Implementation of Preoperative Optimization Checklists to Minimize Elective Surgery Case Cancellations

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Abstract

Problem: Same day surgery cancellations continue to burden hospitals and the nation's health care system. On average, up to 20% of ambulatory surgical cases nationwide are cancelled annually. A medium sized community hospital has a yearly cancellation rate of 8%. A root cause analysis has determined the high rate of delayed and cancelled surgical cases is due primarily to inadequate preoperative planning and patient optimization. If nothing is done to address this problem, there will continue to be a loss of revenue, waste of resources, and potential negative consequences for patients. *Purpose*: The purpose of this quality improvement project was to develop and implement preoperative checklists for the anesthesia staff to use prior to scheduled surgery to assess patients' readiness for surgery and to identify any remaining necessary testing or screening based on commonly encountered comorbidities. *Methods*: This quality improvement project took place over 15 weeks, from August to December 2022. The checklist was used by anesthesia staff members during their preoperative chart review of the patient's electronic chart one to three days prior to surgery. If the checklist revealed missing information, the provider ordered necessary testing, lab work, or consults to be conducted before or on the morning of surgery. *Results and conclusions*: 35% of patients were screened with the checklist weekly. 13 orders were placed weekly based on missing items identified by the checklist The baseline cancellation rate in August 2022 of 5.1% increased to 9.7% in September 2022 and the final cancellation rate in December 2022 was 5.8%. The preoperative checklist creates a systematic yet individualized screening process for patients scheduled for elective surgery presenting with multiple comorbidities, which can increase the safety of patients undergoing surgery and anesthesia.

Key words: preoperative, surgery, optimization, checklist, cancellations

Implementation of Preoperative Optimization Checklists to Minimize Elective Surgery Case Cancellations

Same day surgery cancellations continue to burden individual hospitals and the health care system as a whole. On average, up to 20% of ambulatory surgical cases nationwide are cancelled annually. (Smith et al., 2018). A meta-analysis conducted by Turunen et al. (2018) estimated each cancelled surgical case costs between $5,000-$8,000. Therefore, it can be concluded the loss of revenue ranges between $5-8 million per hospital on a yearly basis. Although several healthcare entities are impacted by these cancellations, with each reporting a plethora of consequences, patients are negatively affected the most by this issue. Prolonged waiting time for surgery can lead to potential deterioration of the patient's condition. Additionally, many people involved in the perioperative process are impacted, including the surgeon, first assists, physician assistants, nurse practitioners, operating room (OR) nurses, surgical technicians, anesthesiologists, certified registered nurse anesthetists (CRNAs), anesthesia technicians, students, and perioperative staff. The patient's family members or friends providing perioperative assistance may be affected as well. Same day surgical case cancellations also impact operational efficiency and can cause a large waste of resources. Furthermore, high rates of cancelations can lead to decreased staff motivation and reduced patient satisfaction. The purpose of this quality improvement project was to develop and implement preoperative checklists for anesthesia providers to use before surgery to assess patient's readiness for surgery and identify missed diagnostic tests or screenings to decrease same-day cancellations of elective cases.

Available Knowledge

Interventions to address the issue of high elective surgical case cancellations are outlined and analyzed in the literature. A thorough review of evidence was conducted to identify specific interventions and tactics to decrease elective surgical cases. Studies included in the literature review either evaluated a standardized preoperative telephone call conducted by a registered nurse or an advanced practice registered nurse (APRN), a standardized preadmission service provided to patients presenting for elective surgery, or the use of a standardized preoperative risk stratification with corresponding necessary optimization. In their pre-posttest study, Teh et al., (2016) evaluated the impact of a preoperative telephone assessment conducted by APRNs. The APRN reviewed the patient's laboratory values, medical, surgical, and medication history with guidance of a preoperative checklist to assess the patient's readiness for surgery. The project concluded the APRN-led preoperative telephone assessment is an effective method in preventing day-of-surgery cancellations in relatively healthy adults undergoing elective surgical procedures. Hovlid et al., (2012) developed a pathway focusing on earlier patient assessment, improved communication between staff, and improved management of co-morbidities. By compiling preoperative screening components and individualizing preoperative questionnaires and checklists, they evaluated this pathway with a longitudinal observational retrospective study. They concluded a preoperative optimization pathway can decrease elective surgery cancellations. Collectively, all studies concluded a systematic, standardized approach to assessing all patients prior to surgery decreases last minute case cancellations. Many studies concluded a pre-operative telephone checklist does not significantly decrease cancellations, but this intervention does identify several frequent causes of cancellations. One study highlights how the use of a checklist to determine what interventions, tests, or assessments are needed to achieve preoperative

optimization in a timely manner significantly reduces case cancellations. Multiple studies concluded some form of a systematic pathway or algorithm used to identify patients who are inadequately optimized allows the provider to intervene prior to the day of surgery. This ultimately leads to decreased rates of cancellations. The positive outcomes demonstrated by the interventions in these studies have inspired the development of the intervention in the current quality improvement (QI) project. A completed review and synthesis of the evidence is demonstrated in Appendix A.

