



Queensland –TUH Digital Sepsis Project

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Phase 1: To evaluate the New South Wales Sepsis Algorithms (Original and 7 options) for specificity and sensitivity in Queensland for adult sepsis patients using ieMR mirror data

Background

- Sepsis Kills >5000 people per annum
- No biomarker to accurately detect sepsis
- Difficulty in diagnosing sepsis in busy ED
- Clinical demand for sepsis recognition tool
- NSW developed revised St John sepsis algorithms which required validation in QLD

- Collaboration between CEQ and CEC, NSW
- Project @TUH in collaboration with PSQIS
- 12 ieMR sites involved

Ethics obtained: HREC/2020/QTHS/67897

Methodology

- Define sepsis for the purpose of the study
- Obtain statewide data: ieMR, QHAPDC and Auslab data
- Clean the data for statistical analysis
- Conduct exploratory data analysis
- Present Queensland data descriptive statistics
- Test the performance of NSW sepsis algorithms on Queensland data
- Present algorithm results to stakeholders

Sepsis definition for study used: Alternative sepsis cohort = (ICD10 + body fluids/cultures and ABs) **or** Sepsis 3 Definition

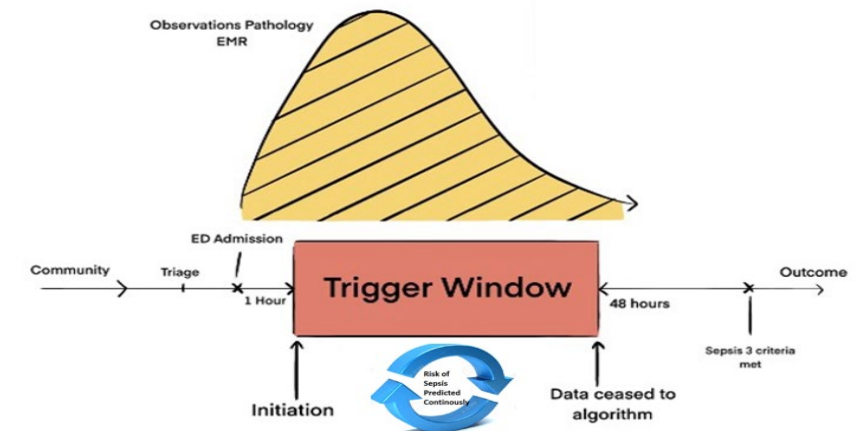
Results –Alt classification

Alert Type	Sensitivity	Specificity	PPV	NPV	AUROC
Original	70.64	90.94	19.10	99.03	0.81
Option 1	77.29	82.35	11.70	99.17	0.80
Option 2	58.78	94.50	24.46	98.70	0.77
Option 3	51.81	95.91	27.71	98.50	0.74
Option 4	58.97	94.48	24.44	98.70	0.77
Option 5	79.10	81.71	11.58	99.23	0.80
Option 6	77.40	82.33	11.71	99.18	0.80
Option 7	79.18	81.70	11.58	99.23	0.80

- Study population 1.1 million encounters with cohort of 26,753 patients identified as sepsis
- QLD algorithms performance comparable with NSW algorithms
- Data science methodology developed appears robust

Phase 2: To enhance QLD Algorithm using Artificial Intelligence

Algorithm Performance Timeline



- In this phase, development of AI enhanced predictive algorithm to detect sepsis and trigger alerts demonstrated the 'Trigger window'
- LightGBM decision tree-based machine learning model chosen

Next steps:

- Results will be published
- Clinical trials to test the algorithm before implementation
- Deployment in ieMR

Acknowledgements: Dr Amith Shetty, Aldo Saavedra & CEC, NSW Team

QLD Sepsis Algorithm Roadmap

