

# Comparison of Hyperglycemia Management Protocols in the ICU: Standard Protocol versus eGlycemic Management System®



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### BACKGROUND

A variety of continuous insulin infusion (CII) algorithms are available to improve and maintain glycemic control in the ICU. American Diabetes Association guidelines state that: (a) insulin therapy should be initiated for patients with persistent hyperglycemia >180 mg/dL, (b) a target glucose range of 140-180 mg/dL is recommended for the majority of patients, and (c) more stringent goals, such as 110-140 mg/dL may be appropriate for selected patients if this can be achieved without significant hypoglycemia.

In December 2016, Grady Hospital, a community-based academic medical center with 640 beds, acquired an electronic glycemic management system for use in our ICUs and step-down units (specifically, the eGlycemic Management System® featuring Glucommander™, a product of Glytec).

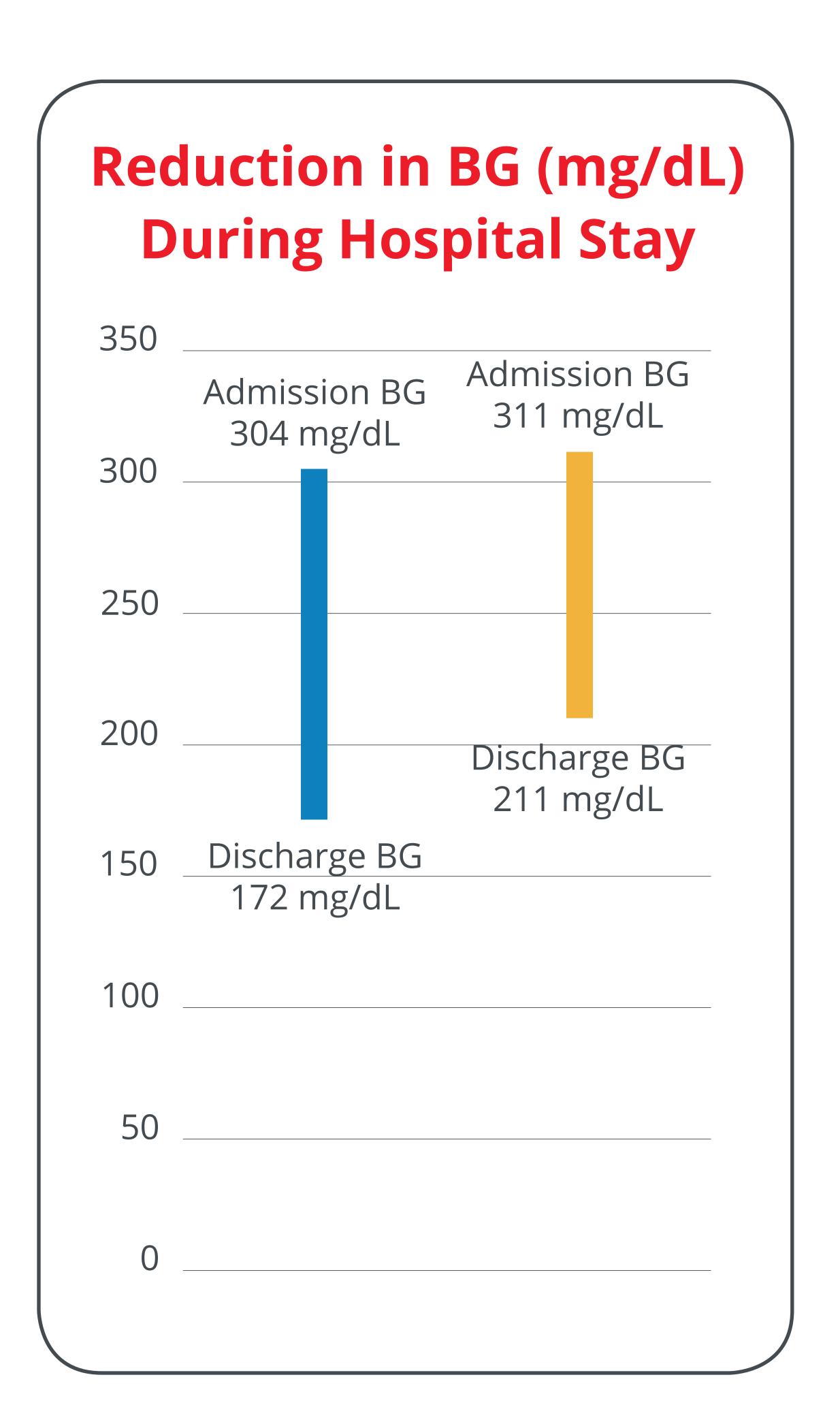
We present our experience with the eGlycemic Management System® (eGMS®) over a two-year period from December 2016 to December 2018, and we compare glycemic control between patients whose insulin infusion was managed with eGMS® to patients whose insulin infusion was managed with usual care (i.e., "standard protocol").