Rationale

The Knowledge to Action (KTA) framework was used to guide the development implementation of this QI project. The KTA framework, developed by Graham et al. (2006), includes seven phases within an action cycle aimed at synthesizing knowledge into produces, tools, or processes. The seven phases in the KTA cycle are: (1) Problem identification; (2) Adapt knowledge to local context; (3) Assess barriers to knowledge use; (4) Select, tailor, and implement intervention to promote the use of knowledge; (5) Monitor knowledge use, (6) Evaluate outcomes of knowledge use, and (7) Sustain knowledge use (Graham et al., 2006).

The first three phases of the KTA framework were completed during project development. The problem of high case cancellation rates was identified at the facility under study. A root cause analysis was conducted to adapt knowledge to local context and identify causes of frequent case cancellations at the specific facility. By adapting knowledge to local context, the primary cause was identified as incomplete patient optimization prior to surgery. A major barrier to adequate patient optimization was identified as a lack of structure to guide the preoperative screening process. Phases four and five of the KTA framework were carried out through project implementation. The preoperative checklist was created and tailored to fulfill the needs at the

facility. Implementation of the checklist was monitored throughout the 15-week project duration. Outcomes were then evaluated and the project's successfulness was analyzed.

Methods

Context

A medium sized community hospital located in Maryland had a yearly cancellation rate of 8%, based on internal data from 2019, and continued to remain high when this QI project was developed. In 2019, the yearly number of scheduled surgical cases was 11,095, however only 10,207 cases were performed, meaning 888 cases were cancelled. The baseline monthly cancellation rate in August 2022 was 5.1%. Key stakeholders in the specific facility confirmed the high rate of delayed and cancelled surgical cases throughout recent years can be attributed to inadequate preoperative planning and patient optimization. Examples of poor patient optimization include a missing pre-operative physical and necessary studies (i.e., electrocardiogram (EKG), echocardiogram (ECHO), stress test, pulmonary function tests), and lack of necessary multidisciplinary consultation (i.e., cardiac consultation). The factors delaying and/or cancel surgical cases at this intuition have been largely contributed to the lack of structure to guide the screening process prior to surgery. Prior to and at the time of QI project implementation, the facility's preoperative testing center had a standard set of orders placed for each patient scheduled for surgery. Individualization of testing and screening was the responsibility of the patient's primary care or specialty provider in collaboration with the surgical team. Often, missing items were caught on the day of surgery, causing the case to be cancelled at the last minute. This ultimately led to a continued loss of revenue, waste of resources, and potential negative consequences for patients.

Intervention

This QI project implemented preoperative checklists to identify missing testing or screening needed to proceed with surgery. The checklist was intended to be used when the provider was completing the pre-operative chart review of the patient one to three days prior to surgery. The checklist, used as a cognitive aid, was aimed at triggering anesthesia providers to order any missing essential items. See the checklist in Appendix B.

This 15-week QI project took place between August and December of 2022. During the initial weeks of project implementation, the QI Project Lead (QI-PL) provided education to all anesthesia providers on the use of the checklist. Education was provided in PowerPoint format and each step of the process was clearly described. The PowerPoint was sent out to all providers via email as well. A physical copy of the checklist was distributed at the facility in pertinent areas and was accessible while staff performed the pre-operative chart evaluation of patients. The QI-PL made multiple site visits to ensure the checklist was still in appropriate locations.

Providers were asked to complete a survey in REDCap, a secure web-based application for managing online surveys and databases. The physical copy of the checklist contained a QR code that, when scanned with a mobile device, took the provider to the survey in REDCap. A digital copy of the checklist was in REDCap for reference, but the provider's main objective was to complete a survey. The survey asked how many times throughout the day the checklist was used and how many orders, prompted by the checklist, were placed. The survey also asked which categories the orders fell into, including, laboratory, cardiac, respiratory, or other.

To ensure no participant of the study was excluded, education information in written and PowerPoint form was sent out multiple times to all anesthesia providers at the hospital. To ensure no patient scheduled for elective surgery was excluded, the QI-PL counted daily

scheduled OR cases and recorded overall weekly scheduled case numbers. This number was then compared to the number of checklists completed to calculate a percentage of patients evaluated by the checklist.

Measures

Various clinical, functional, structural and process measures have driven the development and implementation of this QI project. As observed, the current structures and processes have led to the current outcome of a high rate of cancelled cases. One process measure was preoperative checklist utilization, with the numerator being the number of patients screened with the checklist and the denominator being the total number of patients scheduled for surgery in a week. Another process measure was missing item identification, with the numerator being missing information identified and the denominator being all information screened in the patient's chart. The outcome measure was the monthly case cancellation rate, with the numerator being the number of surgical cases cancelled and the denominator being the total number of scheduled cases monthly.

