

# Capstone Presentation

## Enhancing timeliness of seizure diagnosis in critically ill children



### Team 5

Celeste Alaimo  
Adam Lampert  
Gabriel Mancuso  
Aimee Nguyen  
&  
Dr. Rishi Ganesan

# AGENDA

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1. What is the Problem?
1. Why is it occurring?
1. Interventions/Solutions.
1. Implementation plan.
1. Barriers and challenges.
1. Lessons Learned

## Problem Definition & Aim Statement



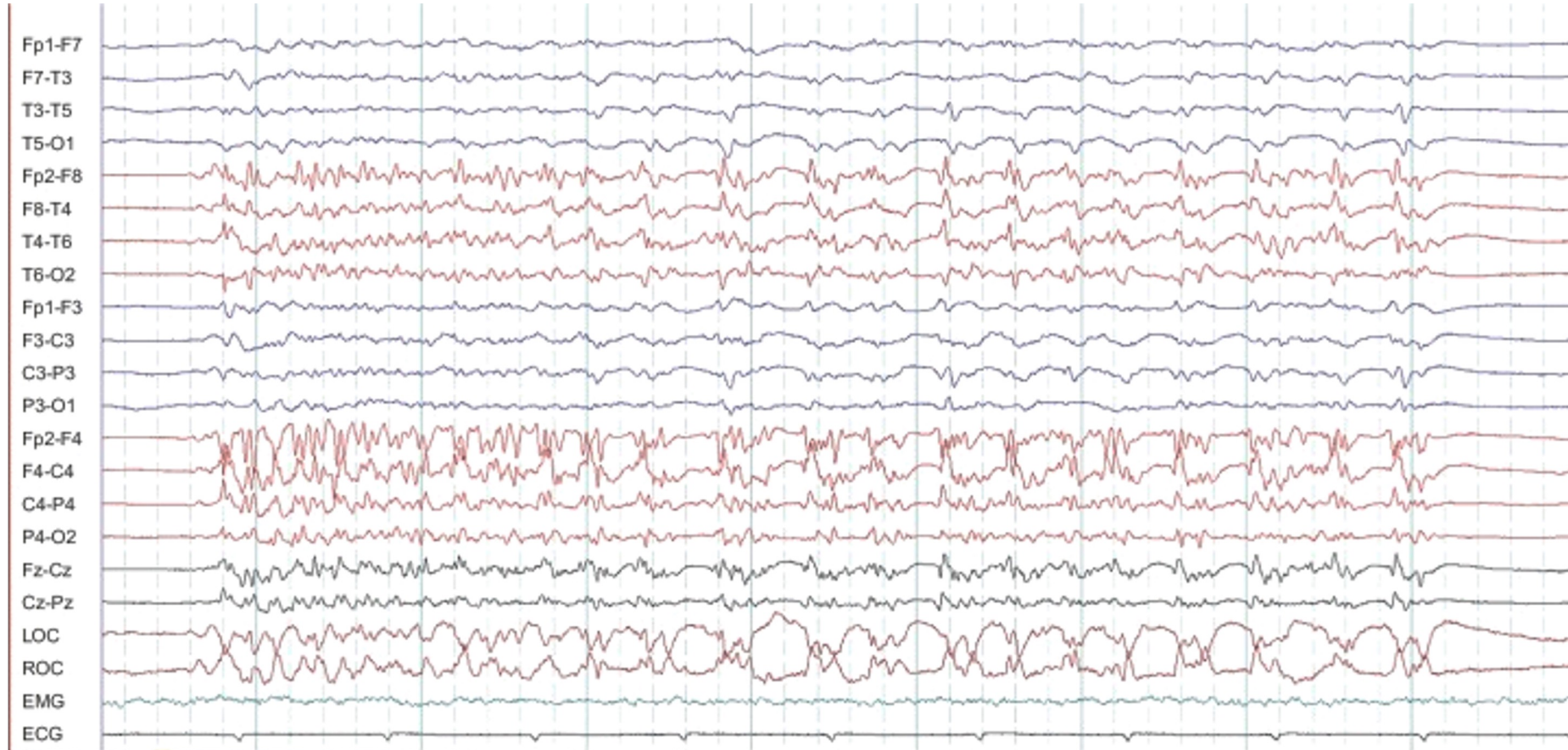
### Problem Identification:

