

# Safety Measures in the Epilepsy Monitoring Unit: An Organizational Assessment

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## Problem Statement

For EMU patients, does adherence to seizure safety measures compared to non-adherence of seizure safety measures influence the risk for seizure emergencies, injuries, and significant adverse events, including falls, status epilepticus, postictal psychosis, SUDEP, and near-SUDEP during the inpatient hospital evaluation?

## Project Objectives

- Identify safety gaps
- Provide recommendations for implementation plans

## Clinical Needs Assessment

Improving quality and safety concerns in the EMU.

A level-4 comprehensive epilepsy neuroscience center in central Ohio.

The EMU is an eight-bed unit, admitting:

- ten patients per week
- 40 patients per month
- on average 480 patients per year.

Key stakeholders include:

- Mentor
- System Medical Chief of Epilepsy
- Epileptologists
- Experienced RN

Key stakeholders witnessed incorrect or absent clinical use of the protocols.

## Significance

The purpose of the EMU is distinctive compared to inpatient hospital admissions, as the EMU goals are provocation of symptoms by withdrawing antiepileptic drugs (AEDs) and utilization of activation methods such as:

- sleep deprivation
- photic stimulation
- and hyperventilation placing individuals at serious risk for:
  - seizure emergencies,
  - injuries,
  - and significant adverse events, including falls, status epilepticus, postictal psychosis, SUDEP, and near-SUDEP (Sauro, et al., 2016a; Sauro et al., 2016b).

## Scaffolding the Project

### Theoretical Framework

Ray's Concepts:

- FORMAL AND INFORMAL EDUCATION PROGRAMS
- POLITICAL, LEGAL, AND ECONOMIC
- PHYSICAL, SOCIAL-CULTURAL, AND TECHNOLOGICAL

### Conceptual Framework

Donabedian's Quality Indicators:

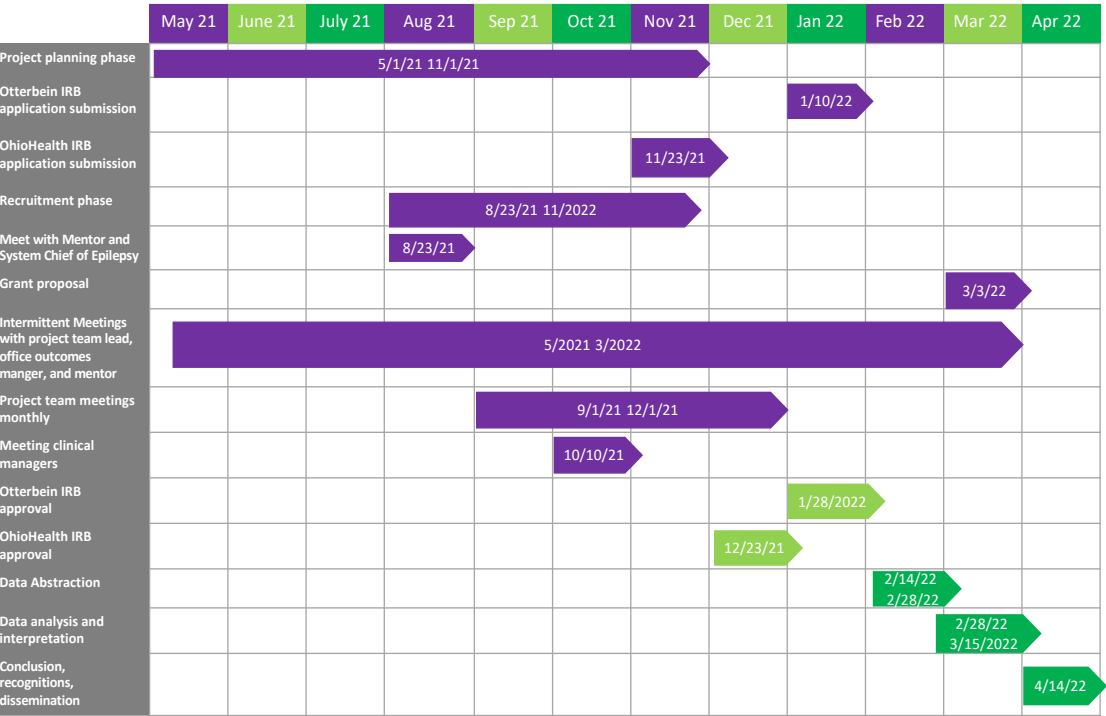
- STRUCTURE MEASURES
- PROCESS MEASURES
- OUTCOME MEASURES

## Instruments and Tools

A CHART AUDIT TOOL including:

- seizure safety quality indicators, and
- demographic data.

