I. Contributory causes were identified through Cause and Effect (Ishikawa) Diagram:

- **Staff:** New or inexperienced staff, imbalanced skill mix, no proper handing over of patients
- **Environment:** Lack of consistent orientation, no window, language barrier
- **Patient:** Disease process, over or insufficient sedation, lack of consistent orientation, sedation break, patient’s inability to communicate and ETT as a foreign body
- **Others:** Inconsistent patient behavior, patient’s strong cough, ETT tape is wet, ETT taping method

II. Final causes identified by our team using Pareto Chart includes:

- ETT taping method
- Lack of consistent patients orientation
- Insufficient analgesia leading to discomfort
- Inadequate sedation

III. Solutions were then explored and prioritised based on root causes identified with the help of Prioritisation Matrix:

- Changing of ETT tapping method
- 2-4 hourly patient orientation or when there is a change in patient’s conscious level
- Accurate assessment of pain score (mCPOT score) for titration of analgesia
- To minimize inappropriate sedation break post spontaneous breathing trial

PDSA #1

Changing of ETT taping method - This had been implemented as a primary measure when nurses observed different method of taping during cross deployment to other ICUs.

PDSA #2

Every 2 to 4 hourly patient orientation or when there is a change in mental state - ICU nurses are educated to provide orientation questions to orientate intubated patients.

Results

There was a statistically significant improvement in days elapsed between unplanned extubation events occurring from once every 12 days to every 33.5 days after the implementation of PDSA#1. PDSA #2 was introduced in addition to PDSA #1 and the mean of days elapsed was sustained at 35 days which shown a significant 66% reduction. The team will continue to implement other solutions explored in this project to further enhance the result and monitor the sustainability.