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Impact of Perioperative Surgical Home on First Cases Delayed on Day of Surgery in Colorectal Patients

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Abstract

Perioperative Surgical Homes (PSH) are evolving patient-centered medical home models that coordinate stream-lined care among all providers in the care process. The PSH model can serve as a solution to improve quality assurance, patient satisfaction, and reduce errors that lead to poor outcomes, many of which are preventable and can lead to higher costs. This model has many benefits, but it can be a challenge to execute in a hospital system. TriHealth chose to adopt a PSH model, the TriHealth Surgical Optimization Center (TSOC) in March 2017. It implemented a pilot program for its colorectal patients. Metrics of primary interest to TriHealth included: the rate of late surgery starts for the first case of the day, the delay reason accompanying it, and the time of delay measured in minutes from the scheduled start time.

It was hypothesized that the TSOC program would decrease the number of surgeries with delayed starts, as well as the time to delay. Surprisingly, analysis showed no change in the frequency of late start surgeries between the two cohorts, pre-TSOC and post-TSOC. However, there was a significant reduction in time delay for late start surgeries, from 17.8 minutes pre-TSOC to 10.0 minutes of delay post-TSOC. Additionally, the number of first cases delayed was largely related to surgeon delay, which increased to 37% upon TSOC implementation. This study gave insight to surgical protocol and patient care issues that still exist within the TSOC program, and subsequently the downstream effect on the health of the patient population served.

Keywords: population management, colorectal surgery, triple aim, time delay

Impact of Perioperative Surgical Home on First Cases Delayed on Day of Surgery in Colorectal Patients

A Perioperative Surgical Home (PSH) is a surgical care coordination model that has been highly adopted in hospitals and health systems across the United States. It serves as a mechanism for quality improvement and cost-savings for surgical patients across their perioperative continuum of care (Kash, Zhang, Cline, Menser, & Miller, 2014). The goal of the PSH is to enhance value and help achieve the Triple Aim, a large initiative directed towards population health, which includes better patient experience, better health care, and lower costs (Vetter, Boudreaux, Jones, Hunter, & Pittet, 2014). Currently, there are major and relevant changes in the healthcare environment, such as movement toward value-based payment programs, increases in information technology, and ambulatory surgical care. Additionally, there is a pursuit to implement service-line strategies for high-quality surgical outcomes as well as control of cost for those surgeries. The PSH is, in part, a solution to streamline care while meeting the demands of the healthcare industry. Hospitals that have adopted the PSH model, report success through predominantly positive quality and cost outcomes (Kash et al., 2014).

The PSH encompasses a medical team that is comprised of the surgical physician, an anesthesiologist, a nursing team, a clinical care coordinator, other patient providers, educators, dieticians, urgent care clinics, sub-specialists, and office staff. Collaboration is a key component of the PSH. It is physician led but works to leverage the abilities of the entire perioperative team. On the other hand, the model is not intended to replace the surgeon's patient care expertise and responsibilities (American Society of Anesthesiologists [ASA], 2017). Further, there are other micro-systems that support the PSH clinical framework throughout the care process. These systems can include the nursing department, central supply, radiology, information technology, laboratory, pharmacy, social services, and human resources (ASA, 2017). Each member of the medical team and each department system make valuable contributions to the PSH model.

The Perioperative Surgical Process starts with the patient's decision to have surgery, and then moves into scheduling which starts pre-optimization. Within this pre-optimization, sometimes referred to as the pre-operative phase of surgery, there are several key elements that take place that will link together with the larger program to function as a PSH. Preoperative elements include admission through a centralized perioperative clinic, early preadmission assessments, centralized systems to gather health and other information about patients before hospital admission, a triage system to identify which patients need to attend a preadmission clinic or program, and use of multidisciplinary approach within the hospital to coordinate complex surgical preparation of patients before surgery (Kash et al., 2014). Coordination also involves patient engagement, education, and creation of a transitional plan of care. Next, the patient moves to the intraoperative phase, where integrated pain management, precise fluid management, and several initiatives to increase surgical efficiency take place. Such initiatives call for focused supervision to ensure that surgery is on a 'fast-track' and which aims for the patient to be discharged home quickly. There are also certain operating room (OR) techniques that are to be implemented and followed. These include delay reduction techniques, processes to increase efficiency through improved OR flow, and scheduling initiatives to reduce cancellations and increase efficiency (Kash et al., 2014). The postoperative phase is also considered a key phase within the PSH. The post-operation time period is dependent on the time needed for recovery which is specific to each patient. This phase starts with the time from patient discharge and could extend to 30 days after operation, or longer if serious complications occur. For tracking purposes, the care team may provide follow-up care through 90 days post-operation. In this phase, the medical team works to improve coordination of care from post-operation to discharge home, to improve the discharge protocol, and increase both patient and caretaker education concerning post-discharge care. Integrated pain management is continued in this phase. Ideally, the patient will receive early postoperative mobilization by physical therapy, integrated acute care, and rehabilitation care during this time as well.

