

# Using a Computer-based Insulin Infusion Protocol to Improve Inpatient Glycemic Control

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## Situation Analysis

- Patients with diabetes are more likely to be hospitalized than patients without diabetes, and are more likely to have a longer duration of hospital stay.
- Insulin therapy is the preferred method for achieving glycemic control in most clinical situations. Poorly treated Hyperglycemia and Hypoglycemia can result in dangerous adverse events.
- It is imperative to understand the different glycemic control targets for noncritical and critical patients. The range recommended by the AACE and ADA should be between 140 and 180 mg/dL. More stringent goals, such as 110–140 mg/dL may be appropriate for cardiac surgery patients, as long as this can be achieved without significant hypoglycemia.

## Project Aim

- Transition from a cumbersome paper based Insulin Infusion protocol to a Computer-based Insulin Infusion Protocol with a proven track record and is evidence-based.
- Ensure safety and accuracy around a complicated treatment strategy of using insulin drips for hyperglycemia and DKA.
- Improve glycemic control to help meet the recognized standards in our critical care patients, including DKA.

## Outcomes and Lessons Learned

McLaren Northern Michigan Glucometrics has improved in many areas. Glucometrics results over 3 yrs (2013 – 2016):

- BG Readings < 70mg/dl decreased: 0.4% to 0.07%.
- BG Readings < 50mg/dl decreased: 0.13% to 0.02%.
- Days with mean BG  $\geq$  180mg/dL decreased: 20.3% to 17.2%.
- For DKA patients, the EndoTool insulin protocol ensures that glycemic control is achieved in a timely and safe manner.

Figure 1: Percent of BG Values <70 mg/dL

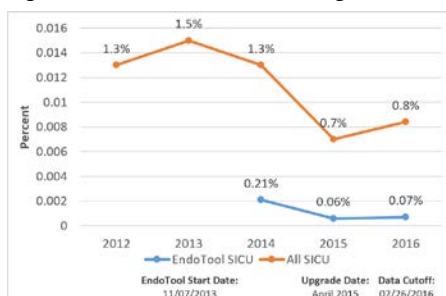


Figure 2: Percent of BG Values <50 mg/dL

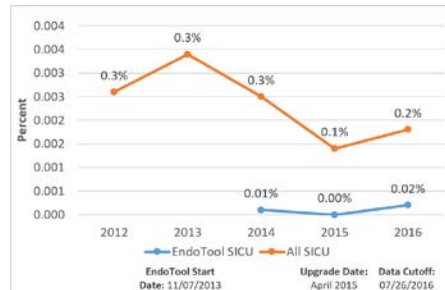
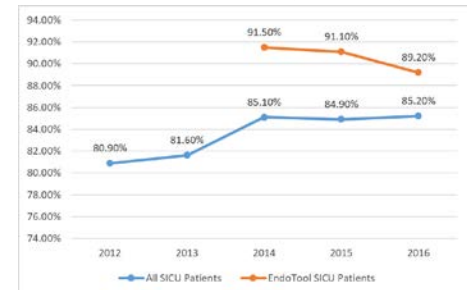


Figure 3: Percent of BG Readings 70-180 mg/dL



## DKA Example

- **Unit:** MICU
- **Total Number of BG Readings:** 19
- **Initial Target Range for DKA :** 200 – 250 mg/dL (for 3 hrs)
- **Final Target Range:** 120 – 160 mg/dL

- **EndoTool Initiated:** Day 1 at 18:41 with a BG 579 mg/dL
- **Last BG Check:** Day 2 at 13:12 with a BG 167 mg/dL
- **Time to Initial Target:** about 9 hours
- **Total time on EndoTool:** about 18.5 hours

Figure 4: DKA Patient Example

