Analysis of Random Demand compared to the schedule of Portering Resources

Editor's Summary: In *Analysis of Random Demand Compared to the Schedule of Portering Resources*, Regional Health Authority B used a software system that integrated 'queue theory analysis' to study random demand for services from the portering[1] staff and compared this information to the existing work schedules. Portering staff assist patients in moving safely across the hospital and assist providers by transporting equipment to where it is needed. Using fifteen weeks of typical data reflecting about 37,000 requests, the group was able to predict the number of staff needed to avoid delays of more than 10 minutes in service. The analysis revealed that while more staff were needed for certain hours of the day, less staff were needed at other times and that the use of portering service staff time could be optimized by staggering the start time of different individuals' shifts. In so doing, the goal of portering requests within 10 minutes could be more readily achieved.

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Purpose:	The purpose of the project was to analyze the random demand for services from the portering staff and compare this to the work schedule of the porters using Queuing Theory methodologies to calculate the demand on resources.
Context:	The Portering Service was being criticized for not meeting the demands for their service in a timely fashion despite adding more FTE's to the schedule to meet the demand. We wondered if applying Queuing Theory calculations to the problem could help to better understand when the demand was higher and if an improvement to the schedule could decrease the delays and thus complaints from other departments and services that depend on portering to get work done.
Resources:	FTE's 0 new

[1] Portering is the service which ensures safe transfer of patients and necessary equipment across the hospital.

Source of resource:	In kind contributions from the organization
Population Group:	As we use a software system to manage the porter's workload, we analyzed 15 typical weeks of data. There were greater than 37,000 transactions for service during this time.
Patient Flow Entry and End Points:	We looked at the time that the request was entered into the system until the job was put to a completed status by the porter.
Description/ approach:	We analyzed the data by time of day and day of week, and contrasted this to the corresponding work schedule for the portering staff.
Tools and Tactics:	Using queuing calculations that we had learned at a Queuing Theory workshop sponsored by IHI in June of 2008, we were able to predict the number of staff it would take on any day or time that would need to be working in order to have not more than a 10 minute delay for service. We used Excel spreadsheets extensively to calculate our findings.
Measurement approach:	We were fortunate to be able to download data directly from the portering software into Excel for analysis. We were then able to calculate the number of staff it would require to have less than a 10 minute delay for service at any given time period during weekdays and weekends. We then compared that to the current staffing pattern, and were able to make staffing change recommendations to the Portering Service Supervisor and Manager.
Impact/ evaluation:	The analysis was able to show that though there was a need for more FTE's at certain times, immediate improvements could be made by having shift start times to earlier in the shift in the case with day shift. For example if peak demand was at 1000 hours, bringing on an extra staff member to work 1000-1400 to get through the heavy demand period did not help to decrease delays very much, as the queue for service had already formed and was growing. If the start times for day staff, which were already staggered were brought back to start earlier in the day, the queue had less chance of building to the point of causing large delays and work flowed much more freely.
Observation/ Discussion:	A major shift in thought for the managers needed to happen. Managers want to have their staff working productively for as much of the time as possible. However, with queuing theory we do not just consider staff productivity, we also consider **throughout**. Having a relatively inexpensive resource (like a porter) being idle for a period of time, is less expensive than an MRI machine (an expensive resource) being idle waiting for a patient. Finding the balance within our organizations will be the key in the future. We also noticed that there is extremely high demand on certain week days. We are looking into this to see if the causes of this peak activity can be determined to then perhaps "smooth" the demand. For example if the GI unit and Medical imaging have high demand activities' every Tuesday, perhaps we can help them to move some of the activity to other times of the day, or even other days of the week when demand is not as high, and unblock bottlenecks caused by scheduling work without knowledge of what other work is being scheduled concurrently in the building.
Critical success factors/ lessons	We enjoyed great support from the Senior Management of the hospital who sent us to the workshop on Queuing Theory, and then allowed us the time to work on this project to see just how it could help our managers make better decisions with the resources on hand, and even make business cases to improve services. The Manager and Supervisor of the Porters were open to new ideas and worked with us to gather the data we needed to do the analysis.

Limiting factors:	Ongoing measurements to look at delays for service are planned. As we move forward, strong support from senior mangers will be needed as some changes will cross departments, and current practice models where there may be more resistance to change.