MENA OBSERVATORY ON RESPONSIBLE AI
مرصد الشرق الأوسط وشمال إفريقيا للذكاء الاصطناعي المسؤول

Governing Responsible Artificial Intelligence and Data in the Middle East and North Africa (MENA)

The American University in Cairo
Onsi Sawiris School of Business
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## Governance of Data for Responsible AI in the Health Sector

# THE CASE OF EGYPT

March 2025

# GOVERNING RESPONSIBLE ARTIFICIAL INTELLIGENCE AND DATA IN THE MIDDLE EAST AND NORTH AFRICA REGION

***Egypt's Policy Brief***

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# I. KEY MESSAGES FOR POLICY MAKERS

As the world makes rapid advances toward integrating digital and AI technologies within health services, Egypt has the potential to catch up with the global transformation but must address several shortcomings and barriers to do so. The current health-data landscape faces issues that include inadequate health-data collection mechanisms, lack of standardised consent, poor health-data quality, inefficient data management and handling, regulatory challenges, limited technological infrastructure, and lack of training and digital literacy. Egypt must work toward standardising health-data practices (especially data collection), promoting collaboration and data sharing between institutions, creating a health-sector-specific legal framework, and forming a digitized national medical record. This policy brief was prepared to share research findings, identify the gaps, challenges, and barriers, and provide policy-oriented recommendations for implementing proper health-data governance in Egypt with an eye toward future AI technologies within the health sector.

# II. BACKGROUND TO THE POLICY BRIEF

With a growing population of 106 million as of August 2024,[1] Egypt has the largest healthcare market in the Middle East and North Africa (MENA) region.[2] Egypt's growing population comes with a growing demand for adequate healthcare system mechanisms that deliver quality care to all beneficiaries effectively. There have been rapid global advances in artificial intelligence (AI) within several sectors in recent years, including healthcare. AI is revolutionizing the way healthcare technologies and algorithms learn, predict, and produce outcomes.[3] However, for low- and middle-income countries such as Egypt, which currently faces major economic challenges, several obstacles prevent the creation and application of these technologies, such as a lack of resources and high-quality data, inefficient data handling, regulatory challenges, limited technological infrastructure, and digital illiteracy.

The MENA region has progressed toward improving health indicators, with an increase in life expectancy and a decrease in the burden of disease as well as maternal and under-five mortality.[4] While these advancements warrant optimism, death and disability among women in the MENA region are largely caused by non-communicable diseases.[5] Women have unequal access to basic health services, with health disparities affecting women living in rural areas, poor women, migrant women, and those with disabilities. Gendered mental health inequalities also exist in the region, with women, especially female youth in crisis-affected areas of the region, having limited access to mental health services.[6]

Women in MENA and Egypt are also disadvantaged as subjects of data. The unequal representation of women in health data is rooted in inequalities among the constituents of the group, with those in rural areas often rendered invisible within datasets when compared to their urban counterparts. These disparities also correlate with socioeconomic status, migration status, disabilities, educational attainment, and digital literacy.

There is also a lack of data on certain aspects of women's health, such as fertility, maternity, pregnancy care, and sexual wellness.[7,8] Sociocultural norms and taboos are a barrier to collecting data that is crucial to addressing women's health needs. In addition, there is a low availability of gender-disaggregated data on women's health in the region, as well as challenges preventing women from accessing their data.[9]

To interrogate the state of data governance in women's health in Egypt, an in-depth review of global standards for data governance in healthcare was conducted to identify relevant questions about data collection, processing, sharing, storage, and security. The identified questions guided the development of a semi-structured interview tool for qualitative, context-specific and regionally relevant fieldwork questions that assess the processes, challenges, gaps, and op-

1 Central Agency for Public Mobilization and Statistics (CAPMAS). (2024, August). https://www.capmas.gov.eg/HomePage.aspx?lang=2

2 Badran, M. F. (2019). eHealth in Egypt: The demand-side perspective of implementing electronic health records. *Telecommunications Policy*, *43*(6), 576-594.

