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Cover Page Footnote
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Case Study

Wait time reality check: The convergence of process, perception, and expectation

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Abstract
There are few experiences as ubiquitous to patients as the experience of waiting. It is an occurrence that transcends diagnosis, is common to all demographics, and is shared across the continuum of care. The experience can be frustrating and full of ambiguity for patients and their families. Wait time and delays can lead to patients sensing a loss of control and magnify the feelings of anxiety they may already be suffering. In an effort to improve patient experience, a framework was developed to examine patient satisfaction as a function of expectations, perceptions, and reality. The process domain focused on the objective reality of the pre-surgical lead times; while the expectation and perception domains focused on the family understanding of the timeliness of the pre-surgical process prior to, and directly following the experience. Guided by this framework, data was collected and analyzed at surgical units throughout the Texas Children's Hospital system. Insights gained from this analysis identified distinct needs where focused improvement approaches could be implemented. Throughout this paper, we will provide insight into the framework developed, case studies illustrating its effectiveness and insights as to how it can be applied at any healthcare organization to improve patient satisfaction.

Keywords
Patient experience, patient satisfaction, process improvement, delays, wait time, timeliness, perception, expectation, surgery, preoperative, framework

Introduction

While the healthcare industry strives to optimize health and reduce suffering for patients and families, a major area of focus operationally continues to be reducing exposure to process deficiencies that create additional patient suffering through unnecessary waits.[1] This may not come as a surprise as timeliness was one of the six dimensions outlined in The Institute of Medicine's 2001 report "Crossing the Quality Chasm".[2] Even with all this focus placed on timeliness, waiting remains as one of the most ubiquitous experiences for patients and their families.

Texas Children's Hospital has long held patients at the forefront of all operations. Given that surgical procedures have the potential to involve traumatic stress for pediatric patients[2], Texas Children's surgical leadership placed a particular focus on minimizing anxiety through a portfolio of improvement efforts. As a result, patient experience scores continued improving; however, one particular area continued to be a challenge for the surgical team: wait time prior to surgery and information about delays.

Texas Children's Hospital
Texas Children's Hospital has one of the country's largest and busiest pediatric surgical programs, serving the global community with over 30,000 surgeries in 2017. In addition to a campus in the Texas Medical Center, the Texas Children's system includes community hospitals with surgical programs in Katy, TX (West Campus) and The Woodlands, TX. This study seeks to illustrate a framework that has proven effective across Texas Children's surgical sites at aligning expectations and perceptions to reality, hence improving the overall waiting experience in the pre-surgical process.

Methods

In order to tackle the challenges around surgical wait times and information about delays, surgical leadership engaged Texas Children's Patient Experience and Business Process Transformation teams to collaboratively assess the challenges, recommend novel solutions and execute improvement initiatives. Initial brainstorming sessions and stakeholder interviews led to a common sentiment emerging: even when the child is taken to surgery on time, the parents still think the wait was too long, and that they

were delayed. In essence, the hospital's operational definition of a delay was not aligned with patients' and families' view of a delay. Simply improving the on-time start metric would not improve the experience of patients and families.

To quantify and address the miss-alignment of delay definitions, the team established the following structure, which will be detailed throughout the paper:

1. Develop Framework for Patient Satisfaction based on Literature Review
2. Execute Framework
    a. Collect Data
    b. Analyze Data
3. Interpret Insights from the Framework to Drive Improvements
4. Execute Improvements
5. Quantify Impact of Improvements

Framework Development

David Maister, former Harvard Business School professor and expert on business management practices, proposed an equation to guide customer experience:

$$Satisfaction = Perception - Expectation$$[4]

In this equation, the process does not impact patient satisfaction directly, but instead through perception and expectation. Therefore, when studying a customer's experience, not only should the objective reality of the service received be considered, but also the customer's perceptions and expectation around that service. With this understanding, a framework was developed to guide data collection, data analysis and improvement strategies addressing delays in the pediatric surgical program. The framework includes three domains: process, perception and expectation. (Figure 1)

This framework changed the focus of the improvement team from purely process improvement to understanding and influencing the patient/family expectations and perceptions around the pre-surgical process.

