# Best Practices in Continuous Glucose Monitoring in the Inpatient Setting during the COVID-19 Pandemic

## PRESENTED AS A LIVE WEBINAR

Thursday, May 6, 2021
11:00 AM - 12:00 PM

## ON-DEMAND ACTIVITY

Release date: 5/25/2021
Expiration date: 5/25/2022

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View faculty bios at https://www.ashp.org/COVID-19/COVID-19-Webinars/Best-Practices-in-Continuous-Glucose-Monitoring

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- ACPE #: 0204-0000-21-413-L01-P
- 1.0 hr, application-based

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# Best Practices in Continuous Glucose Monitoring in the Inpatient Setting during the COVID-19 Pandemic: Role of the Pharmacist

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# Learning Objectives

- Identify which hospitalized patients with diabetes and COVID-19 infections are candidates for continuous glucose monitoring (CGM) systems.
- Explain the benefits of the use of CGMs in hospitals during the COVID-19 pandemic on healthcare personnel and patients.
- Summarize the role of the pharmacist in employing CGM systems in appropriate hospitalized patients.

# Best Practices in Continuous Glucose Monitoring in the Inpatient Setting during the COVID-19 Pandemic

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## COVID-19 and Diabetes

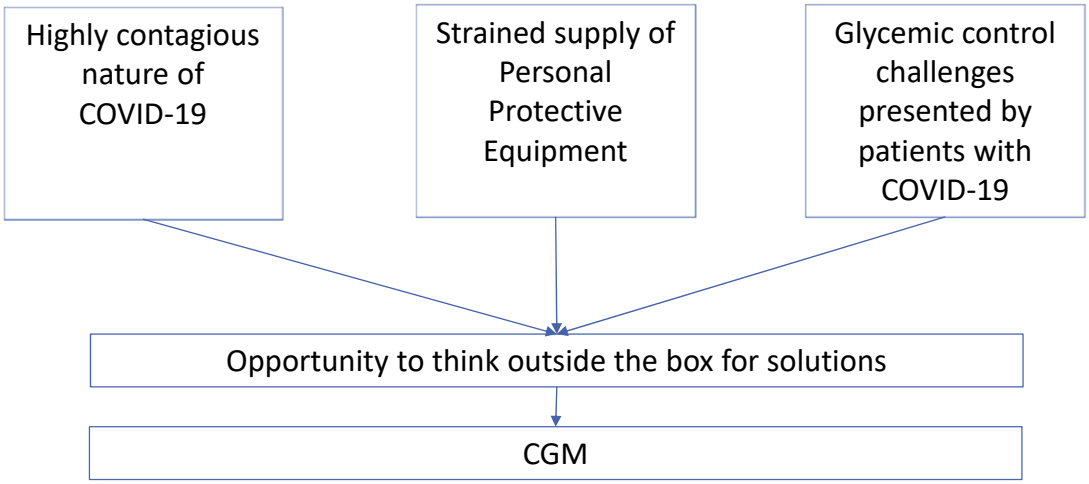
- Patients who were diabetic or had uncontrolled hyperglycemia experienced poor outcomes
  - Longer length of stay
  - Increased mortality

Bode et al. *J Diabetes Sci Technol.* 2020; 14:813-21.
Rosenthal N et al. *JAMA Netw Open*. 2020; 3(12):e2029058

## COVID-19 and Diabetes

- Medications administered to patients with COVID-19 likely to present glycemic control challenges
  - Hydroxychloroquine
  - Dexamethasone
  - Enteral nutrition

# COVID-19 and Continuous Glucose Monitors (CGMs)

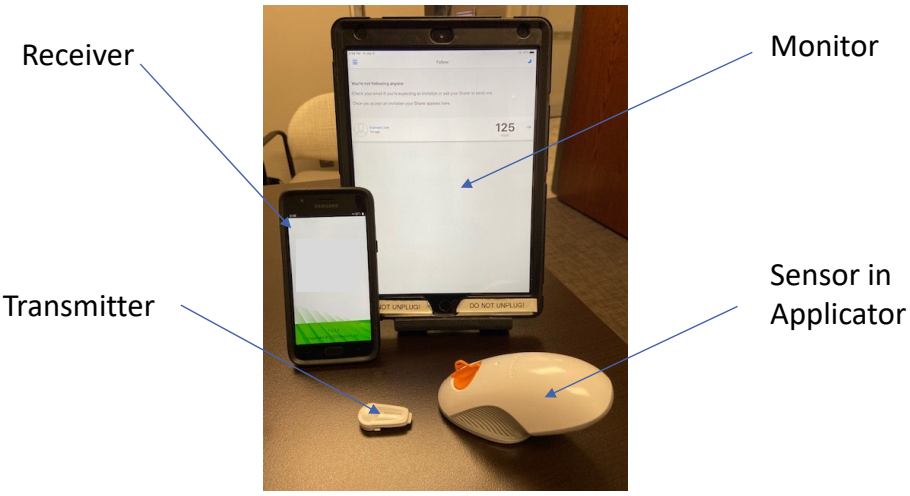



# What is a CGM?

- Wearable device that measures interstitial glucose levels at regular intervals
- Components
  - Sensor
  - Transmitter
  - Receiver


Abbott FreeStyle Libre. https://www.freestyle.abbott/us-en/products/freestyle-libre-2.html(accessed 2021 Apr 27)
Dexcom G6 CGM System. https://www. https://www.dexcom.com/ (accessed April 27, 2021)
Medtronic Guardian Connect https://www.medtronicdiabetes.com/products/guardian-connect-continuous-glucose-monitoring-system (accessed 2021 Apr 27)

# The Glucose Telemetry System




Spanakis E et al. *J Diabetes Sci Technol.* 2018; 12(1):20-5.

# Point of Care (POC) vs. CGM

| | POC | CGM |
|---|---|---|
| Sample | Capillary | Interstitial fluid |
| Sample Frequency | As needed | As frequently as every 5 minutes |
| Display | Glucose Value | Glucose value and direction |
| Alert | none | Some models |
| Use in Hospitals | Established | Nascent |

# Which CGM?

| CGM | Abbott (FreeStyle Libre) | Dexcom (G6) | Medtronic (Guardian Connect) |
|---|---|---|---|
| Calibration necessary? | No | No | Yes |
| Warm up period necessary? | One hour | Two hours | Two hours |
| Alerts | Must scan sensor | Yes | Yes |
| Time frame | 14 days | 10 days | 7 days |
| Interacting substances | Ascorbic acid, Aspirin | Hydroxyurea | Acetaminophen |
| Additional | Scan sensor with receiver for level | Continuous data stream in follow app | Share app |

Abbott FreeStyle Libre. https://www.freestyle.abbott/us-en/safety-information.html (accessed 2021 Apr 15)
Dexcom G6. https://s3-us-west-2.amazonaws.com/dexcompdf/HCP_Website/LBL015752+Rev+003+Artwork%2C+G6+Using+Your+G6+US+WEB.PDF (accessed 2021 Apr 15)
Medtronic Guardian Connect . https://www.medtronicdiabetes.com/sites/default/files/library/download-library/user-guides/Guardian-Connect-System-User-Guide.pdf (accessed 2021 Apr 15)

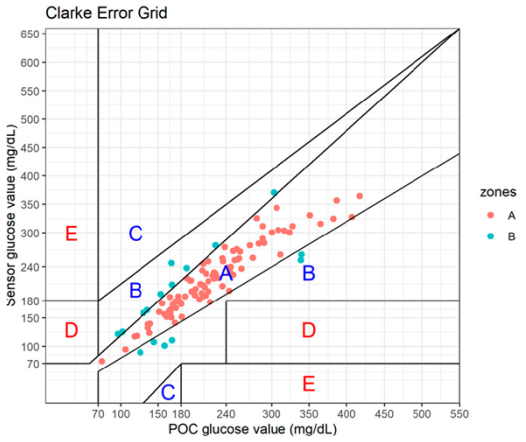
# CGM Safety

- Reutrakul et al.
  - Dexcom G6 applied to 9 non-ICU COVID-19 positive patients
  - After 24 hours CGM used for treatment if CGM/POC pairs correlated, POC was reduced from four to two times daily
  - Results
    - Mean absolute relative difference (MARD) 9.77%
    - Clarke Error Grid 84.8% zone A, 15.6% zone B
    - Median 3 POC tests/day

Reutrakul S et al. *Diabetes Care*. 2020; 43(10):e137-e138.