The data collection procedures aimed to identify checklist completion and usefulness as well as monthly case cancellation rates. The data was stored in REDCap, as previously described. This data was and continues to be only accessible to the QI-PL and faculty advisor, both of whom have password protected accounts on REDCap. The QI-PL had access to daily and weekly survey submission rates as well as the specific answers within the survey. The data was aggregated and made into tables and run charts within the REDCap system. REDCap data was checked daily to ensure checklists and surveys were being completed. Monthly communication with the hospital's primary data analyst continued throughout project implementation to obtain monthly case cancellation rates. This data was also tracked in REDCap. Using this data, run charts were developed to perform a quantitative data analysis of the process goal of the checklist

utilization. By tracking categorical data, frequency of various types of orders were analyzed and visually represented in run charts.

Ethical Considerations

There were no patient identifiers included on the checklist or the follow up survey and there was no way to correlate either item with a specific patient. Therefore, no additional methods were needed to protect patient privacy. The use of REDCap increased overall data confidentiality. The intent of the project was to improve clinical practice and outcomes at the facility. While the project involved interventions with human subjects, it was not designed to infer correlation and/or causality or to generate new scientific knowledge. The project was applicable to the practice site and the patients they serve because it was specifically designed to address the practice gap of preoperative optimization at this facility and involved the unique preoperative process at this institution. Therefore, the outcomes are not generalizable to other healthcare settings or populations. This QI project received approval from the University's Institutional Review Board and the specific hospital's Institutional Review Board.

Results

The data is displayed in Tables 1-3 and Figures 1-3, which include both raw data and run charts. Table 1 contains a chart displaying the weekly number of scheduled cases, weekly number of checklists utilized, and a calculated percentage of patients assessed with the checklist. This correlates to the first run chart, labeled "Preoperative Checklist Utilization," see Figure 1. The x-axis is the week number, and the y-axis is the percentage of patients assessed. The median throughout implementation was 35%. There were no trends, 3 runs, and no shifts in the data. During the first two weeks of project implementation, education was being conducted and the checklists were being distributed, so 0% of patients were assessed during these initial weeks.

Checklist utilization picked up during weeks 3 through 10, ranging from 7.8% to 54%, and decreased to 41% by week 15. Although there were some decreases in percentages during the last few weeks, the overall trend was an increase in checklist utilization. Table 2 contains a chart displaying weekly orders placed that were prompted by the checklist. This correlates to the run chart labeled "Orders Prompted by the Checklist," see Figure 2. The x-axis is the week number, and the y-axis is the number of orders placed. The median was 13.5 orders. There were no trends, 4 runs, and 1 shift in the data. The number of orders steadily increased throughout project implementation. Table 3 contains a chart displaying which category the orders fall into, including cardiac, respiratory, laboratory, and other. Most orders fall into the laboratory test category, followed by cardiac, followed by "other" and finally respiratory. See a visual representation of the categories in Figure 3. The final run chart tracks monthly case cancellations, see Figure 4. The x-axis is the month, and the y-axis is case cancellation percentage. The baseline cancellation rate in August 2022 was 5.1%, which increased to 9.7% in September 2022, decreased to 4.3% in October 2022, and increased to 5.7% in November 2022. The final cancellation rate in December 2022 was 5.8%. Of note, the weeks with the highest checklist utilization correlated to the month with the lowest cancellation rate.

Discussion

Preoperative checklist utilization generally increased throughout the 15 weeks of QI project implementation. The checklist was and still is easy to use and does not heavily impact anesthesia providers' pre-existing workflow. The only cost associated is the printing of the checklists, however, there is an electronic form as well. Therefore, the benefits have the potential to outweigh the costs of both time and money. Implementation of the preoperative checklist was successful in screening patients' readiness for surgery but hindered by some significant barriers.

Primarily, there will always be the risk of uncontrollable factors that are the reason for a cancellation. Patient factors include patient non-compliance in terms of nothing per os (NPO) status, medication instruction non-compliance, and refusal on day of surgery. New onset problems may also restrict the ability to proceed with surgery. Examples include new infection or fever, angina or acute myocardial infarction (MI), chronic obstructive pulmonary disease (COPD) exacerbation, among many other acute etiologies. There are also OR conflicts that delay or cancel cases, including inadequate staffing, scheduling errors, higher priority case presentation, or surgeon conflicts. No matter how much patient optimization is done, a checklist cannot prevent these conditions. The effectiveness of checklist is also hindered by the inability to complete orders prior to the day of surgery. While the orders may be placed in a timely manner, they are not guaranteed to be carried out prior the date of surgery.

Conclusions

For the intervention in this project to be sustainable, it would be beneficial if the checklist was included in the electronic health record system so it can become a routine component of the pre-anesthesia patient assessment. Collaboration with the pre-anesthesia testing center would also help solidify the checklist as a method for patient optimization at this facility. Implementation of the checklist is a small practice change with large implications for practice and patient outcomes. The preoperative checklist can be easily incorporated into the existing screening process. Therefore, practice is not changed, it is enhanced and strengthened. The checklist creates a systematic yet individualized screening process for patients scheduled for elective surgery presenting with multiple comorbidities. By preparing patients to receive anesthesia and undergo surgery safely ahead of time, there is a potential to decrease providers'

stress on the day of surgery. Lastly, the preoperative optimization checklist increases the safety of patients undergoing surgery and anesthesia.