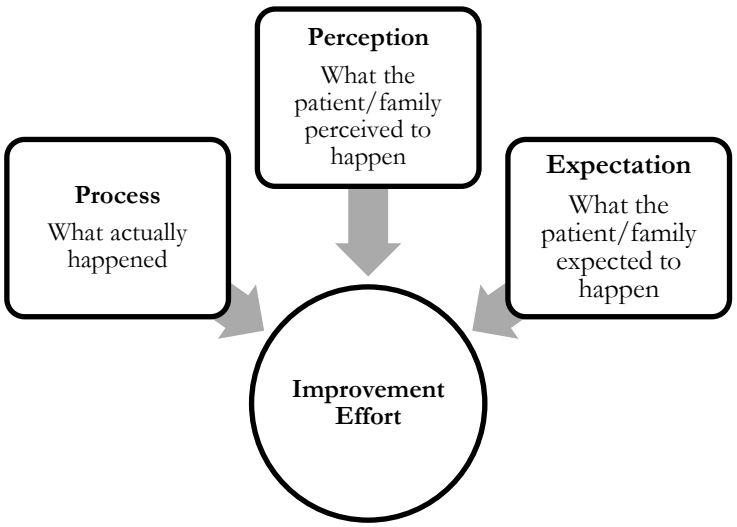
Applying the Framework to Gain Insights

The concept of quantifying patient/family expectations and perceptions is novel for the hospital and required the development of operational definitions, data collection strategies, and analysis methods.

Operational Definition

Prior to this initiative, policies, processes, and patient materials were all aligned to indicate the total time prior to

Figure 1. Patient Experience Framework



surgery would require 2 hours. However, based on the framework, a patient/family is defined to experience a delay any time the pre-surgical process was perceived to take longer than expected. Throughout the rest of this paper, the later will be used as the threshold for a delay.

With regard to pre-surgical wait times across Texas Children's Hospital surgical sites, the process can be divided into two distinct segments based on the location of the patient and family: reception and pre-op. In many cases throughout this paper, the cycle times of these process segments (reception and pre-op) are used to illustrate focused improvement efforts and impact.

Data Collection Strategy

To ensure the integrity of data regarding a patient/family's expectations or perceptions, it is imperative to build a data collection process that developed questions the families could understand. In order to do so, the team integrated patient and family feedback into the data collection strategy. The process began by brainstorming relevant questions and using them to guide conversations with families. These initial conversations allowed us to better gage their understanding of the pre-surgical process and hospital terminology, which was used to construct standard questions. These standard questions were then tested with a new set of families, focusing on adjusting the wording to ensure families were accurately and consistently understanding the intent. A sample of the final questions is provided in Table 1.

The resulting list of questions was then structured into an electronic survey, to be administered by volunteers and reception staff via iPads.

Data Analysis

The expectation and perception responses received from families via the electronic survey were cross-referenced with their cycle time measurements for reception and pre-op, which are extracted from the Texas Children's Hospital electronic medical record. This provided the team with a novel understanding of patient experiences including what the family expected of their surgical visit, what the objective reality of the visit entailed, and what they perceived to have occurred. Due to the non-normal distribution of responses, median values will be used to describe the responses received.

Process

Cycle time measurements for these segments were analyzed to describe what Maister referred to as the "readily measurable objective reality."[4] These process measures are provided in Table 2.

Note that the data collection periods were varied in length and thus large differences in number of patients exist. This is due to the initial focus of the study isolated to Site A, with later expansion to the other surgical sites. The first observation that can be made is cycle times in these segments were extremely varied from site to site.