# CGM Safety

- Clarke Error Grid
  - Zone A: Clinically correct decision
  - Zone B: Clinically uncritical decision
  - Zone C: Overcorrection
  - Zone D: Skip a necessary correction
  - Zone E: Performing the opposite/ wrong correction




Reutrakul S et al. *Diabetes Care*. 2020; 43(10):e137-e138.

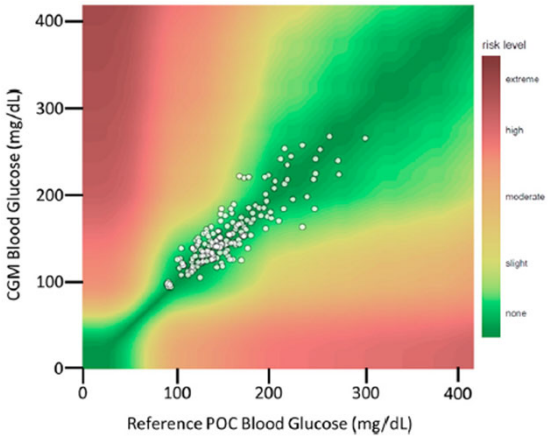
# CGM Safety

- Nair et al.
  - Blinded Dexcom G6 in 10 surgical patients
  - 178 postoperative pairings
  - Results
    - MARD 9.4%
    - Surveillance Error Grid 89% no risk zone

Nair BG et al. *Diabetes Care.* 2020; 43(11):e168-e169.

# CGM Safety

- Surveillance error grid
  - Allows granular detail when assessing two methods




Nair BG et al. *Diabetes Care.* 2020; 43(11):e168-e169.

# CGM Accuracy

- Sadhu et al
  - Medtronic Guardian Connect or Dexcom G6 CGM applied to 11 COVID-19 positive critically ill patients
  - First 24 hours CGM blinded, at 24 hours CGM validated for use to extend insulin infusion POC checks to every 4 hours using CGM values
  - Results
    - MARD
      - Medtronic Guardian Connect 13.1%
      - Dexcom G6 11.1%
    - Clarke Error Grid
      - Medtronic Guardian Connect 74.4% zone A, 25.6% zone B
      - Dexcom G6 86.4% zone A, 11.6% zone B, 2% zone D

Sadhu AR et al. *J Diabetes Sci Technol.* 2020; 14(6):1065-1073.

**Which of the following types of information would be most beneficial in establishing the safety and accuracy of continuous glucose monitors for use in the inpatient setting?**

a. **Clarke Error Grid, Surveillance Error Grid, MARD**
b. Clarke Error Grid, glucose tolerance test, MARD
c. Glucose tolerance test, Surveillance Error Grid, MARD
d. Clarke Error Grid, Surveillance Error Grid, glucose tolerance test

# Perceived Benefits of CGM

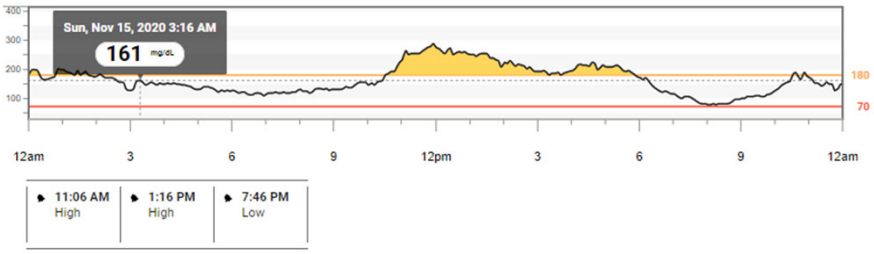
- Alerts – Multiple Customizable Alerts
  - Low (customized)
  - Urgent low (< 55 mg/dL)
  - Urgent low soon (≤55 mg/dL within 20 minutes)
  - High alert (customized)

Singh L et al. *Diabetes Care.* 2020; 43:2736-43.

# Perceived Benefits of CGM

- Trending/predictive ability


- Continuous data stream




Dexcom G6. https://s3-us-west-2.amazonaws.com/dexcompdf/HCP_Website/LBL015752+Rev+003+Artwork%2C+G6+Using+Your+G6+US+WEB.PDF (accessed2021 Apr 15).

# Perceived Benefits of CGM

- Potential to reduce healthcare workers exposure
  - Study in 9 ICU patients on insulin infusion able to reduce POC to 8.24 ± 3.04 tests/day
  - Study in 11 ICU patients estimated 60% reduction in POC tests using CGM during insulin infusion
- Both patients and staff receptive to use
  - French study in 53 general ward patients
    - 94% of nursing staff and 85% of patients found CGM useful
    - 64% of nursing staff felt CGM helped to anticipate blood glucose highs/lows

Agarwal S et al. *Diabetes Care.* 2021; 44:847-9.
Davis G et al. *Diabetes Care.* 2021; 44(4):1055-8.
Dillman C et al. *J Diabetes Sci Technol.* 2021: 1932296821994586

## Current Barriers to Inpatient CGM Use

- Lack of FDA approval for inpatient use for treatment
- Infrastructure lacking
  - Establishing glucose telemetry system
  - Connectivity challenges
  - Electronic medical record integration

## Current Barriers to Inpatient CGM Use

- Knowledge of how to use
  - Understanding CGM vs. POC values
  - Procedures
  - Suitable patients
  - Established protocols
- Cost?

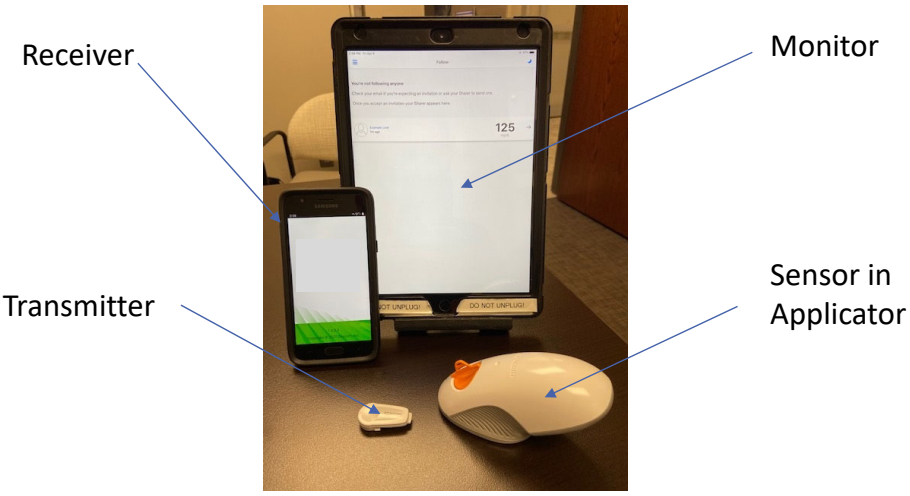
## Building a Process to Operationalize CGM

- Identify partners for collaboration in building process
  - Nursing, Prescribers, Diabetes Educators, Pharmacy, Information Technology, Bioinformatics, Lab, others
  - Identify end users who are process champions
- Establish team member responsibilities for various aspects of the operational process
  - Recordkeeping: necessary vs. ideal requirements
  - Applying device to patient: must monitor sensor site

## Building a Process to Operationalize CGM

- Build the clinical protocol with intent for use
  - Surveillance/prevention
  - Extension of POC checks for insulin infusion patients
  - Treatment
- Will need both provider and administrative support
- Educate, educate, educate

# Establishing the Glucose Telemetry System




Spanakis E et al. *J Diabetes Sci Technol.* 2018; 12(1):20-5.