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Table 1

Checklist Utilization Chart- Raw Data

Week number/dates	**Number of scheduled cases**	**Number of checklists utilized**	**% of patients assessed with checklist**
1 8/29-9/3	125	0	0
2 9/4-9/10	119	0	0
3 9/11-9/17	128	10	7.8%
4 9/18-9/24	124	32	26%
5 9/25-10/1	128	62	48%
6 10/2-10/8	125	46	37%
7 10/9-10/15	121	41	34%
8 10/16-10/21	118	41	35%
9 10/23-10/29	126	51	40%
10 10/30-11/5	138	75	54%
11 11/6-11/12	135	52	39%
12 11/13-11/19	123	45	37%
13 11/20-11/26	130	53	41%
14 11/27-12/3	145	63	43%
15 12/4-12/10	137	56	41%

Table 2

Weekly Orders Placed

Week number/dates	**Number of orders prompted by checklist**
1 8/29-9/3	0
2 9/4-9/10	0
3 9/11-9/17	2
4 9/18-9/24	4
5 9/25-10/1	15
6 10/2-10/8	13
7 10/9-10/15	15
8 10/16-10/21	14
9 10/23-10/29	23
10 10/30-11/5	27
11 11/6-11/12	21
12 11/13-11/19	16
13 11/20-11/26	17
14 11/27-12/3	15
15 12/4-12/10	12

