that disjointed digital health initiatives in Africa may be attributed to lack of clear policies on the adoption, implementation and utilization of digital health systems and products [4][5].

According to the World Health Organization (WHO), about 27% of countries worldwide have digital health policies in place [6]. However, some of these policies have failed to address realistic health challenges due to poor design and implementation. In this study, we argue that lack of comprehensive digital health policy exposes a country to violations of patient's privacy, and unethical practices such as cross-border exchange of sensitive health records. To address these gaps, there is need for holistic approach

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to development and implementation of digital health policies. The development process should take into consideration socioeconomic and technical challenges such as cultural barriers, inadequate funding, changing priorities, political uncertainties, inadequate technical skills, limited sharing of health information, undue influence by development partners, and resistance to change [7].

In this paper, we propose a structured framework that defines a set of components appropriate for systematic and structured development and implementation of digital health policies. Through case-based validation, we believe that the proposed framework has the potential to address most of the challenges experienced by developers and implementers of digital health policies in Africa, and across the world.

2 Research Methodology

To identify documents relating to digital health policies and strategies, we employed a methodology known as Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [8]. PRISMA is a systematic review process that involves identification, screening, extraction, and analysis of documents. Figure 1 shows the methodology used to identify documents relating to policy, strategy and action plans from online and physical sources.

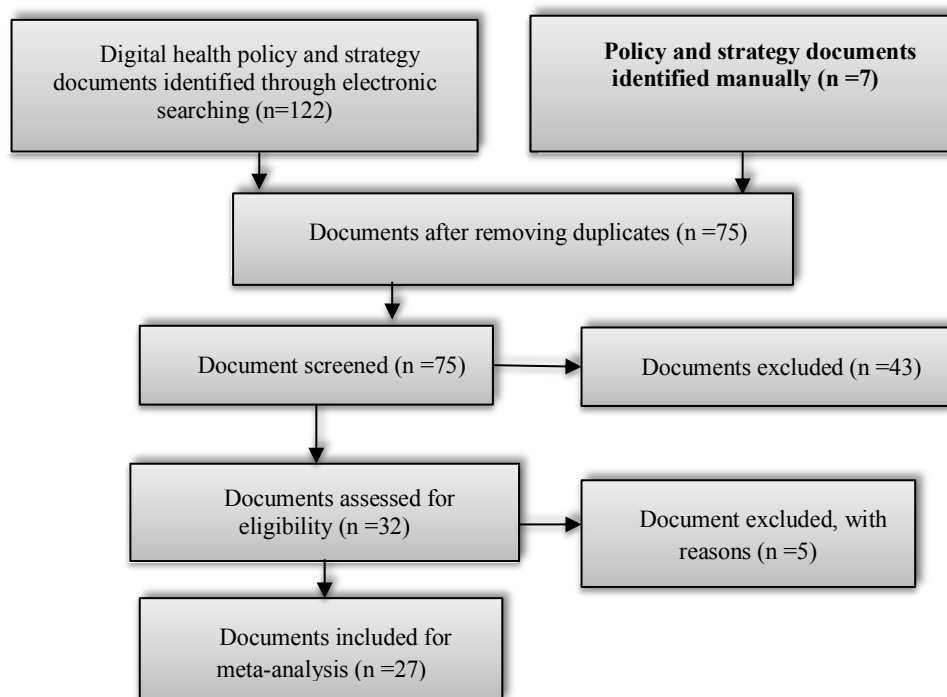


Figure 1. Methodology for identifying digital health policies, and strategy documents

The figure shows that 122 documents were accessed electronically while 7 were manually obtained. The electronic documents were obtained using search tools like Google Scholar, Google search engine, PubMed, Cochrane Library, Directory of Open Access Journals (DOAJ), and Global Observatory for eHealth (GOe) [9]. The search process also involved creating a list of keywords, and then testing them on various search engines to ensure retrieved documents were relevant to this study. Keywords such as “eHealth”, “Health Information Systems”, “Health IT” and “Telehealth” were used in combination with other terms like Policy, Strategy or Action Plan [10]. To further narrow the search space, the consultant used wildcards (*, ?), arithmetic operators and logical operators such as AND, NOT and OR in each search phrase. After removing duplicates from manual and electronic documents, the remaining 75 that were

screened for eligibility. After detailed eligibility assessment, only 27 documents were included for comprehensive review and meta-analysis.