3 Shaheen, M. Y. (2021). Applications of artificial intelligence (AI) in healthcare: A review. *ScienceOpen Preprints*.

4 UNICEF. (2021, November). Situational analysis of women and girls in the MENA and Arab states region: Pillar 1 health and wellbeing key messages and recommendations. https://www.unicef.org/mena/media/14321/file/Pillar-1_V2.pdf.pdf

5 Ibid.

6 Spinardi, A., Isamiddinova, N., Clavijo, I., Henkens, K., & Poggi, C. (2022). Mental health and gender inequality in the MENA region: An analysis of shock related factors within the context of the COVID-19 pandemic. *AFD Research Papers*, (248), 2-24.

7 UNICEF. (2021, November). Situational analysis of women and girls in the MENA and Arab states region: Pillar 1 health and wellbeing key messages and recommendations. https://www.unicef.org/mena/media/14321/file/Pillar-1_V2.pdf.pdf

8 Asi, M. Y. (2020). Do Arab women need saving? The health of women in the Arab world. *Arab Center Washington DC.* https://arabcenterdc.org/resource/do-arab-women-need-saving-the-health-of-women-in-the-arab-world/

9 Inardi, A., Isamiddinova, N., Clavijo, I., Henkens, K., & Poggi, C. (2022). Mental health and gender inequality in the MENA Region: An analysis of Shock related factors within the context of the COVID-19 pandemic. *AFD Research Papers*, (248), 2-24.

portunities regarding health-data governance. The research methodology, questions, and discussions reflect and reference the World Bank's Health Data Governance Principles[10] as its main framework. The principles provide an integral perspective to the discourse on data and public health systems, one that centres on human rights, equity, and sustainability.

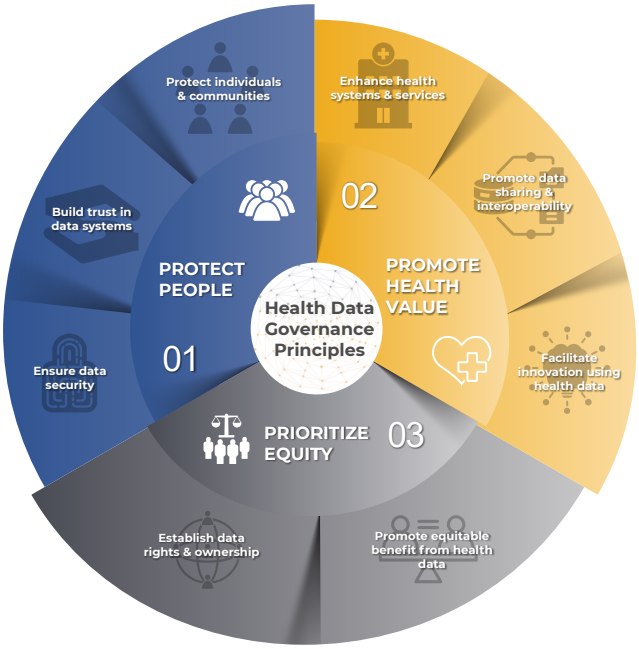


**Figure 1:** The Health Data Governance Principles framework.[11]

Fieldwork was conducted with the objective of assessing the governance of health data in different healthcare settings in Egypt, with a focus on data pertaining to women's health. The aim of the fieldwork is to provide empirical evidence on the existing health-data governance practices, identify challenges and opportunities, and provide policy recommendations for more responsible data governance within the Egyptian health sector. Semi-structured expert interviews were conducted with representatives from 12 different health entities across the public and private sectors: public health centers, hospitals, radiology centers, private clinics, pharmaceutical labs, and various startups in health innovation.

## III. PROBLEM STATEMENT

The findings of this research identified a lack of proper health-data collection mechanisms, a lack of standardised consent, poor health-data quality, inefficient data management and handling, regulatory challenges, limited technological infrastructure, and a lack of training and digital literacy. The research reveals the need for the standardization of health-data practices, collaboration and data sharing among institutions, capacity building for frontline healthcare personnel, the creation of a health-sector-specific legal framework, as well as the formation of a digitized national medical record.