Table 3

Order Categories

Order Category	Number of orders
Cardiac	59
Respiratory	12
Labs	108
Other	15

Figure 1

Run Chart: Preoperative Checklist Utilization

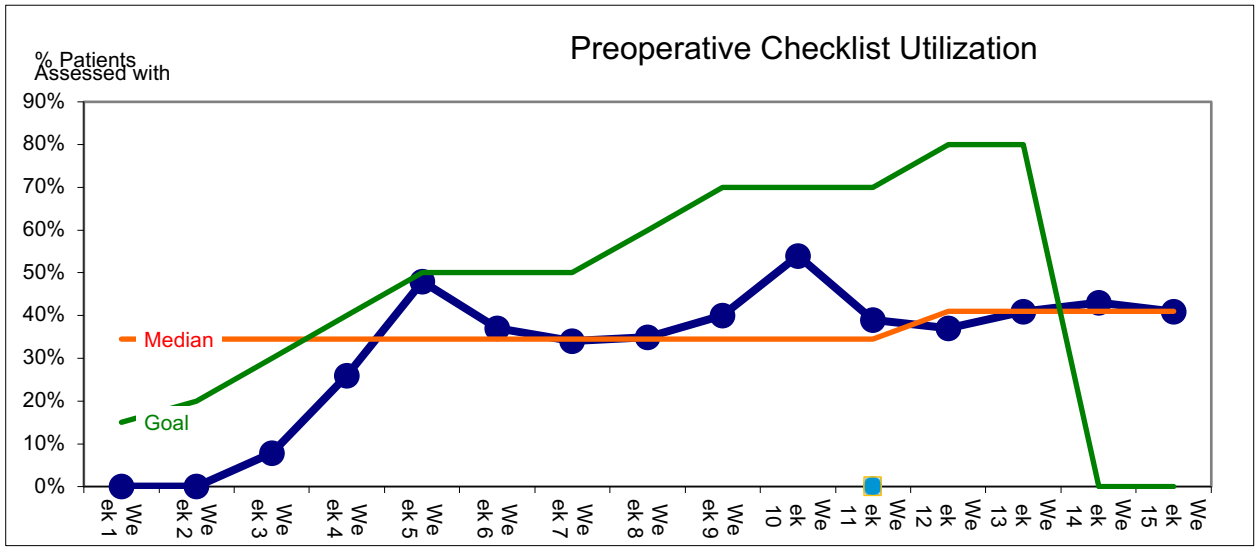


Figure 2

Run Chart: Orders Prompted by the Checklist

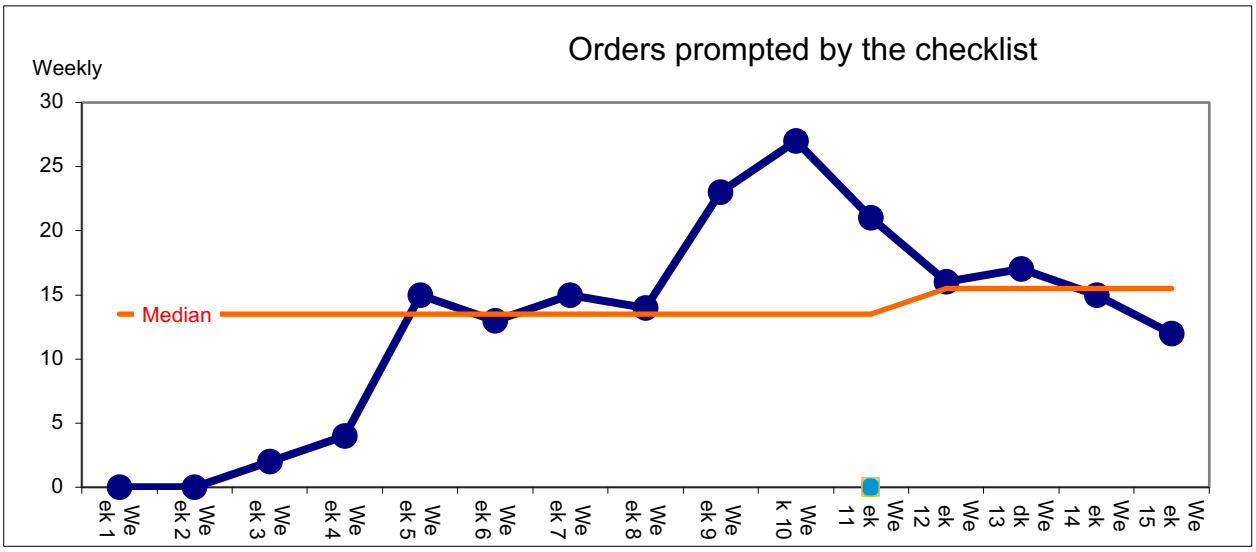


Figure 3

Order Categories

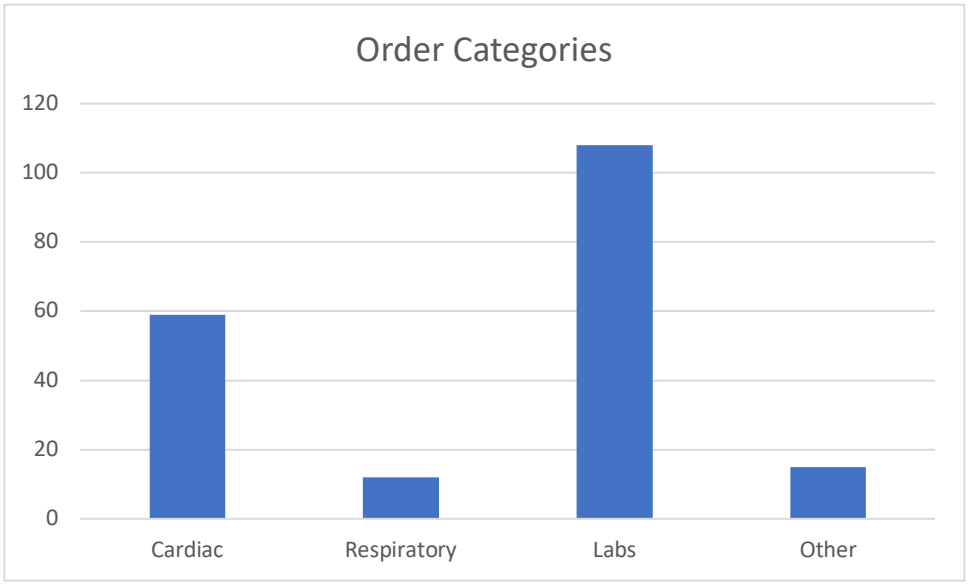
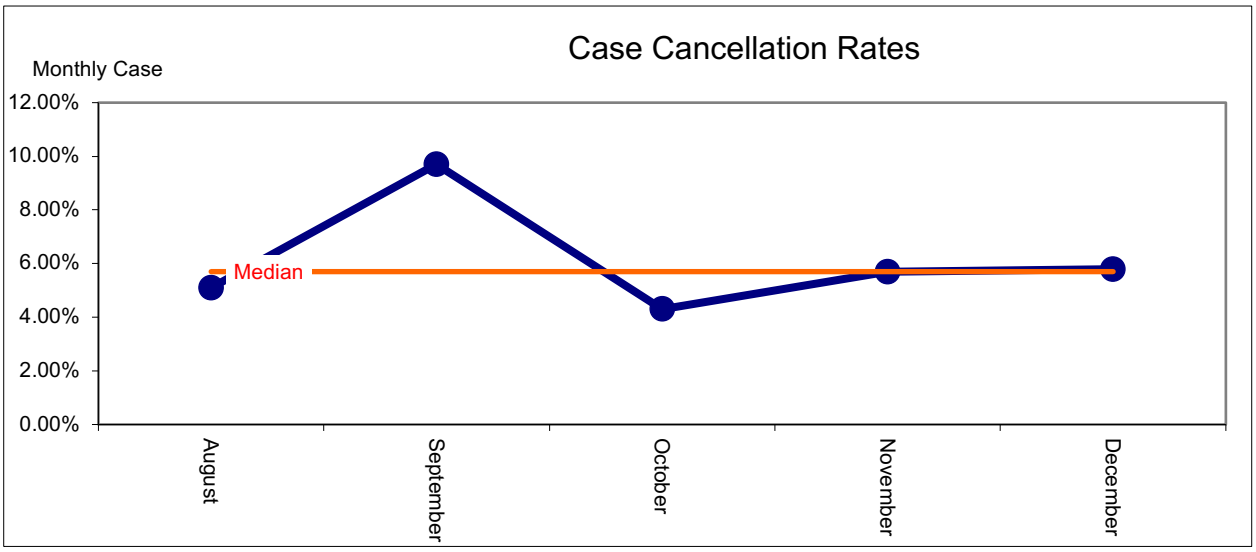


