

CUSTOMER SPOTLIGHT

AI tool built with Posit decreases unexpected deaths of hospitalized patients by 26%

SUMMARY:

Unity Health Toronto has launched over 50 AI and analytics tools to improve hospital efficiency and patient outcomes, including a flagship Early Warning System called CHARTWatch. Built and deployed with Posit Team, CHARTWatch uses Python and R to analyze patient data and predict those at high risk of deterioration. This proactive approach led to a 26% reduction in unexpected deaths by enabling clinical teams to intervene earlier, prioritize patient care, and coordinate more effectively with ICU and palliative teams. To ensure lasting impact, the hospital's data science team focused on stakeholder collaboration and a secure, reproducible production environment to integrate these insights directly into existing clinical workflows.



ABOUT:

Unity Health Toronto has launched over 50 artificial intelligence (AI) and analytics tools to make better decisions, increase hospital efficiency and improve patient care.

INDUSTRY:

Healthcare

TECHNOLOGY USED:

Posit Team (Posit Connect, Posit Workbench, Posit Package Manager)

APPS/PRODUCTS/ SOLUTIONS DELIVERED:

Patient outcome predictions, planning for hospital bed capacity, medical imaging AI tools, assignment/scheduling

The Challenge:

Reactive Care and Clinical Deterioration

With roughly 8% of General Internal Medicine patients either passing away or requiring emergency ICU care, Unity Health Toronto's clinical and data science teams needed to shift from reacting to deterioration after the fact to identifying at-risk patients before a crisis occurred.

- **LATE INTERVENTION IN CLINICAL DETERIORATION:** Clinicians lacked reliable tools to identify which patients were at risk of unexpected deterioration before it became a medical emergency, contributing to unplanned ICU admissions and preventable patient deaths across the hospital's General Internal Medicine wards.
- **FRAGMENTED DATA AND NO SHARED INFRASTRUCTURE:** Patient data was siloed across separate systems for labs and surgical procedures, and the Data Science and Advanced Analytics (DSAA) team lacked a unified, secure environment to collaborate, manage package versions, and deploy real-time alerts into the high-pressure clinical workflow without disrupting existing shift schedules.



The Solution:

The CHARTWatch Early Warning System

In collaboration with frontline clinicians, the DSAA team used Posit Team to build and deploy CHARTWatch, an AI early warning system that analyzes laboratory values, vitals, and demographics across 20,000 patient visits to categorize each patient's risk as Low, Medium, or High.

- **REAL-TIME CLINICAL ALERTS:** CHARTWatch integrates directly into the hospital's infrastructure via Posit Connect, delivering automated risk notifications to clinicians' phones and twice-daily summary emails to charge nurses, enabling care teams to intervene earlier and coordinate more effectively with ICU and palliative teams without disrupting existing workflows.
- **26% REDUCTION IN UNEXPECTED DEATHS:** The transition from reactive to proactive care resulted in a 26% reduction in unexpected hospital deaths, demonstrating that a reproducible, clinician-collaborative approach to AI deployment can achieve measurable, life-saving outcomes at scale.

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