

# Evaluating the Influence of Vasopressor Therapy on the Accuracy of Capillary Blood Glucose Values

## The Problem

Hypoglycemia, hyperglycemia, and glucose variability have been shown to contribute to negative outcomes in critically-ill patients. Optimal glucose control in critically-ill patients requires clinical management based on accurate assessments.

While the accuracy of serum glucose values is well-validated, patients are most frequently treated based on capillary blood glucose values in clinical care. Capillary glucose samples are more cost effective and clinically feasible; however, several small-scale studies have suggested that the accuracy of capillary glucose values is decreased in patients receiving vasopressor therapy. Treatment decisions based on inaccurate values may result in under or over treatment and therefore hyper- or hypoglycemia.

## Aim/Goal

To determine if there is a difference between serum glucose and capillary glucose values in samples obtained when one or more vasopressor agents are infusing as compared to samples obtained when no vasopressor agents are infusing.

A secondary goal was to bring together a team of nurses and data scientists to look at Multiparameter Intelligent Monitoring in Intensive Care (MIMIC-II), an open-access de-identified ICU database from Beth Israel Deaconess Medical Center (BIDMC) maintained at the Massachusetts Institute of Technology.

## The Team

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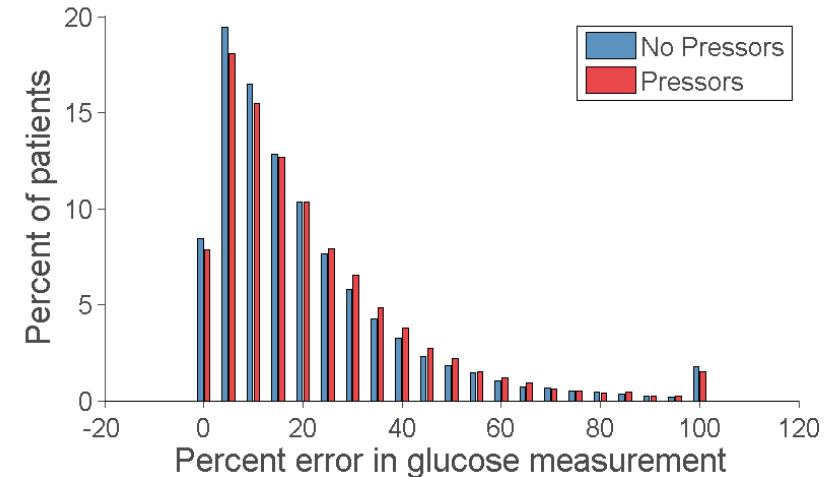
Finard 4 ICU  
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## The Interventions

**Sample:** All data was obtained from MIMIC-II, Version 2.6 database from 2001-2008. Cases in which serum glucose and capillary glucose values were documented within 1.5 hours of one another were included for analysis (n=33,951). Of these 23,171 samples were collected when the patient was not receiving intravenous vasopressor agents and 10,780 samples were collected when the patient was receiving one or more vasopressor agents.

The accuracy of capillary glucose values was compared between patients receiving vasopressor therapy and those who were not.

## The Results/Progress to Date



## Lessons Learned

Data quality is crucial for secondary health data use. Data is a key ingredient of learning health systems.

Clinical data analysis is complex and requires a multi-disciplinary approach and requires a profound understanding of the context of data capture and documentation.

Nurses who document data should spend time with data scientists to understand how data is archived and utilized. Data scientists should spend time with nursing to see how documentation systems function.

## Next Steps/What Should Happen Next

This study supports the need for future prospective research.

Additional analysis is needed to explore the relationship between confounding factors and the accuracy of capillary blood glucose values in patients receiving vasopressor therapy such as the specific agent used, number of agents used, and length of stay fluid status.

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