Figure 4

Run Chart: Case Cancellation Rates



Appendix A
Evidence Review and Synthesis Tables

Citation: Gaucher, S., Boutron, I., Marchand-Maillet, F., Baron, G., Douard, R., Béthoux, J. P., & AMBUPROG Group Investigators. (2016). Assessment of a standardized pre-operative telephone checklist designed to avoid late cancellation of ambulatory surgery: the AMBUPROG multicenter randomized controlled trial. *PloS one*, *11*(2), e0147194. https://doi.org/10.1371/journal.pone.0147194					**Level (Melnyk):** II
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
The purpose of this study was "to assess the impact of a standardized preoperative telephone checklist on the rate of late cancellations of ambulatory surgery." The researchers hypothesized "that a standardized preoperative telephone checklist administered to each patient by an automated phone system a few days before surgery could help to reduce the number of late cancellations in multidisciplinary surgical units."	Multicenter, two-arm, parallel-group, open-label randomized controlled trial	**Sampling Technique**: Stratified random sampling **Eligibility**: Patients scheduled for ambulatory surgery under general anesthesia, regional anesthesia and/or sedation within the next 7 to 30 days and could be reached by telephone. Patients were not eligible if they were undergoing emergency surgery, local anesthesia non-surgical gastrointestinal endoscopy, or termination of pregnancy. # **Eligible**: 4074 patients # **Accepted**: 3,297 # **Control**: 1,950	**Control**: Standard preoperative management (preoperative physical with provider, day of surgery assessment by surgical staff) **Intervention:** The checklist was administered by preoperative nurses between day 7 and day 3 before the scheduled date of surgery, between 8:30 and 20:30 from Monday to Friday. The checklist consisted of 7 items reflecting optimization for	**DV:** Rate of cancellation on the day of surgery or the day before **Measurement tool (reliability), time, procedure**: The calculated percentage of late cancellations per month. Late cancellations defined as cancellation the day before surgery or on the day of surgery.	**Statistical Procedures(s) and Results**: Results were expressed as crude and adjusted odds ratios (95% CI). Significance was assumed at $p<0.05$ (two-tailed t test). All analyses used SAS software version 9.3. The rate of late cancellation did not differ significantly between the control and checklist arms (109 (5.6%) vs. 113 (5.8%), adjusted odds ratio [95% confidence interval] = 0.91

		# Intervention: 1,347 patients **Power analysis:** Based on a two-sided alpha risk of 5% and a statistical power of 95%, 1193 subjects per group were required to detect a minimal clinically important difference of 6% in the cancellation rate between the intervention and control groups (4% in the intervention group and 10% in the control group) **Group Homogeneity**: Intervention and control groups were homogeneous based on p values on Table 1 for baseline demographic and clinical characteristics.	surgery and their corrective actions. **Intervention fidelity:** Blinding was not possible in this study, but the data collectors were not aware of the group to which each patient had been allocated.		[0.65–1.29], (p = 0.005). A standardized pre-operative telephone checklist did not avoid late cancellations of ambulatory surgery, however it enabled the identification several frequent causes. Researches concluded that a checklist with individualized patient factors and the identified frequent causes could impact case cancellation rates. More studies are needed.
Citation: Hines, S., Munday, J., & Kynoch, K. (2015). Effectiveness of nurse-led preoperative assessment services for elective surgery: a systematic review update. *JBI Evidence Synthesis*, *13*(6), 279-317.					**Level (Melnyk):** I
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
This review aimed "to examine whether nurse-led preoperative assessment clinics or services improve surgical outcomes	Systematic review	**Search strategy**: A three-step search strategy was used in this review. An initial limited search of	**Control:** controls varied among included studies.	**DV:** Among included studies, the outcome variable differed but all included	**Level of measurement:** Papers selected for retrieval were assessed by two

for elective surgery patients, reduce day-of-surgery cancellations, and length of stay."		MEDLINE and CINAHL was conducted followed by an analysis of the text words contained in the title and abstract. A second search using all identified keywords and index terms was then conducted across all included databases (Appendix I). Lastly, the reference list of all identified reports and articles were searched for additional studies. **Eligible studies**: Randomized controlled studies published after 2009 that included adult or pediatric patients undergoing elective surgery. Included studies assessed the effect of receiving nurse-led pre-admission services. **Excluded studies**: This review excluded studies of preoperative education, those that included emergency admissions, and studies comparing nurse-led with physician-led	**Intervention**: The review update considered studies that evaluated the effect of attending or receiving the services of a nurse-led outpatient preadmission or preoperative assessment clinic	one or more of the following: the effect of attending or receiving the services of a nurse-led outpatient preadmission or preoperative assessment clinic.	independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix II). **Outcome Data Retrieval**: Day of surgery cancellations were reported in 11 studies. **Analysis:** Despite the number of studies measuring this outcome, there was still insufficient data to enable meta-analyses. Most studies found a reduction in cancellations, but it is not possible to