## IV. SIZE OF THE PROBLEM

The research found there to be a lack of standardized and unified health-data collection mechanisms. Methods of data collection are a mix of analog and digital processes, with public health centers (PHCs) mainly relying on paper-based data collection, except for the presidential initiatives, which operate on computers and tablets. The collected data is fragmented and lacks quality due to incomplete data fields, entry errors, manual updates, and inaccuracy, given the reliance on patient-provided data, verbally or otherwise, with limited verification.

There is also difficulty in collecting data due to cultural barriers and lack of trust and awareness. Written consent is not obtained from patients during data collection, and verbal consent is only sometimes obtained, because of a perception that the collected health data may never be utilized. While nurses at PHCs and private health entities lack awareness of data-protection laws, they also do not perceive them as fundamental to preserving patients' data privacy, echoing statements such as "it goes without saying" and "doctors must respect patient privacy."

Egyptian health entities exhibit inefficient data storage, retrieval, and sharing mechanisms. Analog data is stored in locked filing rooms with limited security measures, and digital data is often stored in non-interchangeable formats, limiting the possibilities of data sharing. Cloud storage is often not accessible to healthcare entities, which therefore resort to storing their data on-site or abroad. Healthcare entities operate in silos and are often reluctant to share data with each other, resulting in scattered efforts and a fragmented healthcare system in which the possibilities of a unified healthcare database are hindered, as is collaboration and research.

10 Transform Health. (2022). Health data governance principles: Universalising the benefits of health digitalisation. World Bank. https://healthdataprinciples.org/images/English/%5BEN%5D%20Health%20Data%20Governance%20Principles.pdf

11 The World Bank's Health Data Governance Principles (https://healthdatagovernance.org/principles/), revisualised

Inefficient data handling is further exacerbated by limited technological infrastructure. Egyptian health entities have inadequate numbers of computers and tablets, unreliable internet connectivity, and inefficient digital data systems and programs. Most nurses in PHCs are not trained to use tablets and computers, and they therefore depend entirely on the few colleagues who are (doctors usually), resulting in a misuse of human resources.

The findings show that most organizations are unaware of any health-specific data-protection laws and cite the lack of legislation as a barrier to implementing AI in Egypt. Those who are aware of Egypt's data-privacy policies state that the existing policies are too vague and primarily focused on the protection and privacy of personal rather than health data. There is an absence of a unified guideline that ensures proper health-data collection, processing, sharing, storage, and security. Meanwhile, the existing, data security laws are not put into practice.

# V. UNDERLYING FACTORS

With its high birth rates and rising life expectancy,[12] Egypt faces demographic challenges that build additional pressure on healthcare providers to deliver services effectively across the nation. A growing population entails an expanding demand for healthcare services, accompanied by mounting costs and resource requirements. Inadequate healthcare funding compounds the problem, as implementing AI and new technologies requires large amounts of funding and resources, especially considering this population growth. Limited infrastructure and resources, including device shortages and connectivity problems, also contribute to these challenges.

Collecting data in Egypt is also difficult due to cultural barriers and the lack of awareness surrounding the importance of data. Patients are unaware of their rights regarding personal health information and are therefore prone to hesitancy or unwillingness to share their data. This is also a result of the limited understanding of how health data could be used, the benefits it could bring, and the measures that are in place to protect their privacy.

AI applications and new technologies also need vast amounts of data sets, which Egypt is lacking. The absence of a unified regulatory framework that provides guidelines for proper governance of health data exacerbates the challenge of responsibly introducing technology into the healthcare system.

# VI. RESEARCH TAKEAWAYS

After synthesizing the results of the fieldwork and research, the following main research takeaways were extracted:

### *Lack of proper health-data collection mechanisms*

Paper-based data collection, a lack of digitized records, unstructured data-collection systems, cultural barriers, and a lack of awareness have created an ecosystem without proper digital health-data collection mechanisms. This undermines data quality and digitization efforts while entrenching fragmented data collection standards and data transfer challenges across healthcare providers.