In critically ill children undergoing 'continuous EEG monitoring', non-convulsive (a.k.a. subclinical) seizures are not diagnosed in a timely manner

### AIM Statement:

Within the next 2 years, increase the rate of timely diagnosis (within 1 hour) of seizures in critically ill children from  $< 25\%$  to  $> 80\%$  using simplified brain wave trends

# Brain wave (EEG) monitoring in critically ill children

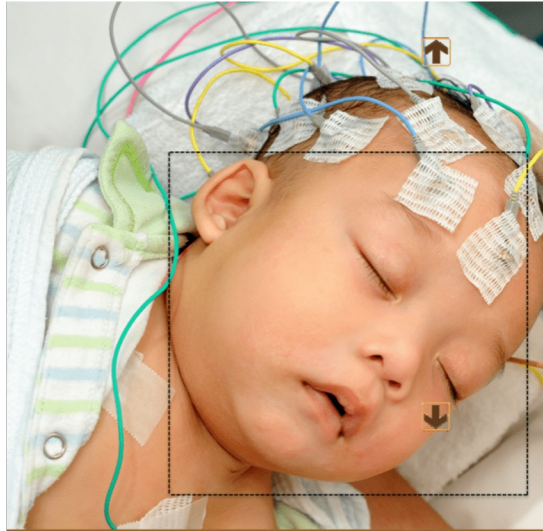


## Meet Emma...

Emma was admitted to the Pediatric ICU with a brain infection (meningitis) and is currently on 'continuous' EEG monitoring for detection of non-convulsive seizures



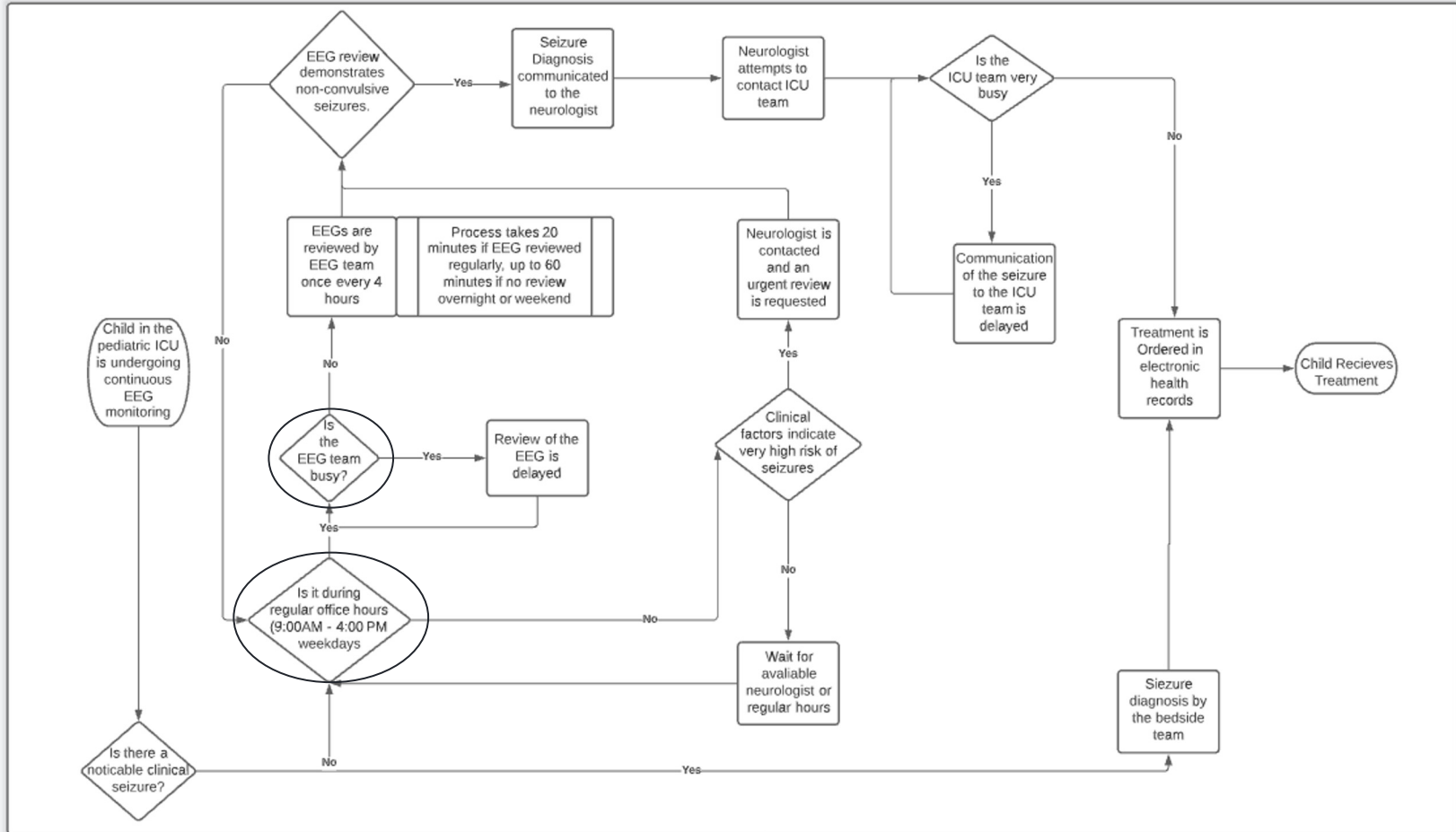
Emma's parents and grandma are really stressed with everything that is going on. They are at the bedside and getting frequent updates regarding her condition.



