



# Effective Health Care Continuous Glucose Monitoring for Type 1 Diabetes Mellitus Nomination Summary Document

## Results of Topic Selection Process & Next Steps

- Continuous glucose monitoring for type 1 diabetes mellitus will go forward for refinement as a systematic review. The scope of this topic, including populations, interventions, comparators, and outcomes, will be further developed in the refinement phase.
- When key questions have been drafted, they will be posted on the AHRQ Web site and open for public comment. To sign up for notification when this and other Effective Health Care (EHC) Program topics are posted for public comment, please go to <http://effectivehealthcare.ahrq.gov/index.cfm/join-the-email-list1/>.

## Topic Description

**Nominator:** Individual

**Nomination Summary:** The nominator is interested in the comparative effectiveness of various treatment strategies with and without continuous glucose monitoring for type 1 diabetes on HbA1c values. The nominator suggests that many patients benefit from continuous glucose monitoring with daily insulin injections or insulin pump therapy; however, insurance coverage is limited to private insurance companies. The nominator asserts that variations in insulin needs can be closely monitored and recorded with continuous glucose monitoring, which may lead to improved insulin dosing and better glucose control.

**Staff-Generated PICO:**

**Population(s):** Adults and children with type 1 diabetes mellitus

**Intervention(s):** Multiple daily injections with continuous glucose monitoring or insulin pump therapy with continuous glucose monitoring

**Comparator(s):** Multiple daily injections alone or Insulin pump therapy alone

**Outcome(s):** HbA1c levels

**Key Questions from Nominator:**

1. What are the comparative differences in HbA1c levels when comparing various treatment options including multiple daily injections, insulin pump therapy, daily injections with continuous glucose monitoring, and insulin pump therapy with continuous glucose monitoring?

## Considerations

- The topic meets all EHC Program selection criteria. (For more information, see <http://effectivehealthcare.ahrq.gov/index.cfm/submit-a-suggestion-for-research/how-are-research-topics-chosen/>.)
- Despite the increase in knowledge about diabetes, new therapies, and technologies available to manage the disease such as insulin pumps, continuous glucose monitors, and closed-loop devices, many patients diagnosed with diabetes in the United States remain above the recommended HbA1c level.
- Technologies such as insulin pumps and continuous glucose monitors are used separately and in conjunction with one another. There is controversy about the independent efficacy of these technologies for short- and long- term health outcomes in different populations and appropriate patient selection. Additionally, access to and coverage for these technologies may vary. Continuous glucose monitoring may have the greatest controversy as there is conflicting data regarding whether there are fewer hypoglycemic events with its use. It is also unclear how documentation of the often clinically undetected glycemic highs and lows by a continuous glucose monitor impacts clinical decision making.
- Hypoglycemic events are also a source of potential harm with insulin pumps, and patient selection is important with this technology. The level of adherence to the intervention affects health outcomes as insulin pump therapy requires patients to be highly compliant with treatment, including moving pump insertion locations and maintaining a sterile environment for the pump. The comparative effectiveness of insulin pumps versus other routes of administration is of interest.
- Although several existing systematic reviews were found that partially address the issues surrounding continuous glucose monitors and insulin pump therapy, no systematic review was found that addressed the evidence for emerging closed-loop or integrated systems. A completely closed-loop system uses an insulin delivery device, continuous glucose sensor, and a controller or computer algorithm. Ideally, the system acts as an artificial pancreas for the patient, delivering the appropriate amount of insulin at the appropriate time.
- This topic will move forward for a systematic review with a focus on continuous glucose monitoring and its impact on clinical decision making, the use of insulin pumps in subgroup populations, and a consideration of newer closed-loop, integrated systems.