**Covenant Hospital Customer Traffic**

Covenant Hospital, along with its three outlying clinics, is experiencing increased congestion and longer waiting times for its patients. In an effort to understand the underlying causes, and propose potential solutions, data on customer arrivals during one-hour intervals over the course of 10 weeks has been collected for all four locations. This report aims to analyze the data, presenting charts that illustrate how customer traffic varies by day of the week and hour of the day. Additionally, the report explores whether any observed patterns are consistent across weeks using statistical process control analysis.

From the daily averages, it is evident that Fridays experience significantly higher customer traffic, an average of 1547.3 compared to other weekdays that have average traffic below 1000. (See Figure 1 below)This could be attributed to various factors, such as patients trying to schedule appointments before the weekend. Understanding this peak on Fridays is essential for resource allocation and other strategic and data-driven interventions to reduce congestion at the facility.

**Figure 1**

*Average Customer Traffic by Day of the Week*

From hourly averages, several patterns emerge: First, there is a significant surge in customer arrivals around 11 AM, which continues until 1 PM, suggesting that patients likely prefer mid-morning to early afternoon appointments. The period between 3 PM to 4 PM sees a dip in arrivals, which then rises again during the last hours of operations (See Figure 2 below). These trends can inform staff scheduling and resource allocation throughout the day, optimizing customer service delivery by reducing waiting duration.

**Figure 2**

*Average Customer Traffic by Hour of the Day*

A statistical process control analysis reveals that the process is stable across the weeks since the weekly data appears to be randomly distributed, and in control since all the data points fall within the control limits (See Figure 3 below). However, it is important to consider that external factors or events may affect customer arrivals in the future.

**Figure 3**

*Control Chart for Weekly Customer Traffic*

Based on the analysis, the report recommends strategic efforts surrounding resource allocation, appointment scheduling, real-time monitoring, capacity planning, and patient communication, to address congestion and improve operations at Covenant Hospital. Resources and staff should be allocated according to the observed patterns (Hou et al., 2022). For instance, on Fridays, and around 11 AM to 1 PM, the facility should ensure there are more staff available to handle the increased traffic. Patients can also be encouraged to schedule appointments during less busy hours, spreading out the demand throughout the day. Additionally, implementing real-time monitoring of customer arrivals and waiting times to make immediate adjustments when unexpected surges occur can enhance customer satisfaction and service delivery (Hou et al., 2022). Concerning capacity planning, the facility can consider expanding capacity during peak hours to accommodate the higher volume of patients (Hou et al., 2022). Furthermore, effective patient communication that informs them about the busiest times and provides alternatives to reduce waiting time, such as telehealth appointments, can significantly reduce traffic during peak hours and enhance service delivery.

In conclusion, analyzing customer arrival patterns at Covenant Hospital has provided insights into the causes of congestion and potential solutions to improve operations. By understanding the daily and hourly patterns, the hospital can better allocate resources, reduce waiting times, and enhance the overall patient experience. It is important to monitor these patterns over time and remain flexible in adapting to changing circumstances to ensure sustained improvement.

**Reference**

Hou, W., Qin, S., & Thompson, C. H. (2022). Effective response to hospital congestion scenarios: Simulation-based evaluation of decongestion interventions. *International Journal of Environmental Research and Public Health*, *19*(23), 16348. <https://doi.org/10.3390/ijerph192316348>