PCCU team tells the family at 8am the next morning - " We just found out that Emma has been having multiple seizures since 11 PM last night and we are now going to treat her"



# The EEG review process



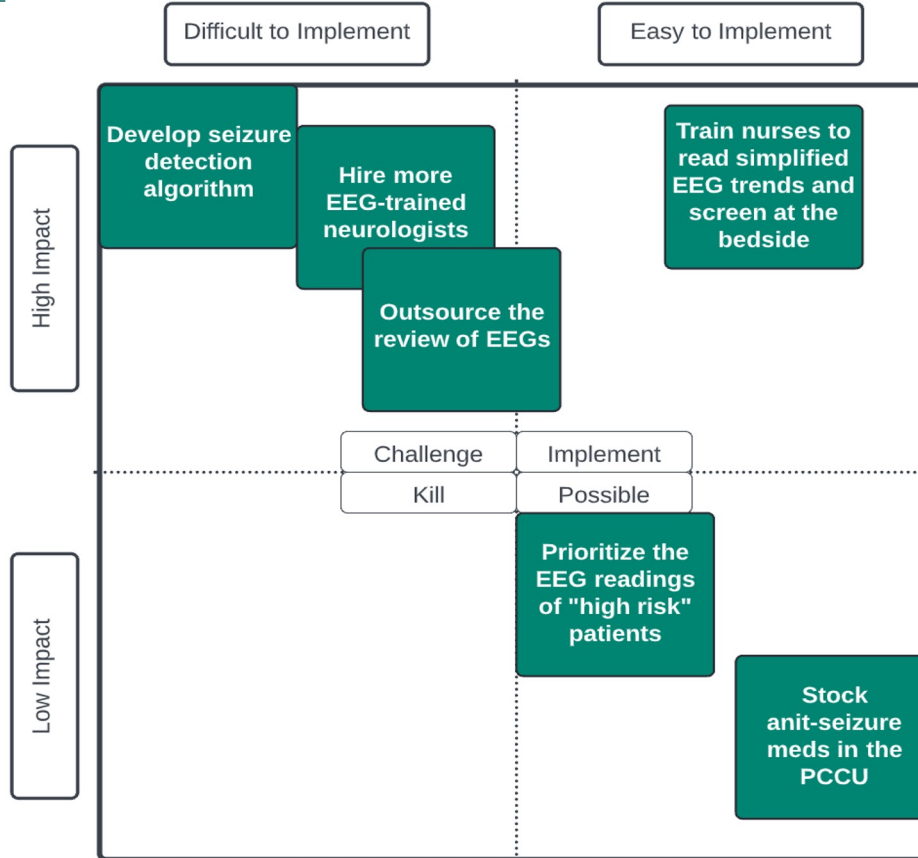
# Root Causes



Non-convulsive seizures are not being detected in a timely manner because...

