Application of Drones for Healthcare in Africa

Policy Brief

November 2024

Key Messages

- ☑ Drones, also known as unmanned aerial vehicles or unmanned aircraft systems, have a wide range of applications in healthcare, from delivering medical supplies to supporting disease surveillance.

- ☑ Drones can reach remote and underserved areas, thereby helping to advance equity in health systems.

- ☑ Underdeveloped regulatory frameworks and high operational costs prohibit the scale-up of drone applications in Africa's health system.

- ☑ African countries can advance their use in health by enhancing capacity on drone technology, including among policymakers and fostering partnerships across sectors as well as by improving supportive infrastructure.

Context

The integration of drone technology, (unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UAS), in healthcare systems across Africa can help address critical healthcare needs, particularly in remote and underserved areas. Drones can offer innovative solutions in healthcare through surveillance, photography, mapping, data collection, as well as transporting medical supplies. However, their deployment is hindered by inconsistent regulatory frameworks in African countries along with infrastructural, financial challenges, technical, social, and ethical challenges. Existing regulations are often geared towards military applications rather than civilian use in healthcare services. There is urgent need for supportive policies and regulations to enable African health systems to fully exploit this technology.

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> " Upholding ethical principles and values, safeguarding patient data, and considering gender disparities and social norms are crucial aspects of deploying drone technology responsibly and ethically in healthcare settings across Africa.

Methodology

The data and other information used to compile this brief were drawn from a review of existing sources, including scholarly and conference papers, books and reports, newspapers and reputable online literature. The authors reviewed the sources to identify opportunities, benefits, and challenges of using drones in the health sector. The brief was further enriched with information gathered during meetings 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

In Africa, drones have been used in a variety of ways that demonstrate their versatility in addressing healthcare challenges and enhancing the resilience of health systems in diverse contexts. Where used, drones have revolutionised healthcare logistics by enabling swift and efficient delivery of critical resources, transporting medical supplies, vaccines, and diagnostic samples to remote and underserved areas. Several case studies demonstrate how drones are facilitating healthcare delivery, emergency response operations, telemedicine support, medical waste management, health surveillance, and dissemination of health education. For example, in Rwanda, Zipline, a drone delivery service, has been delivering blood, vaccines, and other medical supplies to healthcare facilities in remote areas since 2016.

The capabilities and effectiveness of drones in healthcare delivery can be further enhanced with complementary technologies, such as telemedicine platforms, Internet of Medical Things (IoMT), artificial intelligence (AI), blockchain, robotics, augmented and virtual reality, data analytics,

and predictive modelling. These technologies synergise with drones to enable data-driven decision-making, remote consultations, efficient supply chain management, and enhanced disease surveillance. By integrating these technologies, healthcare systems in Africa can leverage the full potential of drones to streamline operations, improve patient care, and advance public health outcomes.

One of the key challenges that hinder the widespread deployment of drones in healthcare services across Africa is inadequate regulatory frameworks. Most of the existing frameworks are limited, unclear or inconsistent, and the licensing requirements and airspace restrictions create barriers to drone use in healthcare delivery. In addition, limited infrastructure (limited road networks, poor communication systems, lack of internet connectivity in remote areas), and high operational costs further restrict use of drones in Africa. Limited technical capacity among healthcare professionals, drone operators, and maintenance staff also undermine the potential of using drones in healthcare delivery. Other challenges include data security concerns, cultural resistance in some communities, and coordination issues among stakeholders.

Overcoming these barriers to ensure the successful integration of drones in healthcare systems requires concerted efforts to develop supportive policies, strengthen technical capacities, address privacy and ethical considerations, and proactively engage communities.

In navigating the social and ethical considerations on the use of drone technology in healthcare, it is essential to prioritise community engagement, cultural sensitivity, equity, privacy protection, and ethical standards. Building trust and ensuring inclusivity is paramount to fostering acceptance and adoption of drone-based healthcare services. Upholding ethical principles and values, safeguarding patient data, and considering gender disparities and social norms are crucial aspects of deploying drone technology responsibly and ethically in healthcare settings across Africa.

Policy Recommendations

To promote the effective and responsible use of drones in healthcare systems in Africa, policymakers should consider the following actions:

1. Develop clear and comprehensive regulatory frameworks on the use of drones in healthcare, including licensing requirements, operational guidelines, safety standards, and data privacy regulations.

2. Invest in capacity building to train healthcare professionals, drone operators, and support staff on the safe and effective use of drones in healthcare delivery.

3. Improve infrastructure and logistical support for drone operations in healthcare, including establishing dedicated drone ports, maintenance facilities, and charging stations.

4. Foster partnerships between government agencies, healthcare providers, technology companies, academia, and civil society organisations to leverage expertise, resources, and knowledge in the deployment of drones in healthcare.

5. Introduce incentive mechanisms, such as tax waivers and rebates, subsidies, or grants, to encourage investment in drone technology for healthcare applications.

6. Involve local communities, healthcare recipients, and stakeholders in the planning, implementation, and evaluation of drone-enabled healthcare services.

7. Establish monitoring and evaluation mechanisms to assess the impact, effectiveness, and efficiency of drone-enabled healthcare services.
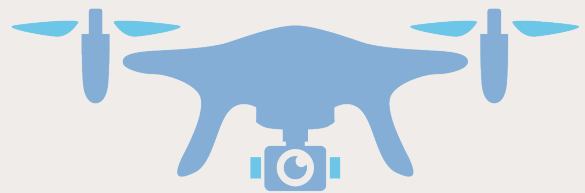
Conclusion

Harnessing drones for healthcare in Africa presents a transformative opportunity to overcome longstanding challenges related to access, delivery, and equity on the continent. Drones have enormous potential in playing a critical role in strengthening healthcare systems, enhancing emergency preparedness, and expanding the reach of healthcare services to marginalised populations, ultimately contributing to improved health outcomes and reduced disparities in healthcare access. However, for Africa to fully realise the benefits of drones in healthcare, it is important for countries to address regulatory, operational, ethical, and social challenges through the development of supportive policy frameworks, capacity building initiatives, infrastructure development, collaborative partnerships, data governance mechanisms, incentive mechanisms, community engagement efforts, and monitoring and evaluation processes.

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