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AI in Healthcare in Africa

Artificial intelligence (AI) adoption in the healthcare sector offers opportunities to expand access to services across all levels of care on the African continent. Challenges such as insufficient resources, pandemic and infectious disease outbreaks, expansion of chronic disease and increasing costs pose challenges to overburdened healthcare systems. Compounded by existing structural inequalities, shortages of qualified healthcare professionals or supplies, barriers to accessibility, affordability and rural and urban divides raise critical barriers.

As a 'general purpose technology', AI can help in several ways both by addressing challenges and leveraging digital data to improve and expand access to quality healthcare. Use cases vary across the so-called "4P Medicine": Personal, Preventive, Participative and Predictive. The COVID-19 pandemic boosted the development of AI use cases in the medical sector including contact tracing algorithms and systems for access control to spaces. In some cases, the pandemic catalyzed telemedicine and digital platforms. Practitioners are using machine learning to detect the virus, diagnose individuals, limit the spread, provide personalized advice, test potential treatments, and more. In other cases, however, evidence indicates the pandemic has compounded historical divides and expanded the digital divide.¹

There are several practical challenges to AI adoption in the healthcare sector such as lack of quality data and technical skills, gaps in digital infrastructure and inclusion (including internet connectivity and uptake²), and in cases lack of trust and data governance. AI technologies bring risks such as potential for widening inequality, bias and discrimination, or lack of explainability. In particular, the healthcare sector brings policy and societal concerns, raising the need for privacy, security and safety. Opportunities must be balanced with careful testing and precaution.³

Governance pathways for responsible AI adoption involve approaches such as expanding digital infrastructure and literacy, data governance and data sharing frameworks, and strategic funding or partnerships to strengthen local startups and skills development. For example, Public-private partnerships (PPP), industry-academia cooperation, and platforms supporting data science and applied social good projects (e.g. Google's AI for Social Good program, Leap Labs/FAIR Forward fellowships, CMU Africa's Industry Innovation Lab) can catalyze AI pilots.

¹ Mothobi, O and A. Gillwald, (April 2021), "COVID-19 Compounds Historical Disparities and Extends the Digital Divide," Research ICT Africa. <https://researchictafrica.net/publication/covid-19-compounds-historical-disparities-and-extends-the-digital-divide/>

² Gillwald, A., & Mothobi, O. (2019). *A Demand-Side View Of Mobile Internet From 10 African Countries* (Policy Paper No. 7; Series 5: After Access – Assessing Digital Inequality in Africa). Research ICT Africa. https://researchictafrica.net/wp/wp-content/uploads/2019/05/2019_After-Access_Africa-Comparative-report.pdf

³ OECD Dev Talks, (April 19, 2021), 'Artificial Intelligence and Healthcare in Developing Countries: Game-changer or premature dream?'

The following lists indicate general, non-exhaustive trends which vary across countries.

Opportunities for AI adoption	Challenges to AI adoption
<ul style="list-style-type: none"> ● Diagnostic tools to support primary care providers for infectious and chronic diseases, e.g. University of Cambridge partnering with healthcare professionals in Sub-Saharan Africa to rapidly distinguish between potential outbreaks of COVID-19, and endemic respiratory diseases⁴ ● AI methods (e.g. natural language processing) to analyze health data held in the public sector, social media, and private sector such as airline ticketing for prediction of infectious and viral disease trends ● Chatbot offering COVID-19 information e.g. Digital Umuganda in collaboration with Rwanda Information Society Authority (RISA), Rwanda Biomedical Center (RBC) and the German Corporation for International Cooperation GmbH (GIZ) ● South African E-health start-up hearX Group offers a smartphone device for testing hearing ● Babyl (Babylon Rwanda Ltd.) supports medical triage and teleradiology for medical imaging diagnostics and research operated by Insightiv Technologies ● Detection of mosquito breeding sites in aerial images e.g. by Charis UAS. ● Personalized medical intervention, or preventive care, with early diagnosis ● AI for fraud detection to speed up insurance reimbursements. 	<ul style="list-style-type: none"> ● Lack of accurate, up to date, complete, representative data ● Low digital skills & literacy particularly in rural areas ● Disparities in digital inclusion where data from underserved communities not present not in digital records ● Gaps in digital infrastructure and internet coverage (31% mobile broadband coverage gap in Sub-Saharan Africa)⁵ ● Low digitization of data results in low data available for AI ● Lower accuracy of algorithms trained on foreign data not representative of African data ● Limited talent pool with practical experience ready to apply AI ● Limited availability of voice and text data across diversity of languages limits applications such as chat-bots ● Data collection and storage not standardized across data sets and data sources/providers ● Gaps in sectoral regulation and guidelines; need for coordination between ICT sector and health sector regarding data regulation ● Need for governance, policy and regulation for data privacy, security and safety. Need for capacity building to govern for 'responsible AI' adoption from system design, development, and operation ● Lack of trust in government limits public use of AI in some regions.

The Future Society thanks our Affiliate Kristophina Shilongo for her contributions to the report.

⁴ Developing a Covid-19 Diagnostic Tool for Sub-Saharan Africa. Retrieved from The Future Society and Global Partnership on AI, (2020), *Responsible AI in Pandemic Response*, <https://thefuturesociety.org/wp-content/uploads/2020/12/Responsible-AI-in-Pandemic-Response.pdf>.

⁵ GSMA, (2019), *Connected Society – Closing The Coverage Gap: How Innovation Can Drive Rural Connectivity*, <https://www.Gsma.Com/Mobilefordevelopment/Wp-content/Uploads/2019/07/Gsma-closing-the-coverage-gap-how-innovation-can-drive-rural-connectivity-report-2019.Pdf>