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SL2　Using Time in Range from Continuous Glucose Monitoring Data to Improve Diabetes Management?

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Recent data on glucose control in the US indicate only 50% of individuals with diai betes are achieving optimal HbA1c levels. This is despite new classes of glucose lowering agents and new types of insulin. While HbA1c remains the gold standard for guiding diabetes management there is building evidence that continuous glucose monitoring (CGM) may provide better awareness of the most appropriate steps to take to optimize diabetes management. HbA1c will remain an important population health measure and a risk marker for vascular complications but for daily diabetes management it may be time to move from the HbA1c management era to the CGM management era.

To use CGM effectively the vast amount of CGM data (288 glucose values per day) must be standardized, organized, analyzed and acted upon. Standardization has progressed to an international consensus on 10 core CGM metrics including (10-14 days of data, mean glucose, glucose management indicator (GMI = estimated A1c), glucose variability (% CV) and 5 time in ranges (TAR >250, >180, TIR 70-180, TBR <70, <54 mg/dL). Targets for the TIR's were agreed upon, including TIR 70-180 of >70% and TBR 70 mg/dL and 54 mg/dL of <4% and <1%.
The American Diabetes Association added the core CGM metrics, targets and the one-page report called the ambulatory glucose profile (AGP) to the diabetes standards of care in 2020. Studies have shown that using CGM data compared to BGM data improves A1c, TIR and lowers the risk of hypoglycemia for patients on insulin therapy or with a history of hypoglycemia. More studies, confirming the initial data showing TIR is also correlated with long term complications of diabetes, are needed.

CGM and TIR are good tools to enable effective telemedicine/virtual care visits that are becoming very common in diabetes management. Continued efforts to directly integrate CGM data in the electronic health record will ensure convenient access to the data for clinical decision making. The entire team of clinician, diabetes nurse specialist, dietitian, pharmacist and information management specialists all need access to the AGP report in order to work together to optimize TIR and TBR and the patient's quality of life. Not only glucose data from CGM systems but also insulin data from smartpens and automated insulin delivery systems also need to be incorporated into AGP reports and integrated into the electronic health record.

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Richard M. Bergenstal, MD, is an endocrinologist and Executive Director of the International Diabetes Center at Park Nicollet. He is Clinical Professor in the Department of Medicine at the University of Minnesota and served as President, Science & Medicine of the American Diabetes Association in 2010. In 2007, Dr. Bergenstal was named the ADA's Outstanding Physician Clinician of the Year and in 2010 he was awarded the Banting Medal for Service for outstanding leadership and service to the American Diabetes Association. Dr. Bergenstal received his MD and endocrine training from the University of Chicago where he was an Assistant Professor of Medicine before joining the International Diabetes Center in 1983.

His clinical research has focused on glucose control and diabetes complications and advanced technology including CGM and automated insulin delivery systems. He has served as a Principal Investigator of five NIH trials: DCCT, ACCORD, GRADE and two technology focused NIH grants, an insulin dose advisor system and a study of next generation automated insulin delivery systems.

Dr. Bergenstal' s clinical efforts have been directed toward improving systems of care for patients with diabetes by translating new research findings into practice. He studies the effective utilization of insulin therapy and the use of the ambulatory glucose profile (AGP) to standardize glucose monitoring metrics and reporting in order to improve glucose control and clinical outcomes. He teaches nationally and internationally on the importance of patient - centered team care, has been listed in Best Doctors in America since it began in 1992, has published over 300 peer reviewed scientific articles.