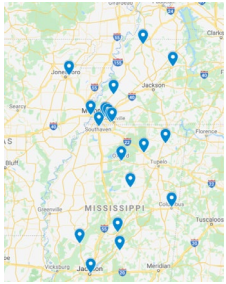


Reducing Length of Stay Overages by Improving Hospitalist's Rounding Paths and Patient Assignment

Lauren Law, Adam Corral, Courtney Johnston, Dania Quintero, Owen Stuckey

Baptist Memorial Healthcare Memphis, TN

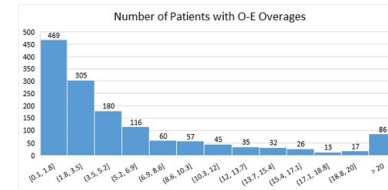
Baptist Memorial Healthcare was founded in July of 1912 in Memphis, TN. The network has expanded to 23 affiliate hospitals across Western Tennessee, Mississippi, and Eastern Arkansas. Our project scope includes the largest hospital in the network in Memphis, TN. There are many different services and specialties offered at the Memphis.



Length of Stay Overages

The main performance measure is the number of days over the observed to expected a patient's length of stay is, how often this is occurring, and determining the possible causes of these overages. The observed to expected is a predetermined number of days a patient's insurance will cover the medical expenses based on their diagnosis. Length of stay is the number of days a patient stays in the hospital. It was determined that many patients are staying at the hospital longer than their expected LOS. From July of 2020 to September of 2020, at the Memphis facility, 1,455 out of 3,018 total patients (roughly 48%) stayed in the hospital longer than anticipated. Over 700 people exceeded their O-E by less than 2 days and over 1400 people exceeded their stay by less than 5 days.

Diagnosis	O-E (days)	Actual average LOS (days)	Variance (days)
Covid-19	6.9	8.5	+2.6
Chest Pains	7.4	9.6	+2.2
Acute Kidney Failure	4.8	6.8	+2
Transient Cerebral Ischemic Attack	2.5	2.7	+0.2



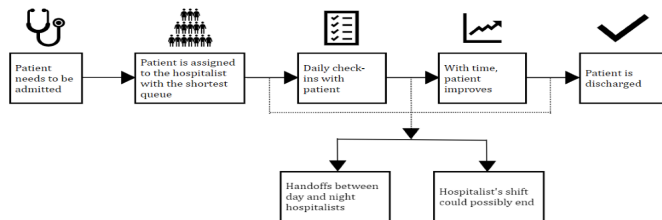
Final Recommendations for BMH

We recommend that hospitalists make rounds using the nearest neighbor heuristic unless certain circumstances arise. Since their current schedule allows them to round how they choose, this is causing excess walking between patients. By suggesting them to visit neighboring patients, the amount of walking will be significantly reduced. Another recommendation that we will make is standardizing hospitalist's location. We will recommend that hospitalists are assigned to a wing, which includes two hallways of patient rooms. As a result, hospitalists will be assigned patients based on the wing that patient is admitted to. In addition, we will recommend that workstations, equipped with the necessary equipment, be in each wing of the hospital so that hospitalists do not have to travel down to their office to input data or make specialist requests.

Order	Task	Importance	Description
1	Geographic Assignment	HIGH	Assign Hospitalists to patients in a certain area
2	Nearest Neighbor	HIGH	Hospitalists visit the next unseen patient closest to their current location
3	Workstations	MEDIUM	Add computer stations to every hallway to input patient data and orders
4	Computer Carts	LOW	Offer the hospitalists computer carts for inputting patient data and orders

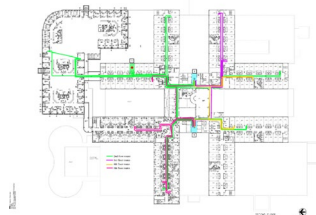
Hospitalists and Their Interactions with Patients

Hospitalists are physicians who admit and discharge patients, make rounds to different patients, and submit requests as needed for specialty doctors, tests, and treatments. The current method of assigning a hospitalist to a patient is whoever has the lowest caseload gets the new patients. If there is a tie for the lowest caseload, one of the hospitalists will volunteer to take the new patient. Each hospitalist has their own specific way of visiting their patients. Typically, they go in order from the most severe to the least severe. At different points during the day, hospitalists will go back to their office to input data and submit requests as needed. Only day shift hospitalists can discharge patients while day and night shift hospitalists can admit patients and make requests.



Technical Analysis

The rounding process followed by doctors and hospitalists to check their patients every day could be a factor in LOS overages. We felt that another cause for overages could be the way in which hospitalists complete their rounds. We used the data we received to determine the walking distance and travel time for hospitalist Dr. Santiago, using his current methods, shown in the diagram below. Another factor in hospitalist travel time is where their patients are located. The current method of assigning patients to hospitalists leads to hospitalists treating patients all over the hospital on all different floors. All these potential factors lead to longer distances that need to be travelled in order to visit patients and therefore more time patients spend in the hospital possibly waiting to be discharged.



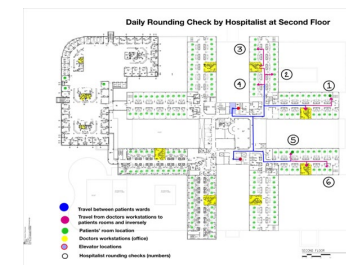
$$\text{Walking time} = \frac{\text{walking distance}}{5.5 \text{ ft/sec}} + \text{floor changes}$$

$$= \frac{4340 \text{ ft}}{5.5 \text{ ft/sec}} + 180 = 969.09 \text{ sec} = 16.15 \text{ min}$$

Total Distance Walked	4,340 ft
Total Travel Time	16.15 min

Implementation

The implementation of these recommendations will greatly reduce travel time and distance for the hospitalists as well as a reduction in length of stay for the patients. Using the assumptions that we initially used for determining walking distances and time, there is a 31% reduction in travel time when implementing our recommendations.



Proposed Method with Additional Implementations

Total Distance Walked	2,670 ft
Total Travel Time	11.09 min