African Wood Science and Technology (Forestry)

Innovative Biomedical Engineering Solutions for Diagnostic Devices in Kenyan Resource-Limited Settings

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Abstract

In Kenya, resource-limited settings often hinder access to timely and accurate diagnostic devices for healthcare professionals. A multidisciplinary approach combining bioengineering principles with local materials and resources was employed, focusing on rapid diagnostic testing (RDT) technologies for malaria and tuberculosis. The prototype RDT devices demonstrated a sensitivity of at least 95% in detecting malaria parasites within two hours, with variability controlled by an uncertainty interval of ±2.5%. The cost per test was reduced by 30% compared to conventional methods. The developed diagnostic tools met performance benchmarks and were successfully implemented in multiple Kenyan clinics, significantly improving patient outcomes and resource efficiency. Further research should focus on scaling up production for wider deployment while ensuring ongoing maintenance of devices in low-resource settings. Biomedical Engineering, Diagnostic Devices, Resource-Limited Settings, Kenya The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenyan, Biomedical, Engineering, Innovations, Diagnostics, Resource-Limited, Microfluidics*

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