The need to implement a perioperative surgical home may be considered by health systems that recognize fragmentation and variability in their existing care plans. The PSH can serve as a solution to correct inconsistencies and therefore, several preventable problems (Schweitzer Brenda, Leib, Rosenquist, & Merrick, 2013). For instance, issues arise when the decision for surgery causes a patient to stray from their usual medical care. Specifically, patients may experience lapses in care or duplication of tests due to a breakdown in communication between providers. Other accompanying problems include complications that can result in higher costs. Physicians and healthcare team members become frustrated, and the family endures a lower quality experience of care. Additionally, lapses in communication can occur during the transition from perioperative care to a medical home or primary care. These problems disrupt the continuity of care and can lead to longer length of stay, higher hospital readmissions, increased cost, and decreased patient satisfaction (EPIC Systems Corporation, 2016).

TriHealth, is a hospital system in Cincinnati, Ohio that has adopted a Perioperative Surgical Home model in partnership with the American Society of Anesthesiologists (ASA) Perioperative Services Home Learning Collaborative. There are over 40 other core group members in the collaborative including Wexner Medical Center in Columbus, Ohio and Mercy Medical Center in Canton, Ohio. The purpose of the collaborative is to share learning opportunities, create a peer networking environment, and gain access to subject matter experts and population health initiatives. The collaborative lends tools and resources to support a successful implementation program of the PSH, and can help the health system reach their adapted outcomes.

TriHealth hospitals participating in this two-year collaborative are Bethesda North Hospital (BNH) and Good Samaritan Hospital (GSH). Together their desired outcomes are to decrease length of stay, decrease complications, decrease re-admissions, decrease overall costs, decrease pharmacy, lab, and radiology costs, and increase the percentage of patients going home opposed to a skilled nursing facility. The first pilot of the program, which is still currently in progress, involves an elective, inpatient colorectal patient population. This means that all patients electing to have colorectal surgery at either BNH or GSH. The strategy for TriHealth is to learn from the collaborative while piloting the colorectal patients, and then to apply a similar model in other surgical patient populations over time. At TriHealth the PSH model is called the TriHealth Surgical Optimization Center (TSOC) and its primary goals are to provide improved clinical outcomes and better perioperative services at a lower cost. TriHealth formed six teams to prepare for the launch of TSOC for March 6, 2017 to care for colorectal surgery patients. These teams have different responsibilities for different aspects of the perioperative process and consist of:

1. Surgery Decision/Optimization/Pre-Op,
2. Day of Surgery/Intraoperative,
3. Phase of Care Pathway Outcomes (PACU)/Acute Care,
4. Discharge,
5. Data Analytics,
6. Education/Communication.

Statement of Purpose

This study will focus on one metric domain in the intraoperative phase of care for colorectal patients electing surgery within the TSOC. This metric domain includes data characterizing the delay for the first surgical case of the day. The primary purpose of the study is to assess the impact of the perioperative surgical home on first cases delayed on day of surgery in colorectal patients. This will involve a comparison of data from 2016, the year prior to implementation, with data post-implementation in 2017.

The study seeks to answer the following research questions:

- What is the impact of the perioperative surgical home on the rate of First Cases Delayed on Day of Surgery for colorectal patients since its implementation at TriHealth?
- What is the mean time of delay for TSOC First Cases Delayed on Day of Surgery?
- What is the reason for delay in First Case of the Day?

It is hypothesized that the TSOC will have a positive impact on rate of first cases delayed, on mean time delay from scheduled start time, and on reasons for delay, based on vastly supported evidence-based practices upon PSH implementation (ASA, 2014). The TSOC program intends to help TriHealth better manage the health of its population by providing proactive, coordinated care and improved patient safety. With better patient outcomes, less pain, fewer complications, and an earlier return home to functionality, patients that receive care within TSOC will contribute to improved health of the community.

Methods

Colorectal patient data were retrieved from the EPIC Reporting Workbench by a TriHealth Information Systems Analyst. As an employee of TriHealth, I was given permission from the Executive Director of Perioperative Nursing to work with the Clinical Operations Support team to analyze the data. The data were analyzed using both Microsoft Excel and the SPSS Version 24 in de-identified form so that no patient health information (PHI) was disclosed. An IRB Decision Chart (see attached Appendix B) was used to conclude that IRB approval was not needed since the research does not impact human subjects, and de-identified data was used retrospectively for analysis and interpretation.

Metric Definitions

The first metric of primary interest was the *rate of TSOC First Cases Delayed*. A surgery case is considered delayed if the time the patient enters the room is at least one minute later than the scheduled start time. *Rate of TSOC First Cases* delayed from the scheduled start time is:

$$\frac{\text{The total \# of delayed TSOC First Cases}}{\text{Total number of inpatient, colorectal TSOC First Cases}}$$

This rate is calculated only for the colorectal cases scheduled as the first surgery case of the day.