3 Results and Discussion

The search methodology used indicates that information on digital health policies was not readily available in digital repositories. This is because some countries may be having such documents existing in printed form, or named differently as principle, strategic plan, national plan of action, or a roadmap. Another reason our search never netted large number of policies may be due to diversity of languages, or simply because such a document may be “hidden” as part of the national health policy [11]. After screening and excluding duplicates, our search strategy identified 27 policy-related documents that qualified for meta-analysis. This includes documents with titles like: eHealth policy; telemedicine policy; telehealth policy; eHealth strategy; or digital health roadmap. Table 1 shows a summary of countries that may be having digital health policies, strategies or action plans.

COUNTRY	TITLE	TYPE	LANGUAGE	DATE
Angola	Estrategico do Sistema de Informação Sanitária 2010	Strategy	Portuguese	2010
Botswana	Botswana’s National ICT Policy 2004	Policy and strategy	English	2004
Burudi	Plan National de Développement de l’Informatique de Santé du Burundi	Plan	French	2015
Côte d’Ivoire	Cybersanté en Côte d’Ivoire 2011		French	2011
DRC	Plan de Développement de l’Informatique de la Santé 2014		French	2014
Egypt	National ICT Strategy 2012-2017	Strategy	Arabic	2012
Ethiopia	Ethiopian National eHealth strategy	Strategy		2014
Ghana	Health sector ICT Policy and Strategy	Policy and Strategy	English	2005
Kenya	Kenya National eHealth Strategy 2011-2017	Policies & Strategy	English	2011
Liberia	National Health Management Information System Strategy and Implementation Plan	Strategy		2009
Madagascar	Indicates there is an eHealth Strategy/Policy	No evidence		
Malawi	Malawi National Health Information System Policy	Policy and Strategy		2015
Mauritania	Indicates there is an eHealth Strategy/Policy	No evidence		
Mauritius	Indicates there is an eHealth Strategy/Policy	No evidence		
Mali	Politique Nationale Cybersanté au Mali	Policy	French	2016
Nigeria	Nigeria Health Information System Policy	Policy and Strategy	English	2016
Rwanda	The National e-Health Strategic Plan 2009-2013	Strategy	English	2006
South Africa	eHealth Strategy South Africa 2012-2017	Policy and Strategy	English	2012
Uganda	Uganda National eHealth Policy 2013	Policy	English	2013
Tanzania	Tanzania National eHealth Strategy 2013-2018	Strategy	English	(Draft)
Zambia	E-Health Strategy 2013-2016	Strategy	English	2013
Zimbabwe	Zimbabwe’s E-Health Strategy 2012-2017	Strategy	English	(Draft)

Table 1. Countries having digital health Policies in Africa by 2018

The results suggest that most of the countries have digital health strategies but only a few of them have policies. The countries with “no evidence” means that we obtained information from published literature that indicate such a digital policy exists but we could not access the documents. The findings suggest that 18 out of 54 (33%) countries have digital health strategies but only 8 (15%) have policies. Table 2 shows a summary of countries that have digital health policies, strategies or action plans in place. The results further revealed that; out of 22 countries with digital health related documents, 82% of them are strategies while

only 36% are policies as shown in Figure 2. This is an indication that majority of the African countries may not be having digital health policies yet Africa is home to the largest number of digital health initiatives.

