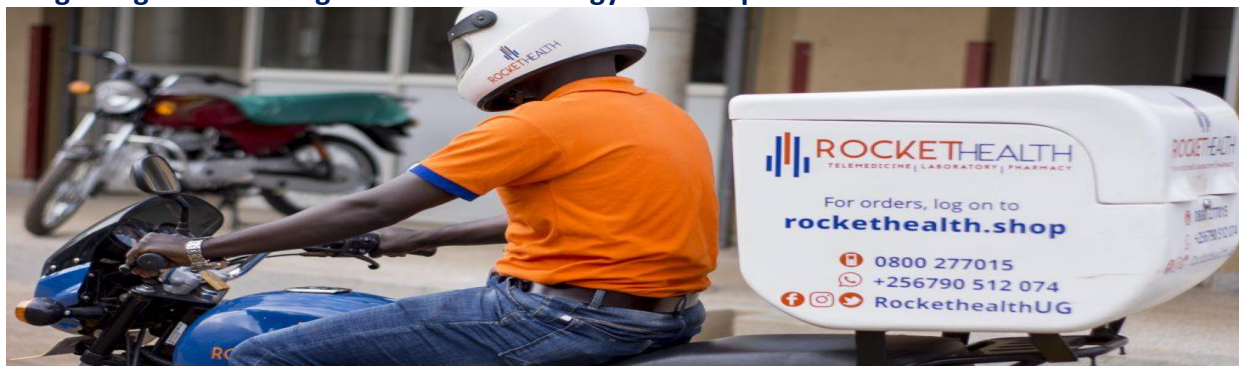


Integrating advanced digital health technology into the prevention and control of NCDs.



Rockethealth.org

Background

Digital health has increased potential to improve the health and well-being of individuals through the promotion of universal health coverage.¹ Universal Health Coverage is layered through the Tanahashi model designed to guide improved health system performance with pillars of; affordability; quality with effective coverage; demand for continuous and contact coverage; supply of commodities and equipment, human resources, and health facilities; and accountability with digital health interventions having potential to effect health service delivery.²

The East African Community (EAC) is home to 302.2 million people, almost equal to the USA population, and a Gross domestic product of \$312.9 billion. Composed of 8 countries, the EAC is home to member states comprising; Uganda, Kenya, Tanzania, Somalia, the Democratic Republic of Congo, Rwanda, Burundi, and South Sudan, and will soon add Ethiopia to the community.³ 40% of deaths in East Africa are attributable to NCDs and are expected to be the leading cause of death over the next 20 years.⁴ The four major NCDs (cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases) accounted

for 72% of deaths globally, and 85% were in low and middle-income countries.⁵

The policy brief documented findings from reviews of medical journals like JMIR publications, Frontiers, National Library of Medicine, and other scientific publishers. Also, other references were extracted from the East African Community website, World Health Organization reports, blogs, strategy guidelines and publications, private non-profit and for-profit websites, relevant articles on NCDs and best practices on news agency websites, and the DHIS2 website for best practices of digital health applications in East Africa.

What is digital health?

Digital health uses communication and information technologies in health service delivery to prevent the escalation of health risks and helps manage illnesses.⁶ The traditional approach to health service delivery entailing consultation, diagnosis, and prescription for new patients, and relying on history from stored files, previous examinations, and prescribed treatments for old patients are being alienated by new developments of digital health and the increased

¹ World Health Organization. Global diffusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth. Geneva: World Health Organization; 2016.

https://africahealthforum.afro.who.int/first-edition/IMG/pdf/global_diffusion_of_ehealth_-_making_universal_health_coverage_achievable.pdf (Accessed on 1 May 2024)

² World Health Organization. WHO guideline: recommendations on digital interventions for health system strengthening. Geneva: World Health Organization; 2019. <https://iris.who.int/bitstream/handle/10665/311941/9789241550505-eng.pdf?sequence=31> (Accessed on 1 May 2024)

³ East African Community. Overview of EAC, <https://www.eac.int/overview-of-eac> (Accessed on 1 May 2024)

⁴ Siddharthan, T., Ramaiya, K., Yonga, G., Mutungi, G. N., Rabin, T. L., List, J. M., Kishore, S. P., & Schwartz, J. I. (2015).

Noncommunicable Diseases in East Africa: Assessing The Gaps In Care And Identifying Opportunities For Improvement. *Health affairs (Project Hope)*, 34(9), 1506–1513.

