

LV Prasad Eye Institute

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Finkler SA, Knickman JR, Hendrickson G, et al. A comparison of work-sampling and time-and-motion techniques for studies in health services research.

Finkler et al. attempt to quantify the differences in accuracy of the work-sampling and time-and-motion techniques for recording the activities of medical residents over a 24-hour period. Through their limited observation period and sample size of eight residents, they are able to conclude that the work-sampling method of extrapolating from hourly, half-hourly and quarter-hourly observations does a poor job of approximating the true distribution of activities, as observed using the time-in-motion techniques, where the observer continuously “shadows” the subject over a period of time. The authors caution that there is a cost tradeoff to be made, where work-sampling is usually more cost effective and may be more practical for contained groups of activities, such as nurses in one hospital unit. Achieving the same level of accuracy however, may require observations over a prolonged period. In contrast, for roles where travel is required, the difference in accuracy and speed may justify the additional cost of using a time-and-motion method. They also stress the importance of a common definition of task categories ahead of time for both methods.

The implications of this study relate to LV Prasad not only with respect to the MIT Sloan project, but also with future attempts at mapping task distribution. As the team of students has limited time to collect data, we would certainly favor employing the time-and-motion method early in our visit. To be as effective as possible, it would be advisable to prepare a list of tasks or categories of tasks, to minimize error in consistency between each member’s observations. The effectiveness of policy recommendations, such as reallocation of tasks to different resources, is contingent on accurate observations.

Zheng K, Haftel HM, Hirschl RB, O'Reilly M, Hanauer D a. Quantifying the impact of health IT implementations on clinical workflow: a new methodological perspective

Using the implementation of a computerized provider order entry (CPOE) system at the pediatric intensive care unit (PICU) at University of Michigan Health System (UMHS) as an example, Zheng et al. demonstrate the limitations of time-and-motion studies in reflecting the effectiveness of new workflow management strategies. Over a period of eight months, observers shadowed a group of resident physicians before and after the implementation of the CPOE system. Expectedly, they observed a decrease in percentage of time spent on paper-based activities, an increase in computer-based activities, and a marginal decrease in the percentage of time spent on the two categories combined, reflecting overall efficiencies in orders writing process. The findings of the time-and-motion study are contrasted with qualitative reports, which identify end-user negative perceptions of the system's effect on their workflow. To resolve this discrepancy, the authors apply new workflow analysis techniques, including consecutive sequential pattern analysis (CSPA) and transition probability analysis (TPA), which show the increase in task fragmentation (time spent changing tasks), and repetition of certain task sequences after the CPOE system implementation. They suggest that this fragmentation is linked to increased mental burden, physical activity, and likelihood of error. These "workflow-oriented" factors are not captured by the time-and-motion study, and may explain the discrepancy between those results and the qualitative findings.

The implications of this study will help the MIT Sloan team frame their approach to observing and analyzing the workflow at LV Prasad, and will be useful to the organization in evaluating the effectiveness of new initiatives in the future. A thorough analysis will consider not only the times allocated to specific tasks and groups of tasks, but also the frequency of certain sequences of tasks, and of task shifting. The result will be a better understanding of both the task time expenditure, and the overall workflow for each of the subjects.

A Dynamic Balanced Scorecard for Managing Health Systems Performance - by David Lyell, Geoff McDonnell

The article addresses the challenge of developing effective performance management systems for healthcare organizations. After review of most widely used frameworks for measuring hospital performance, the authors examine applicability of balanced scorecard for healthcare system management. They argue that although balanced scorecard, developed by Kaplan and Norton is one of the more comprehensive and widely adopted performance management systems in the industry, it suffers from several weaknesses that can be addressed with system dynamics approach. Namely incorporating system dynamics methodology can effectively address dynamic complexities involved in managing hospital performance. Causal relationships between key performance indicators can be tested and validated. Policies and strategic decisions can be tested in a simulated environment before actual implementation.

For LVPEI, facing the challenge of allocating limited resources across competing objectives of providing access to eye care for all those in need, maintaining high quality of care provided and achieving financial sustainability, dynamic balanced scorecard has the potential of enabling key decision makers with a framework that could help them test their mental models, analyze impact of multiple policy alternatives and come up with an optimal set of strategic initiatives to achieve multiple performance objectives.

Note on the Management of Queues

Note on the Management of Queues discusses the nature of queuing systems by examining queuing system performance measures, the types of existing queuing systems, and a wide range of management tools that are available to assist in the design and operation of queuing system. This note is intended for business organization that provides general service, including LVPEI that offers eye care service.

