

Leveraging Electronic Medical Records for Predicting Patient Treatment Outcomes at Ambira Sub-County Hospital. (A Data Analytics Framework for Quality Improvement in A Resource-Limited Setting)

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Abstract

Electronic Medical Records (EMR) have transformed healthcare delivery globally, yet their predictive potential remains underutilized in resource-limited settings, particularly in rural Kenya. This concept paper proposes a data analytics framework to leverage KenyaEMR at Ambira Sub-County Hospital for predicting patient treatment outcomes and driving quality improvement initiatives. Despite KenyaEMR's deployment of over 2,400 facilities nationwide, routine clinical data is primarily used for basic reporting rather than predictive analytics. The proposed framework comprises four interconnected phases: data infrastructure assessment and strengthening, predictive model development using machine learning algorithms, which include random forest, logistic regression, XGBoost, clinical decision support integration into existing KenyaEMR workflows, and establishment of a continuous quality improvement feedback loop. Drawing on successful implementations across sub-Saharan Africa, this framework aims to transform routinely collected data into actionable predictive insights. Expected outcomes include improved clinical decision-making through real-time risk stratification, optimized resource allocation by prioritizing high-risk patients, and enhanced quality improvement through data-driven feedback. While challenges related to data quality, infrastructure limitations, workforce capacity, and sustainability are acknowledged, context-sensitive mitigation strategies are proposed. This framework aligns with Kenya's Universal Health Coverage agenda and provides a scalable model for other sub-county hospitals in similar resource-constrained settings.

Keywords

Electronic Medical Records, Predictive analytics, Machine Learning, Quality Improvement, Resource-Limited Settings, KenyaEMR, Treatment Outcomes, Sub-County Hospital.