

# Hypoglycemia Reduction Quality Improvement Project

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## Background

- In 2022, the Centers for Medicare and Medicaid Services (CMS), added Severe Hypoglycemia as a new Clinical Quality Measure. (1)
  - Severe Hypoglycemia was cited by CMS as “one of the most common adverse drug events” that can be prevented by “careful use [of] antihyperglycemic medications”. (1)
  - Defined as a blood glucose reading of less than 40 mg/dL, with a hypoglycemic medication being given within 24 hours after the reading. (1)
- As a result, University Hospitals (UH) formed an interdisciplinary Hypoglycemia Reduction Project Team under their Quality Institute, a key part of its “Zero Harm” Initiative.
  - UH’s “Zero Harm” Initiative aims to “[ensure]” that patients have an exception experience”. (2)
  - Unifies initiatives to provide Safe and High-Quality Care.
- UH’s Hypoglycemia Reduction Team began a study to investigate determinants for Severe Hypoglycemia in order to guide what practices are best to prevent Hypoglycemic Events in patients.

## ZeroHarm

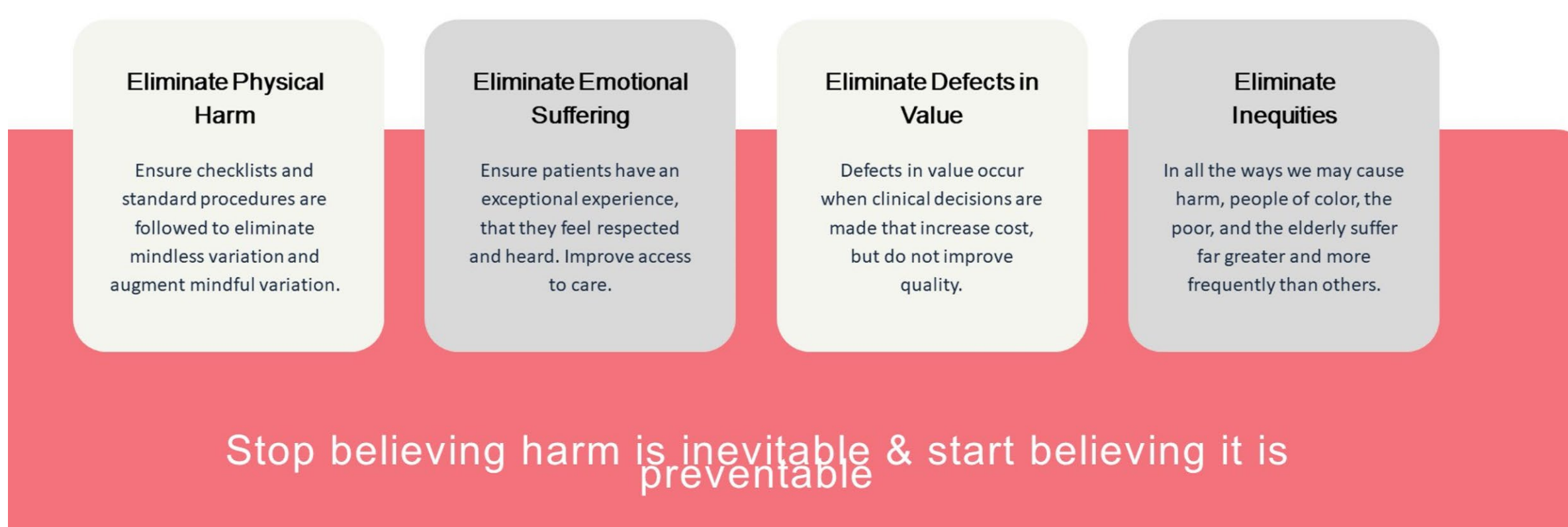


Figure 1: Graphic of UH’s Zero Harm Initiative. Taken from (3).

## Population

The population intended to benefit from the work of my Practicum and the work of the Zero Harm Hypoglycemia Reduction Team are current and future patients of UH.