### *Consent practices for data collection lack standards*

No written consent is obtained from patients, and oral consent is only sometimes obtained, owing to a perception that the collected health data may never be utilized.

### *Poor health-data quality*

Health entities in Egypt collect poor-quality data characterized by incomplete fields, entry errors, inaccuracy due to a reliance on patient-provided verbal and non-verbal data with limited verification, inaccuracy due to language barriers, manual updates, and limited data auditing due to the inability to edit data errors after patients are discharged.

### *Inefficient data storage mechanisms*

Data storage mechanisms in public health entities are often inefficient, with analog data recorded on paper and stored for years, posing challenges in preserving data quality and visibility, in addition to maintaining storage space. Digital data is not stored in an interchangeable format due to limited data sharing among healthcare, which also compounds data interoperability. Furthermore, cloud storage is inaccessible, resulting in entities choosing to store their data abroad.

### *Inefficient data retrieval mechanisms*

The manual retrieval of archived paper files is a time- and effort-consuming process. On the digital front, healthcare providers in PHCs lack

12 Fasseeh, A., ElEzbawy, B., Adly, W., ElShahawy, R., George, M., Abaza, S., ... & Kaló, Z. (2022). Healthcare financing in Egypt: A systematic literature review. *Journal of the Egyptian Public Health Association*, *97*(1), 1.

access to previously collected data on their devices, as correction and retrieval features are centralized through the Ministry of Health.

### *Lack of data sharing practices*

Entities operate in silos, with discrete data collection systems that do not integrate or complement one another, resulting in scattered efforts and a reluctance toward data exchange among departments. This lack of interoperability and data sharing further fragments the healthcare system and hinders collaboration and research.

### *Inefficient legal frameworks*

Personnel working at PHCs and some private entities lack awareness of data protection laws, with data privacy policies seen as vague and focused on personal rather than health data. In the private sector, some entities that operate internationally follow each respective country's health-data laws. Egypt, however, has no unified guidelines to ensure proper data collection, processing, sharing, storage, and security measures. Furthermore, existing, outdated data security laws and policies are not put into practice.

### *Limited technological infrastructure and resources*

PHCs suffer from internet connectivity problems and system malfunctions, which prolong data-entry processes. Inefficient digital data-entry systems often lead to a preference for paper records and a shortage of devices such as tablets results in time-consuming digital data collection.

### *Inadequate healthcare funding*

Not enough funds are allocated for the provision of sufficient digital devices, training of medical personnel involved in data collection and maintenance, digitization and maintenance of proper data collection, or implementation of storage and protection mechanisms. Funding is also lacking for the promotion of medical research, innovation, and development of new digital tools to enhance healthcare service quality and efficiency.

### *Lack of the needed capacities and skills among frontline healthcare workers*

Few are digitally literate and/or trained to use digital technology. This can result in major misallocations of human resources, whereby doctors must sometimes fill in data forms, as they are likely to be more digitally proficient.

## VII. POLICY RECOMMENDATIONS

Taking into consideration the main research takeaways, challenges, and underlying factors impacting the implementation of AI technologies in Egypt's healthcare sector, the following recommendations were produced.

### *Establish proper digital health-data collection mechanisms*

Create a unified digital data collection standard across all healthcare providers to facilitate data transfer and synchronization among health entities. Analog data, including health records and medical documentation, will need to be digitized for a transition into a digitalized healthcare system with datasets that are ready to be processed by AI. The digitization of forms, reports, and prescriptions will allow for efficient data sharing and the creation of a comprehensive, accessible medical record.

