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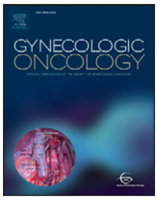

Lean methodology improves efficiency in outpatient academic Gynecologic Oncology clinics[☆,☆☆,★]

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HIGHLIGHTS

- Patient satisfaction scores are used as a measure of quality of care.
- Long clinic wait times negatively affect satisfaction scores.
- Lean methodology can be utilized to decrease wait times and improve efficiency.

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ABSTRACT

Objectives. Patient satisfaction scores may be used as a measure of quality of care, but outpatient scores are significantly and negatively affected by long clinic wait times. Patients in academic Gynecologic Oncology clinic at UVA for chemotherapy visits experience multiple wait times during a complex multipurpose visit. The purpose of this study was to utilize Lean methodology to identify variability in patient flow in order to guide solutions for improvement.

Methods. A value stream map of our clinic process was created. Patient surveys and clinical timestamps were used to identify which visit components were contributing to delays and to identify process variability. After results were analyzed, a process change was instituted, with the patient surveys then repeated.

Results. In the first phase, women experienced short wait times for the first appointment, but the average wait time between appointments gradually increased, with a peak mean wait time of 65 min (range 38–108) just prior to drug infusion. The total mean wait time (including all visits) was 119 min (range 81–154). After instituting process intervention, the overall wait time decreased significantly (82 vs 119 min, $p = 0.001$), but was still affected by aspects of the process that were outside of the investigators' control.

Conclusions. Analyzing patient flow through an academic Gynecologic Oncology clinic can elucidate inefficiencies and guide improvements. Change in process can meaningfully affect overall waiting time. Next steps include instituting a more global change in process, as well as linking results to patient satisfaction scores.

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1. Introduction

In an era of rapidly rising health care costs, the United States is working toward a transition from volume-based to value-based payment for hospitals and health care providers [1]. One of the goals of the Affordable Care Act is to pay for outcomes that take into account quality of care and cost containment. By 2017, hospitals and physicians will be rewarded or penalized on the basis of the relative calculated value (also called the value-based modifier) of the care they provide to Medicare beneficiaries; what this means is that the quality of care provided will be taken into account when providing reimbursement [2]. While most agree that paying for value is important, the actual process of measuring value in medicine is incredibly complex. Practically speaking, it is difficult to accurately measure overall value with the tools that are currently available. Quality of care has been suggested as a surrogate for value, but the measurement of quality is also an elusive target.

Currently, patient satisfaction scores are used as one aspect of measuring quality. For example, inpatient patient satisfaction scores are being considered as a measure of quality when determining hospital reimbursement for particular disease related groups (DRGs) [3]. In fact, patient-satisfaction responses make up 30% of each hospital's score

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under the federal value-based purchasing system, which could have impacted a hospital's overall Medicare payments by up to 1% (in either direction) in 2013 [2,4]. In addition, both inpatient and outpatient scores are available to the public, allowing consumers of health care to make physician decisions based on this data, for example, what hospital or which physician to utilize for care. The high value placed on patient satisfaction scores is also observed in academic medicine, where an individual provider's patient satisfaction scores may be taken into account as part of their promotion package, as well as be used as a factor in determining salaries and tenure.

The competency and appropriateness of care is not always reflected in patient satisfaction scores, however [5,6]. In fact, several authors have demonstrated that patient satisfaction often does not accurately reflect quality and cost of care. In a prospective cohort study of nearly 52,000 patients and the care they received, the authors of one study concluded that higher patient satisfaction was not associated with improved quality and value but instead with greater inpatient care use, higher overall healthcare and prescription drug spending, and increased mortality [7]. Others have found that outpatient satisfaction with care is negatively influenced by the amount of time the patient spends waiting, among other factors [8–10].

Lean is a methodology utilized to eliminate waste in process and improve efficiency in work flow that has its origins in Japanese automobile manufacturing [11]. As part of a Lean analysis, the process in question must first be analyzed to identify any resources being used for a goal other than the creation of value for the customer; these resources are considered wasteful and must be eliminated. In this setting, the customer is defined as the person who is receiving services; in the case of the healthcare system, the patient is the customer. Through this type of analysis, Lean methodology allows the creation of a standardized work process to create the most efficient and effective flow of services. While originally developed as a tool to improve efficiency in manufacturing, Lean has been applied in customer and financial service industries, government agencies, and increasingly, in the health care industry [12–14]. In the outpatient clinic setting, waste primarily occurs while the patient is waiting for care: the waiting room in physicians' offices is an example of waste in the process.