# Establishing the Glucose Telemetry System

- CGM kit
  - Sequentially named to correspond to individual profiles built in Dexcom Clarity System
  - Components: sensor, transmitter, receiver (Android phone), charging cord, battery pack (non-ICU), instructions
  - Maintained by pharmacy

## Establishing the Glucose Telemetry System

- CGM application
  - RN applies
  - Pharmacy assists with setting up sensor, transmitter, and receiver
  - Diabetes educator available for trouble shooting
- Connecting to Clarity system
  - Individual profile “follows” facility profile

## Continuous Glucose Monitoring (CGM) Devices in the Hospital

**Guillermo E. Umpierrez, M.D., CDCES, MACP, FACE**

Professor of Medicine

Director Clinical Research, Diabetes and Metabolism Center

Emory University School of Medicine

Chief, Endocrinology Section

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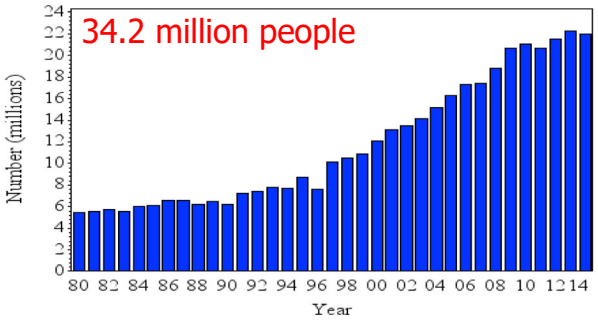
# Agenda

- Traditional glucose monitoring approach-SMBG
- How CGM addresses limitations of traditional approaches
- Evidence of CGM efficacy
- CGM use during COVID-19 pandemic
- Addressing challenges for CGM adoption

## Diabetes Epidemic in the U.S.

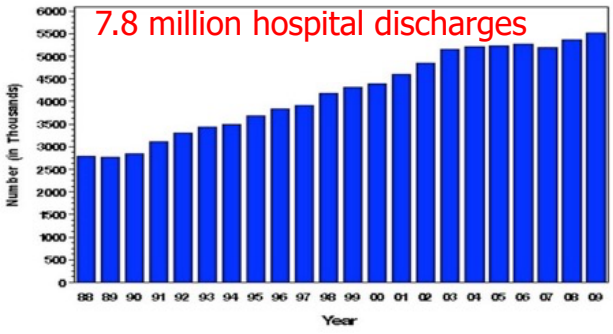
### US Population




Prevalence quadrupled, from 5.5 million to 21.9 million between 1980-2014
- 12.6% (2011-2014) of US adults

CDC's Division of Diabetes Translation. National Diabetes Statistics 2020 http://www.cdc.gov/diabetes/statistics.

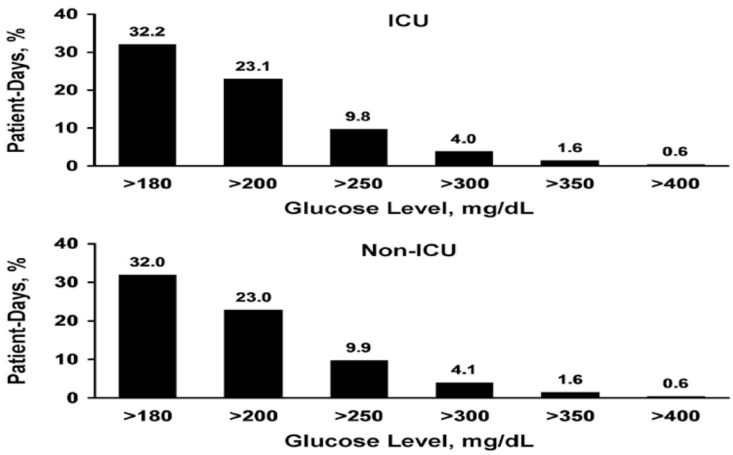
### Hospital Diabetes




- 23% of all discharges; 16 million ER visits/year in adults > 18 years (CDC 2016)
- Annual cost: $327 billion *(2017)*
- Hospital inpatient care (30% of the total medical cost).

ADA. *Diabetes Care.* 2018

Distribution of patient-day-weighted mean POC-BG values for ICU




Data from ~12 million BG readings from 653,359 ICU patients - mean POC-BG: 167 mg/dL

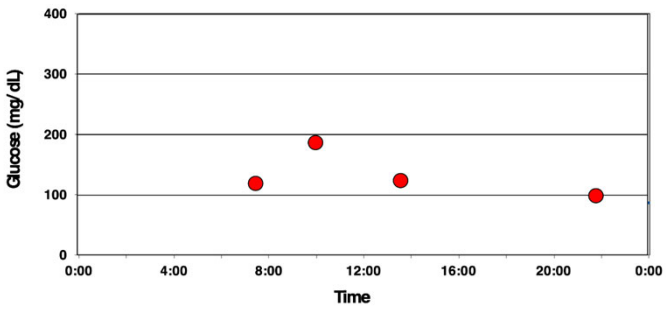
Swanson CM et al. *Endocr Pract.* 2011; 17:853-61.

# Self-monitoring of Blood Glucose (SMBG)

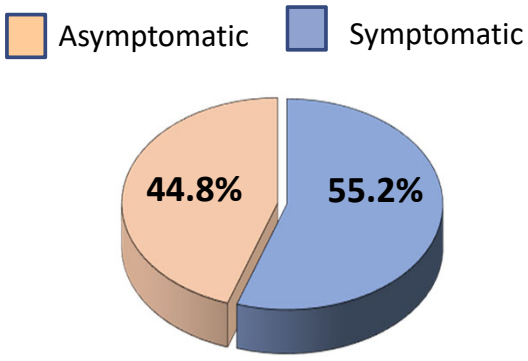
- Uses/significance
  - Determination of capillary blood glucose levels in real time
  - Assessment of hypo/hyperglycemia
  - Usefulness related to number of fingersticks per day
    - ICU: every 1-2 hours during insulin infusion
    - Non-ICU: AC & HS
- Benefits/other considerations
  - Easy procedure with widespread adoption
  - Assessment of glucose levels in response to therapy
  - Effective in adjusting treatment (standard of care)

## Limitations of SMBG: *It Doesn't Tell the Whole Story*

- Only measures glucose levels in a single point in time
- Provides no indication of the direction or velocity of changing glucose levels
- SMBG frequently misses hypoglycemic events, in particular nocturnal and asymptomatic episodes




## Asymptomatic hypoglycemia is common among insulin-treated inpatients with diabetes




Predictors of asymptomatic hypoglycemia

| | OR | 95% CI |
|---|---|---|
| Age < 50 yrs | 1 (ref) | |
| - 50-58 yrs | 1.73 | (0.76-3.96) |
| - 59-64 yrs | 2.55 | (1.11-5.84) |
| - > 65 yrs | 4.01 | (1.62-9.92) |
| Male sex | 2.08 | (1.13-3.83) |
| GFR > 60 vs < 60 ml/min | 0.70 | (0.39-1.26) |

Prospective observational study (n= 250) reported that 45% of insulin-treated non-ICU patients with BG <70 mg/dL had asymptomatic hypoglycemia. In multivariate analysis, older age and male gender were associated with higher risk of asymptomatic hypoglycemia.