The second metric of interest was *TSOC First Case Mean Time Delay*, which measures the mean, or average, difference of actual surgery start time from scheduled start time, in minutes. *TSOC First Case Mean Time Delay* is equal to the sum of all the delay times in the reporting period divided by the number of values in the distribution of PSH First Cases with late starts. TSOC First Cases that are on time or early are not used in computing this value. Additionally, TSOC-related terms are defined in Table 1 below.

Table 1

Definitions of TSOC Terms

Name	Definition
TSOC First Case	A case with a principal procedure code on the TSOC procedure list that was also the first scheduled case of the day for a specific operating room.
Patient-in-Room Time	The time the patient enters the operating room.
Delayed TSOC First Case	Are those cases where TSOC First Case Patient-in-Room time is at least one minute later than that case's scheduled time.

The third variable of importance is *reason for delay* which was categorized into eight groups: anesthesia delay, equipment delay, hospital delay, nurse delay, patient delay, surgeon delay, other delay, and no reason given.

Lastly, length of stay was the final variable of interest that was analyzed. It is a related metric and can be a potential indicator of service quality improvement (Harrison, 2015). Specifically, length of stay refers to the number of days a patient stays at the hospital post-surgery until discharged. A longer length of stay is undesirable; therefore, many hospital systems, including TriHealth, track this information closely. It is assumed that delayed cases with complications could affect number of days to discharge clearance, or length of stay in the hospital post-surgery.

Data Analysis

The following study was a retrospective analysis with historically-controlled data aimed at evaluating the impact of PSH implementation on each of the four metrics mentioned above. To do this, inferential statistics were conducted for each of these metrics to compare the 2016 pre-PSH pilot period and the 2017 post-implementation period. Specifically, a chi-square test of independence was used to determine whether there was a significant difference between the rate of first case late start surgeries in the non-intervention period and first case late start surgeries in the TSOC cohort. The purpose of this analysis was to determine whether the TSOC pilot may have had an effect on first case late starts, or if the observed data was likely due to chance. In addition, independent samples *t*-tests were conducted to evaluate whether there was a significant difference in the mean time delay and mean length of stay between the two groups. The significance for all statistical tests was set at $p < .05$.

In addition to inferential analyses, descriptive statistics were also conducted to assess differences between the two study groups. Counts and frequencies were calculated for several demographic variables including age, race, ethnicity, and surgical location. Furthermore, to facilitate a more focused analysis, the rate of first case late start surgeries was calculated by month from March through December for each group to assess additional differences.

Data Collection and Analysis Limitations

To note, there were a few major limitations to the dataset provided for this project. First, there was a large discrepancy in sample size between the two time periods with 701 surgeries occurring in the baseline year (2016), and only 196 colorectal surgeries in 2017. This discrepancy was not a true representation of the number of colorectal surgeries, but rather, a result of an error in the reporting system related to the detection of procedure codes dignified for colorectal surgeries. It was confirmed that the true cohort in 2016 would likely have resembled that of the 2017 cohort, a count closer to 196 cases. Therefore, frequencies were used for analysis since surgery case counts were likely inaccurate for 2016.

In addition, some duplicate cases were found in the original datasets, and when confirmed, these were removed. The purpose of removing duplicates was to ascertain the true number of individual surgery cases. A case was considered a duplicate surgical event if the unique identifier was repeated and if the surgery start time was the same. In these cases the procedure types was different indicating that multiple procedures were taking place during one surgical event. For example, the same case and variable information would be repeated when an exploratory laparotomy, and a procedure to removal adhesions was listed as a separate case. Yet, both procedures would likely occur during the same surgery setting. So, if the surgery start time was the same, it was assumed that colorectal surgery took place on the same patient. Multiple procedures performed during surgery were reported as distinct cases. The data concerns and limitations are further discussed in the Limitations section of the Discussion and Conclusions.

Results

Table 2 displays characteristics of the colorectal surgery case cohorts: the non-intervention group and the TSOC-intervention group. Aside from sample size, average age of the patients, race, ethnicity, and hospital location were comparable and of similar profiles. For example, the average age of patients undergoing colorectal surgery was 63.9 years in 2016 and 63.5 in 2017, while age ranged from adults as young as 20 years of age to elderly reaching late 90 years. Both populations were primarily Caucasian/White in 2016 (87.0%) and in 2017 (86.7%). Ethnicity for both populations was almost entirely non-Hispanic/Latino with 99.4% in 2016 compared to 99.0% in 2017. The colorectal surgeries took place at both Bethesda North Hospital (BNH) and Good Samaritan Hospital (GSH), with more surgeries at BNH in both time periods.

