中文題目：運用人工智慧及品質改善提升加護病房病人預後

英文題目：The application of artificial intelligence and quality improvement to improve the outcome of patients in the intensive care units

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Background: Critically ill patients admitted to intensive care unit (ICU) due to acute respiratory failure (ARF) with mechanical ventilator (MV), as the occurrence of ventilator-associated event (VAE) or ventilator-associated pneumonia (VAP), might have a poor prognosis. The application of quality improvement (QI) program with the aids of artificial intelligence could improve the outcome of those patients.

Methods: The study was conducted in a 19-bed medical ICU of a medical center in Southern Taiwan. An interdisciplinary team initiated the weaning protocol with a four-step mobilization program within 72 hours of MV when patients become hemodynamically stable. With the integration of AI, ventilator clouds and Clinical Informatics Systems (CIS) with computer transformation of vital signs surveillance, we could safely monitor patients with MV weaning. Before endotracheal removal, we applied weaning APP (Chi-Mei extubation Scores 8) based on our previous 3602 patients' data via the train and test from an artificial neural network (ANN). We inputted 8 items to predict the possibility of liberation from MV within 72 hours.

Results: Before QI (Jan 1 to March 31, 2018), the mean ICU stays were 12.0 days, with a VAE rate of 14.6 ‰ and an average hospital cost of 350,000 New Taiwan Dollars (NTD). After QI (Nov 1 to Dec 31), the ICU stays, VAE rate and hospital costs were down to 8.7days, 0 and 190,000 NTD. The extra nursing hours also decreased from 312 to 56 hours per month.

Conclusions: The integration of QI, AI, ventilator clouds and CIS can improve the quality and outcome of ARF patients with MV. We will apply the successful experiences to the other ICUs in our hospital, and may serve as a benchmarking for other hospitals in Taiwan.

關鍵字：**Acute Respiratory Failure, Mechanical Ventilator, Intensive Care units, Quality Improvement, Artificial Intelligence**