**Script Documentation: Mechanical Ventilation Classification**

* **Overview**: This SQL script classifies mechanical ventilation events by analyzing ventilation settings and markers of oxygen therapy and extubation. It identifies periods of mechanical ventilation and stores the results in the ventilation\_classification table.
* **MIMIC Version**: [Insert MIMIC version]
* **Key References**:
  + The query utilizes the chartevents and procedureevents\_mv tables from MIMIC.
  + Extubation data is added from procedureevents\_mv to complement ventilation information from chartevents.
* **Logic Summary**:
  + The script identifies ventilation-related settings, such as ventilator mode, tidal volume, and pressures, and marks instances of mechanical ventilation.
  + It flags extubation events and the initiation of oxygen therapy, which typically indicate the cessation of mechanical ventilation.
  + The script consolidates ventilation events from two sources: chartevents (real-time monitoring) and procedureevents\_mv (procedural records).
* **Process Steps**:
  + **Identify Mechanical Ventilation**:
    - Various ventilation-related itemids are used to classify mechanical ventilation. For instance, non-null settings like VentTypeRecorded or ventilator mode mark the presence of mechanical ventilation (MechVent = 1).
    - Oxygen therapy markers (such as O2 Delivery Device = Ventilator) and other mechanical settings (e.g., tidal volume, minute volume, respiratory pressures) are also included.
  + **Flag Extubation Events**:
    - The script flags patients as extubated when itemid = 640 and value = Extubated or Self Extubation.
  + **Identify Oxygen Therapy**:
    - When patients transition to oxygen therapy devices (e.g., nasal cannula or face tent), it is marked as the end of mechanical ventilation (OxygenTherapy = 1).
  + **Consolidate from Procedureevents\_mv**:
    - Additional extubation events are pulled from procedureevents\_mv, ensuring no extubation instances are missed, including unplanned extubation events.
* **Output**:
  + The table ventilation\_classification contains:
    - icustay\_id: The ICU stay ID.
    - charttime: The timestamp for each recorded event.
    - MechVent: A binary flag (1 if the patient was mechanically ventilated at the time, 0 otherwise).
    - OxygenTherapy: A binary flag (1 if the patient was on oxygen therapy, indicating the end of ventilation).
    - Extubated: A binary flag (1 if the patient was extubated at the time, 0 otherwise).
    - SelfExtubated: A binary flag (1 if the extubation was patient-initiated).

**Example Query**:  
sql  
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SELECT \* FROM ventilation\_classification WHERE MechVent = 1;

* **Important Notes**:
  + Ensure that ventilation settings and extubation markers are correctly mapped to the MIMIC version in use.
  + The script excludes rows marked as errors (ce.error != 1) to ensure data accuracy.
  + The union with procedureevents\_mv ensures all extubation events are captured, including those missed in chartevents.
* **Conclusion**: This script provides a detailed classification of mechanical ventilation events for ICU patients, allowing for the analysis of ventilation patterns, extubation events, and transitions to oxygen therapy.

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