The Repletion of Electrolytes and the Adaptation of Clinical-Decision Support Systems

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Project Overview

Type of research: A social and behavioral, human subjects research study.

Target Population: Healthcare providers in the ICU medical setting.

Purpose: To describe the drivers and barriers for implementation of computer guided protocols in lieu of provider-driven decisions.

Focus: Medical Decision-Making , Clinical-Driven Support Systems, and Supportive AI.

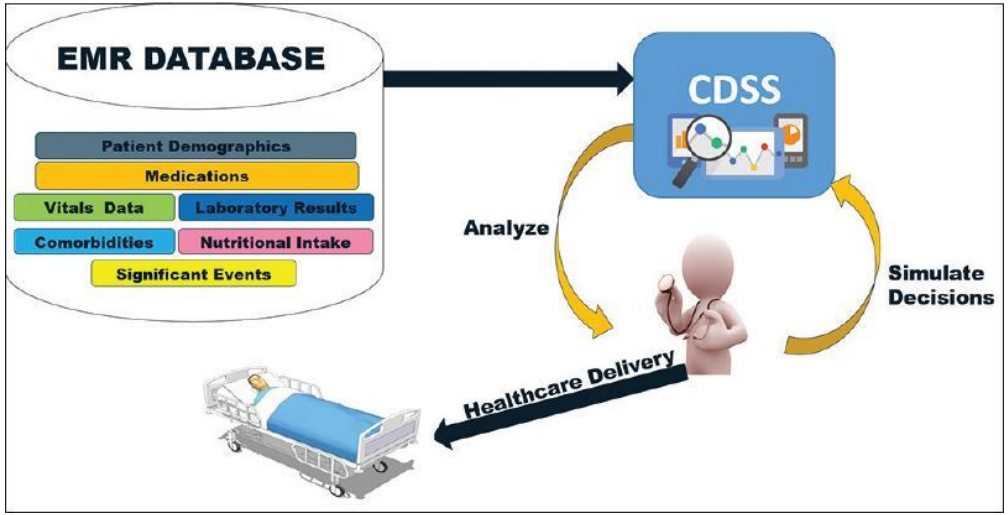
Data Collection: Via a 30-minute RedCap survey that employs several psychological tests.

Current project phase: IRB submission.

Definitions

Clinical-Decision Support Systems (CDSS):

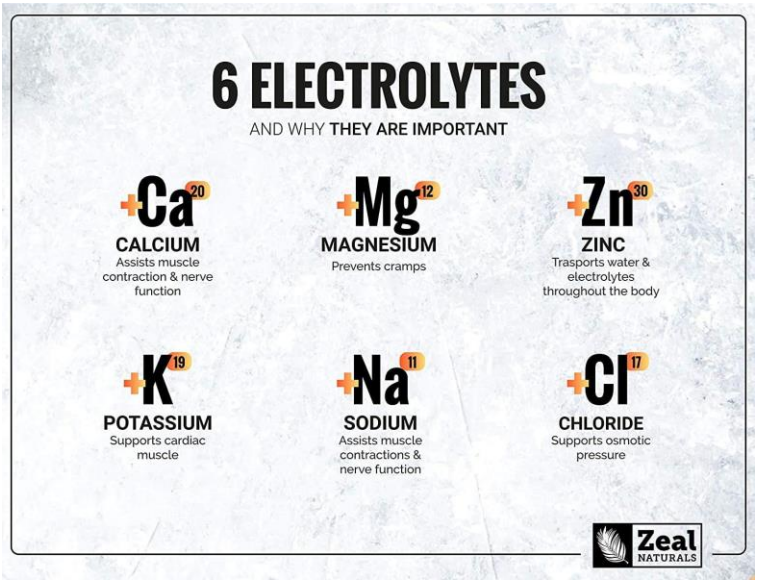
- Computer-guided programs that analyze electronic health records (EHRs) to offer healthcare providers patient-specific and evidence-based clinical “guidelines.”
- Has the purpose of promoting the best, most informed health care possible.



Definitions

Electrolytes:

- Acids, bases, and salts that, in water, dissociate into charged particles that assist with a plethora of physiological functions.
    - Create biochemical gradients that are essential for regulating water absorption, blood pH, muscle contractions, and nerve pulses.



Information about Medical-Decision Making

The medical decision-making processes of healthcare providers in the ICU is a dynamic whose in-depth description still awaits better understanding and qualitative characterization.

The average physician must make around 100 decisions per day, usually about patients' illnesses or conditions, or treatment routine.

CDSS driven medical-decisions may provide a more systematic approach to common medical tasks that can reduce heterogeneity for treatment routines.

