

Decreasing Surgical Cancellations due to GLP-1 Agonists

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A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

School of Nursing, University of Maryland at Baltimore
May 2025

Author Note

There are no known conflicts of interest concerning this quality improvement project. Correspondence concerning this article should be addressed by email to cabbott@umaryland.edu.

Abstract

Problem: In a small community hospital, an increase in surgical cancellations was identified. In the months of October-December 2023, there were surgical cancellation rates of 3.6%, 1.2%, and 6.7%, respectively. An identified root cause was GLP-1 agonist use prior to surgery, which present risks for patients undergoing surgery and anesthesia. Patients are impacted from surgery delay, and the hospital from revenue loss. **Purpose:** The purpose of this quality improvement initiative (QI) is to decrease same day surgical cancellations associated with GLP-1 agonist use. Patients scheduled for surgery will be screened prior to their day of surgery preventing same day cancellations due to GLP-1 agonists. **Methods:** The QI initiative was implemented over a 15-week period in the Fall of 2024. Preceding project implementation, an interdisciplinary team of stakeholders consisting of a clinical site representative (CSR), Director of Perioperative Services, pre-admission testing (PAT) nurse practitioner (NP), and anesthesia department at the project site was mobilized to plan the following structure and workflow changes: PAT NP conducting a GLP-1 agonist screening, recording any corresponding surgical cancellations, increasing medication transparency using a surgeon GLP-1 agonist policy attestation, and workflow supporting surgical rescheduling prior to patient arrival based on the GLP-1 agonist screening. This will impact approximately 50 surgeons, 30 anesthesia providers, and up to 100 patients being screened for surgery per day. **Results:** Post-implementation, 116 recorded patients were screened for GLP-1 agonist use. Of these patients, only two surgical cancellations occurred. Surgeon attestations of the GLP-1 agonist surgical policy have four recordings. **Conclusion:** Project findings suggest preoperative GLP-1 screenings promote communication and may decrease surgical cancellations due to GLP-1 agonist use in the preoperative period.

Keywords: GLP-1 agonist, surgical cancellation, screenings, pre-admission testing

Decreasing Surgical Cancellations due to GLP-1 Agonists

In recent times, glucagon-like peptide-1 (GLP-1) agonists have been approved for the treatment of type 2 diabetes and weight loss. As a result, more patients that present for surgery are taking this class of medication. This class of medication presents unique risks for patients undergoing anesthesia for their surgeries. In a study by Silveira et al. (2023), it was shown that patients presenting for esophagogastroduodenoscopy (EGD) taking semaglutide, which has a half-life of approximately seven days, had a higher incidence of residual gastric content than patients not taking semaglutide. For the patient presenting for surgery, the risk of aspiration while under anesthesia is increased, and presents unique challenges for the anesthesia provider. Due to this increased risk and long half-lives of these medications, the American Society of Anesthesiologists has issued a guideline to hold GLP-1 agonists for at least a week for the long-acting formulations (Joshi et al., 2023). At the project site, the anesthesiology department has been adhering to a guideline of withholding seven to ten days. During the months of October, November, and December 2023, there was a 3.6%, 1.2%, and 6.7% incidence of cancelled same day surgical procedures, respectively. Of which, these included patients cancelled due to GLP-1 agonists. This results in a loss of revenue for the hospital and a decrease in patient satisfaction from not having their surgery on time. These cancellations result from a breakdown in communication where the pre-admission testing (PAT) is not appropriately conveying that the patient is taking these medications to the anesthesia department, or the operating surgeons, as well as patients failing to adhere to GLP-1 agonist recommendations. A fishbone diagram outlining the root causes is shown in Appendix A. To decrease the incidence of same day surgical procedure cancellations, documenting GLP-1 agonist use in the initial patient screening enhances

visibility for PAT and anesthesia allowing them time to make necessary adjustments to patient scheduling, reducing the risk for same day surgical cancellation.