Cardona et al. *BMJ Open Diab Res Care*. 2018;6:e000607

# Continuous Glucose Monitoring (CGM) in the Hospital Setting

- Invasive
  - Intravascular: venous and arterial
- Minimally invasive
  - Subcutaneous
- Non-invasive
  - Transdermal

- Sampling frequencies typically range from 1 to 15 minutes
- More than 15 continuous or semi-CGM devices have been described

**General consensus among experts and medical societies** is that compared with intermittent POC BG testing, CGM technology offers benefits in the prevention of severe hyperglycemia and hypoglycemia.

Wallia A et al. *J Diabetes Sci Technol*. 2017; 11:1036-44.
Umpierrez G et al. *Diabetes Care*. 2018; 41:1579-89

## CGM Use in the ICU

Clinical Care/Education/Nutrition/Psychosocial Research
ORIGINAL ARTICLE

**Real-Time Continuous Glucose Monitoring in Critically Ill Patients**

A prospective randomized trial

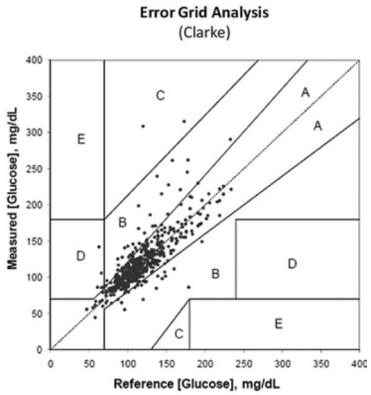
Holzinger et al. *Diabetes Care.* 2010; 33:467-72.

BMJ Open Diabetes Research & Care

**Performance of the Medtronic Sentrino continuous glucose management (CGM) system in the cardiac intensive care unit**

Kosiborod M et al. BMJ *Open Diabetes Res Care.* 2014; 2(1):e000037.

## Randomized Evaluation of Glycemic Control in the Medical Intensive Care Unit Using Real-Time CGM: REGIMEN Trial




| EGA zone | A | B | C | D | E |
|---|---|---|---|---|---|
| Cases | 454 | 60 | 2 | 5 | 0 |
| Percentage (%) | 87.1 | 11.5 | 0.4 | 1.0 | 0.0 |
| Percentage (%) | 98.6 | | | 1.4 | |

During 96 h of monitoring, glycemia reached target (80–110 mg/dL) in 37 (15%), was between 70 and 180 mg/dL in 91 (10%), and <60 mg/dL in 2 (2%) of the time

98.6% of data falling in Zones A and B of the error grid analysis

RT-CGM did not ameliorate glucose control or variability; neither did it reduce the number of hypoglycemic events,

Snell-Bergeon JK. *Diabetes Technol Ther.* 2015; 17(11):759-62.

## CGM Use in the ICU

Clinical Care/Education/Nutrition/Psychosocial Research

ORIGINAL ARTICLE

**Real-Time Continuous Glucose Monitoring in Critically Ill Patients**

A prospective randomized trial

**A recent systematic review of 37 studies, both RCTs and observational studies, concluded that in terms of efficacy, the use of subcutaneous CGM systems does not seem to improve the glycemic control of critically ill patients in a clinically significant manner.**

Kosiborod M et al. BMJ *Open Diabetes Res Care.* 2014; 2(1):e000037.

Continuous Glucose Monitoring in the Operating Room and Cardiac Intensive Care Unit

Perez-Guzman et al. Diabetes Care March 2021

Diabetes & COVID-19

ICU Care

Continuous Glucose Monitoring in the Intensive Care Unit During the COVID-19 Pandemic

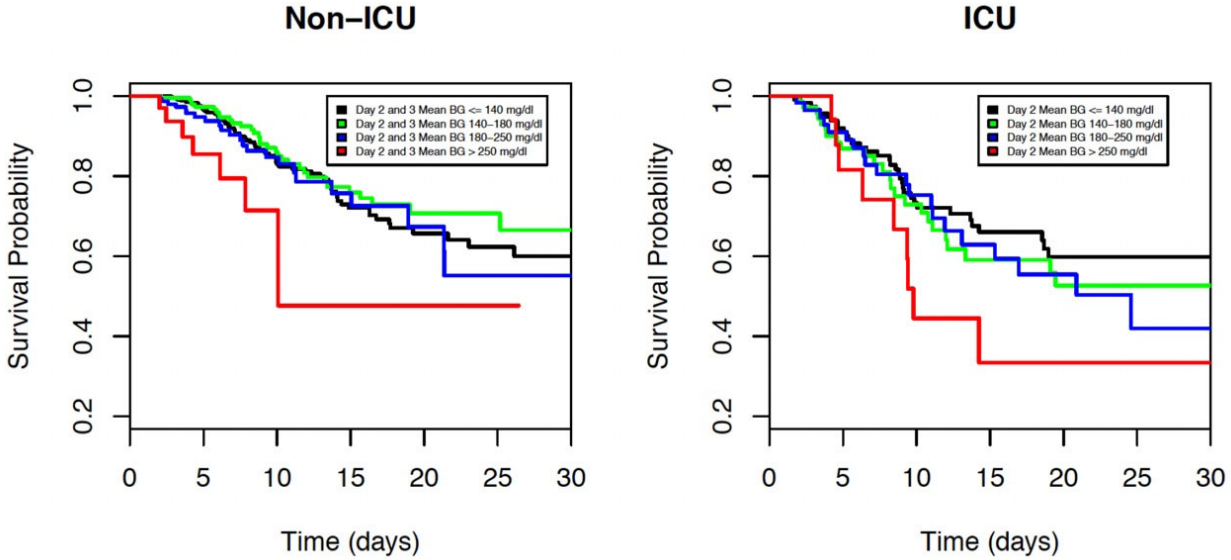
Agarwal et al. Diabetes Care 44:847-849, 2021

9

Remote Continuous Glucose Monitoring With a Computerized Insulin Infusion Protocol for Critically Ill Patients in a COVID-19 Medical ICU: Proof of Concept

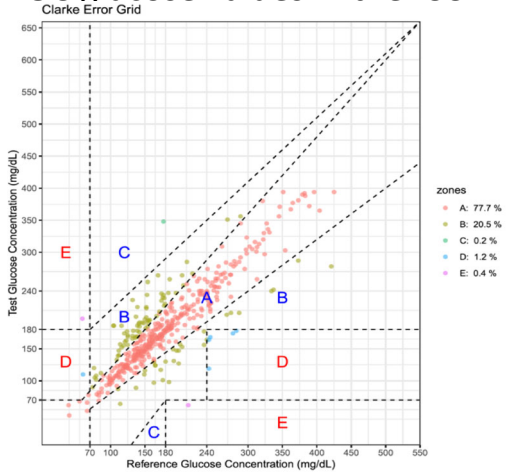
Davis et al. Diabetes Care, Online February 9, 2021

Glycemic Control and Clinical Outcomes in Hospitalized Patients With COVID-19: A Multicenter, Retrospective Hospital-Based Analysis




Klonoff DC et al. *Diabetes Care.* 2021; 44:578-85.