Gynecologic Oncology patients undergoing chemotherapy require frequent care visits. At the University of Virginia (UVA), each care visit for chemotherapy involves appointments at multiple locations within the Cancer Center, including the laboratory, the physician's office, and the infusion unit. This physical discontinuity can lead to considerable variability in patient flow as well as decreased care efficiency, with a resulting less positive patient experience. In the setting of appropriate clinical care that follows accepted national guidelines, one important way to improve patient satisfaction is to improve clinic efficiency, thereby eliminating waste and improving patient waiting times [10,15–17]. In addition to improving patient satisfaction, improving efficiency, particularly in the Infusion Unit, will subsequently allow increased Infusion Unit utilization. At UVA, increased utilization opportunity would then allow us to expand our clinical trials program, a goal of the Cancer Center that is significantly impacted by current lack of Infusion Unit availability.

We undertook the current study of our Gynecologic Oncology patients experiencing outpatient chemotherapy to decrease patient waiting times by eliminating waste from the process, using Lean techniques. Our primary objective was to identify the sources of waste in our process, with the secondary objective of eliminating waste to demonstrate an improvement in the process of patient flow.

2. Methods

Lean methodology dictates that an important first step in process improvement is to document the current process state. In order to do this, Lean utilizes a value stream map of patient flow that details event location, personnel, information technology requirements, and alternative pathways that can indicate variability within the system. We therefore created a value stream map of the process at the outpatient Clinical Cancer Center at UVA. We then followed patients through the process in order to document variability in the process as well as periods of waste. Finally, we introduced a change in the process designed to decrease waste and improve patient satisfaction. Our project group consisted of: an attending physician in Gynecologic Oncology, a nurse clinical research coordinator, an undergraduate student, and a Lean expert advisor.

The study was performed as a quality project, and for that reason Institutional Review Board (IRB) review was not required. UVA Human Subjects Research IRB (HSR-IRB) permission was subsequently obtained for a retrospective analysis of the prospectively collected data for the purposes of publication.

2.1. Building the value stream map

The value stream map was generated with the assistance of clinic leaders and staff. Patient registrars, medical assistants, nursing coordinators, physicians and Cancer Center leadership gave input into all of the separate steps required for a patient to be seen for a chemotherapy infusion encounter. Excel software was utilized to create the value stream map.

2.2. Part I: tracking patients through the process

Eligible patients were women with at least three scheduled appointments on a particular day at the UVA Cancer Center: one for laboratory work, one with the physician, and one to receive treatment in the infusion unit. Each patient was given a survey to fill out throughout their day, with a focus on recording the time expected for each appointment and the time the actual appointment service was provided. The surveys were verified and supplemented by clinical time stamps. The times recorded were: scheduled appointment; front desk registration, visit start at treatment access center (TAC, where intravenous lines are placed and laboratories are drawn), Women's clinic, Infusion Center; and specific incidents at the Infusion Center including arrival at infusion chair and hanging of infusion medications. The computerized clinical tracking system (TRACKS) was utilized to confirm registration times. The electronic medical record (EPIC) was used to pull data regarding the time that chemotherapy orders were signed and released, and the time that chemotherapy was administered. Clinic days were chosen randomly and all patients receiving chemotherapy on that day were approached for trial participation.

The data were analyzed using SPSS version 21. Steps in the process that contributed to inefficiencies were identified by patient flow analysis. We also analyzed the data for variation between patients and between process steps.

2.3. Part 2: altering and re-measuring the process

Following the data collection in Part 1 detailed above, the work group met to identify the best step(s) in the value stream map for intervention. It was determined that the group had the most control over the physician (MD) portion of the visit as the Infusion Unit was run by a separate entity in the Cancer Center. From our group's standpoint, therefore, an intervention with respect to the Women's Clinic appointment would have the highest yield. Since the MD also was responsible for signing chemotherapy orders and we could impact this step in the process, we anticipated that additional attention to the MD order signing delay would impact the infusion administration wait time.

The decision was therefore made to implement an intervention in the way patients were roomed in the Women's Clinic. In this setting, “roomed” meant that the patient was moved from the waiting area to the examination room to see the physician. The process in the office prior to the intervention was as follows: the medical assistant roomed

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