Table 2

Descriptive Statistics for Colorectal Patient Population

Descriptive Variable	**2017 (*n* = 196)**	**2016 (*n* = 701)**
Average Age (years)	63.5	63.9
Patient Age Range (years)	27-95	20-97
Race, *n (%)*		
Caucasian/White	170 (86.7%)	610 (87.0%)
African American/Black	22 (11.2%)	76 (10.8%)
Asian	0(0.0%)	4 (0.6%)
Other/Unknown	4(2.0%)	11 (.15%)
Ethnicity, *n (%)*		
Non-Hispanic/Latino	194 (99.0%)	697 (99.4%)
Hispanic/Latino	2 (1.0%)	3 (0.4%)
Patient Refused	0 (0.0%)	1 (0.1%)
Surgical Location *n* (%)		
Bethesda North Hospital	113 (57.7%)	416 (59.3%)
Good Samaritan Hospital	83 (42.3%)	285 (40.7%)

Table 3 shows the contingency table for first cases of the day with a late start for 2016 and 2017. Of the 701 colorectal cases, 530 were on time and 171 were late in 2016. In 2017, 196 cases were reported and 46 of those were late. A chi-square analysis indicated that there was not a significant difference between the rate of first case delay late start surgeries in the pre-intervention year (24.4%) compared to the TSOC pilot program (23.5%) (X^2 (1, N = 897) = 0.071, p = .789).

Table 3

Test of Significance for Pre-TSOC vs. TSOC First Case Late Starts

Year	**First Case Late Start (*n*, %)**		**Total First Case Surgeries**
	No	Yes	
2016	530 (75.6%)	171 (24.4%)	701
2017	150 (76.5%)	46 (23.5%)	196
Chi-Square Test of Independence for First Case Late Start Surgeries			
Chi-squared Value		Degrees of Freedom	*p*-value
0.071		1	.789

Table 4 shows the frequency of time delay overall and categorized by five increasing levels from 1-100 minutes. The mean time delay for cases that started late in the non-intervention period was 17.8 minutes (*SD* = 1.5 minutes), while the mean time delay for late cases in the TSOC pilot was 10.0 minutes (*SD* = 1.5 minutes). Table 5 contains results from the independent sample *t*-test, which compares the mean time delay between the non-intervention year and intervention year. This test revealed a significant difference in the mean time delay between the two years (*p* =.009). Upon reviewing incremental time delays, the bulk of the delays occurred between 6 and 30 minutes for both samples. The longest delay recorded was a delay of over 90 minutes in 2016. The frequency of late start surgeries that occurred in the first five minutes increased from 27.2% to 42.0% upon TSOC implementation. Lastly, there were no first case late starts delayed over an hour, or 60 minutes, in 2017 in the TSOC cohort.

Table 4

Incremental Time Delay

Time Delay in First Case Late Start Surgeries		
	2017	2016
Mean ± SD. Time Delay (minutes)	10.0 ± 1.5	17.8 ±1.5
Delay from Scheduled Start Time, *(%)*		
1 to 5-minute delay	42.0%	27.2%
6 to 30-minute delay	51.1%	57.0%
31 to 60-minute delay	6.7%	9.7%
61 to 90-minute delay	0.0%	5.5%
91 to 100-minute delay	0.0%	0.6%

Note: There were five first case late start surgeries removed from the pre-TSOC period analysis due to missing data. Similarly, in the post-TSOC period, one case was missing.

Table 5

Mean Time Delay for Pre-TSOC vs. TSOC First Case Delay Late Starts

Time Delay in First Case Late Start Surgeries			
Year	*N*	Mean (minutes)	*SD* (minutes)
2016	165	17.8	1.5
2017	45	10.0	1.5

Independent Samples t-Test for Mean Time Delay		
t-value	Degrees of Freedom	*p*-value
2.634	1	.009

An independent samples *t*-test was also conducted to evaluate whether there was a difference in mean length of stay for patients who received colorectal surgical during the pre-intervention year period compared to the TSOC intervention period (Table 6). There was a statistically significant difference in mean length of stay for pre-intervention patients (M = 8.4, SD = 8.5 days) compared to patients who had surgery after the implementation of TSOC (M = 4.0 days, SD = 2.5) (p = .001).

Table 6

Mean Length of Stay for Pre-TSOC vs. TSOC First Case Delay Late Starts

Length of Stay in First Case Late Start Surgeries			
Year	*N*	Mean (days)	*SD* (days)
2016	171	8.4	8.5
2017	46	4.0	2.5

Independent Samples *t*-Test for Mean Length of Stay		
t-value	Degrees of Freedom	*p*-value
3.462	1	.001

Figure 1 shows the proportion of first case late starts in each month from March to November in 2016 and 2017. A distinction to note is that for March 2017 there were no first case late starts. In contrast, 22 out of 80 first cases were late in the non-intervention group during the month of March. The highest monthly proportion of late starts in the non-intervention cohort was 30.5%. In the cohort with the TSOC pilot, September was the month with the highest at a rate of 33.3%.