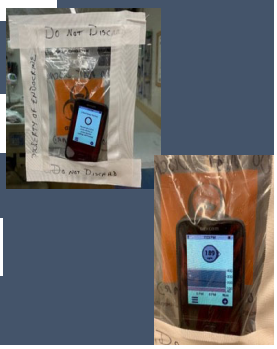
## Relationship between CGM and POC glucose values in the ICU




| n | 15/15% | 20/20% | 30/30% | 40/40% | MARD | Median ARD |
|---|---|---|---|---|---|---|
| 493 | 0.708 | 0.777 | 0.888 | 0.953 | 12.578 | 6.338 |

## World Logistics of Inpatient CGM

- Placement of sensor
  - Skilled endocrine NP
  - Pronin tren = arm placement
- Placement of receiver
  - On door facing out, within 2 ft
  - F used receiver (after cleaning)
- Alerts (10 250 m; , drop/rise)



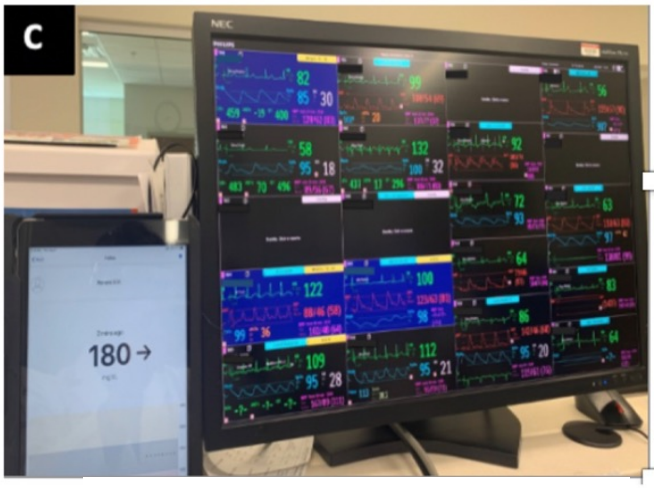
Agarwal S et al. *Diabetes Care.* 2021; 44(3):847-49.

## Remote CGM - Glucommander System in the ICU, COVID-19 Ward

Remote CGM (G6) + POC

+ Electronic Health Record Documentation/Validation

## Remote CGM with Computerized Insulin Infusion Protocol


Davis GM et al. *Diabetes Care.* 2021; 44:1055-8.

## CGM in the ICU: Technology Limitations

- Measurement lag
- Substance interference (acetaminophen, maltose, ascorbic acid, dopamine, mannitol, heparin, and salicylic acid) with some CGM devices
- Limited evidence on the accuracy during periods of arterial hypotension, hypothermia, or hypoxia
- Intravascular CGMs carry risks of thrombus formation, catheter occlusion, and catheter-related infections
- Costs
- Limited data in favor of tight glycemic control in ICU

Umpierrez G et al. *Diabetes Care.* 2018; 41:1579-89.

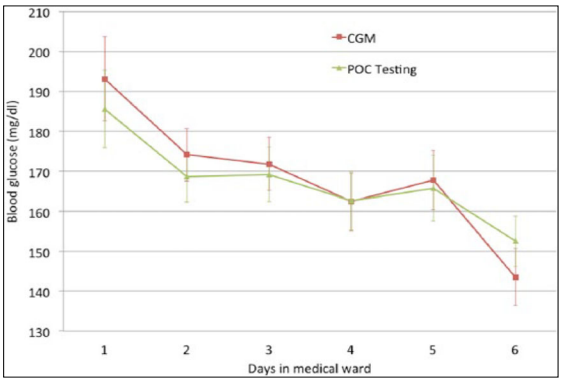
## Clinical Trials using CGM in Non-ICU Settings

| Author, Year | Population | Sample Size | # of sites | Type of CGM | Performance Measurement | Comparator |
|---|---|---|---|---|---|---|
| Rodriguez, 2010 | General Wards- ACS | 16 | 1 | Guardian | Glycemic control, time to BG <140 | Capillary BG |
| Burt, 2013 | General Ward | 26 | 1 | System Gold | Performance Measurement | Comparator |
| Schaupp, 2015 | General Ward | 84 | 1 | iPro | Accuracy | Capillary BG |
| Gomez, 2016 | General Ward | 38 | 1 | iPro-2 | Accuracy | Capillary BG |
| Gu, 2017 | Ward | 81 | 8 | Sensor Augmented Pump | Performance Measurement | MDI with Blinded CGM |
| Galindo, 2020 | General Ward | 100 | 1 | Libre | Accuracy | Capillary BG |

1. Rodriguez, etal. Diabetes Technol Ther 2010;12:347-351; 2. Burt, et al. Diabetes Technol Ther 2013;15:241-245; 3. Schaup, et al. Diabetes Technol Ther 2015;17:611-618; 4. Gomez etal. J Diabetes Sci Technol 2016;10:325-329; 5. Gu, et al. Diabetes Metab 2017;43:359-363; Galindo et al. Diabetes care 2020; 43:2730-5.

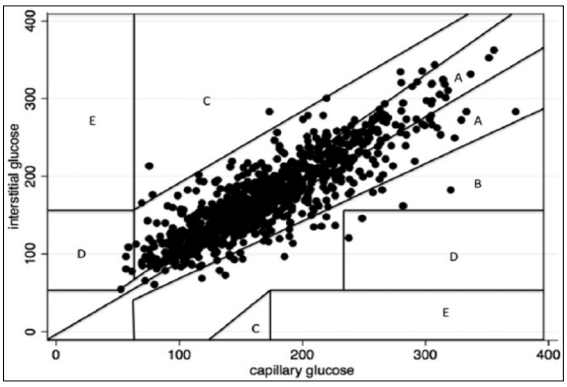
## CGM in Non-ICU Insulin-Treated Patients with T2D

### Average daily BG measured by CGM and POC




No differences in daily BG between CGM and POC. Higher # of hypoglycemia detected by CGM ( than POC (55 vs 12, P < .01).

### Clinical accuracy BG levels measured by CGM

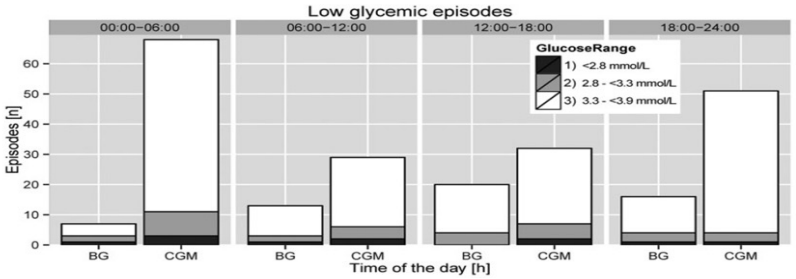



Glucose measurements were clinically valid, with 91.9% of patients falling within the Clarke error grid A and B zones.

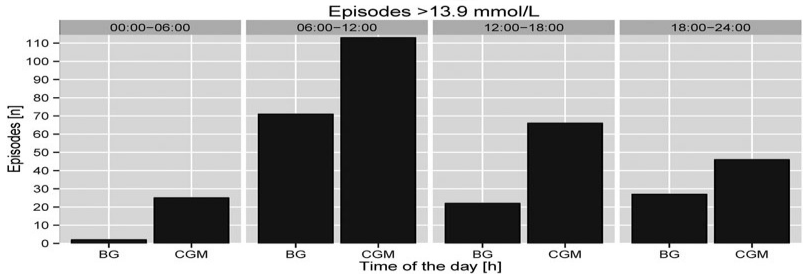
Gomez AM et al. *J Diabetes Sci Technol*. 2016; 10:325-329.