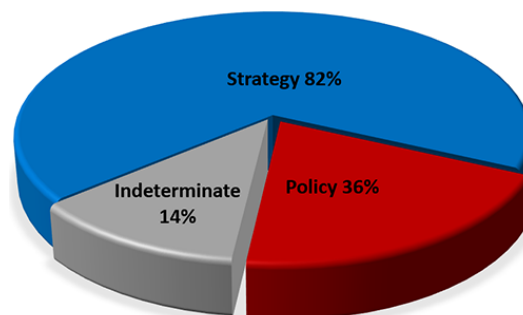


Figure 2. Status of digital health policy in Africa

3.1 Digital Health Policy Development Framework

In a study conducted by Scott and Maurice, it is evident that the process of developing policy process is not anchored on any structure or empirical evidence [12]. Most of the approaches are based on public opinion, electoral considerations, personal preference, and crisis management. Furthermore, the findings from this study uncovered little evidence on guidelines for structured development and implementation of digital health policies. This is the gap we wish to address by providing a structured framework for the development and implementation of digital health policies suitable for African context.

3.2 Structure of Proposed Framework

The framework comprises of three components that are critical to the of design, development and implementation of digital health policies [12][13]. The three components of the proposed framework are governance, guiding principles, and predictable policy development process.

- **Governance:** This component on governance emphasizes on leadership, oversight and administrative support that make it possible to develop and implement a digital health policy. Digital health governance may be in form of advisory boards, and intergovernmental committees responsible for establishing, fostering, and maintaining efficient and effective process for the development, approval, implementation and review of digital health policies.
- **Guiding Principles:** Guiding principles are philosophical ideologies and values that are consistent with global best practices. They are written to support vision, mission, values, priorities, legislations and governing the country's health system(s).
- **Predictable policy development process:** Policy development should follow structured approach shown in Figure 3. To be predictable, it is important that legal mechanism be embedded throughout the development and implementation process.

a) Needs Assessment

Justification for a new digital health policy should start with needs assessments. Needs may be influenced by vision, mission, and strategic direction, new legislations, health policy, or government directive. The need for digital health policy may also come from research findings, public expectations, political decrees, government initiatives, or emerging trends.

b) Planning and Design

When need for a new policy is confirmed, the planning and design phase commences. This involves planning, identifying key principles, and formulating clear policy objectives. Design of a new digital health policy requires collaborative and iterative approach to identify priorities, vision, goals, principles, standards and issues in a country's health system.

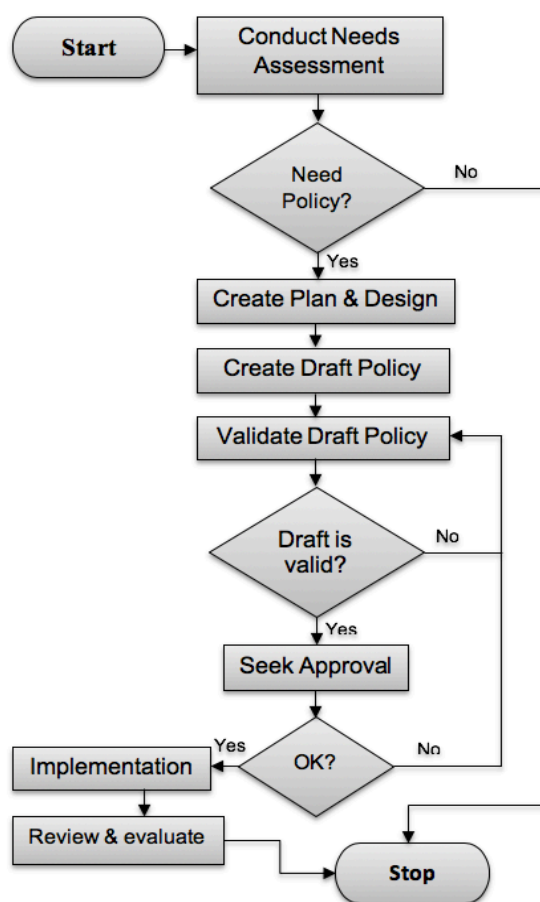


Figure 3. Predictable policy development process

c) Policy Drafting

Drafting entails formulating the layout and creating content provided by subject matter experts. The team of experts may be drawn from ministry of health employees, medical professionals, volunteers, students, contracted providers, and individuals who act on behalf of, or in conjunction with the ministry of health. The content of digital health policy should be consistent with the provisions of the country’s legal and regulatory frameworks.

