Using digital health to address antimicrobial resistance

Nov 18–24 marks World Antimicrobial Resistance Awareness Week, a global initiative aimed at increasing awareness and understanding of this major global health problem. By 2050, antimicrobial resistance (AMR) is forecasted to cause 1·91 million direct deaths and 8·22 million associated deaths globally, with the highest rates anticipated in south Asia, Latin America, and the Caribbean. Vulnerable groups, including pregnant people and neonates, will be primarily affected. The misuse and overuse of antibiotics greatly contribute to the rise of AMR, worsen patient outcomes, and increase health-care costs. Digital tools are essential for strengthening surveillance, enhancing diagnostics, and optimising treatment approaches. To explore the effect and implementation of these tools, in this issue of *The Lancet Digital Health*, we present a three-paper Series investigating the potential of digital health technologies in addressing this growing threat.

Digital tools can aid early diagnosis of bacterial infectious disease, addressing the need for accurate diagnoses to prevent delays the infection recognition, improper risk stratification, and a poor understanding of local AMR patterns. However, many low-income and middle-income countries (LMICs) face challenges such as poor infrastructure, insufficient investment and human resources, underuse of available health-care data, and inadequate dissemination of information to regulatory bodies. According to the Mapping AMR and Antimicrobial Use Partnership, only 1·3% of the 50 000 medical laboratories within the networks of the 14 participating African countries do bacteriology testing. To implement effective and affordable diagnostic approaches and innovations for AMR, digital tools such as computerised decision support, mobile health applications, and wearables devices can have a crucial role. However, obtaining high-quality validated diagnoses is challenging, especially in LMICs where infrastructure deficiencies and poor system harmonisation impede implementation and innovation of these tools and technologies, as discussed by Timothy Miles Rawson and colleagues. Emerging innovative diagnostic tools rely on data connectivity and interoperability between health information systems to provide accurate and timely diagnoses, but suboptimal infrastructure hinders integration, highlighting the need for shared data platforms and interoperable electronic health records. Additionally, data security, privacy concerns, and patient safety affects the feasibility of these initiatives.

Tan and colleagues showed in a cluster randomised controlled trial in Tanzanian that a digital clinical decision support tool with diagnostic tests and mentorship reduced antibiotic prescriptions to 23·2% compared with 70·1% in the usual care cluster, without compromising patient safety. In a randomised controlled trial with 249 participants, Plechatá and colleagues showed that experiential virtual reality significantly increased intentions to use antibiotics prudently, more effectively than informational virtual reality or leaflets information.

Regulatory pathways for digital health tools are crucial for ensuring the quality, safety, and efficacy of diagnostic procedures. Fragmented regulatory frameworks can increase the burden on innovators, causing delays and added costs. In LMICs, where regulatory frameworks often have little capacity to ensure quality and safety, the absence of harmonised standards and approval processes across regions and low international recognition of regulatory authorisations further exacerbate these challenges. As presented by Jesus Manzano and colleagues, to accelerate the development and global access to diagnostic tools it is essential to improve international collaborations and simplify regulation through harmonisation programmes, such as the African Medical Devices Forum (AMDF), which coordinates medical devices and diagnostics regulation in Africa. The creation of the AMDF has strengthened regional regulatory cooperation by facilitating collaborative review processes and developing guidance. However, challenges such as insufficient funding and scarce resources are barriers to implementation, with only a few countries adopting AMDF-led harmonisation frameworks.

The battle against AMR requires a global effort, with digital health technologies having a pivotal role. Rigorous clinical trials and real-world evidence are crucial to prove the effectiveness of these tools. However, additional challenges in low-resource settings and in vulnerable groups should be addressed to ensure equitable and effective solutions. ■ *The Lancet Digital Health*

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