Lakeland Regional Hospital: Operating Room Turnaround Dashboard User Guide

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I. Introduction

This dashboard is the primary deliverable for the 2024-2025 Lakeland Regional Health: Real Time Turnaround OR Dashboard Capstone team. The dashboard (DB), built in Tableau, is intended to interact with the second deliverable, a FHIR interface, to load data directly into the DB. These tools are able to provide real-time and historical insights into operating room (OR) turnaround events. It is able to effectively monitor OR KPIs such as utilization and efficiency, and identify bottlenecks in room turnover processes.

It is important to note that this dashboard is built around a "Dummy Database" or a dataset filled with placeholder data. Because of this, we recommend that you change the tool to best fit hospital needs. This could be in the form of adding/editing variables or creating new visualizations. Ultimately, this tool provides a functional framework that is intended to interact well with established hospital infrastructure.

II. Dashboard Overview

The Tableau DB consists of three main dashboard tabs and ten supporting worksheet tabs. These tabs serve an individual purpose and demonstrate both current and historical representations of OR data. Each of the dashboard tabs are described below:

Dashboard - The "Dashboard" tab features an interactive floor plan of the entire OR wing. Each OR has an interactive box button that can be clicked to send the user to the "Rm_View" DB tab. Whatever room was selected will correspond to the room view the user is navigated to. In other words, selecting "OR 1" on the Dashboard will navigate the user to the "OR 1" Room View with insights specific to it. Each of the boxes represent a separate room and store all relevant data (Room ID/Room number and Turnaround Status). By hovering over the box you can see what information is currently being stored. The color of each room indicates the current status of the turnaround process for that OR. To better align with OR specifications, the selected colors to represent turnaround are red for "Available", purple for "In-Turnaround", and blue for "Occupied".

Rm_View - The Room View or "Rm_View" tab is designed to help users gain instant insights into the current state of any given OR room. This view is made up of the tables

and graphs of four different worksheets. The first is named “Room” and shows a table with four variables related to the OR. These variables are the room number, patient number, patient first name, and patient last name. The second is “Turnaround” which contains a table showing the turnaround status, start time, and end time (if applicable). The third is “Staff Count” which has a bar graph indicating the number of active staff currently in the room. Fourth is the “Timer” which counts elapsed time since turnaround was started. This value is represented in minutes.

Summary Stats - This view houses four visualizations designed to give a broad understanding of turnaround trends, performance of the turnaround team, and per room insights. The first table is a “Turnaround Summary”, a histogram depicting average turnaround per room. On the x-axis we see each room number, the y-axis shows average turnaround times. The second, “Status”, shows turnaround status in each room on a Gantt chart. Start time is on the x-axis while room number is on the y-axis Each time segment is colored according to the “Turnaround Status” designated colors. This table is meant to convey OR status for each room for the length of the day. The third table, “Avg Duration and Staff Count/Room” has the room number on the x-axis and values on the y-axis. The measured values include average turnaround and staff count for individual rooms. The “Room Summary” contains a table showing the turnaround statuses and their corresponding room counts. Each of these tables can be manipulated using the “Turnaround Strt” filter, which will allow for the user to view changes throughout the day. This particular feature can give insights as to how each variable changes during the day.

III. Supporting Worksheets

The DB tabs each have corresponding worksheets to support their data. Below are each of the DB tabs listed with their connected worksheets:

- The “Dashboard” tab is connected to “Rm_Overlay”, which holds the data for each of the interactive boxes.
- “Rm_View” is connected to “Rm_Sheet”, “Staff_Sheet”, “Turnaround_Sheet”, and “Timer”.

- “Summary Stats” is connected to “Summ_Turnaround”, “Summ_Turnaround1”, “Summ_Turnaround2”, and “Summ_Staff”.

IV. Data format

Included with the DB deliverable is a dummy database with 14 variables. Two of the variables, “X Coordinate” and “Y Coordinate”, are necessary to create the “Dashboard” visualization. More specifically, they are used on the “Rm_Overlay” worksheet to establish the placement for each OR in “Dashboard”. The rest of the variables, their types, and a short description are listed in the table below.

Variable Name	Variable Type	Description
ID	Numerical	-
Date	Date	-
Last Updated	Date-Time	Last time turnaround was updated.
Patient Frst	Character	Patient first name.
Patient Lst	Character	Patient last name.
Patient ID	Character	-
Turnaround Strt	Date-Time	Turnaround Start time.
Turnaround End	Date-Time	Turnaround End time.
Turnaround Status	Character	-
Staff Cnt	Numerical	Staff count.
Timer	Date-Time	-
rm ID	Numerical	Room ID.
X Coordinate	Numerical	Map x coordinate.
Y Coordinate	Numerical	Map y coordinate.

V. Navigation & Layout

The tabs at the bottom of Tableau can be used to switch between tabs as well as view. All visualizations can be hovered over to show more specific details. The filter on the “Summary Stats” DB can be used to adjust the timeline for each calculated field and summary table in the tab. The tabs are filtered in order of highest priority. The first three tabs are DB tabs, the

following five are worksheets connected to the “Dashboard” and “Rm_View” DB tabs, the final five are worksheets connected to the “Summary Stats” DB tabs.

VI. Dashboard Actions

Tableau allows for built in DB functions also known as “Dashboard Actions”. These Actions can perform different operations for the DB according to user specification. There are two main Actions utilized in the DB workbook. The first is a “Go to Sheet..” Action named “Go2RmSheet”. This function runs on “Select”, meaning selecting the source, in this case the “Dashboard” tabs’ “Rm_Overlay” (the boxes), will navigate the user to the target sheets: “Rm_View” DB tab. The second Action is a “Filter..” function named “Filter2Rm”. This works by connecting the source sheet, “Dashboard” to target sheet “Rm_View”. The data in the target sheet is filtered by the target field, “rm ID”.These two Actions work together to display room-specific information upon selection of it in the “Dashboard” tab.

VII. Calculated Fields

The calculated fields feature in Tableau can create new fields from existing data using a formula. These fields are very beneficial to analytics as they enable more complex visualization. We created 7 calculated fields for use in the “Summary Stats” tab. The name, variable type, short description, and variables used to create each calculated field are pictured in the table below.

Variable Name	Variable Type	Description	Variables Used
Strt Time	Character	Strt time in "HH:mm:ss".	Turnaround Strt
End Time	Character	End time in "HH:mm:ss".	Turaround End
Time	Numerical	Timer count in minutes.	Timer
Avg Turnaround	Numerical	Average turnaround.	Turnaround Strt, Turnaround End
Duration	Numerical	Duration of turnaround.	Turnaround Strt, Turnaround End
Active Dur	Numerical	Active turnaround in minutes.	Turnaround Strt, Turnaround End, Turnaround Status
Utilization	Numerical	% of active turnaround utilization.	Active Dur, Duration

VIII. Interactive Filters

Referred to in Section 2, there is an interactive filter in the “Summary Stats” tab that can be used to adjust the timeline covered by the analytic visualizations. The filter can help the user narrow/broaden their focus and automatically adjusts tables/graphs accordingly. The filter focuses on times during each day, and further allows users to tailor the data to their needs. The filter itself is located on the top of the sidebar, which is to the right of the graphs. Some examples for use cases for this tool are comparing a previous day's turnaround efficiency to the current day, reviewing performance trends over a week or month, and checking for bottleneck indicators within a specific hour.