Available Knowledge and Specific Aims

Same day surgical cancellations result in decreased patient satisfaction, and increased costs for the hospital as well as the patient (Leite et al., 2019). The purpose of this quality improvement (QI) project at the project site was to decrease same day surgical cancellations in adult patients taking GLP-1 agonists by screening for GLP-1 agonists during the initial patient encounter. To identify the root causes and possible solutions to same day surgical cancellations, a literature review and synthesis was conducted. The literature search was executed using the PubMed database. The Boolean phrases (reduce) AND (surgical cancellations) were used yielding 676 results. Inclusion criteria of full text, English language, and publication year no later than 2017 were applied yielding 330 results. After excluding irrelevant studies by title and abstract review, a final seven studies were retrieved that met the criteria for this literature search and review. A PRISMA diagram detailing the literature search and PubMed search history is presented in Appendix B. Three studies of Johns Hopkins Nursing Evidence-Based Practice Guide (JHNEBP) level II were included in the final retrieved studies. Two had a quality rating of B and one a quality rating of A. Based on these studies a recommendation of using preoperative clinics to conduct virtual patient interviews and provide a thorough patient evaluation to reduce the incidence of same day surgical cancellations (Leite et al., 2019; Liu et al., 2021; Zhang et al., 2021). Four studies of JHNEBP level III were included in the final retrieved studies. Two studies are quality level B, and two studies quality level C. Based on the results of these studies, increased communication among patients and the preoperative surgical team can help to decrease surgical cancellations (Dimitriadis et al., 2013; Hovlid et al., 2013; Kim et al., 2023; Naderi-

Boldaji et al., 2023). However, these recommendations may need further clarification depending on communication flow and specific institutional needs. Evidence reviews and synthesis tables are presented in Appendix C and D, respectively.

Rationale

The quality improvement framework chosen to guide the described quality improvement project was the Promoting Action on Research Implementation in Health Services (PARIHS) framework. This framework utilized three elements, evidence, context, and innovation, to guide successful research implementation (Ryecroft-Malone, 2004). This framework was chosen due to its logical clarity of its elements in the context of improving a conundrum a hospital is facing. The evidence supported the use of a PAT in the perioperative period to optimize patients for surgery. The literature also supported communication as a factor to improve patient optimization. The context referred to the surgical cancellations at the project site due to patients arriving for same day surgery taking GLP-1 agonists. This also included the existing PAT to adopt a change in workflow to flag these patients so they can be rescheduled. Facilitation within the framework supported clear lines of communication and information among the perioperative staff to screen patients for GLP-1 agonist use and made necessary changes to decrease cancellations. A diagram depicting the PARIHS framework applied to this quality improvement project is presented in Appendix E.

Methods

The project site was a two hundred bed hospital in the southwestern quadrant of Baltimore City. This hospital performs surgical procedures of multiple disciplines including orthopedics, bariatric, vascular, gynecologic, amongst others. The cultural climate of the project site was complex. Using the organizational culture assessment questionnaire (OCAQ) tool

assessing the project site context for project implementation, it was determined that there was a relative opposition to change leading to an implementation barrier within the cultural climate. There are many senior staff in this facility, including anesthesia providers, surgeons, nurses, and perioperative personnel. However, for as many senior staff as there are, there is an equally numerous amounts of newer staff having less than 5 years' experience within this facility. The senior staff held lots of informal power within the hospital. Because of this formality, change did not appear to be easily embraced. Change came with initial opposition before any benefits could be seen, and even still, the change process was difficult because it differs from the usual process flow that has been going on for years. The current process of surgical scheduling is diagramed in Appendix F. Patients were scheduled for surgery, interviewed in an initial PAT phone call, and as preoperative testing was done, the patient's notes were reviewed by PAT. The final surgical clearance was given by PAT. In Appendix G, the desired process map is diagramed showing the addition of GLP-1 agonist screening by PAT during the initial interview, as well as GLP-1 agonist screening documentation and rescheduling the patient for surgery if they did not meet the required GLP-1 agonist policy. Conducting GLP-1 agonist screening allowed for potentially cancelled surgical cases to be caught before they occurred. This had the potential to significantly save funds from wasted resources due to surgical cancellations. Al Talalwah and McIltrout (2018) reported a research study conducted at Tulane University Medical Center concluded that their 6.7% rate of surgical cancellation correlated to approximately one million dollars lost in revenue.

As discussed in the evidence review, effective communication was a driving factor in the reduction of surgical cancellations. By the end of September 2024, PAT was educated on the new process goal. This included conducting a GLP-1 agonist screening during the first patient interview, and documentation of the screening using a data collection tool. This documentation

was completed by the PAT NP at the time of the initial patient encounter. The anesthesia department was also educated on this project and the outcome goals. This created a way to improve visibility of GLP-1 agonist use and created a new line of communication for providers that allowed early action in surgical scheduling. If the patient was known to be taking a GLP-1 agonist and it was not held within the appropriate timeframe prior to surgery, anesthesia providers could relay this information to either the surgeons, or PAT to contact the surgeons and reschedule the surgical case. The outcome goal that was tracked during the implementation of this evidence-based intervention was surgical cancellations due to GLP-1 agonist use in the pre- and perioperative period. This information was recorded by the PAT NP, as well as a surgical cancellation logbook. This logbook, however, was unable to be viewed due to project site concerns over viewing protected health information (PHI). Surgical cancellations were recorded by the PAT NP and correlated with the initial PAT GLP-1 agonist screening. To ensure adherence, the surgeons also received the PAT GLP-1 agonist policy for review. During the implementation period, bi-weekly check-ins with PAT were conducted. The PAT clinic was able to use their existing materials and processes with only the addition of GLP-1 agonist screening and documentation of this information, this ensured a smooth transition process. Bingham's ABCDE Framework was used to further leverage strategies and tactics, such as keeping existing PAT workflow in place. A detailed GANTT chart for the project timelines is presented in Appendix H.

