

TITLE: Longitudinal Clinical Investigation Intelligence System (LCIIS): An Intelligent Hospital-Based Laboratory Trend Analysis and Monitoring Platform

DESCRIPTION: Laboratory investigations and other monitoring data are continually generated for each patient during hospitalization, and stored in Electronic Medical Records (EMR), Laboratory Information Systems (LIS) and Hospital Information Systems (HIS), but are still seen as separate reports of information from one another in time. This requires manual review of serial laboratory values and vital signs over time which increases clinician cognitive load and the risk of clinically important changes being missed.

A laboratory value within the normal reference range, but showing a meaningful upward or downward trend, may identify a developing physiological failure, which may not be noticeable as readily if periodic readings of heart rate, blood pressure, respiratory rate, oxygen saturation, temperature, or urine output alone are used as indicators. This may not be recognized in time in busy inpatient settings, potentially detracting from clinical decision-making, patient safety and overall workflow.

A smart hospital-based platform that integrates serial laboratory investigations with physiological monitoring data, synthesizes disparate reports of clinical findings over time, and sends non-diagnostic alerts to clinicians at the time of clinical deterioration, is urgently required.

The aim is to create a software and hardware solution that exploited the hospitals' existing information systems, provided easy-to-understand trends of laboratory investigations and physiological variables, recognized key trends over time, and provided alerts and graphical representations of a patient's current clinical situation. The intention was to assist clinical trend recognition without removing the clinician's right to make diagnostic and therapeutic decisions.

The intention of these systems is to make longitudinal interpretation of available patient data less cognitively demanding, more workflow-integrated and to empower safer, more proactive inpatient care using a custom-built pocket-sized communications device with E-ink or small OLED display having Loud alarm and vibration, connectivity using SIM/Wi-Fi/Bluetooth (preferably WiFi) with Software alerts from the lab and One-click detail screen

REFERENCES:

1. <https://arxiv.org/abs/1806.00397>
2. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11491741/>

EXPECTED OUTCOME: Develop an intelligent monitoring platform that integrates laboratory and physiological data to detect clinical deterioration trends and provide timely alerts to healthcare professionals.