Introduction:
The optimal management of blood glucose levels for critically ill patients remains unclear. Hypoglycemia, hyperglycemia, and glycemic variability are associated with mortality. The time in targeted blood glucose range (TIR) has been suggested to correlate with mortality depending on the status of antecedent glycemic control, but it has not been verified optimal TIR and whether there is an optimal disease-specific TIR.

Methods:
A retrospective observational study was performed at a single center. In the present study, we enrolled all critically ill patients admitted in intensive care unit from 1 January 2016 to 31 October. Patients with diabetic ketoacidosis or hyperosmolar hyperglycemic syndrome and patients who had < 10 blood glucose readings were excluded. Gathered information included, in part, demographics, comorbidities, severity of illness scores, diagnosis at admission, length of ICU stay and hospital discharge status. The primary outcome was 28-day mortality. We analyzed to find the optimal TIR for critically ill patients. Several TIRs were each tested for correlation with mortality.

Results:
A total of 1,523 patients, 51.8% of whom had diabetes, were studied. TIR 70 to 139 mg/dL (OR, 0.33; 95%CI, 0.18-0.58), TIR 70 to 179 mg/dL (OR, 0.33; 95%CI, 0.23-0.47) and TIR 110 to 179 mg/dL (OR, 0.28; 95%CI, 0.17-0.44) > 80% was independently associated with mortality in critically ill patients respectively. The optimal TIR did not differ depending on diagnosis at admission.

Conclusion:
In this retrospective evaluation, TIR 110 to 179 mg/dL > 80% was independently associated with mortality in critically ill patients, especially those with good antecedent glucose control. These findings have implications for the design of future trials of intensive insulin therapy.