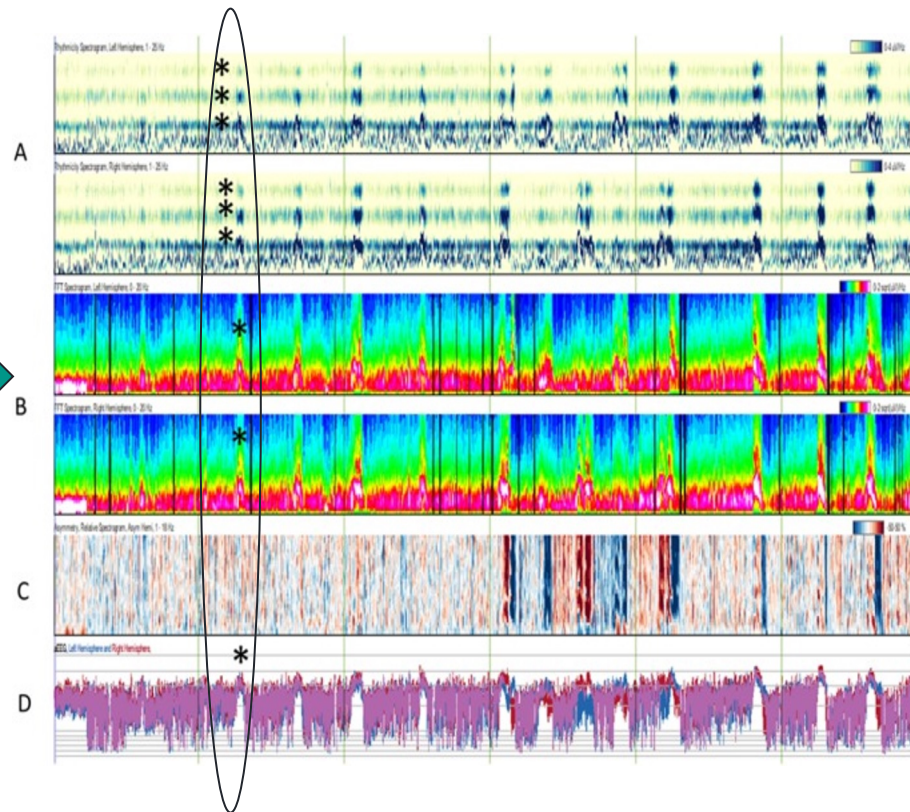
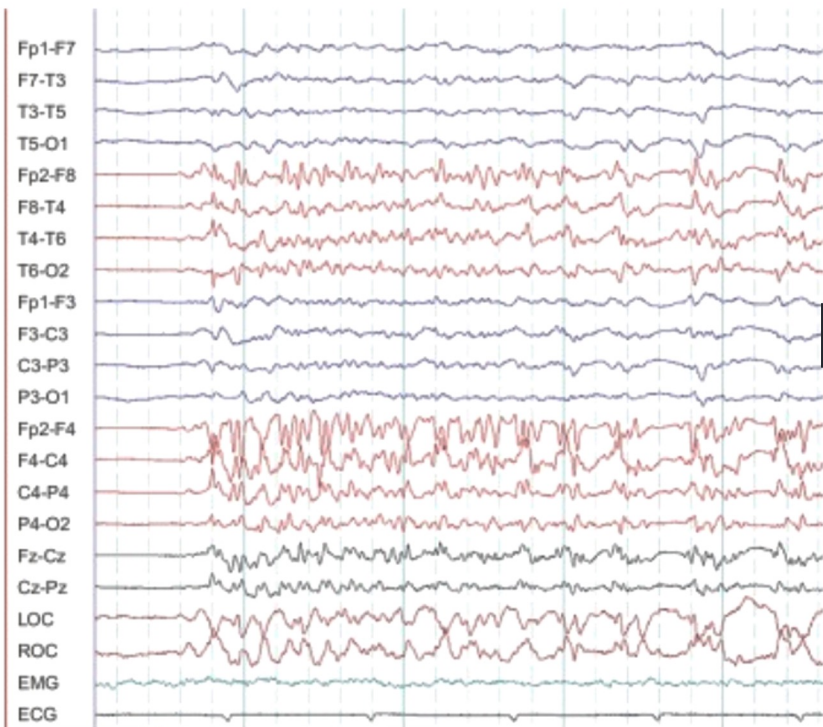
- Even though the EEG recording is continuous, it's only being reviewed intermittently and infrequently
- EEG is a complex signal that is **labour intensive** to read
  - A single child generates **5760** pages of EEG data per day
- Hospitals do not have enough **resources** to continuously review the EEG