## CGM in Non-ICU Patients with T2D

Hypoglycemia
< 2.8 mmol/L



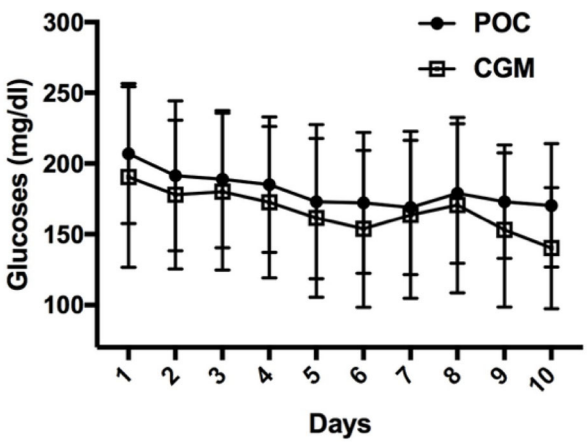

Hyperglycemia
>13.9 mmol/L



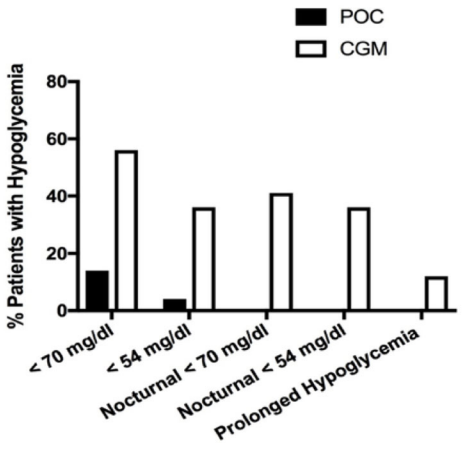

Schaup et al. *Diabetes Technol Ther*. 2015; 17:611-618.

## Freestyle Libre Pro Flash CGMS vs. POC Capillary Glucose Testing in Hospitalized Patients with T2D

**Mean Hospital Daily Glucose**



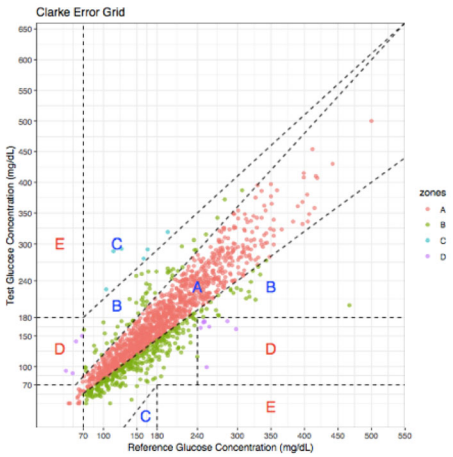

**Hypoglycemia by POC and CGM**




Galindo RJ et al. *Diabetes Care*. 2020; 43:2730-5.

## Freestyle Libre Pro Flash CGMS vs. POC Capillary Glucose Testing in Hospitalized Patients with T2D

**Clarke Error Grid analysis**

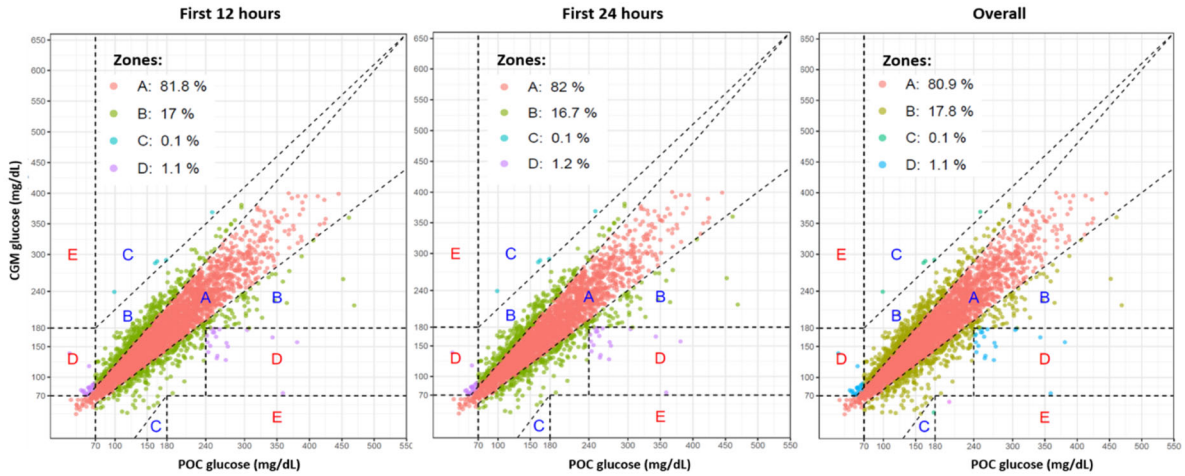



| Glucose Range (mg/dL) | Matched Pairs (n) | MARD (%) |
|---|---|---|
| Overall | 1576 | 14.8 |
| 51-69 | 13 | 27.9 |
| 70-180 | 829 | 16.7 |
| >180 | 731 | 12.1 |
| >250 | 253 | 11.4 |

Galindo RJ et al. *Diabetes Care*. 2020; 43:2730-5.

## Accuracy of Dexcom G6 CGM in Non-Critically Ill Hospitalized Patients with Diabetes

### Clarke Error Grid Analysis by Sensor Age




N= 205
T2D patients in general medicine & surgery wards

Error Grid Analysis: Zones A and B: 98.7%

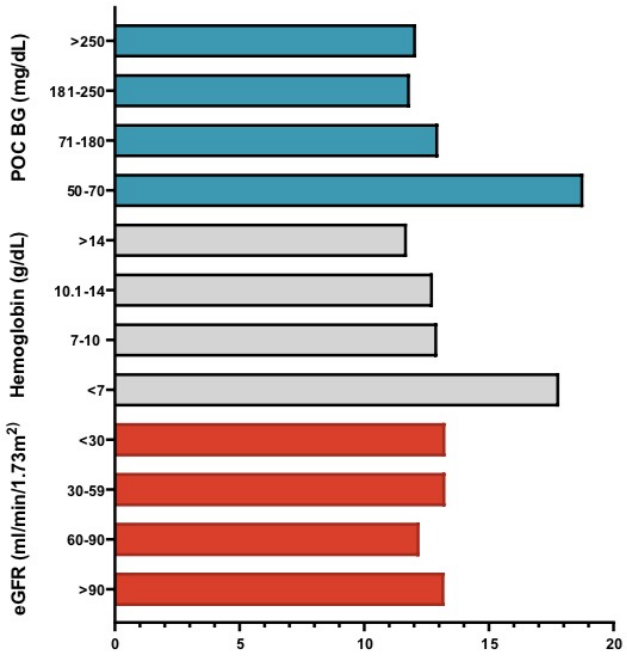
Davis G et al. *Diabetes Care*. 2021; 44(4):1055-8.