For robust and accurate outcomes, innovative data-collection tools must be developed, and the pool of available data that is to be fed into AI systems must be maximized. Several countries have begun implementing these recommendations to modernize their health-data systems. For instance, the United Kingdom's General Practice Data for Planning and Research (GPDPR) program, proposed in 2021 by NHS Digital, exemplifies a unified approach to data collection. This initiative aims to replace the existing, outdated data collection system by consolidating 300 separate data collections into a single process.[13] The new system seeks to gather primary care health data from general practitioners (GPs)[14] and sufficient public health data to monitor and protect public health, produce comprehensive health reports, support research and innovation, and improve services.[15] To ensure the system is effective, NHS Digital collaborates closely with GPs, patients, data experts, and public sector partners to develop a solution that is efficient, secure, and reduces the administrative burden on GPs, allowing them to focus more on patient care.[16]

13 NHS England Digital. (2024, June 6). About the GPDPR programme. NHS England Digital. https://digital.nhs.uk/data-and-information/data-collections-and-data-sets/data-collections/general-practice-data-for-planning-and-research/about-the-gpdpr-programme.

14 Ibid.

15 NHS England Digital. (2023, December 15). General practice data for planning and research (GPDPR). NHS England Digital https://digital.nhs.uk/data-and-information/data-collections-and-data-sets/data-collections/general-practice-data-for-planning-and-research

16 Ibid.

Additionally, there is a need to raise awareness around the importance of data, among patients and healthcare personnel. Most importantly, since digitalization is very expensive, incentivizing the practice of accurate digital data collection within health entities to save their resources and increase their revenues is crucial

### *Implement and standardize consent practices for data collection*

The importance of consent must be highlighted to patients and healthcare personnel alike. Raising awareness among stakeholders about the necessity of obtaining patient consent is necessary to foster ethical data practices.

### *Improve the quality of health data and promote regular auditing*

Prioritize quality health-data recording by advocating the value of data. The ground should be laid for the production of quality medical reports, with priority given to digitizing patient data, unifying the dataset, promoting complete data entry, encouraging regular auditing, and conducting data analysis with the aim of improving health services and outcomes.

Furthermore, digitalization can help improve the quality of data. AI should be leveraged on the policy level and, more importantly, on the practical level. AI presents opportunities for higher quality and more efficient data collection, allowing for false-entry detection, transcription of records, trend tracking, and diagnostic assistance through radiological image analysis, among other functions.

### *Introduce efficient data storage mechanisms*

Establish interoperable standards for digital data storage to ensure that health data can be exchanged and accessed across different healthcare entities. There is a need to facilitate the migration of analog data into digital formats while ensuring data integrity and quality. Training and capacity-building initiatives should be implemented to ensure that healthcare professionals and IT staff can effectively manage and utilize digital data storage systems.

### *Introduce efficient data retrieval mechanisms*

Streamline and digitize data retrieval processes and establish decentralized mechanisms for data correction and retrieval at the local level within health centers. In addition, healthcare providers should be empowered and given the authority to update and retrieve data, reducing dependency on centralized processes.

### *Promote data sharing practices:*

Allow for data sharing between departments, external entities and across medical providers. As a best practice example, the creation of a digitized national medical record that compiles patients' complete medical histories and can be accessed by any healthcare provider could transform the health data-sharing process. While data sharing is important, it is crucial to strike a balance between ease of access and data sovereignty. To create a unified system across all healthcare providers, there is a need to counteract the prevailing perception of health data as a personal project rather than a tool for public health policy.

### *Implement an efficient legal framework*

Mainstream dialogue should be initiated between healthcare institutions and legal stakeholders to create laws for governing health data. Health sector-specific governing laws and regulations should define data governance rules as well as promote the innovation of new technologies and AI tools, without restricting innovation, development, and advancement. Such laws should aim to push for the fulfilment of the components of the World Bank's Health Data Governance Principles framework and implement policies that protect data on both an institutional and national level. To ensure the implementation and enforcement of these laws, the formation of a regulatory body is also needed.

### *Address issues of limited technological infrastructure and resources*

Interruptions caused by limited infrastructure, including internet outages, need to be mitigated by, for example, enabling offline data collection within digital systems to mitigate interruptions caused by internet outages. There is a need for more efficient digital and data infrastructures that enable the utilization of AI in the healthcare system, which requires more support and funds. Moreover, equal access to digital resources and the internet in remote areas should be advocated to ensure that prospective AI technologies will not be used to deny patient care based on analysis of the currently available datasets.

