

## Effect of Short-Term Use of a Continuous Glucose Monitoring System with a Real-Time Glucose Display and a Low Glucose Alarm on Incidence and Duration of Hypoglycemia in a Home Setting in Type 1 Diabetes Mellitus

Raymond J. Davey, Ph.D.,<sup>1</sup> Timothy W. Jones, M.D.,<sup>2,3</sup> and Paul A. Fournier, Ph.D.<sup>1</sup>

### Abstract

#### **Background:**

The objective of this study was to examine whether setting the low glucose alarm of a Guardian® REAL-Time continuous glucose monitoring system (CGMS) to 80 mg/dl for 3 days and providing instructions to users reduce the risk of hypoglycemia under free-living conditions in individuals with type 1 diabetes mellitus (T1DM).

#### **Methods:**

Fourteen participants with T1DM aged  $26.1 \pm 6.0$  years (mean  $\pm$  standard deviation) were fitted with a CGMS and assigned for 3 days to either an alarm [low and high blood glucose (BG) alarms set at 80 and 200 mg/dl, respectively] or no alarm condition, with each treatment administered to all participants following a counterbalanced design. All participants were given detailed instructions on how to respond appropriately to low glucose alarms.

#### **Results:**

The CGMS with alarm reduced the incidence of hypoglycemia (CGMS readings  $\leq 65$  mg/dl) by 44% as well as the time spent below this hypoglycemic threshold by 64% without increasing average BG levels. However, the CGMS with alarm had no effect on the incidence of symptomatic hypoglycemia.

#### **Conclusions:**

Short-term use of the CGMS with alarm, together with appropriate instructions for users, reduces the incidence and duration of hypoglycemia, but only to a limited extent, in part because it overestimates BG in the low glucose range.

*J Diabetes Sci Technol* 2010;4(6):1457-1464

**Author Affiliations:** <sup>1</sup>School of Sport Science, Exercise and Health, University of Western Australia, Crawley, Western Australia, Australia; <sup>2</sup>Department of Endocrinology and Diabetes, Princess Margaret Hospital, Subiaco, Western Australia, Australia; and <sup>3</sup>Telethon Institute for Child Health Research, Centre for Child Health Research, University of Western Australia, Perth, Western Australia, Australia

**Abbreviations:** (BG) blood glucose, (CGMS) continuous glucose monitoring system, (RT) real time, (T1DM) type 1 diabetes mellitus

**Keywords:** continuous glucose monitoring, hypoglycemia, low glucose alarm

**Corresponding Author:** Raymond J. Davey, Ph.D., School of Sport Science, Exercise and Health, University of Western Australia, M408, 35 Stirling Highway, Crawley, WA, 6009, Australia; email address [daveyr01@student.uwa.edu.au](mailto:daveyr01@student.uwa.edu.au)