- UH generally serves the population of Northeast Ohio.
- General objectives of the Zero Harm Initiative are to serve this population (2).

## Learning Objectives/Activities

In joining the Hypoglycemia Reduction Team as a Data Analyst for my Practicum, I had the following learning objectives:

- To learn the anatomy and overall process of an in-hospital performance improvement project, as well as see the overall leadership and management structure at work in a hospital.
  - To learn how to apply data to solve and improve processes within a hospital setting, as well as using that data to reduce patient harm and improve patient safety at the population level.
  - To learn how to educate and inform healthcare and public health practitioners on emerging process and population health issues and how to drive procedure change within a healthcare organization.
- To accomplish those objectives, I attended biweekly Team meetings and was assigned a Chart Review.

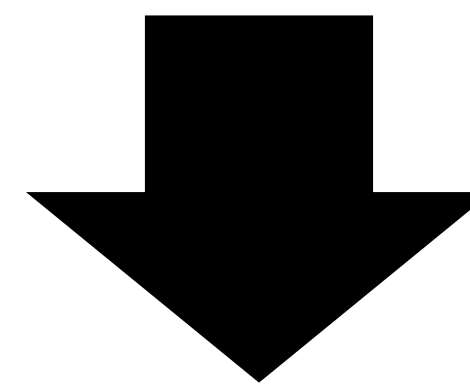
## Methods/Deliverables: The Chart Review Process

### Inclusion Criteria

- Be a patient above 18 years old at either UH Ahuja or UH Parma Medical Centers.
- Have at least one blood sugar reading of 55 mg/dL or below.
- Severe Hypoglycemia Episode occurred in an inpatient setting between July 2022 and December 2022.

Title:	GLU 55 System
Author:	Karen E. Snyder
Date Created:	5/26/23
Number of Patients(Rows):	829
Purpose:	List of patients meeting inclusion criteria for chart review of UH Ahuja and UH Parma Medical Centers

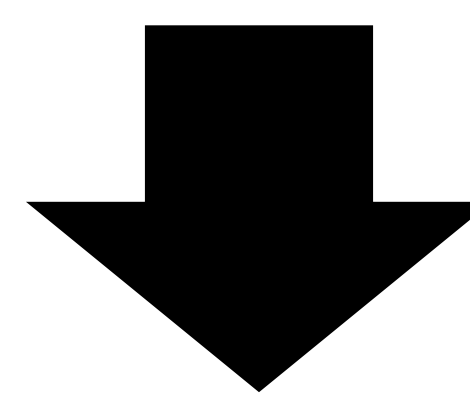
Table 1: Metadata for Table of Patients Meeting Inclusion Criteria.\*



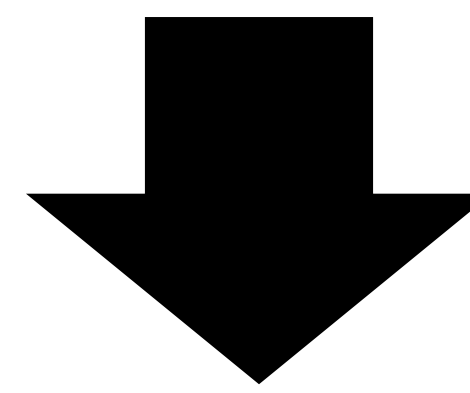
### Deliverable 1: Dataset of Review of Chart Through UH Cares Electronic Medical Record

