

TITLE

**Translating Glucose
Variability Metrics
into the Clinic via a
Continuous Glucose
Monitoring Graphical
User Interface for
Diabetes Evaluation
(CGM-GUIDE)**

Patrick Nelson

University of Michigan School of Medicine

Continuous glucose monitors (CGMs) are among the improved glucose sensing technologies developed to measure real-time glucose dynamics in Type 1 and Type 2 diabetes patients. Data collected from such monitors offer robust measurements of time-series glucose concentrations in intervals of 1-5 minutes¹, as opposed to the standard seven-point glucose profile, making CGMs ideal for analyzing dynamic changes in blood glucose. Metrics to interpret CGM data and connect them to clinical complications are essential for the most effective use of CGMs in long-term clinical care.

I will discuss currently employed metrics and present newly developed metrics, including slope transition densities. Given a dataset, CGM-GUIDE calculates several of the commonly used statistics: mean, standard deviation, time (and percent time) spent hyperglycemic, hypoglycemic, and in user-defined ranges, as well as the glucose variability metrics---MODD, CONGA(n), and MAGE---and presents them to the researcher all in one setting. Presenting these metrics in an aggregate, concise format facilitates researchers' ability to compare quantitative measures and glean insight into the connection between glucose variability and clinical complications associated with diabetes. Additionally, CGM-GUIDE displays graphical representations of the data: 1) a line plot of the raw data, including a display of user-defined threshold ranges, and 2) a histogram plot indicating the magnitude and frequency of monotonic increases and monotonic decreases in the glucose data, along with the time duration of each of those increases and decreases.

The Continuous Glucose Monitoring Graphical User Interface for Diabetes Evaluation provides a readily accessible and interpretable tool for describing CGM data, and is expected to be a significant asset for academic researchers as well as medical practitioners studying Type 1 and Type 2 diabetes.

Biography

Patrick Nelson, PhD, is a research faculty in the Center for Computational Medicine and Bioinformatics at the University of Michigan. His research is focused on developing quantitative tools for clinicians and computational models for researchers to improve our understanding of Diabetes. He has published over 40 papers, is an associate editor for 3 journals, and a recipient of a career award from Burroughs Wellcome. He also directs an NSF funded undergraduate research program in mathematical biology at UM and is actively involved with recruitment and mentorship of underrepresented groups.