Expectation

After reviewing the patient/family responses to the expectation questions, there were inconsistencies for many patients between expected times and when the families consider it a delay – meaning, a family may say they expected to spend 30 minutes in Reception, but later indicated that they considered it a delay after 45 minutes. For the purposes of this study, the team chose to use the latter as our threshold for delay whenever an inconsistency existed. See Table 3.

Again, it can be noted that estimates were extremely varied from site to site and between process segments.

Table 1: Family Questionnaire

After Patient Check-In	During Surgery
▪ How much time do you expect to spend here in the reception area, before you and your child are taken back to Pre-Op? ▪ How much time do you expect to be in Pre-Op before your child is taken back to the OR for surgery?	▪ About how long did you spend in the reception area prior to going to Pre-Op? o Was that an acceptable wait time? If no, at what point did you consider it a delay? After ____ minutes. ▪ About how long did you spend in Pre-Op prior to your child going to the operating room? o Was that an acceptable wait time? If no, at what point did you consider it a delay? After ____ minutes.

Table 2: Process Measures for Multiple Hospital Surgical Sites

	Number of Patients (N)	Reception	Pre-Op	Total Pre-Surgical
Site A *Posted Day Surgeries 11/1/16-3/31/17*	1850	28 min	83 min	2 hr. 1 min
Site B *Posted Day Surgeries 9/4/17-9/31/17*	380	70 min	60 min	2 hr. 20 min
Site C *Posted Day Surgeries 9/4/17-9/22/17*	120	15 min	78 min	1 hr. 35.5 min

is equal to the cycle time measurement plus the P2A

Table 3: Expectation Measures for Multiple Hospital Surgical Sites

	Number of Patients (N)	Reception	Pre-Op	**Total Pre-Surgical**
Site A	44	32.5 min	60 min	**1 hr. 32.5 min**
Site B	81	30 min	35 min	**1 hr. 5 min**
Site C	81	15 min	35 min	**50 min**

Perception
The patient/family responses to perception were highly variable. Initially, it was hypothesized that this was due to variations in the process – i.e., some patients take longer to complete the pre-surgical process than others and thus will perceive a longer pre-surgical time. In order to verify this, a scatterplot was used to graphically compare the actual time spent with the perceived time spent. Figure 2 depicts this graphical analysis, where each patient surveyed appears as a single dot on the graph.

If families perceive time exactly as the objective reality of the process occurred, all dots would fall along the diagonal. This is clearly not the case. Additionally, most dots fall below the line, indicating most families perceived less time than actually occurred; thus indicating a favorable bias. In order to quantify this bias, the actual time was subtracted from the perceived time to generate the "Perceived-to-Actual" metric per family. See Table 4.

Process Capability
Finally, these insights were compiled into a metric to extrapolate how frequently patient's expectations were being met as a whole. The median threshold for a delay was used as the success criteria. Each patient encounter was then categorized as to whether their bias-adjusted cycle time met this threshold. The bias-adjusted cycle time metric for the site. Each site had different processes, patient expectations, and perceptions, which interacted to define the percentage of time expectations were being met at a particular site. See Table 5.

Interpreting Insights from the Framework to Drive Improvements

The focus for improvement efforts should be driven by domain-specific contributions to the process capability percentage. For instance, if the process domain is drastically larger than expectation, opportunities exist in closing this gap either by improving the process or aligning the expectations. Our team met with surgical leaders in each area to discuss the analysis, impact of each domain and feasibility of improving with focused initiatives.

Process
When the cycle time measurement (objective reality) exceeds the internal metric (the time the site predicts the pre-surgical process to require) efforts should focus on process improvement. This was the case for Site B, whose total cycle time measurement was 2 hours 20 minutes – 20 minutes greater than the internal metric of 2 hours.