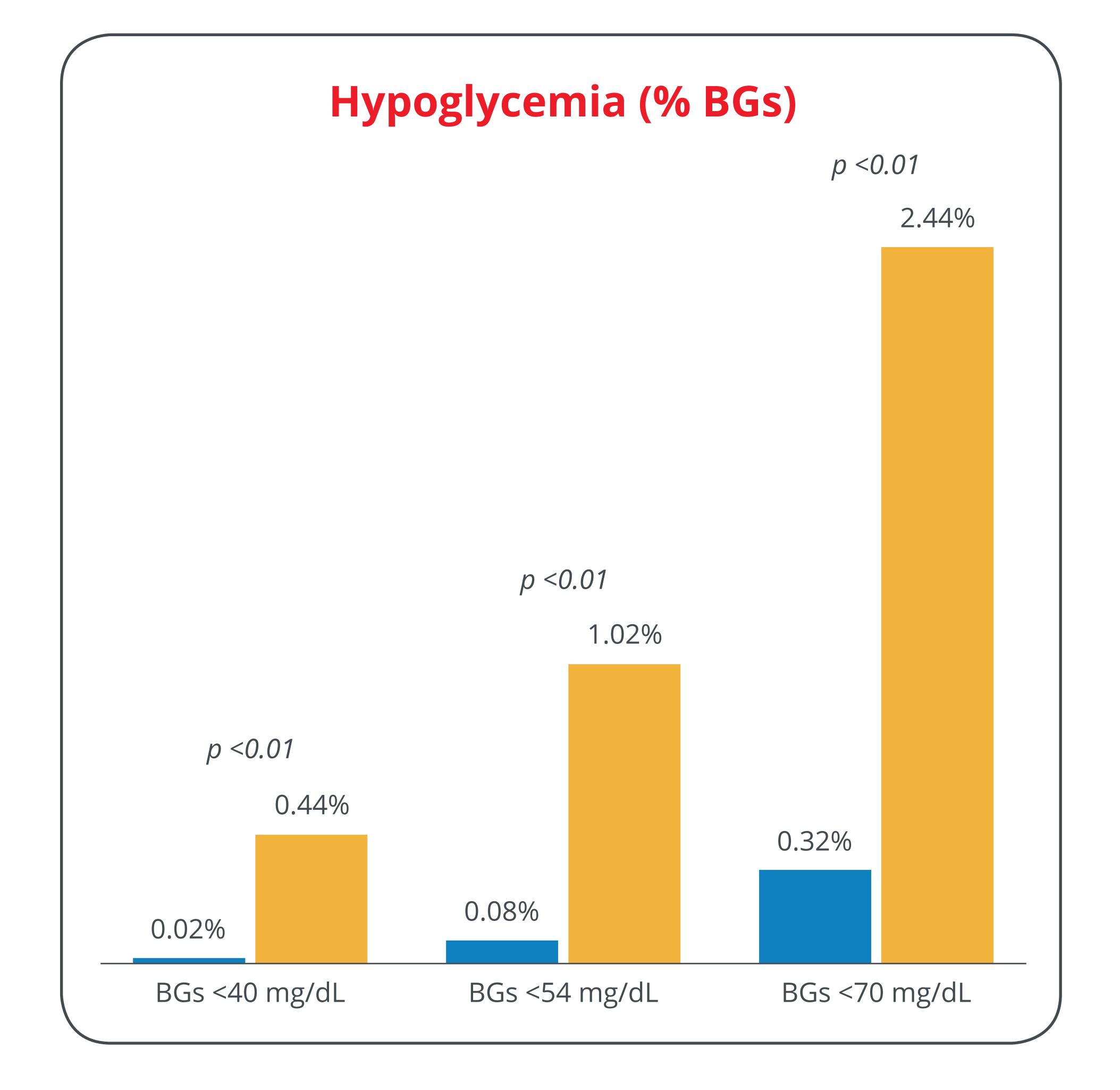
DEMOGRAPHICS	eGMS®	Usual Care	
Number of Patients	926	1,971	
Average Age (Yrs)	59	57	
Gender - Male	49.89%	65.52%	
Gender - Female	50.11%	34.48%	
Average BMI	33	28	
Average A1C	8.51%	7.53%	