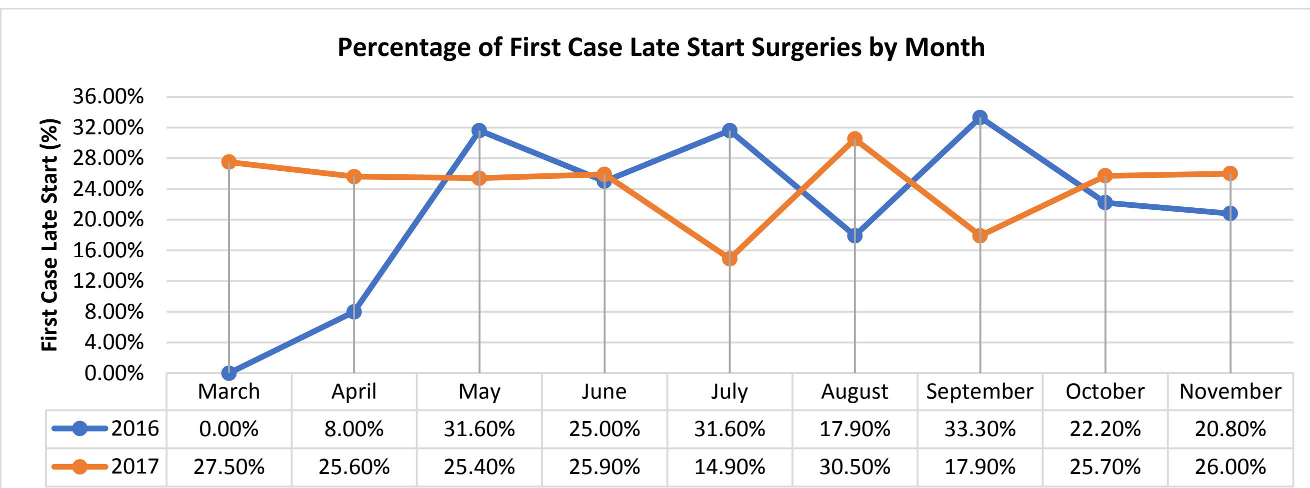

*Figure 1***.** Monthly percentage of colorectal surgery cases scheduled as the first of the day that started late.

Lastly, first case late starts were categorized by delay reason (Figure 2). The highest discernable reason for delay was reported to be caused by the surgeon, and this was the case in both cohorts. The frequency of surgeon delay was found to be 31.6% in the pre-intervention cohort, while the cohort exposed to TSOC-intervention was delayed in 37.0% of the occurrences. Separately, a large percentage of reasons for delay were either unreported, or uncharted in the electronic medical record (EMR) used at TriHealth facilities. A category for delay reasons other than surgeon delay, patient delay, nurse delay, anesthesia delay, equipment delay, or hospital delay was noted as *other*, and in 2017, 23.9% of first case late starts were categorized as *other*.

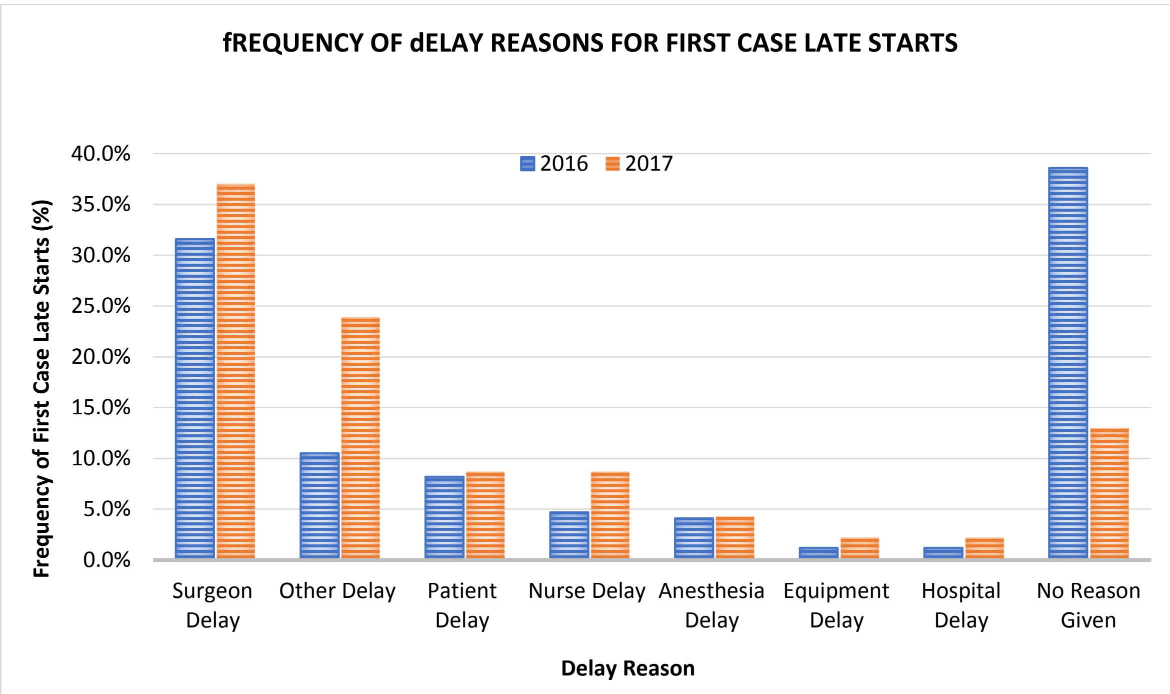

Figure 2. Bar graph showing comparison of frequencies for the eight delay reason categories.