Queuing System Performance Measures

- Average (expected) waiting time
- Probability that waiting time exceeds x minutes
- Probability that waiting time is zero (no line)
- Average (expected) number of customers in waiting line
- Probability that waiting line exceeds x minutes
- Proportion of customers wanting service that were served
- Average (expected) service time
- Probability that service time exceeds x minutes
- Expected (average) total time in system (waiting and being served)
- Average system utilization (or percent of time that servers are busy)
- Probability that servers are busy for more than x consecutive times

Type of Queues

- Single stage system
- Multiple stage system
- Parallel single stage system
- Multichannel single stage system
- Multi-line system
- Customer discrimination system

Management Tools for Queues

- Changing the number of channels by adding (or closing) service facilities
- Pre-processing line
- Adding training or staffing at each service facility
- Eliminate certain service at peak times
- Distract customers' attention from purely "waiting"
- Preliminary processing
- Disguise the length of line
- Be explicit about the expected waiting time
- Peak-pricing
- Appointment systems, but raises expectations

NHS Seven Ways to No Delays – Version 2.0, January 2010

Seven Ways to No Delays is a guide for clinicians and managers to improve the quality and productivity of patient care, and provides information and detail on tried and tested improvement practice used successfully in the NHS that be transferred directly to improving patient flow at LVPEI. The seven ways are 1) focus on patient pathway, 2) plan ahead along all stages of patient's pathway, 3) balance demand and capacity, 4) pool similar work together and share staff resources, 5) keep things moving – see and treat patients in order, 6) reduce things that do not add value to patients, 7) keep the flow – reduce unnecessary waits. Below are some of the tools that can be used to achieve each of the seven objectives.

Management tools that can be used to achieve seven ways to no delays:

1. Focus on patient pathway
 - Map the last ten patients
 - Clinical engagement
 - Stakeholder analysis
2. Plan ahead along all stages of patient's pathway
 - Discharge planning
 - Pre-operative assessment and planning
 - Process templates
3. Enhanced recovery program
4. Balance demand and capacity
 - Plot patient volume by type
 - Understand resources required by one type of patient
 - Understand daily patterns of demand
 - Develop schedules and staffing levels based on volume
5. Pool similar work together and share staff resources
 - Identify high volume procedures (which therefore have the potential for pooling)
6. Keep things moving – see and treat patients in order
 - Investigate difference in waiting time
 - Minimize the number of different types of slot, cancellations, no-shows. Seeing patients in order reduces difference in waiting times between patients, which reduces maximum waiting time, which improves the patient experience.
7. Reduce things that do not add value to patients
 - Map the processes and procedures and identify parts that don't add value
8. Keep the flow – reduce unnecessary waits
 - Identify bottlenecks
 - Introduce “lean” working practices

Massachusetts General Hospital's Pre-Admission Testing Area (PATA) – Kelsey McCarty, Jérémie Gallien, Retsef Levi

The case study discusses the operational challenges faced by Pre-Admission Testing Area (PATA), an outpatient clinic at the Massachusetts General Hospital (MGH). The PATA clinic was responsible for completing all the necessary testing and “work-ups” for all outpatient surgery patients at the MGH. Despite 12 examination rooms, state of the art facilities, and well-trained staff, PATA patients faced average wait times of 3-4 hours for pre-admission testing with many patients having to spend a full day at the facility. With many outpatients coming to MGH through referrals, experience at PATA played a big role in patient’s first impression of the hospital.

The case goes on to discuss how MGH approached this problem from the management lens, collecting data for all patient checkpoints, conducting a time and motion study on patients and providers, and identifying where the true bottlenecks exist in the patient flow structure at PATA. The management practitioners at PATA were able to reduce the average wait time for PATA to 40 minutes employing these techniques. The case is particularly relevant as the operational challenges faced by PATA are synergistic to those faced by LVPEI. It highlights the importance of having a human-centered design approach, i.e. conducting a time and motion study to observe the user behavior and identifying the issues that plague the system. The team had the pleasure of talking to Kelsey McCarty, Senior Operations Manager at the MGH and author of this case study about the approach employed for PATA and the techniques that worked well.

Waiting lists, waiting times, and admissions: an empirical analysis at hospital and general practice level. Windmeijer F, Gravelle H, Hoonhout P. Health Econ.

The academic article reports on the empirical study performed at the UK National Health Service (NHS) Hospital in Scotland. The study aimed to identify the impact of waiting lists and waiting times on inpatient, outpatient, and emergency admissions at the regional hospital and what policy interventions when placed can do to alleviate the long wait times/lists.

Windmeijer, Gravelle, and Hoonhout analyzed the supply side by analyzing past trends of patient care delivery from the NHS and patient throughput rate. They collected data on the demand side by analyzing the number of patients from the referral services and how many of those actually fulfilled the referral at the hospital. The conversion rate is hypothesized to be correlated to the waiting lists and waiting times associated with the clinic.

The supply and demand results from the Scottish hospital are simulated using statistical models. The simulations are run over a period of 24 months. The simulation results were combined to perform an exercise to assess the responses to activity levels and waiting measures to exogenous increases in the number of elective inpatient and day-case admissions. The simulation exercise takes account of the dynamic relationships and feedbacks found between the various activity levels and waiting measures. The analysis shows that it is possible to estimate economically sensible dynamic models of the supply and demand for hospital care. It also carries the general lesson that that one- off policy interventions to reduce waiting times have complicated effects which are difficult to predict a priori without a formal model and which persist for a considerable time.

The case is a relevant comparison to the situation at LVPEI where long wait times, waiting lists, and overutilization is an existing problem. It will be important for the GHD Lab team to be aware of the intended and unintended consequences of policy interventions implemented to solve the problem of waiting lists and understanding the dynamics and feedback loops that exist in the system. Any policy intervention that is to be implemented must be carefully studied and reviewed prior to implementation.

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