## Mean absolute relative difference (MARD) reported by glucose range, hemoglobin value and eGFR category

**Dexcom G6**
Hospital Accuracy Study,
CGM vs POC

N= 205
Insulin-treated patients with T2D in general medicine and surgery wards

**Comparable accuracy metrics were also observed across Race, BMI, GFR, and abdomen vs arm placement**




## Glucose Telemetry System

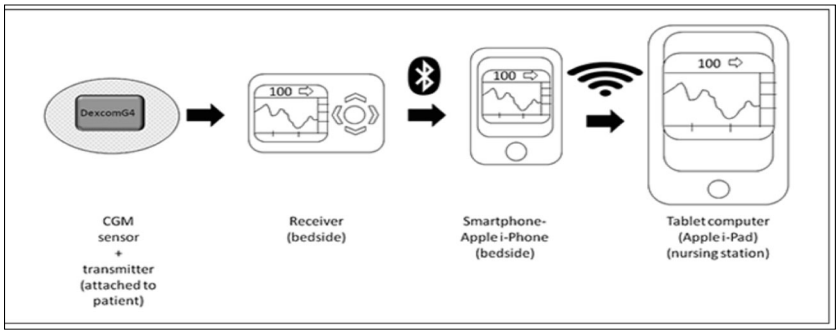
### The Effect of Continuous Glucose Monitoring in Preventing Inpatient Hypoglycemia in General Wards: The Glucose Telemetry System

Journal of Diabetes Science and Technology
1–6

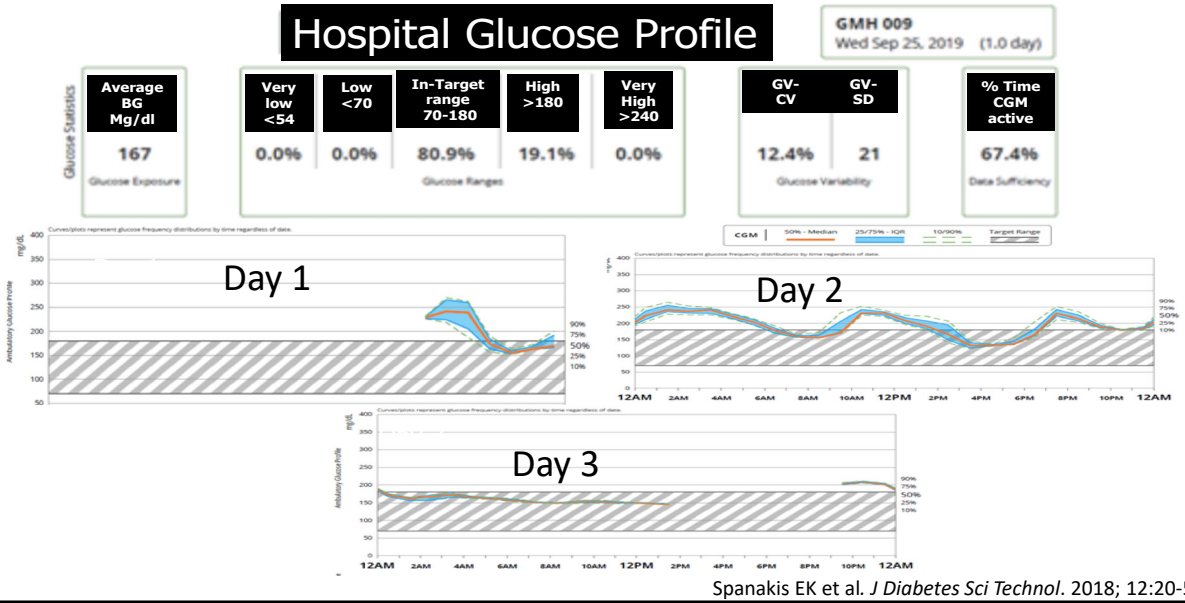

**Spanakis et al.**
Baltimore VAMC, University of Maryland

Pilot study.
BG results < 85 mg/dl were transmitted to nursing station allowing early intervention to prevent hypoglycemia.

NCT02904512

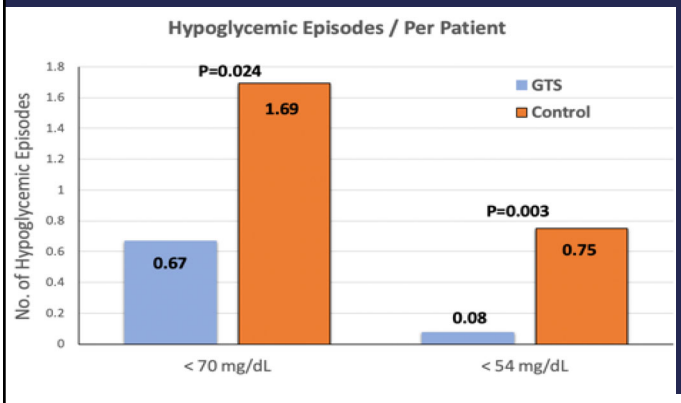


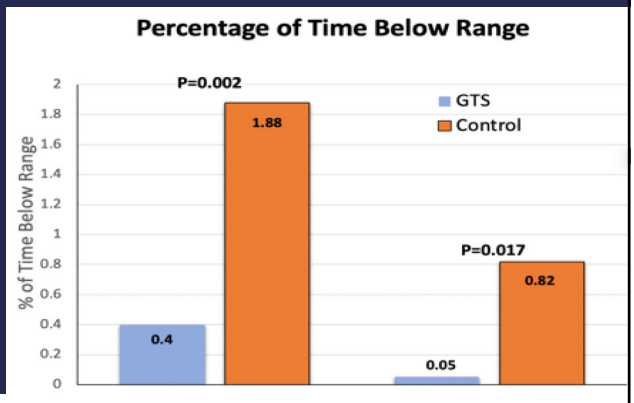
# CGM Hospital Use: Intervention Study




Spanakis EK et al. *J Diabetes Sci Technol*. 2018; 12:20-5.

## Reducing inpatient hypoglycemia in the general wards using real-time CGM- the Glucose Telemetry system: A randomized clinical trial.



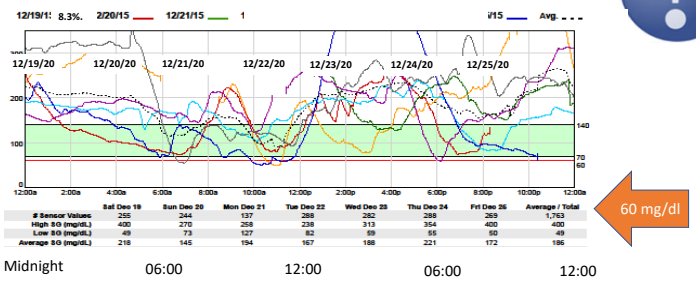




Spanakis EK et al. *J Diabetes Sci Technol*. 2018; 12:20-5.