Discussion

Perioperative delays that occur on the first surgical case of the day can cause patient flow inefficiencies, working environment errors, and sources of frustration for the patient, for family members and caregivers, the surgeons, and other staff members (Wong, Khu, Kaderali, & Bernstein, 2010). Because of the adverse impact of first case delays, health systems, like TriHealth, have emphasized the need to record and share information pertinent to perioperative delays in order to help improve operational efficiency and develop innovative strategies to reduce preventable errors.

Before the results of this study, not much was known about the rate of first case late start surgeries within the organization. Given the implementation of a pilot program which was expected to reduce delays, the results of this study were surprising since they showed no change in the rate of first case late start surgeries upon TSOC implementation. This is contrary to reports by other health systems who have reported successful reductions in delays following the implementation of their PSH programs (Saver, 2015).

Further analysis did find that mean time to delay was significantly lower by an average of 7.8 minutes in post-implementation. (It is important to note that the independent samples *t*-test indicates an association between time delay and the introduction of the plot, but does not imply causation.) Another promising analytical finding was that the length of stay had significantly decreased in the post-implementation cohort compared to the pre-pilot cohort. Length of stay is another quality assurance metric that has reportedly been improved after PSH implementation (Kash et al., 2014).

It was originally the goal of this analysis to help the organization learn more about the precise reasons for surgical delay. From the results, it appears that delays occurring on the first case of the day are attributed to the surgeon performing the surgery somehow. There are several possible reasons a surgeon or surgeon-related circumstances could delay the surgery but greater specificity was beyond the scope of this study. It may be the case that the surgeon simply arrived late to the facility and/or the holding area to check the patient, or the surgeon could have had incomplete schedule information or not receive a complete consent from the patient, but this is just speculative.

Limitations

This study has several limitations. The most striking limitation is the sample size discrepancy. There were 701 colorectal patients scheduled in 2016 and only 196 in 2017. It was confirmed with the physician overseeing the TSOC program, that there should not be a large deviation in the number of colorectal cases between the two time periods. The high number of cases in 2016 is due to an error in the reporting system that selects procedure type. Because the technology that accommodated the patient registry was not in place before TSOC was piloted, the data was manually extracted and done so incorrectly. Much of the analyses were reported as frequencies, rather than counts, yet it is very possible that this error may have impacted the possible detection of differences between the two cohorts.

As mentioned previously, duplicate cases were removed from the dataset prior to analysis. This is considered a limitation to the dataset since duplicates were removed on a case-by-case basis. As such, removing duplicates may have skewed the actual number of cases. Eliminating the technical issue that caused repetitive cases during data extraction may have contributed to a more accurate interpretation of first case surgery delays.

Another limitation is that many of the variable fields in the dataset were found to be empty or contained ‘null’ information. This information was missing from the EMR system and was excluded when it was imported into the statistical software program. A complete dataset may have contributed greater insight into first case delays. In the same way, the reason for delay variable contained an *other* category that did not lend any further explanation as to what ‘other’ could mean. This could be remedied if a comment was automatically required in the EMR when *other* was selected as the delay reason. Unfortunately, this information was not available for analysis.

Conclusion

TriHealth piloted a PSH model, TSOC, with patients undergoing colorectal surgery to monitor and improve efficiency in the operating room. Delay incidences can adversely impact patient care such as an advanced disease state, increased risk for infection, and prolonged hospital stays (Wong et al., 2010). On the other hand, a potential benefit of reduced time delay and reduced length of stay is increased patient satisfaction, diminished risk for post-discharge complications, and the possibly cost savings. The PSH model has the potential to be a proactive strategy to provide various benefits and reduce adverse outcomes. Thoroughly studying the impact of the PSH implementation can help identify system failures that can be addressed.

This analysis appears to demonstrate that perioperative surgery delay is a system concern at TriHealth that is pervasive and deserves targeted attention. While the TSOC pilot did not appear to be associated with any significant decrease in the number of first case late starts, the mean time delay may have been reduced and a downstream process, length of stay, may have improved as well. In addition, the most common types of discernable delays continue to be surgeon-related, which seems to indicate the need for a specified approach with the surgeons at multiple steps in the surgery process. Leadership from TriHealth physicians and collaborative efforts from clinical care teams will be necessary to combat first case late start surgeries (Kash et al., 2014). As the colorectal surgery group was targeted first with the PSH intervention, it will be important to further identify and develop protocols that address care inefficiencies prior to implementing TSOC to other cohorts.