Measures

Throughout this QI project, structure, process, and outcome measures were assessed. Structure processes include an initial screening for GLP-1 agonist use by PAT during the initial patient screening. The screening was documented using a QR code linked to the data collection tool. The measures included the number of patient screenings completed each project week, and

the number of surgical cancellations that occurred. The process goal of conducting a GLP-1 agonist screening was also recorded using the data collection tool. With a change in structure, and a change in process, this increased communication to providers regarding patient GLP-1 agonist use. The outcome measure was ultimately the number of same day surgical cancellations out of the total number of same day surgical cases scheduled for the day. Each of these measures was recorded through REDCap using a QR code during weekly audits. The structure and process measure were recorded by the PAT NP who conducted the initial screening. The outcome measure was also recorded by the PAT NP and analyzed by the QI project leader. Throughout the QI project, eligible inclusion criteria for data collection were confined to same day surgical procedures for adult surgical patients, which were posted on each day's surgical schedule. Data collection and measurement was excluded from any surgical procedure that was for pediatric patients, or any surgical procedures that were designated as emergencies or add-on procedures. However, while every effort to was made to include all eligible patients, due to the large volume of patients being screened by the PAT daily goals were set to improve PAT adherence to the measurement tools. The measurement tools are presented in Appendix I.

Analysis

The structural goal of adding the GLP-1 agonist screening to the initial PAT patient screening was met. The structure goal of this QI initiative was the administration of the GLP-1 agonist screening. Using the data collection tools presented in Appendix I, the frequency of GLP-1 agonist screenings was calculated. Using this frequency, adherence to this process goal was calculated using the observed frequency of GLP-1 agonist screening against the set goal of screenings. The outcome goal of decreasing surgical cancellations due to GLP-1 agonist medications was recorded on the data collection tool, and the rate of surgical cancellations was

calculated for the observed GLP-1 agonist mediated surgical cancellations against the total number of same day surgical cases. In addition, the observed frequency of surgical cancellations compared to the pre-implementation period was used to determine the impact of the GLP-1 agonist screenings on surgical cancellations. To evaluate if the interventions lead to a significant and observable change in practice and reduction in same day surgical cancellations, the data was analyzed using quantitative statistics to draw inferences, as well as utilizing run charts to illustrate the change over time as a variable. The presence of statistically significant changes was evaluated through the presence of runs, shifts, and trends on the run chart.

Ethical Considerations

During the course of this QI project, patient records were accessed to collect and record data solely by the PAT NP. Measures to protect patient privacy and data confidentiality were strictly adhered to under the Health Insurance Portability and Accountability Act (HIPAA). Training for HIPAA and the Collaborative Institutional Training Initiative (CITI) program were completed in preparation for QI project implementation. To maintain confidentiality, personal identifiers are de-identified and coded as a random number. A HIPAA-compliant server, REDCap, was used for data collection and data storage. Access to the surgical schedule and screenings is only authorized by the PAT NP in accordance with a data use agreement (DUA) drafted by the project site legal team between the project site and University of Maryland Baltimore. This limits the access to PHI to only one employee who access' this information as a normal job duty. Non-human Subject's Research determination from the Human Research Protections Office (HRPO) of the project site, and University of Maryland School of Medicine Institutional Review Boards (IRB) were obtained prior to project implementation. There are no

known conflicts of interest concerning this QI project. At the conclusion of the project, aggregated data was disseminated to site and externally with permission.

Results

Over the course of 15 weeks of data collection during the Fall of 2024, 116 patient screenings were recorded out of approximately 80 to 100 patients cleared for surgery per day. With such a large amount of incoming data, the goal for the PAT team was at least 10 recorded screenings weekly in the hopes that additional screenings were occurring outside of the data collection. Adherence to this goal ranged from 0% to 100%, varying upon the week. The weekly median number of screenings was 10. The number of GLP-1 screenings per project week, the number of surgical cancellations per project week, and the median number of GLP-1 screenings is presented in a run-chart in Appendix J. From the run-chart, there was one shift in GLP-1 screenings that occurred at week 7 through 15, demonstrating a significant change in screening adherence. There were also three cancellations shown due to a GLP-1 agonist medication. While GLP-1 agonist medication screening occurred for two patients by the PAT team, it was discovered that the GLP-1 agonist medication use was undocumented in prior medication reconciliation records. Upon PAT screening, it was discovered and lead to a surgical cancellation due to the proximity of the discovery to the scheduled surgical date. The third cancellation was incorrectly recorded as this was due to a SGLT-2 inhibitor, not a GLP-1 agonist medication. The project site policy recognition tool only recorded four responses from surgeons acknowledging the project site GLP-1 agonist policy.