Figure 2: Site A Patient Perceptions Compared to Process Measures

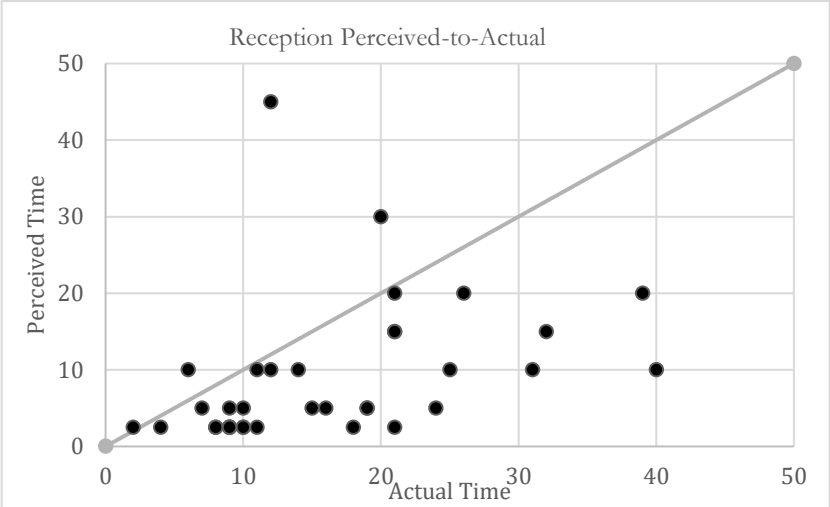


Table 4: Perceived-to-Actual (P2A) Measures for Multiple Hospital Surgical Sites

	Number of Patients (N)	Reception	Pre-Op
Site A	44	**-1 min**	**-12 min**
Site B	81	**-25 min**	**-12 min**
Site C	81	**-6.5 min**	**-27 min**

Table 5: Process Capability Percentage across Texas Children's Surgical Sites

Location	% Meeting Expectations	
	Reception	Pre-Op
Site A	57%	48%
Site B	36%	37%
Site C	80%	36%

Negative numbers indicated a favorable response in which perceived time was less than process time.

Expectation

Expectations varied widely from family to family in both Reception and Pre-op. Even more notable, the thresholds for delay in Reception and Pre-op were inconsistent with internal process capabilities and patient education provided to families prior to the day of surgery. At all sites, the median time families expected to spend in Reception and Pre-op was less than the actual process time, with expectations ranging from 50 minutes to 1 hour 32 minutes for the three sites. If the hospital's internal measure for success of 2 hours has been so far off from the families' threshold for a delay, it is no wonder families have been dissatisfied.

Table 6: General Recommendations Based on Targeted Domain

Domain for Improvement:	Process	Expectation	Perception
Recommendations	Streamline the process by minimizing waste to create a continuous flow for the patient as they move through pre-surgery.	Clarify patient expectations through improved communication and education to ensure all are shooting for the same attainable target.	Investigate how waiting is experienced and use the principles of uncertainty management[6] and psychology[4] to reduce anxiety.

Perception
When patients perceive less time than actually occurs (favorable perception) cycle times become conservative measures for how patients are actually perceiving time, and it becomes easier to meet their expectations. When perception is greater than the cycle time, there is an opportunity for improvement.

The recommendations in Table 6 were developed and presented to leaders when brainstorming improvement strategies.

For the purpose of this paper, we will discuss two improvement projects that were implemented to highlight how different strategies were used based on the domain with the most need for improvement.

Improvement Execution

Improvement Focus 1: Arrival Time Reduction
At Site B the process domain showed the greatest need for improvement, as the median time spent in reception was over one hour, which is well over the 30-minute threshold for delay.

A more targeted analysis was conducted per surgical subspecialty (pediatric urology, pediatric otolaryngology, pediatric surgery, etc.) to review timeliness of patient arrival, variation in cycle times, and surgery volume. Results indicated that the pre-surgical process for multiple specialties took far less time than the 2 hours families were told to arrive prior to surgery. Considering this information, Pediatric Surgery conducted a 2-month pilot involving adjusting the instructions for patient arrival time from 2 hours to 1.5 hours prior to surgery.