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Appendix A: Perioperative Surgical Home Learning Collaborative

PERIOPERATIVE SURGICAL HOME *Learning Collaborative*

INTERNAL EFFICIENCY OUTCOMES PRIMARY METRICS SPECIFICATIONS

Metric Number: PSH-IE1

Metric Name: PSH First Case Delayed on Day of Surgery (IP and OP)

Metric Domain: Internal Efficiency

Metric Surgical Phase: Intra-operative

Metric Steward: ASA PSH Learning Collaborative

Metric Last Revised: Apr 15 2015 version 9

Metric Description:

There are two sub-metrics:

Sub-metric PSH-IE1.1 – Rate of PSH First Cases Delayed:

Rate of PSH First Cases delayed from the scheduled start time

Sub-metric PSH-IE1.2 - PSH First Case Median Time Delay:

Median time (in minutes) of delay for PSH First Cases from the scheduled start time

Metric Denominator Definition:

The denominator for both sub-metrics is the total number of inpatient and outpatient PSH First Cases scheduled during the reporting time period. A PSH First Case is 1) a case with a principal procedure code on the PSH procedure list, and 2) the first scheduled case of the day for a single OR room. The length of the reporting time period for the metric will be selected based on how many cases are available and the specific reporting needs (e.g. monthly, quarterly, annually, rolling twelve month, etc.).

Note1: *Depending on the data source, the PSH procedure codes can be either ICD-9-CM procedure (ICD-10-PCS) procedure or CPT codes. A PSH procedure group is defined by a distinct ICD-9, ICD-10, or CPT procedure code.*

Note2: *Given the likelihood of very small denominators, a time period less than a month is not recommended for any reporting for comparative purposes or trending performance.*

Note3: *If a patient has multiple PSH First Cases during the reporting time period, then count each PSH surgical case separately in the denominator. This denominator is a set of cases, not a set of patients.*

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This document was last updated on 7/27/2016. For a summary of all changes made to the specifications and data elements list since the metrics were introduced on 3/12/15, please reference the ***PSH Metrics Change Log*** *on PremierConnect.*

PERIOPERATIVE SURGICAL HOME *Learning Collaborative*

Metric Denominator Exclusions (if applicable):

There are no denominator exclusions.

Note: *While there is no denominator exclusion a priori, reason-for-delay indicators are requested for submission for related research and stratification purposes (see Data Elements for Reporting).*

Metric Numerator Definition:

Sub-metric 1.1 Numerator: The *total number* of delayed PSH First Cases during the same reporting time period used for the corresponding denominator. PSH First Cases that are on time or early are not included in the numerator count.

Sub-metric 1.2 Numerator: The *set of values* representing PSH First Case Delay Times for each delayed PSH First Case during the same reporting time period used for the corresponding denominator. PSH First Cases that are on time or early are not included in the numerator values.

A delayed PSH First Case is defined as PSH First Case Patient-in-Room Time that is at least one minute later than the case's scheduled time (PSH First Case Scheduled Start Time). PSH First Case Patient-in-Room Time is defined as the time the patient enters the operating room.

Example:

PSH First Case Scheduled Start Time: 07:30
PSH First Case Patient-in-Room Time: 07:40
PSH First Case Delay Time (in minutes) = Patient-in-Room Time - Scheduled Start Time
PSH First Case Delay Time = 07:40 – 07:30 = 10

- Case included in the *total number* for the sub-metric 1.1 Numerator
- Case included in the *set of values* for the sub-metric 1.2 Numerator

Methods for Data Collection:

Potential data sources from which data may be collected include an OR schedule or other type of scheduling log from an EHR system, surgery/OR system, or other electronic or paper-based system. Any or all of the mentioned systems may be used as long as the required data elements are captured (see Data Elements for Reporting), and PSH cases can be identified as the first scheduled case of the day.

Rate or Estimate Calculation:

Sub-metric 1.1: The numerator divided by the denominator will define a rate (e.g. 5%) of PSH First Cases delayed from the scheduled start time.

Sub-metric 1.2: The median value (e.g. 5 minutes) of the set of values in the numerator will define the median time (in minutes) of delay for PSH First Cases from the scheduled start time

Note: *A median is defined as the value lying at the midpoint of a frequency distribution of observed values, such that there is an equal probability of falling above or below it. It can be calculated using an Excel spreadsheet formula or any statistical programs.*

This document was last updated on 7/27/2016. For a summary of all changes made to the specifications and data elements list since the metrics were introduced on 3/12/15, please reference the ***PSH Metrics Change Log*** *on PremierConnect.*

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Risk Adjustment Methods (if applicable): There is no risk adjustment method applied.

