Process Analysis Case Study: A Medical Center Ophthalmology Clinic

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Summary
An ophthalmology clinic is often one of the highest volume clinics in a Medical Center. Being the primary resource for many low-income and uninsured patients, the Medical Center we studied strives to provide patient care and access for those most in need within the local safety-net health care system. Among other challenges, being the primary source of specialty care for the region’s patients translates into a high volume of patients who typically do not have a regular source of care or a medical home to help guide their care. In order to appropriately care for such a population, providers in the ophthalmology clinic must treat a broad spectrum of patients who have a wide range of acuity levels, and often exacerbated conditions. In addition, the ophthalmology clinic is required to see patients who come from the ER, provide consults throughout the hospital and provide care to patients from the prison ward. Providers therefore often opt to provide as much care as possible in a single visit while the patients are in the clinic as it is unlikely they will be able to access routine follow-up care. As a result, the ophthalmology clinic has consistently long wait times after patients arrive. Anecdotally, patients are told to pack a lunch and be prepared to wait all day. In the spring of 2011, graduate students from the University of Southern California Viterbi School of Engineering performed a cycle time and process analysis on the operations of the clinic to help decrease their cycle time.

Method
The analysis was conducted over seven days in two ways—observations and a time study.

Observational Study
Observations were made of the daily operations. In addition to monitoring queue lengths and times, processes and work flow maps were documented and work patterns of the clinic were observed. Informal key informant interviews of the physicians, nurses and leadership were conducted to assess perception of the clinic’s operations.

Time Study
The time study measured several discrete time points throughout the process. The first point was defined as the moment a patient registered at the desk. Using a custom time tracking worksheet that

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was attached to a patient time chart, the amount of time that passed during and between each handoff was documented as the patient and chart moved throughout the process. Time points included start and end times of the visual acuity exam of the patient, the time required to log the chart at the desk and the entire doctor’s visit, which included exams and tests, etc.

Results
Upon completion of the time study the results were assessed using Six Sigma and Lean principles. The following notes were based on our observations of the clinic, and suggestions we made for improvement:

- **High volume** – In the general ophthalmology clinic alone, the number of visits averaged many patients a day. The volume of patients, however, seems to be a result of the more systemic issues of the healthcare system as a whole, which of course was beyond our scope to review.

- **Cycle times** – The mean cycle time median and maximum was determined.

- **Variability in cycle times** – The time study showed that many of the support processes, including registration and chart recording, while somewhat variable, did not contribute significantly to the overall variability of the process. A key driver appeared to be patient acuity, which required more time of the physician and key staff. Nonetheless, while variability existed, the distribution of wait times was centered about the mean, suggesting a central convergence of the cycle time. This would indicate that the clinic is working at or close to its capacity, given its current parameters.

- **Block scheduling** – The clinic is using a block scheduling system. There are four main timeslots that multiple patients are asked to come throughout the day, with two additional as overflow. Walk-ins are accommodated on a case-by-case basis. This appears to be the greatest area of opportunity.

Recommendations

- We recommended that there be a deeper analysis of the caseload and acuity of the clinic and implement an acuity-based scheduling system. This would help align the amount of work required to care for the patient with the amount of time scheduled for the work. By scheduling according to need, a more calculated work flow could be implemented that deliberately stagers patient appointments to allow for better management of patient arrivals and cycle time.

- Level the workload. All appointments were made in the four time slots, so we suggested they utilize the entire day and stagger patient arrivals so they are not waiting all day. Also we suggested they make appointments and appointment times based on acuity. For example, new patients take longer. The clinic can assign more minutes for them so there are different appointment types of varying lengths. When a patient leaves an appointment, the doctor can make note of what type of appointment they need and the duration (on a scale: 1-5) so that when the patient leaves, the registration clerk can make the follow-up appointment accordingly.
Results and high-level recommendations were presented to the Medical Center executives, as well as to the physicians and nurses in the clinic. Physician and staff leadership are currently working to further review the analysis and to implement some of the recommendations provided.

The study was conducted over six days. The staff was very open to the results of the analysis. A challenge was getting a timesheet completed by the physicians. Below is a timesheet we used for gathering data and a dashboard recommended for future use.

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Figure 1: Worksheet for gathering data.
Figure 2: Clinic dashboard

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