## **METHODS**

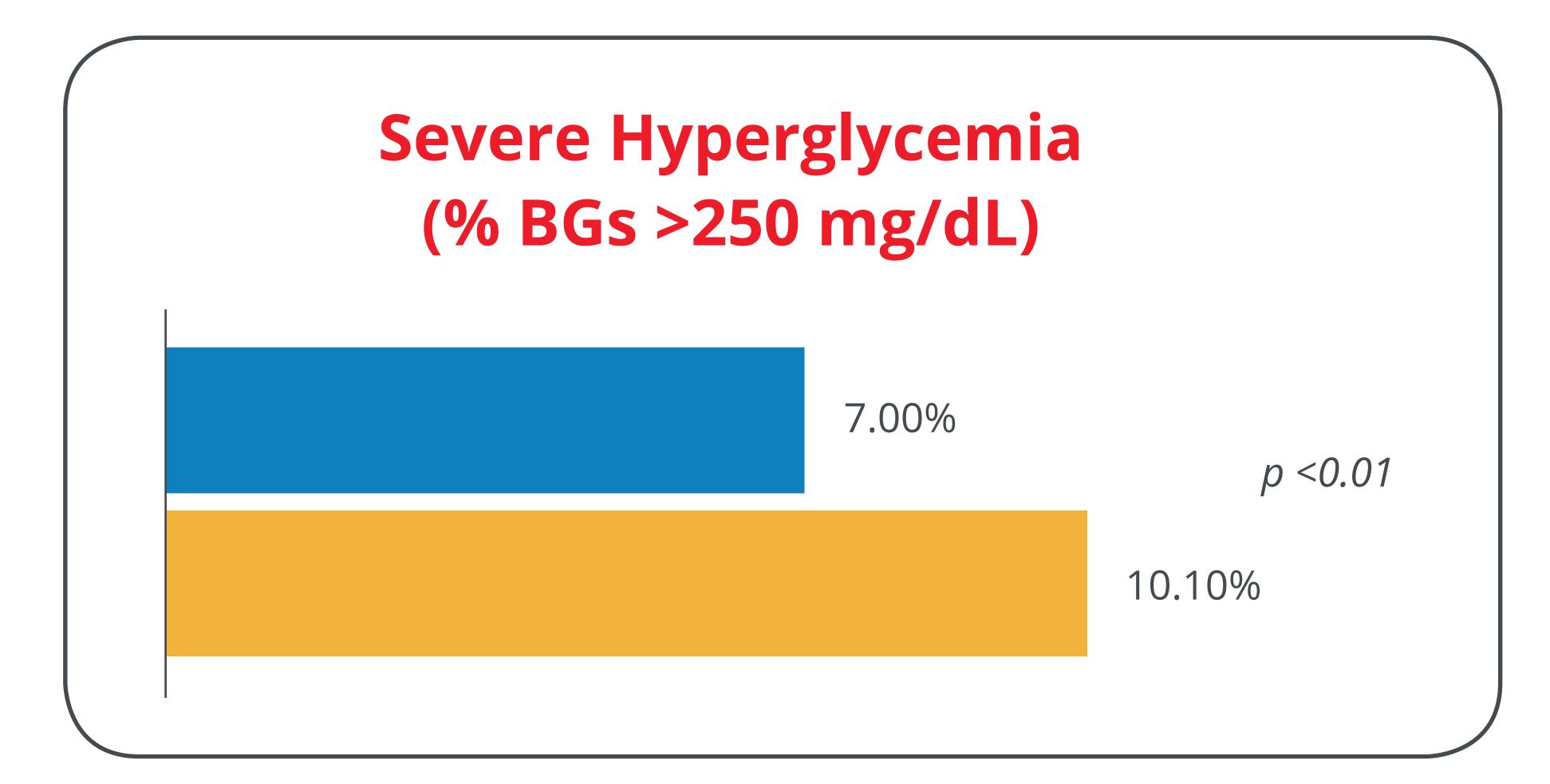
We conducted a retrospective review of critical care patients with persistent hyperglycemia >180 mg/dL who received insulin infusion in an ICU or step-down unit. Among a total of 2,897 patients, 926 (32%) were managed with eGMS® and 1,971 (68%) were managed with usual care.

The primary endpoint of our review was the percentage of blood glucose (BG) readings in the target range of 70-180 mg/dL. Secondary outcomes included the rate of severe hyperglycemia >250 mg/dL measured as the percentage of BG readings and the rates of hypoglycemia <40 mg/dL, <54 mg/dL and <70 mg/dL measured as both the percentage of BG readings and the percentage of patient days.





RESULTS	eGMS®	Usual Care	Difference in Rate	p Value
Average Admission BG (mg/dL)	304 ± 201.37	311 ± 188.00	N/A	
Average Discharge BG (mg/dL)	172 ± 70.60	211 ± 83.60	N/A	
Average Reduction in BG During Stay (mg/dL / %)	132 (43.4%)	100 (32.2%)	32.4% greater with eGMS®	
% BGs 70-180 mg/dL	69.80%	66.34%	5.2% more with eGMS®	<0.01
% BGs <40 mg/dL	0.02%	0.44%	95.5% less with eGMS®	<0.01
% BGs <54 mg/dL	0.08%	1.02%	92.2% less with eGMS®	<0.01
% BGs <70 mg/dL	0.32%	2.44%	86.9% less with eGMS®	<0.01
% BGs >250 mg/dL	7.00%	10.10%	30.7% less with eGMS®	<0.01
% Patient Days with BG <40 mg/dL	0.19%	1.19%	84.0% less with eGMS®	<0.01
% Patient Days with BG <54 mg/dL	0.79%	2.56%	69.1% less with eGMS®	< 0.01
% Patient Days with BG <70 mg/dL	2.97%	5.70%	47.9% less with eGMS®	< 0.01



# CONCLUSION

Use of eGMS® to manage insulin infusion was superior to usual care in improving glycemic control of critical care patients in the ICUs and stepdown units. This included reductions in hypoglycemia, severe hyperglycemia and average blood glucose during the hospital stay. It also included a greater percentage of patients in the target blood glucose range.

### **Affiliations**

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