d) Draft Validation

Stakeholders’ engagement is crucial to the development and validation of digital health policies. Once the draft policy is in a reasonably advanced state, the drafters should provide the stakeholders with an opportunity to make their suggestions in order to minimize implementation risks. If there are issues identified, the policy should be revised and another validation requested once the changes are affected.

e) Policy Approval

The new policy approval demonstrates the government’s commitment. The policy owner should ensure that delegation of approval is permitted with written communication from a senior government official in the health ministry.

f) Policy Implementation

Following the approval, the new policy should be launched and disseminated for implementation. It is important to note that, a well-intentioned policy will fail and put the country at risk if not properly implemented [14]. To avoid this pitfall, stakeholders should be made aware of the launch of a new or revised policy through articles in the media, health forums, websites, policy briefs and academic publications. Furthermore, a well-written policy should have implementation plan comprising of communications, education, training, and change of practice.

g) Review and Evaluation

The review process depends on emerging needs and demands while evaluation is conducted to identify what has worked, what has not, or where there may be gaps or issues to be addressed [15]. Review and evaluation of a policy should be a regular or periodic process or as directed by the sponsor or approving authority. Due to unique circumstances, modifications to the approved policy should adhere to regulations, and procedures governing policy review.

3.3 Application of the Framework

To demonstrate practical utilization of the proposed framework, we developed the Kenya eHealth Policy (2016-2030) [16]. The policy dubbed DigiAfya was officially launched in March 2018 during the Kenya Health Forum. Table 2 shows how KeHP was mapped onto the three components of the proposed framework. The table also shows resources that informed on the structure and content of DigiAfya Policy:

Process Step	Mapping KeHP to Framework Components	Resources
Needs Assessment	Situational analysis, stakeholders’ engagement, alignment to goal, objectives, values, priorities, and aspirations of the Constitution, Health Act 2017, and the Kenya Health Policy 2014-2030.	Field survey and case study reports, Kenya Health Forums, Constitution of 2010, Health Act, Health Policy, Vision 2030, ICT Master Plan,
Policy Design	Principles of best practices involved collaborative design by 10 lead digital health experts and hundreds of stakeholders in ICT and health. The design was also informed by policy development frameworks.	WHO and ITU eHealth Strategy Toolkit, policy development frameworks, Health Act 2017, and journal papers [17][18][7][19].
Policy Drafting	Principles of collaborative and participatory design were employed to draft the KeHP. The content was informed by Kenya Health Policy (2014-2030), WHO&ITU’s eHealth Toolkit, themes provided by Khoja[11], and contributions from hundreds of stakeholders in ICT and health sectors.	Experts from eHealth Unit (MoH), MoICT, Partners, Universities, KeHIA, Oracle, GSMA, mHealth Kenya and KEMRI.
Policy Validation	Extensive validation was conducted by circulating the draft to experts in digital health experts, policy experts and government officials at the national and county levels	Stakeholders from MoH, digital health experts from UoN, KeHIA, Regenstrief Institute, Indiana University, JKUAT, SEKU, and International Leadership University.
Draft Approval	The policy was approved by the Cabinet Secretary (MoH) to demonstrate government’s commitment to uphold the requirements set out in <i>DigiAfya</i> policy.	Former CS, MoH - Dr. Cleopa Mailu
Policy implementation	Governance structure for implementation of the KeHP has been provided. This started with the official launched by CS, Ministry of Health.	CS, MoH, Health providers, Academia, KeHIA, WHO, and development partners,
Review and evaluation	The KeHP has clear provisions on evaluation and review as directed by MoH departments responsible for policy and regulations.	MoH’s eHealth Unit, local universities, County Governments, digital health developers, development partners, university academia, and Ministry of ICT.

