

## Virtual Trial Protocol Analysis of Nursing Workload Intensity within ICU

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### ABSTRACT

Currently, effective glycaemic control protocols consume significant nursing time, which may be unsustainable as the number of patients requiring control increases with increasing rates of diabetes. This paper investigates the safety and efficacy of basal insulin therapy as a means to reduce nurse workload associated with glycaemic control in intensive care patients with stress hyperglycaemia. Validated virtual trial simulations (N = 40 patients) of a successful glycaemic control protocol (SPRINT) using 1-2 hourly interventions and a modified version using 4 hour interventions augmented with basal insulin therapy using Glargine. An additional model was used to capture the kinetics of Glargine. Workload was assessed by counting the total number of interventions (BG measurements, changes to insulin and nutrition rates) per day. Glycaemic performance was assessed by time in the target band (4.4-7.0 mmol/L) and number of severe hypoglycaemic episodes (BG<2.2 mmol/L). Workload reduction is around 30% (p<0.001) due to basal insulin therapy. Glycaemic control performance was slightly reduced from 86% to 80% (p=0.006) time in the target band using basal insulin therapy and 4 hourly interventions. However, safety was maintained with 0 incidence hypoglycaemia. Basal insulin therapy enables glycaemic control protocols with reduced intervention frequency while maintaining performance and safety. Reduced intervention frequency directly translates into reduced nurse workload associated with glycaemic control.

**KEYWORDS:** Nursing effort; Glycaemic control; Model-based Protocol; Glargine

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