### *Advocate for funding digital healthcare technologies and AI implementation*

Improve health financing and allocate public funds toward digitizing the Egyptian healthcare system and maintaining proper data collection, storage, and protection mechanisms, as well as promoting medical research, innovation, and development of new digital tools to enhance healthcare service quality and efficiency. This can be achieved by providing sufficient digital devices to medical providers, training medical personnel involved in data collection and maintenance, investing in innovation and research, and financing new medical technologies. Due to Egypt's economic challenges, it is imperative to facilitate and incentivize the innovation of home-grown, sustainable, and scalable healthcare technologies.

### *Capacity building for frontline healthcare workers*

Provide capacity building and continuous training for healthcare professionals on the concept of health-data governance, in addition to technical training in data processing, protection, security, and utilization to ensure that medical professionals are equipped to leverage emerging technologies. In addition, there is a need to raise awareness around the importance of data, as well as a need for more efficient allocation of digital data-entry tasks.

Several countries have prioritized digital literacy and capacity-building efforts to enhance their healthcare systems. For example, training and capacity building of human resources is listed as one of the seven main priorities of Brazil's Digital Health Strategy 2020–28 to improve data collection mechanisms and enhance data quality and reliability.[17] Morocco has also taken steps to improve digital literacy among its healthcare workforce. Medical students are taught basic computer skills and biostatistics, and medical informatics courses are offered to physicians interested in this speciality.[18] The Moroccan Society of Medical Informati-cs and Health (SMIMS) has actively promoted IT education among both clinical and non-clinical specialists to improve their digital capacities.[19] Moreover, Morocco collaborates with developed countries, such as France, to provide further opportunities to train Moroccan informatics specialists.[20]

17 OECD. (2021). OECD reviews of health systems: Brazil 2021. OECD Publishing. https://doi.org/10.1787/146d0dea-en.

18 Bouhaddou, O., Othmani, M. B., & Diouny, S. (2013). Medical informatics in Morocco. *Yearbook of Medical Informatics*, *22*(01), 190–196.

19 Ibid.

20 Ibid.

## VIII. IMPLEMENTATION CONSIDERATIONS: BARRIERS & COUNTERSTRATEGIES

| BARRIER | FACILITATOR |
|---|---|
| ***Lack of digitization and continued use of outdated, analog data collection mechanism*** | Plan and implement a national health-data digitization scheme for paper-based systems, whereby analog data is transferred to digital databases and new, digital data collection mechanisms are put in place.[21] This plan will require funding and technical support; a health-data framework must also be put in place to ensure the proper governance of patient data.[22] This will require collaboration between health, ICT, and law stakeholders in Egypt to ensure the scheme functions properly and addresses national health policies and data laws.[23] |
| ***Lack of proper and standardized health data collection mechanisms*** | Create a unified digital data-collection standard across all healthcare providers to facilitate data transfer and synchronization among health entities. Implement and standardize consent practices for data collection by raising awareness among stakeholders about the necessity of obtaining patient consent to promote ethical data practices. |
| ***Lack of awareness among patients on the importance of sharing their data*** | Promote public engagement and education through awareness campaigns. Encourage patient participation in data sharing by developing resources that explain how patient data could be utilized, the benefits it could bring, and the measures that would be in place to protect their privacy. This must be done in an accessible manner that is easily understood by the patient.[24] |
| ***Poor health-data quality*** | Systems must be designed to ensure the quality of the data content, with procedures that minimize data inaccuracy and gaps.[25],[26] More effort should be put into producing quality medical reports by prioritizing patient-data digitization, unifying the dataset, and promoting complete data entry. Nurses and doctors involved in data entry must be trained and provided with clear guidelines and data definitions.[27] |
| ***Inefficient data storage and retrieval mechanisms*** | Establish interoperable standards for digital data storage to ensure that health data can be exchanged and accessed across different healthcare entities. Streamline data retrieval processes and establish decentralized mechanisms for data correction and retrieval at the local level within health centers. |