		preadmission assessments. **Included studies**: After removal of duplicates, 1345 records were screened for relevance to the review's inclusion criteria and 33 studies were found. After evaluation of the full-text article, 23 studies were included in the review. **Power analysis**: Not applicable for this systematic review			assess whether this was statistically significant (Table 2.). **Conclusions**: Nurse-led preadmission services may be an effective strategy for reducing procedural cancellations, failure to attend for procedures, and length of stay; however the current evidence level is low. (Grade B). The included studies report generally positive findings on their services, however the methodological quality overall is low and the addition of new studies by this update has not strengthened it. It seems there is little risk of harm from using this intervention; however future studies may

					indicate different findings.
Citation: Hovlid, E., Bukve, O., Haug, K., Aslaksen, A. B., & von Plessen, C. (2012). A new pathway for elective surgery to reduce cancellation rates. *BMC health services research*, *12*(1), 1-9. https://doi.org/10.1186/1472-6963-12-154					**Level (Melnyk):** IV
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
This study's purpose was "to evaluate a new preoperative pathway aimed at improving patient optimization and its impact on elective surgery cancelation rates."	Longitudinal observational retrospective study-data from the hospital prior to pathway implementation was compared to data after the interventions were implemented.	**Sampling Technique**: Convenience sampling **# Sample size**: 5,743 planned cases **# Pre-intervention**: 2722 planned cases **# Post- intervention**: 3021 planned cases **Power analysis**: not included **Group Homogeneity**: No specific mention of group homogeneity, however the proportion of cases per surgical department was approximately the same pre and post-intervention. Throughout the two-year study duration, surgical cases per department were approximately as follows: 1.2% ophthalmology, 2.8% ear, nose, throat, 21%	**Pre-intervention**: prior to the new pathway, patients were managed preoperatively with traditional methods (preoperative physical by primary care physician, necessary specialty consultations, day of surgery preoperative assessment by anesthesia and surgical staff). **Intervention:** The entire pathway for elective surgery was redesigned, focusing on earlier patient assessment, improved communication between staff, and improved management of co-	**DV**: elective surgical cancellation rates **Measurement tool (reliability), time, procedure**: calculation of percentage of cancelled cases (mean % per month)	**Statistical Procedures(s) and Results:** A Student's t-test was performed to analyze pre and post intervention mean cancellation rate. The mean cancellation rate was reduced from 8.5% per month to 4.9% per month (95% CI for mean reduction 2.6-4.5, $p < 0.001$). This decrease was statistically significant and researchers concluded that the preoperative optimization pathway can decrease elective surgery cancellations.

		gynecology, 22% general surgery, and 28% orthopedics.	morbidities. Specific pathway components included- one single compiled electronic documentation record of all preoperative screening and consultation notes, inclusion of surgeon's and anesthesia provider's preoperative instructions into patient portal, phone call two days prior by preoperative nurse directed by a checklist of items to ensure patient is ready for surgery.		
Citation: Teh, A. H. M., Turner, B. S., Tan, S. B., & Tham, C. S. (2016). Effectiveness of an Advanced Practice Nurse–Led Preoperative Telephone Assessment. *Journal of nursing care quality*, *31*(2), 191-196. https://doi: 10.1097/NCQ.0000000000000152					**Level (Melnyk):** IV
Purpose/ Hypothesis	**Design**	**Sample**	**Intervention**	**Outcomes**	**Results**
The purpose of this study was "to assess the cancellation rates for day of surgery before and after the implementation of an evidence-based preoperative telephone assessment protocol.	Pre-post study design.	**Sampling Technique**: convenience sampling **Inclusion criteria:** American Society of Anesthesiologists (ASA) physical classification I (normal healthy	**Pre-intervention**: Standard preoperative process (physical by patient's provider, day of surgery assessment by surgical and	**DV**: elective surgery cancellation rate **Measurement tool (reliability), time, procedure:** percentage of	**Statistical Procedures(s) and Results:** Pre- and post-cancellation rates were compared using the χ^2 test.

		patients) and ASA II (patients with mild systemic disease) undergoing general or regional anesthesia; patients with a body mass index of less than 35 kg/m^2; surgical procedures that do not require intraoperative blood transfusion; procedures not predicted to carry significant risk of serious complications requiring immediate medical attention # **Eligible**: 225 # **Accepted**: 200 # **Pre-intervention**: 200 anesthesia records reviewed # **Post-intervention:** 200 anesthesia records reviewed **Power analysis**: no mention of power analysis. **Group Homogeneity**: Descriptive statistics were used to analyze the demographic data Demographics, including average age, ASA status, and primary language, were	anesthesia providers). **Intervention**: Three business days before surgery, the RN obtained the list of patients scheduled for surgery at the ASC. The APN reviewed the patient's laboratory values and medical, surgical, and medication history through electronic health records. Patients conforming to ASA I were assigned to the RN, and ASA II patients were assigned to the APN. The APN and the RN conducted telephone assessments be-tween the hours of 8:30 AM and 5:30 PM, using a structured questionnaire.	cancelled cases during a 4-month period.	The number of day-of-surgery cases cancelled after implementation of telephone assessment was compared to pre-implementation The rate of day-of-surgery cancellations procedures decreased from 4.5% per 4 months to none after implementation of the preoperative telephone assessment (P = .01). The project concluded that the APN-led preoperative telephone assessment is an effective method in preventing day-of-surgery cancellation in relatively healthy adults undergoing elective surgical procedures.

		compared between pre and post intervention groups. No statistically significant differences were found between groups.			