<https://doi.org/10.1377/hlthaff.2015.0382> (Accessed on 1 May 2024)

⁵ Juma K, A. Juma P, Shumba C, Otieno P, Asiki G. Non-Communicable Diseases and Urbanization in African Cities: A Narrative Review [Internet]. Public Health in Developing Countries - Challenges and Opportunities. IntechOpen; 2020. Available from: <http://dx.doi.org/10.5772/intechopen.89507> (Accessed on 1 May 2024)

⁶ Ronquillo Y, Meyers A, Korvek SJ. Digital Health. [Updated 2023 May 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from:

<https://www.ncbi.nlm.nih.gov/books/NBK470260/> (Accessed on 1 May 2024)

need for individualized patient support. The role of a clinician is shifting from the knowledge expert who reviews history and current patient realities to offer solutions, to a communicator who relies on real-time information to guide an individual to have better health and wellbeing.⁷ Digital health encompasses a variety of health technologies such as; Self-monitoring devices like: Blood pressure machines; Wearables; Telemedicine; Electronic medical records systems; Online clinical training material; Multiple language digital clinical materials, Insightful media platforms disseminating health or NCDs information to the general public, Video reels of patient stories adhering to NCDs or other health ailment support system, Patient alert systems, Artificial intelligence and Predictive analytics monitoring systems, among others. The scope of application of digital health across the continuum of care has broadened with the advent of AI. However, it's notable that these two main determinants of digital health are fulfilled, they include; literacy of ICT and access to the relevant equipment and broadband internet connections. Digital health intervention categorizes the digital and mobile technologies used to support health system needs focused on these four groupings; **a). Interventions for clients, b). Interventions for healthcare providers, c). Interventions for health system or resource managers and d). interventions for data services.**⁸ The interventions are effective if they meet the digital determinants of health. Digital determinants of health (Chidambaram et al. 2024) are intrinsic factors to technology that affect social demographic discrepancies, health inequities and gaps of access, affordability, and quality health outcomes.⁹ The growing need for NCD services is

⁷ Butcher CJ, Hussain W. Digital healthcare: the future. *Future Healthc J.* 2022;9(2):113-117. doi:10.7861/fhj.2022-0046 (Accessed on 1 May 2024)

⁸ World Health Organization. Classification of Digital Health Interventions 1.0, A shared language to describe the uses of digital technology in health.

<https://iris.who.int/bitstream/handle/10665/260480/WHO-RHR-18.06-eng.pdf> (Accessed on 2 May 2024)

⁹ Chidambaram S, Jain B, Jain U, Mwavu R, Baru R, Thomas B, Greaves F, Jayakumar S, Jain P, Rojo M, Battaglino MR, Meara JG, Sounderajah V, Celi LA, Darzi A. An introduction to digital determinants of health. *PLOS Digit Health.* 2024 Jan 4;3(1):e0000346. doi: 10.1371/journal.pdig.0000346. PMID: 38175828; PMCID: PMC10766177.

¹⁰ Monaco A, Palmer K, Holm Ravn Faber N, Kohler I, Silva M, Vatland A, van Griensven J, Votta M, Walsh D, Clay V, Yazicioglu MC,

worsened by challenges like distance, cost, displacement, mobility, low knowledge levels of health experts, and emergencies. With solutions like mobile health, entities can use text messages and mobile phone applications to communicate with patients, and educate and improve disease self-management. Other positive aspects of digital health include; a). Telemedicine service provision, b). Remote patient monitoring, c). Medication and appointment reminders, d). Self-monitoring and wearable devices for recording signs and symptoms e). Digital tracking systems for key policy actors for efficient budget allocation, legislation, and emergency management with COVID-19 serving as an example of the application of digital health technologies across the continuum of care engaging various sectors within economies globally.¹⁰

Current Status of Digital Health in East Africa

In the EAC, digital healthcare is highly fragmented with entrepreneurs, healthcare researchers, software engineers, bioinformatics experts, data scientists, and social entrepreneurs experimenting with individualized ideas in the space. Regionally, records are stored in the national health information system - DHIS2¹¹ (in Uganda, Kenya, Tanzania, Rwanda, DRC, and Burundi) that's accessible remotely and other forms of electronic patient records, and most private for-profit, private not-for-profit and government facilities manage a records department with files for patients or records. Also, players within the telecommunication space like Safaricom Kenya's M-tiba digital health insurance product¹², Airtel Uganda and Prudential insurance¹³ through a product called Hospital Sente, Vodafone in Tanzania through

Ducinskiene D, Donde S. Digital Health Tools for Managing Noncommunicable Diseases During and After the COVID-19 Pandemic: Perspectives of Patients and Caregivers. *J Med Internet Res.* 2021 Jan 29;23(1):e25652. doi: 10.2196/25652. PMID: 33464206; PMCID: PMC7850778.