# Interventions





# Interventions



# Implementation Plan

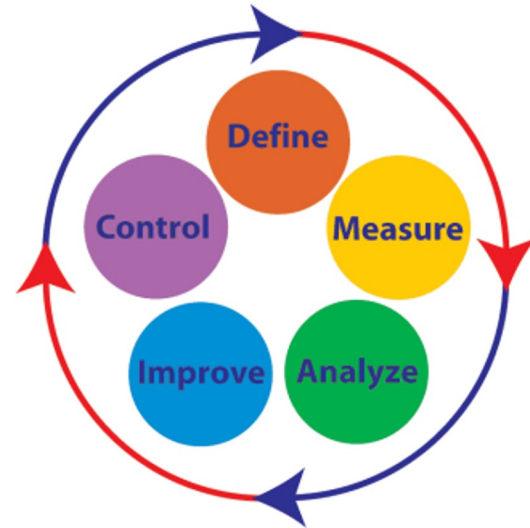


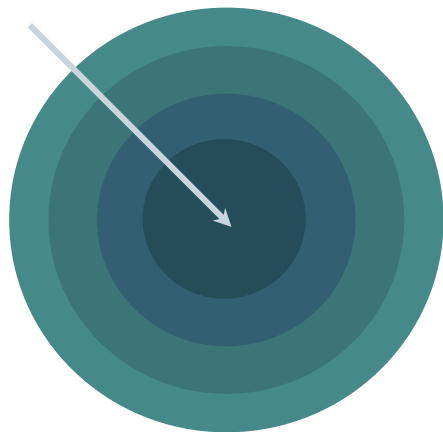
## PHASE 1 (July 2021 to March 2022) - COMPLETE

- Committee of stakeholders formed to lead initiative
- Surveys & interviews to better understand knowledge, attitude & practices
- Implemented strategies for improved communication between teams
- Anti-seizure medications stocked in the PCCU
- QEEG Education Modules developed
- NCS Action Pathway finalized

## PHASE 2 (April 2022 to Dec 2022) - UNDERWAY

- Training of bedside nurses ongoing
- Bedside performance review
- QEEG Super-users to supervise in each shift
- Ongoing review of process and outcome measures
- Program review & continuous quality improvement





01

## Outcome Measures

% of seizures in critically ill children undergoing EEG monitoring that get diagnosed within one hour

% critically ill children who receive timely treatment within two hours of seizure