Improvement Focus 2: Increased Child Life Presence
Site A targeted the perception domain, as surgical leaders felt a greater impact could be made to patient experience through this focus. Collaboratively with surgeons and nursing leaders, a guiding principle was developed to focus our perception improvement efforts:

> "Improving patient perceptions is more than just minimizing delays, it is a commitment to reducing patient & family anxiety and building empathy into the surgical process."

As basis for the improvement, a cognitive strategy was adopted to decrease anxiety and increase understanding regarding the surgical process. In this case, a dedicated perioperative certified child life specialist (CCLS) was piloted. Benefits of child life are well known and include anxiety reduction[5], which is aligned with the Maister's assertion that "anxiety makes waits seem longer.[4]" Time spent with a CCLS in pre-op is also viewed as "occupied time.[4]" This site did not have a dedicated CCLS for perioperative services. A CCLS was available only by request and depended upon availability. For this pilot, a CCLS was dedicated daily from 7am-noon, perioperative services busiest time, to provide evidence-based, developmentally appropriate interventions. To quantify the impact, data was collected on the 3 domains (process, expectation, and perception) throughout the 3-week study period.

Results

Improvement Focus 1: Arrival Time Reduction
During the pilot, the median Reception and Pre-op cycle times decreased by 15 minutes and 10 minutes, respectively. No downstream effects were identified, resulting in an endorsement for the adjusted arrival time to become the standard practice. All surgical specialties have transitioned to a 1.5 hours arrival time versus 2 hours. Currently, Site B has increased the overall patient satisfaction score by 4 points.

Improvement Focus 2: Increased Child Life Presence
Utilizing therapeutic play and hands-on education by a certified professional, trained in the developmental impact of illness and injury, positively impacted the experience of children and their families during the surgical process. Patients with a child life consult, on average, experienced 34 minutes less in reception and pre-op than what actually occurred. One mother of a 5-year-old had commented that her daughter had been "really worried when we arrived to

the hospital." During the pre-operative process, she and her daughter were able to meet with a child life specialist who helped provide facts about the sequence of events and sensory experiences of the procedure and process. In response to a post-operative survey, this same respondent noted the patient "wishes her adenoids would grow back so she can have them removed again." Additionally, patient satisfaction scores for "wait time before procedures" increased by 8.5 points when comparing pre and post data.

Discussion

We believe building direct patient and family feedback into the framework to quantify their experience enabled this initiative to significantly impact patient experience, where others have fallen short. We also believe that the framework developed can be applied beyond patient satisfaction regarding waiting and delays. In fact, any patient encounter is driven by the three domains provided and can be enhanced through targeted analysis and improvement efforts. By assessing and addressing the domains of process, expectation, and perception our organization was able to make significant strides towards positively influencing the way our patients feel about their surgical experience. Instrumental in the success of the various initiatives was the concept of uncertainty management.[6] Waiting can lead to patients sensing a loss of control which can magnify feelings of anxiety from which they may already be suffering.

Limitations

Through this project, we gained valuable insights into patient/family perspectives, though some limitations exist. One such limitation of current findings is that the deployment of this framework was restricted to the ambulatory surgery setting. Plans at the hospital are to expand this methodology when implementing improvement projects in other areas to determine its effectiveness across the system. Furthermore, we are confident that many of these principles and strategies would be applicable and relevant to any healthcare environment.

Conclusions

As information and control given to patients and families increased, the amount of wait time they perceived decreased resulting in a more positively perceived experience overall. Since anxiety makes wait times seem longer, we utilized strategies[6] to help patients manage their uncertainty, reduce anxiety, and thus improve their perceptions. Through our efforts, we've seen substantial gains in this endeavor and we are determined to make even more strides when it comes to wait times for patients and their overall experience.

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