¹¹ Neumark, T. and Prince, R.J. (2021), Digital Health in East Africa: Innovation, Experimentation and the Market. *Glob Policy*, 12: 65-74. <https://doi.org/10.1111/1758-5899.12990>

¹² Morgan L, Case Brief: M-tiba digital health platform, https://webapps.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_749427.pdf (Accessed on 2 May 2024)

¹³ By Jjingo E, Airtel, Prudential roll out low cost insurance cover, 2023, <https://observer.ug/businessnews/77266-airtel-prudential-roll-out-low-cost-health-insurance-cover> (Accessed on 2 May 2024)

Vodabima¹⁴ offering mobile health insurance, and drone technology firm Zipline in Rwanda that provides seamless and quick transportation of samples, and medical supplies across remote locations in Rwanda¹⁵ and some digital health service providers like Rocket health offering telemedicine support,¹⁷ and doorstep sampling and testing of patients in Uganda. Despite this progress, little information exists on regulation, impact, and ways in which these modes of digital health have improved access to healthcare services regionally.

Use Cases of Digital Health Interventions in EAC

1. Private sector

- a) **M-tibe – Digital Health insurance in Kenya.** M-tibe is a digital platform created through a collaboration between Safaricom Kenya, PharmAccess, and Care Pay, by capitalizing on mobile technology and mobile money for inclusive health. Within 4 years of launch, it reached 4 million people through 1,400 health facilities, payers, and operators¹² through the Safaricom platform. Also, it allows users to enroll for the National Health Insurance Fund of Kenya, and can also strategically identify vulnerable populations like pregnant mothers and top up their accounts with additional funds for emergency treatment.
- b) **Telemedicine, door-step lab sampling, and delivery of medical supplies in Uganda.** Rocket Health is a digital health service and telemedicine operator in Uganda. In April, June, and September 2021, they had 113,791 telemedicine consultations with 75,651 in June 2021 during the Covid-19 pandemic. Also, they had 195,201 visits within 4 months of 2021 alone on their e-shop that dispenses prescribed patient medicine through doorstep delivery.¹⁶ All teleconsultations are documented within a custom-built electronic

¹⁴ Vodafone. Making digital inclusion a reality in Tanzania, 2021, <https://www.vodafone.com/news/digital-society/vodabima-tanzania> (Accessed on 2 May 2024)

¹⁵ The Guardian. Healthcare by air: Rwanda's life saving medical drone, 2022, <https://www.theguardian.com/global-development/gallery/2022/apr/20/healthcare-by-air-rwandas-life-saving-medical-drones> (Accessed on 2 May 2024)

¹⁶ Rocket Health, How Ugandan Telemedicine company grew during Covid-19 pandemic, 2021, <https://rockethealth.africa/wp-content/uploads/2022/01/Rocket-Health-Report-2022.pdf>

¹⁷ Kamulegeya L, Chikwata C, Lubega W, Musinguzi, D, & Bwanika J, 2021. Lessons Learnt from Initial Deployments of Rocket Health Telemedicine Service to Deliver Last Mile Medical Services in

medical record, integrated into the laboratory and pharmacy information system. Also, digital health service providers offer outpatient clinic support¹⁷ through an electronic scheduling and appointment referral management system.

2. Government

c) **Electronic medical records – DHIS2 in Rwanda.**

The Ministry of Health and Rwanda Biomedical Centre with support from Defeat NCD partnership and United National Institute for Training and Research created a five-year strategic plan for prevention and control of NCDs and reducing premature mortality by 25%. The health team aimed to scale screening of hypertension and diabetes. The effort which began in July 2022, screened 2.5 million individuals using a DHIS2 tracker with one year. The screenings ably diagnosed 130,662 in 2023 from 89,925 in 2020.¹⁸ An example of how digital data collection, management, and storage simplifies the detection of emerging health issues like NCDs.

3. Partnership between government and private sector

d) **Drone delivery for medical supplies and samples like blood in Rwanda.**

The Rwanda Ministry of Health partnered with Zipline to deliver medical supplies and samples to rural parts of the country. Zipline began by delivering 75% of blood samples in 2020 and does close to 100% of the rural deliveries today. The time for delivery of blood was slashed from two hours to 15 minutes for Rwinkwavu Hospital. Through its drone loading stations in Kayonza and Muhanda, they delivered 20,000 units of blood by making over 11,000 deliveries of which 30% were for emergencies.¹⁹ Due to various health interventions, 1,160 deaths per 100,000 live

Uganda.

https://www.researchgate.net/publication/351515566_Lessons_Learnt_from_Initial_Deployments_of_Rocket_Health_Telemedicine_Service_to_Deliver_Last_Mile_Medical_Services_in_Uganda

¹⁸ DHIS2. Diagnosing non-communicable diseases with DHIS2 in Rwanda for improved treatment access.

