

Application of Emerging Technologies to Improve Maternal, Neonatal and Child Health in Africa



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Policy Brief

November 2024

Key Messages

- ✓ Several emerging technologies have the potential to sustainably improve maternal, neonatal, and child health (MNCH) outcomes in Africa.
- ✓ These technologies are being adapted to suit the continent's needs, including low-cost medical devices, mobile health (mHealth) solutions, telemedicine platforms, and point-of-care diagnostics.
- ✓ Barriers to developing and deploying these emerging technologies include limited infrastructure, resource constraints, and poor regulatory and policy frameworks.
- ✓ Greater investments in health infrastructure, such as establishing private-public partnerships and more comprehensive health information systems, can help scale up these innovative platforms and solutions for MNCH in Africa.

Context

Maternal, neonatal, and child health (MNCH) encompasses the health of women during pregnancy, childbirth and the postnatal period, and the health of new-borns and children. MNCH programmes are particularly important in low- and middle-income countries because of limitations in healthcare services. This is especially important in Africa, given that the region accounts for 69% of the global mortality ratio, and 57% of total deaths globally among children within the first 20 days of life. Applying emerging technologies will help African countries to improve access to MNCH services, including early detection and diagnosis of problems during pregnancy, childbirth, and infancy, and to enhance monitoring and surveillance. However, significant challenges exist in their implementation in Africa, which should be addressed so that proven interventions can be integrated into routine healthcare delivery for improved health outcomes.



To advance the benefits of emerging technologies in MNCH, researchers and innovators are developing adaptable, low-cost medical devices and mobile health solutions tailored to the African context.

Methodology

This brief is based on data and other information drawn from a review of existing sources, including scholarly and conference papers, books and reports, newspapers and reputable online literature. The brief also used information gathered during dialogues with experts on emerging technologies convened by the African Institute for Development Policy (AFIDEP) and the African Union Development Agency (AUDA-NEPAD) in August, September and October 2024. The meetings included the emerging health technologies expert meeting, biannual statutory meeting for the African Union High Level Panel on Emerging Technologies (APET) and a Regional Dialogue on Leveraging Emerging Technologies to Improve Healthcare Delivery Systems in Africa.

Findings

Emerging technologies present significant opportunities for enhancing MNCH in Africa. Artificial intelligence (AI), for instance, is crucial in enabling healthcare providers to identify high-risk pregnancies and forecast health outcomes, thus facilitating early decision-making and improved planning, and leading to better outcomes for mothers and children. Blockchain supports the secure management of electronic medical records and supply chain information as well as data integrity and privacy. Additionally, the Internet of Medical Things (IoMT) enables remote monitoring of vital signs and foetal movements through wearables, providing continuous support and facilitating better adherence to medical protocols.

Advancements in genomics and precision medicine are being applied to tailor healthcare interventions based on genetic profiles, and thus improve MNCH outcomes. Furthermore, 3D printing can produce low-cost medical

devices and prosthetics, while healthcare services are already using drones to transport medical supplies, vaccines, and biospecimen, improving access to services by mothers and their families living in remote areas. The incorporation of robotic surgery and telemedicine in MNCH not only minimises the invasiveness of procedures, but also reduces recovery times and healthcare costs.

Some of the challenges that limit application of these technologies in MNCH interventions in African countries include limited infrastructure, such as unreliable electricity and internet connectivity, and resource constraints, including budget limitations and competing health priorities in underfunded healthcare systems. Additionally, lack of trained healthcare workforce capable of integrating these technologies poses a significant barrier, particularly in rural and underserved regions. The unequal access to digital technologies, such as mobile phones that affects some low-income households and marginalised communities further restricts access to these innovations, while cultural and socioeconomic factors can influence perceptions and acceptance of technology-enhanced MNCH solutions.

To advance the benefits of emerging technologies in MNCH, researchers and innovators are developing adaptable, low-cost medical devices and mobile health solutions tailored to the African context. Strengthening health systems and workforce capacity can also help advance these benefits, alongside implementation science approaches that facilitate the effective integration of proven interventions into routine healthcare delivery. Engaging communities, empowering women, and addressing cultural barriers is also essential for the successful uptake and scalability of these technologies within healthcare systems across Africa.

Policy Recommendations

To promote the availability and utilisation of emerging technologies for MNCH in Africa, policymakers should consider implementing the following recommendations:

1. Develop comprehensive national e-health strategies that prioritise the integration of emerging technologies into MNCH programmes.

2. Establish clear regulatory frameworks and guidelines for the development, implementation, and evaluation of digital health solutions in MNCH.

3. Prioritise investment in healthcare infrastructure, including reliable electricity, internet connectivity, and telecommunication networks, to support the deployment of emerging technologies for MNCH.

4. Encourage interoperability and data sharing among different health information systems, platforms, and devices to facilitate seamless exchange of health information and improve care coordination in MNCH.

5. Invest in training, capacity building, and continuous professional development programmes to enhance the digital literacy, technical skills, and competencies of healthcare workers in MNCH.

6. Promote public-private partnerships (PPPs) and collaborations between governments, healthcare providers, technology developers, academia, and the private sector to accelerate the adoption and implementation of emerging technologies in MNCH.

7. Prioritise equity and accessibility in the deployment of emerging technologies for MNCH, particularly in marginalised and underserved communities.

8. Establish mechanisms for monitoring, evaluation, and accountability to assess the impact of emerging technologies on MNCH outcomes and health system performance.



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Conclusion

While emerging technologies hold tremendous potential to transform MNCH in Africa, it is crucial that African countries address the significant barriers to their implementation. Innovations such as artificial intelligence, blockchain, and IoMT can revolutionise health outcomes, but the challenges that hinder their uptake must be tackled. Additionally, ensuring equitable access to digital technologies for marginalised communities is vital, as well as fostering cultural acceptance of use of these advancements in MNCH services. African nations can reap the benefits of integrating these technologies into healthcare systems and significantly improve MNCH outcomes in their population by prioritising strategic investments, developing clear regulatory frameworks, and encouraging collaboration among stakeholders.

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For More Information, Contact:

Africa Institute for Development Policy (AFIDEP)

Malawi Office: 3rd Floor, Public Service Pension Fund Building,
P.O. Box 31024, Lilongwe 3

Kenya Office: 6th Floor (Block A), Westcom Point Building,
Mahiga Mairu Avenue, Off Waiyaki Way, Westlands

P.O. Box 14688-00800, Nairobi, Kenya | info@afidep.org
www.afidep.org

African Union Development Agency (AUDA-NEPAD)

230 15th Road, Midrand, Johannesburg, South Africa

+27 11 256 3600

info@nepad.org

www.nepad.org



HealthTech
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www.healthtechafrika.org