02

## Process Measures

Accuracy with which nurses can identify seizures using simplified EEG trends

% Nurses who sign up for and complete the QEEG training modules

03

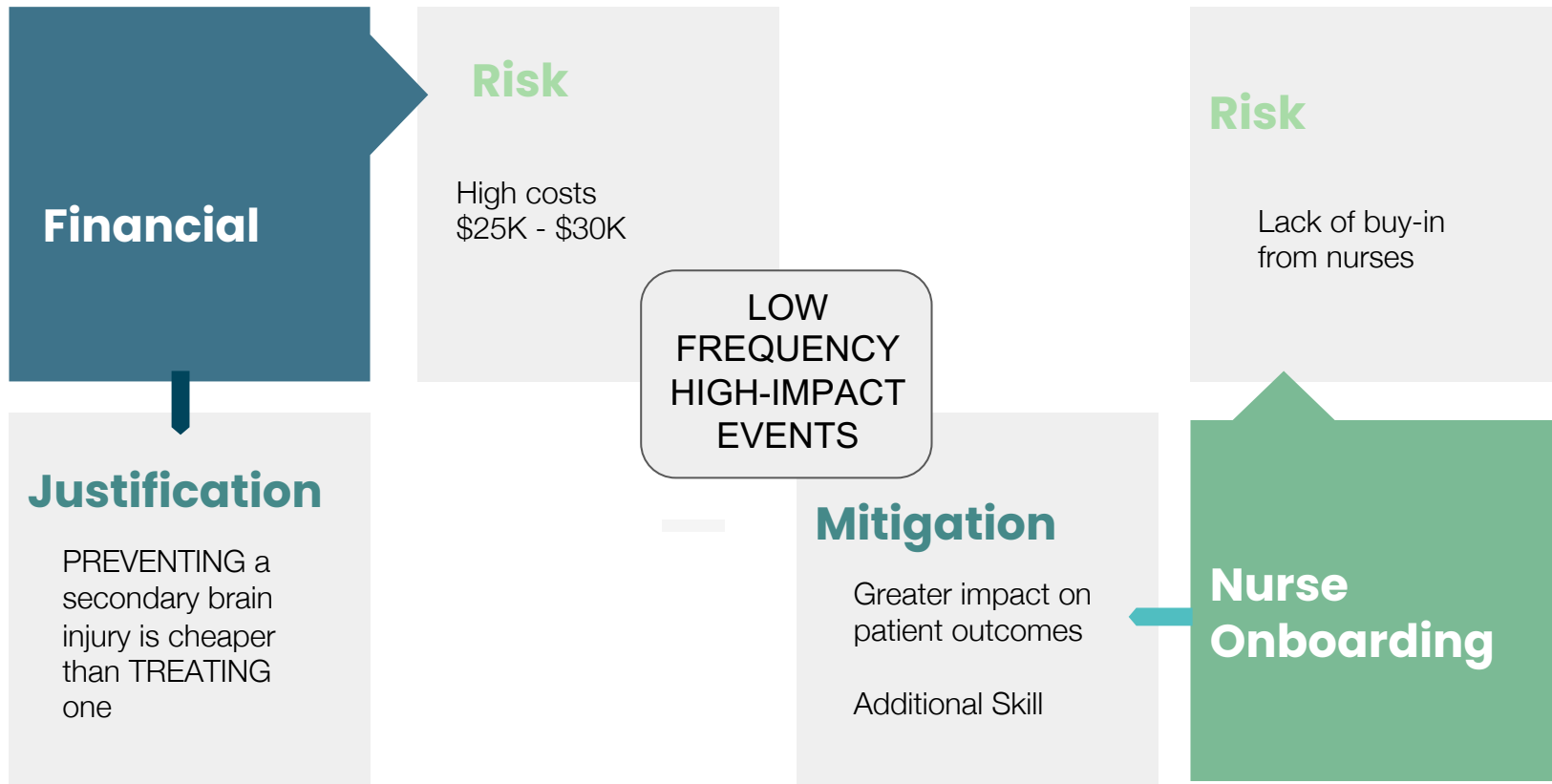
## Balancing Measures

% critically ill children receiving unnecessary anti-seizure medication

Costs of training to teach nurses how to accurately read QEEG

Perception of additional workload in nurses

# Barriers and Challenges



# Lessons Learned

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- Healthcare problems (& solutions) are complex
- Importance of involving all stakeholders in:
  - identifying the root cause
  - identifying suitable solutions
- Working on infrequent but high-stakes events

**Thank you for listening.**