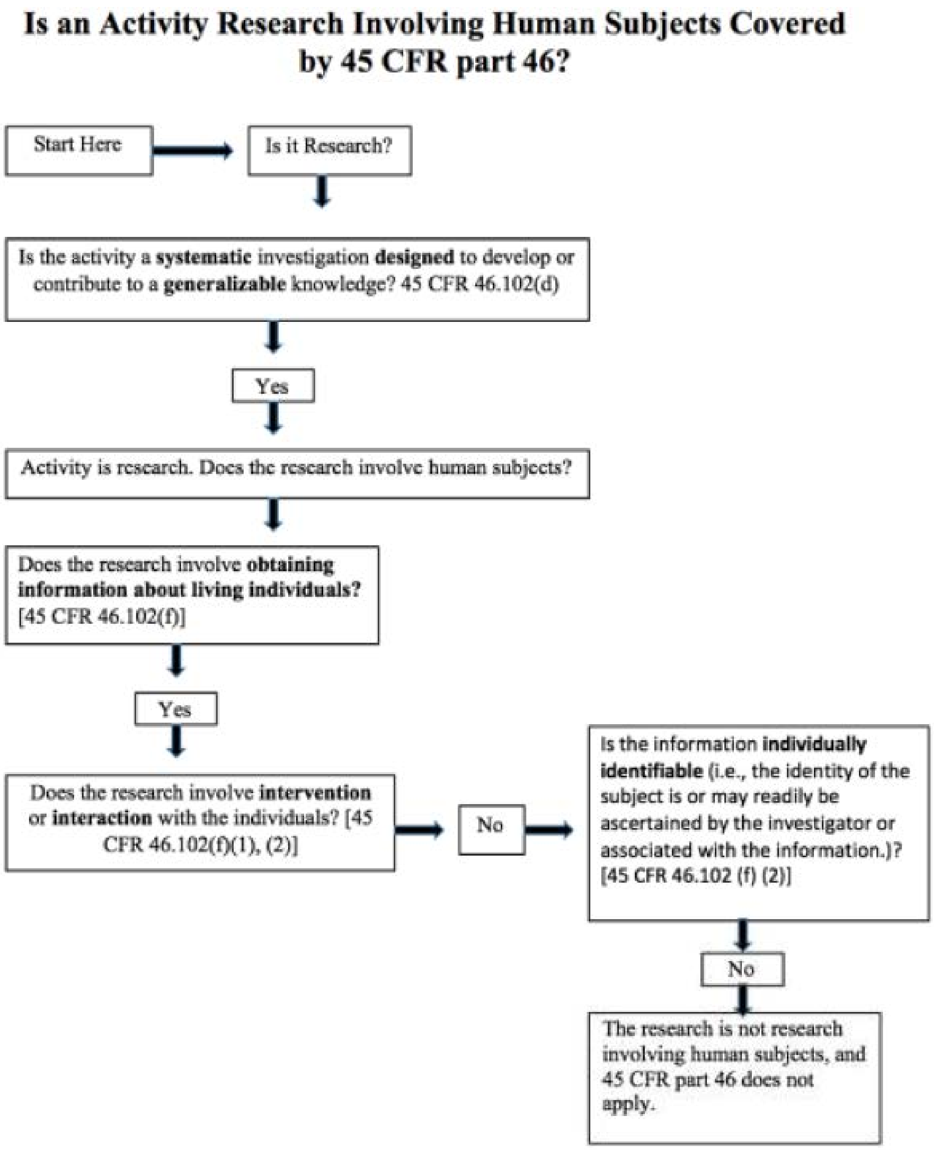
Data Elements for Reporting Metric:

- [Case Identifier Keys]
- [General Case Data]
- PSH First Case Scheduled Start Date
- PSH First Case Scheduled Start Time
- PSH First Case Patient-in-Room Date
- PSH First Case Patient-in-Room Time
- Case Delay Time in Minutes
- Reason for Delay Indicator (Y) – Emergent Case Took Precedence
- Reason for Delay Indicator (Y) – OR Equipment Delay
- Reason for Delay Indicator (Y) – OR Staff Delay
- Reason for Delay Indicator (Y) – Other Reason

Appendix: There is no Appendix.

This document was last updated on 7/27/2016. For a summary of all changes made to the specifications and data elements list since the metrics were introduced on 3/12/15, please reference the ***PSH Metrics Change Log*** *on PremierConnect.*

Appendix B: Human Subjects Regulations Decision Chart



Appendix C – List of Competencies Met in Integrative Learning Experience

Wright State Program Public Health Competencies Checklist

Identify and describe the 10 Essential Public Health Services that serve as the basis for public health performance.
Assess and utilize quantitative and qualitative data.
Apply analytical reasoning and methods in data analysis to describe the health of a community.
Apply behavior theory and disease prevention models to develop community health promotion and intervention programs.
Describe how policies, systems, and environment affect the health of populations.
Engage with community members and stakeholders using individual, team, and organizational opportunities.
Make evidence-informed decisions in public health practice.
Evaluate and interpret evidence, including strengths, limitations, and practical implications.
Demonstrate ethical standards in research, data collection and management, data analysis, and communication.
Explain public health as part of a larger inter-related system of organizations that influence the health of populations at local, national, and global levels.

Concentration Specific Competencies Checklist

Population Health Concentration
Explain a population health approach to improving health status
Use evidence-based problem solving in the context of a particular population health challenge.
Demonstrate application of an advanced qualitative or quantitative research methodology.
Demonstrate the ability to contextualize and integrate knowledge of a specific population health issue.
Evaluate population health programs or policies that are designed to improve the health of the population, reduce disparities, or increase equity.