# Clinical Case: Type 1 Diabetes

- 34-year-old school teacher with history of T1D since age 16 is admitted with lower extremity cellulitis in the right leg. She had experienced large swings of blood glucose during the day, and has had multiple episodes of severe nocturnal hypoglycemia.
- Home treatment: basal-bolus regimen: glargine 24 units HS and 6-8 units lispro before meals, plus correction with SSI for BG >180 mg/dL
- Labs: BG: 238 mg/dL; HbA1c: 8.2%, eGFR: 62 mL/min

Case: 34 y/o Woman with type 1 DM



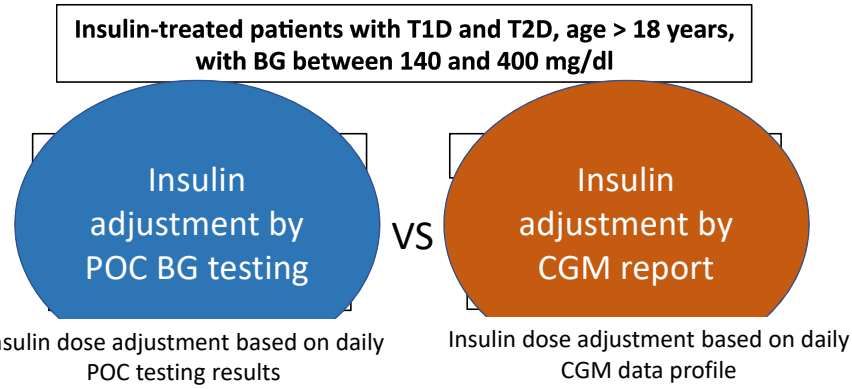

## What would you do?

a. Refer patient to endocrinologist
b. Discontinue CGM and change to POC before meals and at bedtime
c. Reduce dose of basal at HS by 20% and increase prandial insulin by 10%
d. Start insulin pump
e. Change glargine to degludec using 80% of daily dose

# What's in the pipeline?

## Management of inpatient hyperglycemia by CGM in insulin-treated patients with diabetes: Dexcom G6 Intervention Study

Study Aim: To determine differences in glycemic control - time in range between 80-180 mg/dl (efficacy outcome) and frequency of hypoglycemia (safety outcome), between DexcomG6 CGM and POC BG testing in hospitalized patients with T1D and T2D treated with basal bolus insulin regimen




Umpierrez et al. unpublished

## Closed-loop insulin delivery in inpatients with type 2 diabetes: a randomized, parallel-group trial

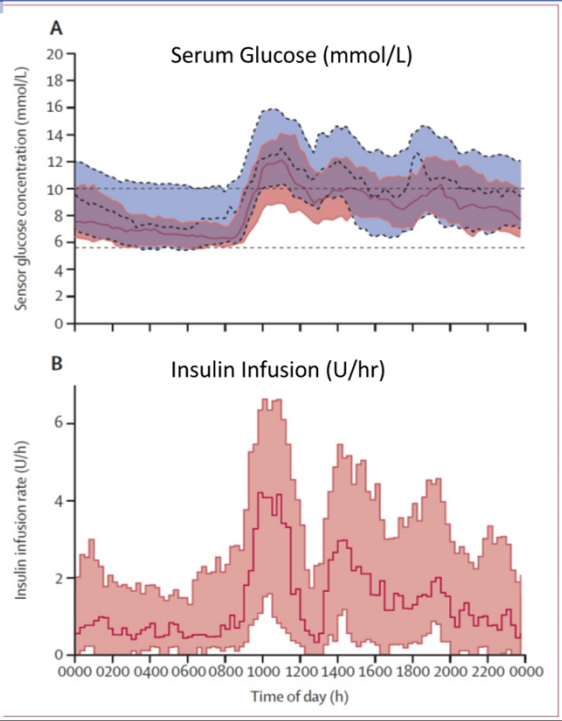
N= 40 patients, 20 in close loop, 20 control group

Higher proportion of time spent in the target glucose in the closed-loop group (59.8%) than control (38.1%)- difference 21.8% [95% CI 10.4–33.1]; p=0.0004).

No episodes of severe hypoglycemia or hyperglycemia with ketonemia in either group.

Interpretation Closed-loop insulin delivery without meal-time boluses is effective and safe in insulin-treated adults with type 2 diabetes in the general ward.

Thabit et al. Lancet Diabetes & Endocrinol 5:117-24, 2017




## CGM Use in the Hospital: Challenges

- New technology, not commonly used by PCPs and hospitalists
- Need for calibration, sensor drift, measurement lag
- Interference (acetaminophen, maltose, ascorbic acid, dopamine, mannitol) with some CGM devices
- Information overload- risk of overtreatment
- Lack of evidence on the accuracy during periods of arterial hypotension, hypothermia, or hypoxia
- Real-time data transmission to nursing staff and EMR
- Costs
- Limited data in favor of tight glycemic control in ICU

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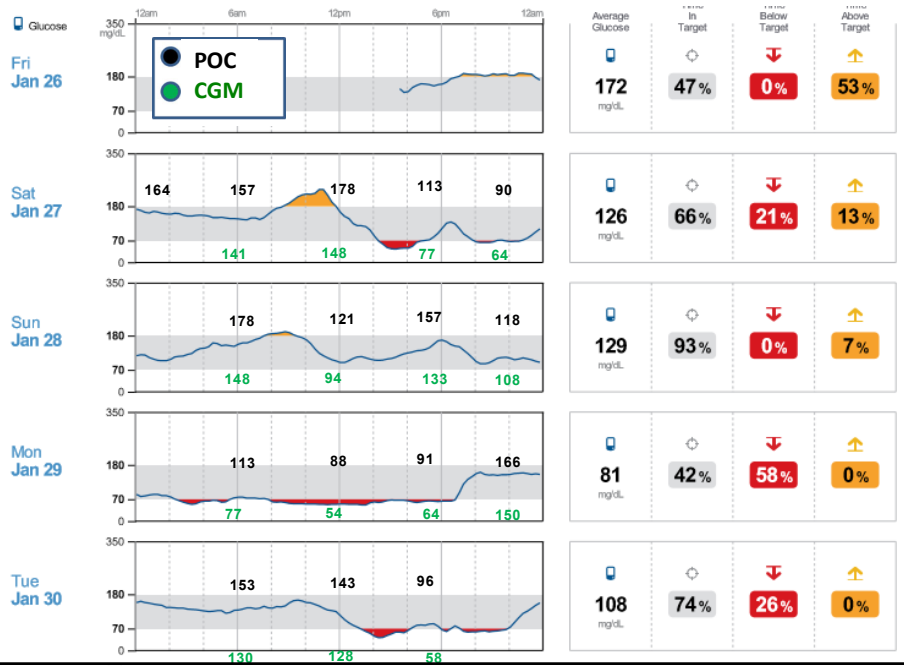
## Discrepancy dilemma

54 y/o male, diabetic foot ulcer, S/P BKA



## CGM Use in Non-ICU Settings: Summary

- Available data from clinical studies suggest:
  - The use of CGM in patients with T2D can provide a more complete picture of the patient's glycemic status than POC testing
  - CGM provides a better direction of change, magnitude of change and warnings to predict both low and high BG levels compared to POC testing
- Improved accuracy of CGM sensors and reduced need for frequent calibration, or any calibration; are attractive features in the hospital.

## Summary and Future Directions

- Need to conduct appropriate studies for FDA approval to use CGM in the hospital setting
- Education and training programs for hospital personnel are needed
- Develop simplified systems for data transmission from bedside to nursing station (i.e. continuous glucose profile)
- Pharmacoeconomic analyses of CGM systems in the hospital setting are needed
- Accurate CGM systems combined with automatic insulin dosing systems will facilitate glycemic control and reduction of hypoglycemia and hyperglycemia patients with diabetes

# Faculty Discussion and Q&A

# How will you change your practice?

- Discuss with the interprofessional team continuous glucose monitoring (CGM) and the role it plays in managing patients with diabetes
- Work with interprofessional team to identify patients for whom CGM use is appropriate in the inpatient setting
- Analyze the differences between point of care (POC) and CGM
- Use CGM results to manage glucose levels in patients with diabetes in the inpatient setting
- Actively assess how COVID-19 is impacting the management of patients with diabetes in the inpatient setting
- Collaborate with the interprofessional team to prepare a plan to operationalize CGM use in the inpatient population.

**Take a moment to reflect on changes you would make based on what you learned today**