# TEAM BMC-T: Improving Hospital Transportation at the Boston Medical Center

Leonardo Lott, Jiayi Gu
15.777 – Healthcare Lab
January 2024

## Background

Boston Medical Center (BMC) manages a critical medical transport service, conducting around 240,000 annual trips for **16,000 patients and 4,000 pieces of equipment**. This service is essential for patient access to various hospital services, including emergency, inpatient, and surgical care. Efficient transport is crucial for timely medical interventions, which can be life-saving, particularly in emergencies. Prompt patient transport to testing and procedure areas, along with the swift availability of equipment, is key to preventing treatment delays and subsequent complications.

## Problem Definition

BMC transport service experiences delays and cancellations, which lengthens the overall transport turnaround time. The transport team is concerned because long transport time can result in poor patient and staff experience and wasted time and resources. BMC has previously focused on ensuring enough staff is available for transport. The host would now like to optimize their transport process to minimize delays and cancellations, which if successful would lead to lower transportation turnaround time.

## Goals

1. Help BMC identify the key **factors causing the delays and cancellations** in all operational sectors and areas provided in the dataset by BMC.
2. Provide recommendations to l**ower the overall transport turnaround time.**

## Methodology

1. Extensive **review of literature** for best-practices and recent innovations in organizing patient transport
2. **Analysis of transport data** from July, August, and September 2023
3. Detailed **process mapping** of the transport process
4. Multiple **on-site visits** throughout December and January and **interviews** with stakeholders such as transporters, nurses and supervisors.
5. **Optimization model** to better match transporter assignment to anticipated demand
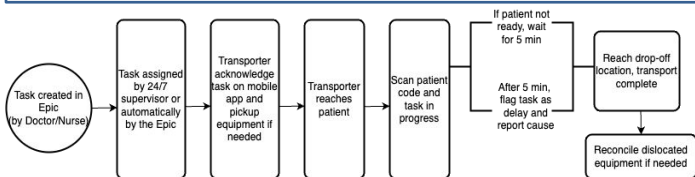


BMC Transport process mapping

## Data analysis Results
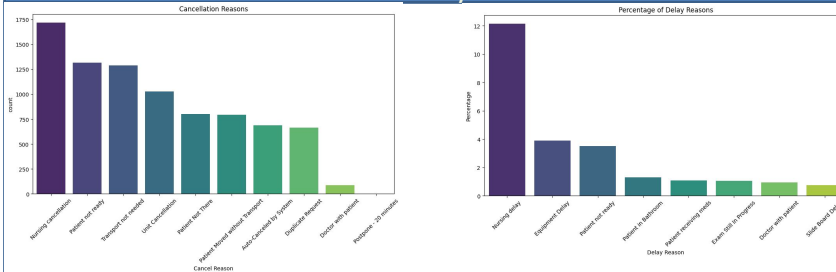


Insights include:
1. Patterns in delays and cancellations: number of delays, total delay time and cancellation rates are higher in mid-day to early afternoon.
2. Delays and Cancellations are mainly caused by external factors (ED organization, nursing readiness, patient behavior, etc.).
3. The Sector that contributes the most to delays and cancellations is Menino General. Within this sector, tasks involving the Emergency department contribute the most delays and cancellations.

## Qualitative Recommendations

Strategies to reduce delays and cancellations:
1. Update Location Info: enhance patient location details in system.
2. Streamline Cancellations: train staff; introduce alert system.
3. Flexible Transporter Shifts: implement staggered shifts and flexible staffing.
4. Stretcher Management: set temporary storage zones.
5. Special Transport Protocols: criteria for bariatric/transports with extra equipment.
6. Improve Command Communication: faster cancellation handling.
7. Continuous Training Updates: focus on efficiency and awareness.
8. Leadership Involvement: engage with staff, address transporter concerns.
9. Nurse Identification Post-Transport: Implement clear signage for responsible nurse.

## Technical Improvements

We also developed an optimization model that streamlines scheduling full-time equivalents (FTEs) to daily shifts, aiming to minimize gaps between capacity and demand, especially during peak hours. The optimization model integrates seamlessly with the team's existing scheduling framework using Excel and the OpenSolver Add-in for efficient optimization.