## Timeline



## Methodological Approaches

### Target Population & Sample

Eleven patients (N=11) with a total of fifteen (N=15) clinical generalized tonic-clonic seizures (GTCs) with electrographic epileptiform correlation were included for data abstraction.

## Data Analysis

- Microsoft Excel

Data Extractors:

- An experienced RN
- Project Leader
- Collaboration with the Epileptologist

## Analysis and Outcome Evaluation

## Results

### Demographics

Baseline Characteristics	n=11	%
Male	3	27.0
Female	8	73.0
Age		
20-29	2	18.2
30-39	3	27.3
40-49	1	9.1
50-59	3	27.3
60-70	2	18.2
Developmental Disability		
Cognitive	2	18.2
Memory	5	45.5
Attention	1	9.1
Unknown	5	45.5
Ethnicity		
African American or Black	4	36.4
American Indian or Alaska Native	1	9.1
Asian	0	0
Caucasian	6	54.5
Native Hawaiian or Other Pacific	0	0
I. slander	0	0
Two or more races	0	0
Declined to Specify	0	0
Employment		
Unemployed	3	27.3
Employed	7	63.6
Retired	0	0
Disabled	1	9.1
Education		
Highschool or less	1	9.1
Some college	0	0
College graduate	0	0
Graduate school	1	9.1
Unknown	9	81.8
Marital Status		
Married	6	54.5
Single	4	36.4
Divorced	0	0
Widowed	1	9.1
Seizure Frequency		
Daily	1	9.1
Several daily	0	0
Weekly	1	9.1
Several weekly	3	27.3
Monthly	2	18.2
Several monthly	5	45.5
Unknown	1	9.1

### EEG Tech

#### I Seizure Efficiency

- Time to EEG tech response
- Time to RN response
- Time to Airway, Breathing, Circulation assessment
- Time to recognize and call out vitals
- Time to RN verbalizing calling physician

