



## Service Priorities and Programmes Electronic Presentations

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### **Utilization of portable blood gas and electrolyte analyzer in intensive care unit by using DMAIC methodology**

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#### **Introduction**

Appropriate use of the portable blood gas and electrolyte analyzer (iSTAT) in Intensive Care Unit (ICU) can aid prompt diagnosis and treatment of the critically ill patient. As there was trend showing the increasing annual consumption of iSTAT (about 16%) in our ICU, we conducted a quality improvement project by using DMAIC (Define, Measure, Analyze, Improve, Control) framework to evaluate the use of iSTAT in our unit.

#### **Objectives**

The purpose of the study is to promote the rational use of iSTAT so as to minimize overutilization.

#### **Methodology**

Our ICU is a 21-bed mixed medical-surgical unit located in a tertiary care regional hospital. We collected 2 weeks data on the clinical indication for performing iSTAT. We also studied the turnaround time of laboratory arterial blood gas. Multifaceted interventions (seminar, revision of protocols) were promulgated among all the ICU doctors and nurses over a period of 1 month. We then studied the number of iSTAT for the subsequent 6 months after the interventions. And the appropriateness of the use of iSTAT was conducted at 3-month and 6-month post intervention. The primary outcome was the number of portable analyses performed and its' appropriateness.

#### **Result**

There were 3 main clinical indications observed for the use of iSTAT (i.e. respiratory, protocol driven, post-operation). Before intervention, there were 188 portable blood gas and electrolyte analyses in the 2 weeks study period. At 3-month and 6-month post-intervention, it was reduced to 86 (54.3% reduction) and 125 analyses (33.5% reduction). There was a similar decreasing trend in the use of iSTAT in ICU from 652; to 367 and 259 analyzes per month in 2014, 2015 and 2016 respectively. In terms of

cost saving, the yearly expenditure was decreased from HK\$391,250 in 2014 to \$229,736 in 2015 to the projected HK\$180,798 in 2016.

Proper and rational utilization of the portable analyzer was promoted in this study. Reduction of the use of portable analyzer were observed in managing respiratory condition (from 14% to 8%) and after streamline of ECMO and DKA guidelines (from 2% to 0 %). Redundant investigations were minimized, and hence saving more nursing time in ICU.