MRN	AGE	SEX	BMI	UNIT	LOS (DAYS)	ALIVE AT TIME OF DISCHARGE	DM HX	DM TYPE	A1c	INSULIN PUMP (INPATIENT) Y/N	CGM (Y/N)	ACTIVE COMORBIDITIES	ENDOCRINE CONSULT	GLUCOSE LEVEL	HYPOGLYCEMIC EPISODES	RISK FACTOR FOR HYPOGLYCEMIA
				ICU				*Types				*Categories				MEDICATION-RELATED
				Surger				1				CHF/HF				NUTRITION
				y				2				SEPSIS/SEPTIC SHOCK				COMORBIDITIES
				CICU				3c				HEPATIC FAILURE				LAB ERROR
				SICU												OTHER/INSUFFICIENT DATA
				IM				Gestational				MALIGNANCY				
				OB/GY								MECHANICAL				
				N								VENTILATION/HYPOXEMIA/CYSTIC FIBROSIS				
												INFECTION				
												CIRCULATORY SHOCK				
												CKD/ESRD				
												PREGNANCY				
												CAD (TIA/MI/CVA/PVD)				
												OTHERS				
												PARKINSON/DEMENTIA/ENCEPHALO				
												LAPTHY/POLYSUBSTANCE ABUSE				
												/PSHYC/MS/DERMATOMYOSITIS/AL				
												LERGIC REACTION				
												TRAUMA/FALL/HIP REPLACEMENT				
												TRANSPLANT				
												PANCREATITIS/IBD/CHRON'S				
												SURGICAL ABDOMEN: SOB,				
												CHOLECYSTECTOMY, FIBUTLA				
												CECAL, GI BLEEDING, ILEUS, HITAL				
												HERNIA, PERFORATION				
												HEMATOLOGY DISCRASIA: SSS ,				
												DVT/PE, EPISTAXIS				
												NEUR O SURVERU: SPINAL ,				
												ANURISMA , SDH,				
												SPONDYLOSUESTS				
												CARDS: ARRYT/MIA/AAA				
												DKA				

Table 2: Layout and Inputs for Dataset from Chart Review.\*



### Deliverable 2: R Code Written to Clean Dataset



### Deliverable 3: Clean Dataset for RedCap

\*Metadata or example variables shown; full dataset is unavailable due to IRB requirements, as data is Protected Health Information covered by the Health Insurance Portability and Accountability Act (HIPPA)

## Early Results

While not yet fully complete, early findings of my chart review indicate:

- Many of the patients experiencing hypoglycemia episodes do not have diabetes and are not on antidiabetic medications
- For those that do have diabetes, there is often insulin given the night before with the episode occurring early in the morning.
- Many patients, if having a severe hypoglycemic episode, have multiple episodes in one visit.

## Lessons Learned

- The scale of evidence needed to guide evidence-based practices is large.
- Quality Improvement is a process that takes time, evidence must be collected to drive the change, and habits and protocols must be changed to truly work, all of which takes time.

## Future Directions

- Personally, analysis of my chart review is going to take place in a Capstone Project.
- UH will begin to plan and implement Hypoglycemia Protocol changes based on the evidence that is being collected.
- More studies of community hospitals is coming for UH.
- Integration of Best Practice Alerts for UH Epic.
- Justified need for GluCommander, which is AI that can alert providers to abnormal Blood Glucoses.

## Public Health Implications

- This is an example of evidence-based medicine, with community health data from a patient population being used to drive health-practices on both an institutional and individual level.
- Quality Improvement is a unifier for both Public Health and Clinical Practices, as clinical policy changes are often done on the institutional and community level.

## Acknowledgements

I would like to thank the University Hospitals Quality Institute and the Hypoglycemia Reduction Team for allowing me to work on this project and for their constant help, trust, and guidance. I would also like to thank both my preceptor, Karen Snyder, and one of my professors, Karen Boyd, for their guidance through the Practicum Process.

## References

- (1). Nievera, M., & Lefebvre, M. (2022). *eCQM New Measure Review: Hospital Harm -Severe Hypoglycemia, Hospital Harm -Severe Hyperglycemia*. Pioneers in Quality Expert to Expert Webinar Series. <https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/joint-commission-online/may-25-2022/-/-/media/03BA52FC67C8433696A2874056B783E7.ashx>
- (2). Megerian, C. (2021). *University Hospitals Strategy for the Future of Health Care* [UH Clinical Update]. University Hospitals. <https://www.uhhospitals.org/for-clinicians/articles-and-news/articles/2021/12/university-hospitals-strategy-for-the-future-of-health-care>
- (3). Pronovost, P. (n.d.). *Leading with Love: Join the Journey for Zero Harm*.