



## **Hospital Nursing Intervention Pilot Program**

### **Background:**

You are a Data Analyst working for the Business Insights Group at the ACME Integrated Delivery System. An integrated delivery system (IDS) is a network of health care organizations under a parent holding company, usually a network of physicians and hospitals.

Leadership wants to launch an intervention to hire more nurses in ACME's hospital network, for hospitals with Intensive Care Units (ICU) and Surgical Intensive Care Units (SICU), to better care for critical patients who are admitted to these facilities. Medical literature has demonstrated that higher nurse to patient ratios lead to better outcomes in these intensive care settings.

However, this intervention will only be cost effective at hospital sites that have sufficient volume for ICU and SICU beds as defined by three types of beds: license beds, census beds, and staffed beds.

- Licensed beds (total beds allowed by state license)
- Census beds (total beds at the hospital)
- Staffed beds (total beds for which staffing, e.g., physicians and nurses, exists)

Leadership is interested in selecting one or two hospitals as pilot sites for their intervention to be launched in the next fiscal quarter. To identify these pilot sites, they need you to first develop a set of lists of Top 10 Hospitals based on ICU/SICU bed count volume.

### **Data, Process, and Tasks**

The following data is supplied to you to address the request:

- Two dimension tables, `business.csv` and `bed_type.csv`
- One fact table, `bed_fact.csv`

Leadership is not familiar at all with dimensional modeling and data warehousing. They need your help in identifying which of these fields are facts vs. dimensions so they can better understand how their data is structured.

Your tasks are to complete the following steps:

### **Step 1: Identify the dimensions from each dimension table**

You'll notice in `bed_type` there are only three variables, `bed_id`, `bed_code`, and `bed_desc`. Consider which of these is a fact if any and which is a dimension. Note that the PK qualifies as a dimension.

For the business table, pay attention to the differences between a fact and a dimension variable as we discussed in class. In this table there are only three dimensions to select. See if you can correctly identify which ones they are (again the PK can be counted as one dimension).

### **Step 2: Identify the Facts variables from the single Fact Table**

Consider what type of variable would be a fact vs. a dimension and select three of those from the `bed_fact` table. Be aware, it is likely that some variables in a fact table are dimensions, for example a foreign key or anything of that sort is a dimension even if it's listed in the fact table.

### **Step 3: Sketch out a Star Schema using MySQL Workbench**

Include both the data tables of interest and the appropriate joins between the tables that can be used to answer the questions.

Use MySQL to draw the star schema. Be sure to label the fact table and dimension tables accordingly (you can always add a text box above the tables in MySQL Workbench if you need to)

Paste a screenshot of your Star Schema below:

### **Step 4a: Analysis for Leadership**

Identify which hospitals have an Intensive Care Unit (ICU `bed_id` = 4) bed **or** a Surgical Intensive Care Unit (SICU `bed_id` = 15) bed **or both**.

Create three summary reports that show the following:

1) License beds: List of Top 10 Hospitals ordered descending by the total ICU or SICU license beds.

Include just two variables, `hospital_name` (`business_name`) and the total license beds from above as one summary fact. But include only 10 rows in your output table.

2) Do the same thing for Census beds. List of Top 10 Hospitals ordered by total icu or sicu census beds. Include just two variables, `hospital_name` (`business_name`) and the total census beds from above as one summary fact. Include only 10 rows again.

3) Do the same thing for Staffed beds. List of Top 10 Hospitals ordered by the total icu or sicu staffed beds. Include just two variables, hospital\_name (business\_name) and the sum of staffed beds from above as one summary fact. Include only 10 rows again.

#### **Step 4b: Interpretation of findings**

Based on your results from step 4a, discuss your insights from the data summary that you want to bring to the attention of Leadership.

For example, what are the top one or two hospitals per list based on bed volume? Are there any hospitals that appear on multiple lists? They might make good candidates for the intervention pilot program.

#### **Step 5a: Drill down investigation**

Leadership is also interested in hospitals that have sufficient volume of **both** ICU **and** SICU beds, as opposed to either type of bed that you developed in step 4a.

Conduct the same investigation as you did for 4a and list the same output of top 10 hospitals by descending bed volume, only this time select only those top 10 hospitals that have both kinds of ICU and SICU beds, i.e. only hospitals that have at least 1 ICU bed and at least 1 SICU bed can be included in this part of the analysis.

Conduct separate data investigations for Census beds, License beds, and staffed beds, like step 4a.

#### **Step 5b: Final recommendation**

Based on your analyses in step 4a and 5a, state your final recommendation here for Leadership as to **which hospitals are the best candidates for their pilot intervention program**. Remember, Leadership stated they are only interested in **one or two** hospitals for their pilot sites so it's best to tailor your recommendation to their business need and avoid unnecessary details that might confuse them. Identify your hospitals and briefly explain why you chose them.