Identification and Improvement of Medical Care Inefficiencies at a Resident Clinic

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Abstract. A resident primary care clinic serves as both a teaching facility and source of health care to lower income patients. A local primary care resident clinic has been identified in order to analyze how effectively access to care is being provided. A six week data collection effort was completed in order to quantify the patient and physician experience within the clinic. Initial analyses have indicated that waiting times, appointment scheduling and exam room utilization can be improved. Both a capacity and demand model can be developed in order to offer care to more patients. Timeliness and effectiveness of care can be improved by applying optimization techniques to clinic procedures.

1. Introduction

Health care access and effectiveness is at the forefront of the current national debate. In collaboration with the University of Kansas School of Medicine, the research team has identified a primary care teaching facility that serves low income patients. More than 95% of the patient population at this clinic use state funded insurance (Medicaid). Using system improvement tools, the effectiveness of care throughout the clinic can be improved. Currently, about 300 patients are seen by resident physicians in the clinic per week. These physicians have 0-3 years of experience as a post medical school graduate. Residents obtain a unique patient panel at the clinic in order to gain experience and develop clinical continuity. Patients at the clinic are currently scheduling appointments which are granted in 15, 20, 30 or 45 minute intervals. The particulars of the patient population or retention are not known. The potential benefits of clinical improvements to the patient population are substantial. By improving access to primary and preventative care, it can be expected that the impact on other facets of the health care industry to be minimized by reducing unnecessary hospitalizations and urgent care visits.

2. Methodology

In order to analyze the baseline operation of the clinic, observational data was taken both in the waiting room and within the physician pods at the clinic. Data collection was conducted over all weekdays and during all care times in order to collect a comprehensive analysis. Patient identifiers and the names of providers associated with each appointment were not recorded to protect patient confidentiality. No data were collected by observers within the exam rooms of the facility. The data collected included patient tardiness and waiting times, appointment allocation, exam room utilization, and how providers spend their time both inside and outside the exam room. Observations for each patient participating in the study were taken from nursing staff, physicians and an observer to increase the reliability of the data. More than 600 patients were observed during this process over a six-week period. Baseline data collection was done prior to a pre-determined schedule of implementation of electronic medical recording and scheduling software in order to eliminate data effects due to training and turnover of procedures. Data was subsequently manually entered into a Microsoft Access© database for analysis.

3. Results

The overall capacity of the clinic can be defined as how appointments, providers, exam rooms and equipment are currently being allocated. For the time being, however, capacity will only be described as hours available for appointment scheduling. Time capacity will be the summation of individual providers multiplied by the number of hours worked, with n being the total number of providers on staff at the facility.

The demand of the clinic is the load of requests for appointments being taken by new and current patients. In order to optimize clinic effectiveness, steps should be taken to match the current capacity to the demand. This can most easily be done by adding capacity by reducing inefficiencies in the clinic. Inefficiencies slow the progress of providers and cause strain on the other resources within the clinic. A preliminary data set has been analyzed. Based on a sample size of more than 100 observations, more than 30% of patients arrived late for their scheduled appointment. This causes a strain on providers whose appointments might collapse on one another due to tardiness. After a patient arrives and checks in for his appointment, he is asked to wait in

the lobby to be called back to an exam room by the nursing staff. Data on this lobby waiting time was collected during two days of the data collection period. The range of lobby waiting time was three to 40 minutes.

Currently, no algorithm is being used at the clinic to determine the length of appointment each patient is given. Ideally, with clinic improvements, the amount of face-to-face time each patient spends with his provider can be maximized. The allocation of patient slot was compared to the amount of face-to-face time each patient spent with his provider.

Appointment Slot (minutes)	Number of Patients	Patient time with provider ≤ appointment slot	Patient time with provider > appointment slot	Average total face to face time with provider
15	37	18	19	17.8
20	2	0	2	27.0
30	61	50	11	22.0
45	3	3	0	27.6

Table 2. Appointment allocation

Across the four appointment slots available, most patients were awarded 30 minutes. Regardless of this appointment slot, patients spent an average of only 20.8 minutes with his provider, with very little deviation based on appointment slot. The average total time spent in the exam room by one patient was 50 minutes.

Appointment allocation, demands on providers and patient waiting and tardiness impact the capacity and demand condition of the clinic. Further analysis should be performed to determine specific suggestions for improvements to the facility in order to optimize the care being provided to patients.

4. Acknowledgements