Evidence Based Practice Question (PICO): In a medium sized community hospital, does the use of pre-operative screening checklists tailored to patient comorbidities compared to no use of checklists decrease the number of cancelled cases in a 4 month period?

Level of Evidence	# of Studies	Summary of Findings	Overall Quality
I	**1**	In their systematic review, Hines et al., (2015) analyzed 23 randomized controlled trials studying the impact of nurse-led services on patient outcomes and surgical case cancellation rates. They found that nurse-led preadmission services may be an effective strategy for reducing procedural cancellations, failure to attend for procedures, and length of stay.	B- The review had a thorough and appropriate search and had strong inclusion criteria for included studies. All included studies were of experimental design, with randomization and a control group. However, the outcomes varied among included studies, making it difficult to come to a definitive clear conclusion. Some studies found conflicting evidence regarding case cancellation rates, while some studies found no difference between intervention and control groups. Therefore, overall quality of evidence was low.
II	**1**	Gaucher et al., (2016) studied the impact of a standardized preoperative telephone checklist on the rate of late cancellations of ambulatory surgery. The checklist consisted of 7 items aimed at optimizing patients preoperatively. They did not find a significant decrease in cancelled cases after checklist implementation. However, their research enabled the identification of several frequent causes of surgical cancellations. They concluded that a checklist with individualized patient factors and the identified frequent causes could impact case cancellation	A- This study had a strong experimental design, with randomization and an adequate control. The sample size was sufficient, with adequate power. Results were consistent and researchers came to definitive conclusions in order to make consistent recommendations.

		rates. Therefore, more studies regarding this topic are needed.	
IV	**2**	Hovlid et al., (2012) and Teh et al., (2016) both studied the impact of a newly implemented preoperative protocol on surgical cancellation rates. In their pre-post test study, Teh et al., (2016) evaluated the impact of a preoperative telephone assessment conducted by advanced practice nurses (APNs). The APN reviewed the patient's laboratory values, medical, surgical, and medication history through electronic health records to develop a preoperative checklist to assess the patient's readiness for surgery. The project concluded that the APN-led preoperative telephone assessment is an effective method in preventing day-of-surgery cancellation in relatively healthy adults undergoing elective surgical procedures. Hovlid et al., (2012) developed a pathway focusing on earlier patient assessment, improved communication between staff, and improved management of co-morbidities. By compiling preoperative screening components and individualizing preoperative questionnaires and checklists, they evaluated this pathway with a longitudinal observational retrospective study. They concluded that a preoperative optimization pathway can decrease elective surgery cancellations.	B- These studies both had an experimental design, but did not include randomization and did not have a specific control. They both compared their intervention to data within the institution prior to implementing their change. Prior data was compared to post-intervention data, instead of an experimental group compared to a control. However, they both revealed statistically significant results and came to definitive conclusion.

Appendix B
Preoperative Checklist

Preoperative Checklist

Use this checklist when conducting the preoperative chart review. This will help identify missing necessary information and decrease case cancellations! ☺

Patient information and diagnoses:	Yes	No	N/A	Complete	Incomplete	Ordered
Has the patient had an H&P within the last 30 days?	☐	☐				
Has the patient had the required/recommended lab work?	☐	☐				
Is the patient over the age of 50?	☐	☐				
Do they have an EKG in their chart?			☐	☐	☐	☐
Does the patient have any of the following cardiac conditions? *High blood pressure, heart failure, heart valve conditions, or arrhythmias?*	☐	☐				
Have they had a cardiac consultation (if needed)?			☐	☐	☐	☐
Do they have an EKG in their chart?			☐	☐	☐	☐
Do they have an ECHO in their chart?			☐	☐	☐	☐
Do they have a completed stress test in their chart?			☐	☐	☐	☐
Does the patient have any of the following respiratory conditions? *Asthma, COPD, current smoker*	☐	☐				
Do they have a chest x-ray in their chart?			☐	☐	☐	☐
Do they have PFTs in their chart?			☐	☐	☐	☐
Is the patient taking any anticoagulant medications ("blood thinners")? Ex. Coumadin (warfarin), Eliquis (apixaban), Xarelto (rivaroxaban), Pradaxa (dabigatran)	☐	☐				
If yes, have they received instructions on when to stop taking these medications? (If unsure check N/A)			☐	☐	☐	☐

Acronyms
PCP- primary care provider
H&P- history and physical
EKG- electrocardiogram
ECHO- echocardiogram
PFT- pulmonary function test