<https://dhis2.org/rwanda-ncd-tracker/> (Accessed on 2 May 2022)

¹⁹ Mhlanga M, Cimini T, Amaechi M, Nwaogwugwu C, & McGahan A, Reach Alliance. From A to O-Positive: Blood delivery via drone in Rwanda, 2021, <https://reachalliance.org/wp-content/uploads/2021/03/Zipline-Rwanda-Final-April19.pdf> (Accessed on 2 May 2024)

births in 2020, fell to 260 deaths per 100,000 live births in 2016 and reduced further to 203 deaths per 100,000 live births in 2022.²⁰

Recommendations

- a) **Draft a digital health strategy inclusive of NCDs.** Kenya, Uganda, Tanzania (expires in June 2024), and Rwanda, have digital health strategy guidelines,²¹ though DRC,²² Burundi,²³ and South Sudan²⁴ barely have a digital health strategy. The EAC digital strategy can be fine-tuned to country-specific needs and NCDs integrated into the relevant aspects of the country's strategic guidelines to improve UHC.
- b) **Leveraging private sector platforms to reach the public for NCDs and other health needs or other technologies.** Governments and private non-profit players can partner with private for-profit players to deliver digital health services to individuals locally, nationally, and regionally. Platforms like Telecom player subscribers, customers of businesses, and other relevant platforms can be engaged through existing business structures to empower them to prevent and control NCDs individually, and communally.
- c) **Integrate digital technologies into existing or modifiable health infrastructure.** Most countries within the region have robust healthcare infrastructure, with emerging chronic diseases alienated due to funding and other factors, so different players involved in prevention and control efforts can capitalize on the existing infrastructure to increase buy-in from health service providers, improve monitoring through tools like DHIS2 or provide continuous professional development through government or private sector platforms at scale.
- d) **Develop real-time monitoring and evaluation tools capable of identifying emerging health**

²⁰ Sserwanja, Q., Gatasi, G. & Musaba, M.W. Evaluating continuum of maternal and newborn healthcare in Rwanda: evidence from the 2019–2020 Rwanda demographic health survey. *BMC Pregnancy Childbirth* **22**, 781 (2022). <https://doi.org/10.1186/s12884-022-05109-9>

²¹ The United Republic of Tanzania, Digital Health Strategy July 2019 – June 2024, https://media.path.org/documents/Tanzania_Digital_Health_Strategy_2019_-2024.pdf (Accessed on 2 May 2024)

²² Vital Wave, EAC, Summary Findings from the National Consultation in DRC, 2023, https://vitalwave.com/wp-content/uploads/2023/10/Final-DRC_EAC-Digital-Strategy-

challenges. EAC member states can use tools or trackers to monitor specific NCDs or other chronic conditions and increase screening, diagnosis, and prevent premature deaths by providing early support for individuals with underlying risk factors.

- e) **Allocate national resources for emergency health needs like influx in NCDs and investing in digital health technologies.** Healthcare budgets allocated towards health should be increased with a proportion dedicated towards digital health and directed towards NCD prevention and control efforts at scale. The increased budgetary resources will help member states reduce premature deaths and cut costs of emergency health influxes.

Conclusion

Digital health is a fragmented intervention within the EAC with a handful of best practices identifiable in Uganda, Kenya, South Sudan, DRC, Somalia, Tanzania, Rwanda, and Burundi. However, some member states have piloted and implemented varying successful best practices of digital health in the prevention and control of NCDs. This brief provides a sample of best use cases and possible benchmarks that other countries can use to integrate digital health into NCD prevention and control. Other unexplored or detailed use cases include mobile messages for public health messaging, and reporting of incidences through simple dial codes without the need for internet. With the above recommendations and a summary of the status of digital health in the prevention and control of NCDs, its notable that gaps exist. EANCDA and its member alliances commit to perpetuate efforts to prevent and control NCDs working with the relevant stakeholders and advocating for governments around the region to capitalize on new technologies encompassed in digital health.

[National-Consultation-Brief-20230616.pdf](#) (Accessed on 2 May 2024)

²³ Vital Wave, EAC, Summary Findings from the National Consultation in Burundi, 2023, https://vitalwave.com/wp-content/uploads/2023/10/Final-Burundi_EAC-Regional-Digital-Strategy-National-Consultation-Brief.pdf (Accessed on 2 May 2024)

²⁴ Vital Wave, EAC, Summary Findings from the National Consultation in South Sudan, 2023, https://vitalwave.com/wp-content/uploads/2023/10/Final-South-Sudan_EAC-Digital-Strategy-National-Consultation-Brief.pdf (Accessed on 2 May 2024)