Table 1. Mapping Kenya eHealth Policy 2016-2030 to the Policy Framework

4 Conclusions Limitations and Recommendations

In this study, we used the PRISMA model to investigate whether African countries have comprehensive digital health regulatory policies and strategies. Despite the significant role digital health plays in promoting health outcomes, lack of regulatory policies that govern their adoption and implementation is serious

concern. The study revealed that only eight countries in Africa have digital health policies while 18 have strategic plans.

The results from this should be interpreted in light of some limitations. First, there is likelihood that policy related documents were excluded from the meta-analysis due to the search strategies used. Secondly, the language used to conduct the searches was English yet several countries in African have their official languages as French, Portuguese, Kiswahili, Amharic, Afrikaans, Arabic, or Spanish. Consequently, the variables used to identify digital health policies and strategies may have overlooked or excluded such documents published by these countries.

Despite limitations of this study, the findings lay a strong foundation for systematic development and implementation of digital health policies. We believe that the adoption and utilization of the proposed framework will catalyze and improve the process of developing, implementing, monitoring, and evaluating the impact of digital health policies.

References

- [1] World Health Organization (WHO Afro), "Leveraging eHealth to improve national health systems in the African region," *Heal. Monit.*, vol. March, no. 14 s, pp. 46–52, 2011.
- [2] M. Njoroge, D. Zurovac, E. A. A. Ogara, J. Chuma, and D. Kirigia, "Assessing the feasibility of eHealth and mHealth: A systematic review and analysis of initiatives implemented in Kenya," *BMC Res. Notes*, vol. 10, no. 1, pp. 1–11, 2017.
- [3] Yusif Salifu and Soar Jeffrey, "Preparedness for e-Health in developing countries: the case of Ghana," *J. Health Inform. Dev. Ctries.*, vol. 8, no. 2, pp. 18–25, 2014.
- [4] H. F. Mandirola Brioux, J. H. Bhuiyan Masud, S. Kumar Meher, V. Kumar, F. Portilla, S. Indarte, D. Luna, C. Otero, P. Otero, and F. González Bernaldo De Quirós, "Challenges and Hurdles of eHealth Implementation in Developing Countries," *Stud. Health Technol. Inform.*, vol. 216, no. December, pp. 434–437, 2015.
- [5] S. Mburu and R. Oboko, "A model for predicting utilization of mHealth interventions in low-resource settings: case of maternal and newborn care in Kenya," *BMC Med. Inform. Decis. Mak.*, vol. 18, no. 1, pp. 1–16, 2018.
- [6] WHO, *Global diffusion of eHealth: Making universal health coverage achievable*. 2017.
- [7] K. Juma, M. Nahason, W. Apollo, W. Gregory, and O. Patrick, "Current Status of E-Health in Kenya and Emerging Global Research Trends," *Int. J. Inf. Commun. Technol. Res.*, vol. 2, no. 1, pp. 50–54, 2012.
- [8] A. Liberati, D. G. Altman, J. Tetzlaff, C. Mulrow, P. C. Gøtzsche, J. P. A. Ioannidis, M. Clarke, P. J. Devereaux, J. Kleijnen, and D. Moher, "The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration," *J. Clin. Epidemiol.*, vol. 62, no. 10, pp. e1-34, 2009.
- [9] A. Sliante, "How to Conduct a Literature Search - Internal Staff Guide," no. November, pp. 1–11, 2013.
- [10] E. Aromataris and D. Riitano, "Constructing a search strategy and searching for evidence," *Am. J. Nurs.*, vol. 114, no. 5, pp. 49–56, 2014.
- [11] S. Khoja, H. Durrani, P. Nayani, and A. Fahim, "Scope of policy issues in eHealth: results from a structured literature review," *J. Med. Internet Res.*, vol. 14, no. 1, 2012.
- [12] R. E. Scott and M. Mars, "Principles and framework for eHealth strategy development," *J. Med. Internet Res.*, vol. 15, no. 7, pp. 1–14, 2013.
- [13] M. Mars and R. E. Scott, "Global e-health policy: A work in progress," *Health Aff.*, vol. 29, no. 2, pp. 239–245, 2010.
- [14] K. K. P. Sylva and B. D. S. Peradeniya, "eHealth policies that underpin global health care digitisation: A review," vol. 2, no. 4, pp. 118–129, 2011.
- [15] M. C. Jimenez-Marroquin, R. Deber, and A. R. Jadad, "Information and communication technology (ICT) and eHealth policy in Latin America and the Caribbean: a review of national policies and assessment of socioeconomic context TT - Política en materia de eSalud y tecnologías de la información y la comunicaci," *Rev Panam Salud Publica*, vol. 35, pp. 329–336, 2014.
- [16] Republic of Kenya Ministry of Health, "Kenya national e-health policy 2016-2030," 2016.
- [17] Alberta Health Service, "Policy Development Framework," pp. 1–19, 2016.
- [18] World Health Organization and International Telecommunication Union, "National eHealth strategy toolkit," *World Heal. Assem. Resolut. ITU World Telecom Dev. Conf. Resolut.*, pp. 1–223, 2012.
- [19] Broadband Commission for Sustainable Development, *Digital Health: A Call for Government Leadership and Cooperation between ICT and Health*, no. February. 2017.