Project Background and Significance

Routine medications and replacements, such as electrolyte repletion, are performed even when previous lab values fall within normal limits.

Economically, we would save approximately $1.25 million if the behavior that governs electrolyte repletion was reduced.

The introduction of CDSS designed with the cognitive biases of the providers in mind could be an avenue to reduce such superfluous behavior.

Project Details

Question: What is the potential acceptance of more advanced CDSS for healthcare providers in the ICU?

Objectives:

1. To identify the drivers behind decisions related to common medical task (electrolyte replacement).
2. To identify potential barriers for implementing CDSS.

Goals

1. Data collection method needs to be easy and have high potential to be disseminated.

1. Obtain waiver of written consent to avoid the collection of identifying health information.

1. Recruit ~100 subjects, with interim analysis after enrolling 25 and 50 individuals.

Project Design and Methods

- REDCap Survey:
  - Demographic data
  - Electrolyte repletion data
  - Clinical scenario and psychological data collection
    - NASA TLX (task load index)
    - STAI (State-Trait Anxiety Inventory)
    - IUS-12 (Intolerance of Uncertainty Scale – Short Form 12)
  - CDSS experience questionnaire
  - AI presentation

My Role and Current Project Status

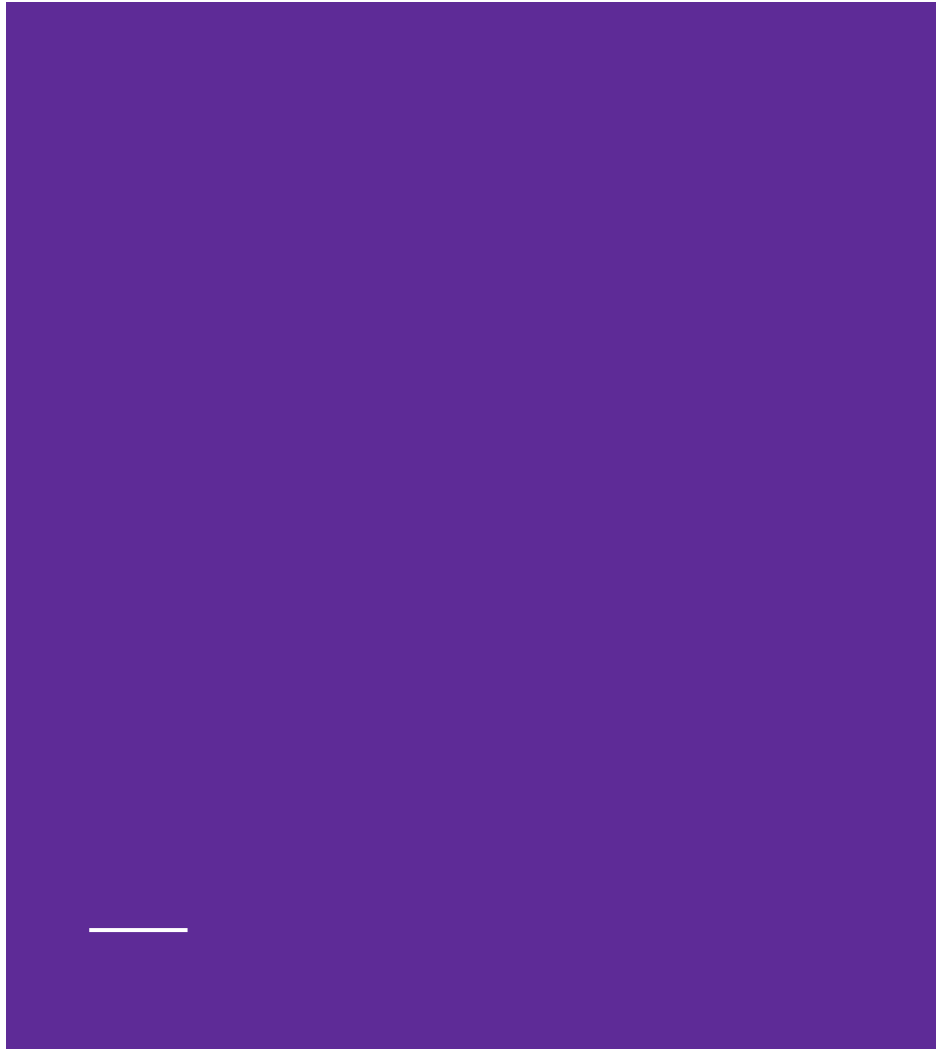
IRB

(Institutional Review Board)

Lessons Learned

Thank you!!!

Miles Meline
Gabe Brodeur
Kris Laudanski



Questions?