| | |
|---|---|
| ***Lack of data-sharing practices among health entities*** | Allow for data-sharing among entities and across medical providers. While data sharing is important, it is crucial to strike a balance between ease of access and data sovereignty. |
| ***Fragmented efforts and lack of collaboration*** | Promote collaboration among different health-sector stakeholders and other contributors that play a role in health-data governance, such as the ICT sector and lawmakers. |
| ***Inefficient legal frameworks*** | Implement an efficient health-data governance framework with health-data-specific laws and regulations that define data governance rules and promote the innovation of new technologies and AI, without restricting innovation, development, and advancement. |
| ***Limited technological infrastructure and essential resources*** | Address issues of limited technological infrastructure by providing the necessary equipment, funds, and support. |
| ***Lack of needed digital skills among frontline healthcare workers*** | Provide capacity building and continuous training for healthcare professionals on the concept of health-data governance. Provide technical training on data processing, protection, security and utilization to ensure that medical professionals are equipped to use emerging technologies. |
| ***Lack of enforcement of data laws*** | Establish a governing body to enforce, regulate, and oversee the governance of health data. |

21 Tamrat, T., Ratanaprayul, N., Barreix, M., Tunçalp, Ö., Lowrance, D., Thompson, J., ... & Mehl, G. (2022). Transitioning to digital systems: the role of World Health Organization's digital adaptation kits in operationalizing recommendations and interoperability standards. *Global Health: Science and Practice*, *10*(1).

22 Tamrat, T., Ratanaprayul, N., Barreix, M., Tunçalp, Ö., Lowrance, D., Thompson, J., ... & Mehl, G. (2022). Transitioning to digital systems: the role of World Health Organization's digital adaptation kits in operationalizing recommendations and interoperability standards. *Global Health: Science and Practice*, *10*(1).

23 Ibid.

24 DeMarco, J., & Nystrom, M. (2010). The importance of health literacy in patient education. *Journal of Consumer Health on the Internet*, *14*(3), 294–301.

25 Tamrat, T., Ratanaprayul, N., Barreix, M., Tunçalp, Ö., Lowrance, D., Thompson, J., ... & Mehl, G. (2022). Transitioning to digital systems: the role of World Health Organization's digital adaptation kits in operationalizing recommendations and interoperability standards. *Global Health: Science and Practice*, *10*(1).

26 Arts, D. G., De Keizer, N. F., & Scheffer, G. J. (2002). Defining and improving data quality in medical registries: a literature review, case study, and generic framework. *Journal of the American Medical Informatics Association*, *9*(6), 600–611.

27 Arts, D. G., De Keizer, N. F., & Scheffer, G. J. (2002). Defining and improving data quality in medical registries: a literature review, case study, and generic framework. *Journal of the American Medical Informatics Association*, *9*(6), 600-611.

## IX. NEXT STEPS

Given that data constitutes a key building block for implementing responsible AI technologies, it is imperative to start with the reform of Egypt's health-data collection system. The next steps should include the planning and implementation of a national health-data digital "relocation," whereby all analog data is transferred to digital databases, and new digital data-collection mechanisms are put in place. Egypt's transition into a fully digitalized healthcare system with data that is ready to be utilized by AI is necessary to ensure that we catch up with the global developments in relation to innovation and improving healthcare outcomes. Concurrently, there is a need to create a unified digital data-collection standard across all healthcare providers to facilitate data transfer and synchronization among different health entities. The establishment of an interoperable data format and the promotion of easier access will allow for the creation of a larger, unified health dataset, facilitating the implementation of AI technologies.

Routinely obtaining informed patient consent is also key to ensuring that when Egypt is ready to begin utilizing AI technologies on a national level, data is used in a responsible manner, with patients' full understanding of their rights.

Furthermore, an effective health-data governance framework is necessary for the implementation of AI technologies and proper data governance in the Egyptian health sector. Multi-sectoral collaborative efforts involving diverse stakeholders are needed to develop health-data-specific laws and regulations that define health-data governance rules and promote the innovation of new technologies and AI, without restricting innovation, development, and advancement. It is essential that a governing body is formed to ensure that these laws are enforced.

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