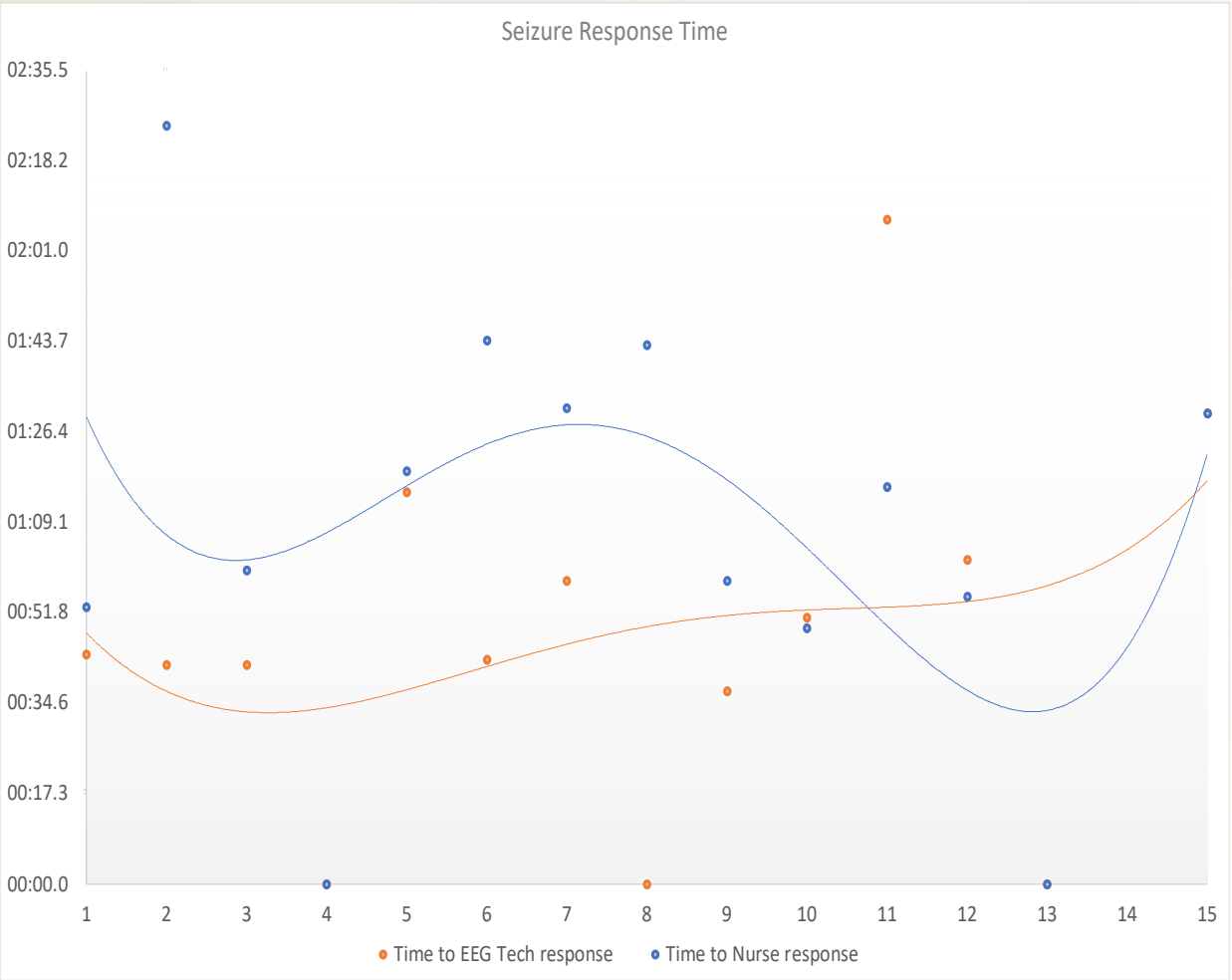


Figure 2. EEG tech and nurse response time

#### II GTC Management and Seizure Precautions

- Time to neurological assessment
  - eight (53%) of the nursing assessments were by the EEG techs and one (7%) by the nurses.
  - five GTCs(33%) had no neurological assessment.
- Time to suction
- Turn patient on side
  - the EEG tech turned two patients (13%) on their side
- Remove objects to prevent injury
- Side rails in place
- Oxygen
- Continuous pulse oximetry
  - eight GTCs (53%) did not have continuous pulse oximetry in place.
- Fall precautions
- IV access
- Continuous telemetry monitoring
- Camera visible to patient

Table 4

Seizure Safety Measures in the EMU

GTC Average Percentages	Suction				Oxygen	
	Suction Set Up on Arrival to Room	Time to Suction Initiation	Improper Suctioning	Suction Malfunction	Oxygen Set Up on Arrival to Room	Time to Oxygen Initiation
1	-	-	-	-	-	-
2	+	68 s	-	+	+	-
3	-	70 s	-	-	+	-
4	-	77 s	-	-	+	-
5	+	58 s	-	-	-	-
6	+	-	-	+	-	-
7	+	-	-	-	-	185 s
8	-	125 s	+	-	-	-
9	-	98 s	+	-	+	76 s
10	+	108 s	-	-	-	109 s
11	+	92 s	-	-	-	-
12	+	-	-	-	-	-
13	+	85 s	-	-	-	-
14	-	-	-	-	-	-
15	-	-	-	-	-	-
Average Percentages	53%	86.4s	20%	13%	27%	123.3s

Note: Average time from seizure onset to suction and oxygen initiation. Percentage of suction setup, improper suctioning, suction malfunction, and oxygen setup. EMU=Epilepsy Monitoring Unit; GTC=Generalized Tonic-Clonic Seizure.

NO one responded during two GTCs (13%).

## Limitations & Facilitators

### Limitations

- convenience sampling.
- managing incomplete or missing data.
- short time frame allotted for this project.
- data abstractors were not blinded to the study purpose and had difficulty managing confounding factors.

### Facilitators

- organizational support.
- formal and informal discussions with several epileptologists expressing interest in the project idea.
- developing the right team.
- the project leader exemplifying excellent facilitator skills through communication, prompt feedback, and maintaining sensitivity to the abstractor's needs.

## Recommendations

- Improve processes and practices using performance improvement efforts or quality improvement initiatives.
- Use of fishbone cause and effect diagrams, Pareto analysis charts, and root cause analysis (RCA) to identify possible causes and effects of seizure safety practice gaps.

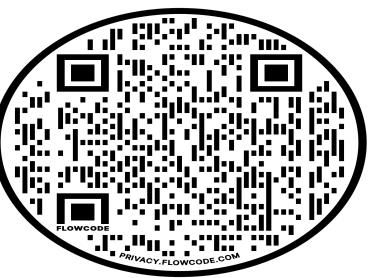
- Culture change
  - developing standard protocols
  - defining responder roles
  - providing formal and informal education
  - developing step-by-step nursing-driven protocols
  - face-to-face real-time feedback
  - develop debriefing opportunities.

- A multidisciplinary EMU committee.

- Quality improvement implementation plans.

An array of pertinent safety measure concerns was revealed and are consistent with the literature emphasizing prompt reassessment of safety protocols in the EMU to minimize seizure emergencies, injures, and significant adverse events including falls, status epilepticus, cardiac arrhythmias, and SUDEP.

## Executive Summary



## References

