The Role of Healthcare Robotics and Diagnostic Robots in Strengthening Health Security and Optimizing Health Resource Management

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Abstract:

Global health threats, including the COVID-19 pandemic, resource shortages, population aging, and reduced U.S. health funding, highlight the urgent need to transform health financing and resource management. This transformation is not optional but essential to address interconnected health, climate, economic, and financial crises. In this evolving landscape, healthcare robotics and diagnostic robots have become critical technologies for building resilient health systems. All sectors and available resources must be mobilized to ensure equitable access to care. Digital technology is central to this revolution, not merely an alternative. It must be thoroughly integrated to drive innovation and transform every aspect of healthcare delivery. This review explores how healthcare robotics enhance health security by reducing infection risks, automating diagnostics, and sustaining care delivery under pressure. Case studies and policy analyses reveal how robotics improve resource management by streamlining logistics, increasing diagnostic accuracy, easing staff workload, and reducing costs. Technologies like UV disinfection robots, AI-powered diagnostic bots, and vaccine drones are now part of health systems globally, in both high- and low-income nations. The paper synthesizes insights from health economics, digital health, and innovation ecosystems, emphasizing the need for equitable access, strong regulations, and strategic integration. Ultimately, healthcare robotics are proving to be practical, transformative solutions, not future concepts.

Keywords:

Healthcare Robotics; Diagnostic Robots; Health Security; Health System Resilience; Digital Health; Health Innovation; Medical Drones; Automation in Healthcare; Health Policy; Pandemic Response.