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Adoption of Health Information Systems in integrated Primary Healthcare in Developing Countries

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Background and Purpose: Several healthcare organizations in developing countries have implemented health information systems (HIS) due to their remarkable information processing power that has lately transformed the way Healthcare practitioners manage health information. However, even with several health information systems in use, Healthcare practitioners still lack processed patient information to enhance primary healthcare (PHC). To advance understanding of the current role played by health information systems in integrated primary healthcare in developing countries, this paper analyses the current HIS in developing countries and their ability to support integrated primary healthcare.

Methods: The paper relies upon related literature of HIS implementations and primary healthcare.

Results: Derived insight is that prominently used health information systems are health management systems that support healthcare secondary roles more than primary healthcare roles.

Conclusions: The paper concludes by suggesting proactive implementation of comprehensive and interoperable health information systems that support both primary and secondary healthcare roles.

Keywords: Health information systems, Primary healthcare

1 Introduction

Healthcare organizations are increasingly adopting healthcare information technologies due to their potential in promoting quality healthcare [1-5]. In order to promote quality healthcare and make informed health care decisions access to accurate and timely health information is important. Incidentally health information systems have shown great information processing power by transforming the way healthcare organizations manage health information [6, 7]. Consequently, health information system implementation has become the subject of continuing interest among the medical community, health leaders and developing countries.

In addition, a number of authors including [8-10] have highlighted Information Communication Technologies role in improving the healthcare system particularly in developing countries. In recent years, developing countries have implemented various HIS at various administrative levels for monitoring public health through known health indicators [11]. A number of them are health management information systems with limited evidence of patient care information systems [12]. Though there is limited evidence of patient care HIS in developing countries [13] they still offer great possibilities of patient care continuity through implementation of electronic health records systems. The case of HIV/AIDS patient records systems in most developing countries, clearly illustrates this [12, 14, 15].

Existing health information systems' research suggests that healthcare systems ought to promote continuous flow of data to aid better decisions [16] and be interconnected in order to achieve quality integrated primary healthcare (PHC) [2, 16]. Given the importance of primary healthcare (PHC) World Health Organization (WHO) calls upon its member-states to strengthen their healthcare systems through primary healthcare principles [17], in order to meet the primary role of healthcare organizations. According

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