### **Script Documentation: First 24-Hour Lab Values Pivot**

#### **Overview**

This SQL script calculates key laboratory values recorded during the first 24 hours of a patient’s stay in an intensive care unit (ICU). It extracts and pivots the lab measurements to obtain both the minimum and maximum values for each test across the first day. The script is designed to ensure that all laboratory data are appropriately labeled and checked for validity. It then generates a new table, labs\_first\_day, containing the results for each patient.

#### **Logic Summary**

* **Lab Measurements:** The script focuses on a predefined set of common laboratory tests (e.g., glucose, creatinine, potassium) relevant to clinical decision-making.
* **Pivoting Data:** For each laboratory test, the script captures both the minimum and maximum values recorded in the first 24 hours of ICU admission.
* **Value Sanity Checks:** The script includes logic to ensure that extreme values (e.g., highly improbable or invalid lab results) are filtered out or set to NULL.
* **Time Window:** The lab values are restricted to a window starting 6 hours before ICU admission (intime) and ending 24 hours after admission.

#### **Process Steps**

1. **Table Creation:**
   * The script drops any existing labs\_first\_day table and creates a new one.
2. **Extracting Lab Data:**
   * A CASE statement is used to map the raw ITEMID (specific to each lab test) to human-readable labels (e.g., 'GLUCOSE', 'CREATININE').
   * The data is drawn from the labevents table and is joined with ICU admissions from the icustays table. Only lab results with valid, positive numeric values (valuenum > 0) are included.
3. **Filtering Invalid Lab Results:**
   * A series of CASE conditions are applied to exclude unreasonable lab values. For example:
     + Albumin values greater than 10 g/dL are considered invalid.
     + Glucose values over 10,000 mg/dL are excluded.
4. **Pivoting Lab Values:**
   * For each lab test, both the minimum and maximum values within the first 24 hours are calculated using MIN()and MAX() functions.
   * The tests include anion gap, albumin, bilirubin, creatinine, glucose, potassium, and many others.
5. **Output:**
   * The script generates a table with the following structure:
     + subject\_id: The unique identifier for the patient.
     + hadm\_id: The hospital admission ID.
     + icustay\_id: The ICU stay ID.
     + A series of columns for each lab test, reporting the minimum (\_min) and maximum (\_max) values for that test during the first 24 hours.

#### **Example Query**

To retrieve patients with glucose values above 180 mg/dL during their first day in the ICU:

sql

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SELECT subject\_id, hadm\_id, icustay\_id, glucose\_max

FROM labs\_first\_day

WHERE glucose\_max > 180;

#### **Important Notes**

* **Measurement Units:** It is assumed that the unit of measurement for each lab test remains consistent across all patients (i.e., units are either correct or NULL).
* **Lab Test Item IDs:** The script maps specific item IDs from the labevents table to common lab test labels. If the dataset is updated or changed, the item IDs may need to be adjusted.

#### **Output**

The labs\_first\_day table provides ICU-specific lab results, which can be used for clinical studies, predictive modeling, or patient care analysis. Each patient’s minimum and maximum values for various key lab tests are stored in the final table, enabling easy querying and analysis.