

Nocturnal hypoglycemia (NH) and CGM technology

1. The Silent Burden

Critical Frequency



It is estimated that **55%** of all episodes of severe hypoglycemia occur at night.¹

Diagnostic invisibility



51% of severe nocturnal events are not detected by the patient while sleeping.¹

Psychological impact



Fear of nocturnal hypoglycemia **impairs quality of life** and leads patients to maintain intentionally elevated glucose levels to avoid nocturnal events.²

2. Unique characteristics of nocturnal episodes

Nocturnal <70 mg/dL **vs.** Diurnal <70 mg/dL
60 min. **30 min.**

Prolonged duration

Nocturnal episodes (<70 mg/dL) last **significantly longer than daytime episodes**: 60 minutes versus 35 minutes.³



Diminished autonomic response

During sleep, the autonomic and symptomatic response to hypoglycemia is reduced, making it **difficult for the patient to wake up or recognize the event**.⁴



Predominance in the late phase

Between **60% and 70%** of nocturnal hypoglycemia episodes occur in the **second half of the night** (3:00–7:00 a.m.), when the counterregulatory hormone response is less pronounced.¹

3. The Impact Upon Waking

Evidence Against the Somogyi Effect



CGM data refute the classical theory; following a night of hypoglycemia, **morning glucose levels tend to be lower** (median difference of -25.3 mg/dL), not higher.³

Cognitive consequences



Nocturnal hypoglycemia is directly associated with **slower cognitive processing speed** the following day.¹

Socioeconomic impact

14.7 hrs

Each episode of nocturnal hypoglycemia results in an **average loss of 14.7 hours of work** time due to fatigue and reduced productivity.¹

Persistent instability



Nocturnal events **increase glycemic variability (GV)** and elevate the risk of new hypoglycemia episodes the following day.³

4. How the prediction tool can help

Beyond the current alarms



Traditional threshold alarms can cause **alarm fatigue and sleep disruptions**, leading some patients to disable them.⁵

Proactive prevention



AI algorithms in CGM that estimate the risk of nocturnal hypoglycemia for the next 7 hours before the patient goes to sleep.⁶

Algorithm Performance



The predictive algorithm in the **Accu-Chek SmartGuide CGM** offers **86.5% accuracy**, correctly predicting whether nocturnal hypoglycemia will occur on more than 27 out of 30 nights.⁶



References:

1. Kulzer B, et al. Nocturnal hypoglycemia in the era of continuous glucose monitoring. J Diabetes Sci Technol. 2024.
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5. Barnard-Kelly KD, et al. Identifying the deficiencies of currently available MCG to improve uptake and benefit. Diabet Med. 2024.
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