

Optimizing value utilizing Toyota Kata methodology in a multidisciplinary clinic



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Summary

Introduction

Value in healthcare is measured in terms of patient outcomes achieved per dollar expended. Outcomes and cost must be measured at the patient level to optimize value. Multidisciplinary clinics have been shown to be effective in providing coordinated and comprehensive care with improved outcomes, yet tend to have higher cost than typical clinics. We sought to lower individual patient cost and optimize value in a pediatric multidisciplinary reconstructive pelvic medicine (RPM) clinic.

Materials and methods

The RPM clinic is a multidisciplinary clinic that takes care of patients with anomalies of the pelvic organs. The specialties involved include Urology, General Surgery, Gynecology, and Gastroenterology/Motility. From May 2012 to November 2014 we performed time-driven activity-based costing (TDABC) analysis by measuring provider time for each step in the patient flow. Using observed time and the estimated hourly cost of each of the providers we calculated the final cost at the individual patient level, targeting clinic preparation. We utilized Toyota Kata methodology to enhance operational efficiency in an effort to optimize value. Variables measured included cost, time to perform a task, number of patients seen in clinic, percent value-added time

(VAT) to patients (face to face time) and family experience scores (FES).

Results

At the beginning of the study period, clinic costs were \$619 per patient. We reduced conference time from 6 min/patient to 1 min per patient, physician preparation time from 8 min to 6 min and increased Medical Assistant (MA) preparation time from 9.5 min to 20 min, achieving a cost reduction of 41% to \$366 per patient. Continued improvements further reduced the MA preparation time to 14 min and the MD preparation time to 5 min with a further cost reduction to \$194 (69%) (Figure). During this study period, we increased the number of appointments per clinic. We demonstrated sustained improvement in FES with regards to the families overall experience with their providers. Value added time was increased from 60% to 78% but this was not significant.

Conclusion

Time-based cost analysis effectively measures individualized patient cost. We achieved a 69% reduction in clinic preparation costs. Despite this reduction in costs, we were able to maintain VAT and sustain improvements in family experience. In caring for complex patients, lean management methodology enables optimization of value in a multidisciplinary clinic.

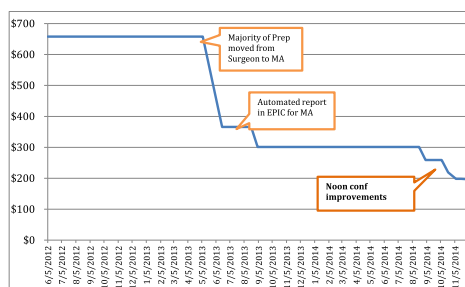


Figure Improvement made in patient preparation that allowed for cost reduction. Noon conference refer to our pre clinic huddle that occurs 1 hour before clinic start.

Introduction

It is estimated that 20% of the gross domestic product in the United States will be spent on healthcare by the year 2018 [1]. Increasing costs negatively impact value in healthcare. Value is measured in terms of patient outcomes, achieved per dollar expended. The central focus of the healthcare industry must be to increase value for patients by measuring outcomes and cost at the patient level [2]. One of the challenges is the acquisition of accurate cost information on which to base strategic, pricing, and management decisions [3]. Recently Kaplan and Anderson [4] developed an approach, called the time-driven activity-based costing (TDABC), that is based on the unit cost of supplying capacity and the time required to perform an activity.

The practice of Kata is the act of practicing a pattern so it becomes second nature. It is a day-to-day management system practiced at Toyota. It teaches a way of working (a Kata) that is a step-by-step discovery process through experimentation at the front lines and using the PDCA cycle (Plan Do Check Act) to get from a current condition to a desired or ideal condition [5].

In an effort to provide value for patients, a multidisciplinary pediatric specialty clinic was created to treat children with anomalies of the pelvic floor organs. Multidisciplinary clinics have been shown to be effective in providing coordinated and comprehensive care with improved outcomes, yet tend to have higher cost than typical clinics [6–9]. This paper describes the use of TDABC as a cost accounting method to direct our continuous improvement efforts based on the Toyota Production Systems philosophy. We sought to lower cost per patient and optimize value in a multidisciplinary outpatient clinic.

Methods

The study

From May of 2012 to November of 2014, the clinic has utilized Toyota Kata Methods to enhance operational efficiency and improve value for our patients. Value was derived using cost and quality outcomes.

We measured cost at the individual patient level using a TDABC analysis by measuring provider time for each step in the patient flow and estimating the hourly cost of the providers (MD, Registered Nurse [RN], MA, Advanced Registered Nurse Practitioner [ARNP]) at the individual patient level. For this study we only targeted clinic preparation.

Quality variables included time to perform a task, number of patients seen in clinic, percentage value-added time (VAT) (face-to-face time with patients), and Family Experience Survey scores (FES).

A research assistant or an administrator acquired times for TDABC and VAT manually. VAT was calculated by manually acquiring the time the patient was seen by a provider(s) and dividing that over the entire time the patient was in an examination room. As an example, if a patient was in an examination room for 2 h and was seen by

three providers for a total of 1 h face-to-face time, VAT was calculated at 50%.

Family Experience Surveys (National Research Corporation) were administered at the end of clinic using an iPad (Apple, Cupertino, CA, USA) with data collection software (Tonic, Menlo park, CA, USA). Data were compiled in Excel (Microsoft, Redmond, WA, USA). Data were reviewed and a proposed change was discussed and implemented.

The clinic

The Reconstructive Pelvic Medicine Clinic is a multidisciplinary clinic based in a stand-alone tertiary pediatric children's hospital. The clinic focuses on the care of children with anomalies of the organs of the pelvic floor such as anorectal malformations, Hirschsprung's disease, cloacal exstrophy, bladder exstrophy, Mullerian anomalies, and idiopathic constipation. The clinic consists of pediatric specialists in the following disciplines: urology, general surgery, gynecology, and gastrointestinal motility. The clinic is supported by two MAs, three nurses, and a nurse practitioner. The clinic occurs twice a month. Clinic is preceded by a multidisciplinary conference/huddle to discuss the patients. During clinic, one to five providers may see an individual patient.

Change methodology

The clinic's initial value improvement initiative was supported by the hospitals Quality Improvement Department. A consultant was assigned to our team to facilitate the initial implementation of TDABC and improvement methodology.

First, all members of the clinic team were convened to define and obtain data on the current condition and create a process map to identify the tasks that each member of the team performed before, during, and after clinic.

Second, the work was divided into the following three buckets: (1) clinic preparation, (2) clinic flow, (3) coordination of care.

Third, a challenge state map was created (Fig. 1). The total cost of the clinic based on the baseline data collected was \$1449 per patient, which included the cost of preparation, patient flow, and care coordination. The focus of this study was the clinic preparation component.

Fourth, the team was committed to measuring outcome and cost variables and making one small change per clinic. A huddle is conducted at the end of each clinic where data for that clinic is shared with all staff, deficiencies in care are discussed, and changes for next clinic (Kata) are discussed and implemented. Table 1 lists notable changes and the dates implemented.

Statistics

Shewhart Control Charts (ImR [individuals and moving range chart]) were used for the study. The central line in these charts depicts the sample mean. Upper and lower control limits are calculated at three standard deviations from the mean. If the process is in control (common cause variation) all the data points fall between the control limits. When

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