Discussion

Over the 15-week implementation period, a total of recorded 2 surgical cancellations were observed. This demonstrates a decrease in surgical cancellations as a direct result of GLP-1

agonist medications screening compared to the pre-implementation period. While only 116 GLP-1 agonist screenings are recorded, with between 80 to 100 patients requiring pre-surgical screening per day, up to a possible 700 surgical candidates could be impacted weekly by GLP-1 agonist screening. Implementation of GLP-1 agonist medication screening resulting in a decrease in surgical cancellations at this project site aligns with current literature and the evidence review conducted and displayed in Appendix C. The resultant increase in communication between the PAT and patient presenting for surgery created by the additional GLP-1 agonist screening opens a pathway for communicating pertinent patient information. Adherence to GLP-1 agonist screenings was improved throughout the implementation period using weekly reminders and project site visits to circumvent decreases in GLP-1 agonist screening misutilization. The resultant decrease in cancellations also holds a large return on invest for the project site. As previously noted, a research study conducted at Tulane University Medical Center concluded that their 6.7% rate of surgical cancellation correlated to approximately one million dollars lost in revenue (Al Talalwah & McIltrout, 2018). In addition, at a hospital based in New York, it was estimated that the cost to operate an operating room is approximately \$150 per minute (Cerfolio et al., 2019). Preventing cancellations could also potentially increases the revenue gained by the project site following implementation.

Throughout the course of this QI project, barriers and limitations were noted. As noted within the results section, one cancellation was incorrectly recorded and misattributed to a GLP-1 agonist medication, when it was actually due to an SGLT-2 inhibitor and not a GLP-1 agonist medication. GLP-1 agonist medications are a relatively new class of medications with a rapidly expanding market and indications for use. Due to this, medical professionals may not be familiar with these medications making their detection more difficult. Screening a large volume of

patients also creates a time factor that may prevent GLP-1 agonist screenings from occurring. A data use agreement required by the project site IRB also placed significant barriers on the type of information that could be collected and used to correlate surrounding factors to identified surgical cancellations. For future iterations of this project with appropriate IRB approval, the ability to include the EMR within the scope of this project would encompass a larger pool of eligible patients. The larger pool of data that would be collected would provide a more representative efficacy of the GLP-1 medication screenings for the project site.

The sustainability plan outlined by the Institute of Healthcare Improvement (2019) was applied throughout this QI project. This sustainability plan focused on five domains that included measurement, ownership, communication and training, hardwiring the change, and assessment of workload (MOCHA). Following the MOCHA sustainability plan, dissemination of this project was carried out at the project site, as well as a state conference comprised of nurse anesthetists. Dissemination of this QI project and its results allowed more practitioners to become aware of GLP-1 agonist medications and their impact on surgical cancellations. This is a crucial component of hardwiring the change implemented through this QI project.

Conclusions

This QI project showed that a GLP-1 agonist screening for patients requiring surgical procedures is feasible and obtainable. A preoperative GLP-1 agonist screening conducted by PAT is a simple and effective way to decrease surgical cancellations due to GLP-1 agonist medications. While many patients require screening, this screening is a low cost and effective way to improve patient satisfaction, perioperative provider satisfaction, as well as preventing poor patient outcomes. This screening results in a high yield gain by the project site by preventing loss of revenue from surgical cancellations and treatment of complications arising

from aspiration events. The simplicity of the GLP-1 agonist screening makes the likelihood of this intervention being sustainable very favorable. Future implications for this QI initiative include utilizing this screening for all patient areas and not just patients arriving for same day surgical procedures. An addition to the EMR providing a field specifically for GLP-1 agonist use in PAT clearance notes would provide another line of communication where providers have a uniform place to find pertinent patient information. In accordance with communication, disseminating this QI project also allowed other practitioners to see the value of this QI project and potential application of this QI project to other sites. The literature used as the pillars for this QI project showed that increasing communication leads to a decrease in surgical cancellations. Translating this evidence into clinical practice adds to the body of knowledge utilized by the nursing profession showing that preventative screenings can be used to decrease surgical cancellations associated with new and novel drugs presenting risks to patients undergoing surgical procedures.

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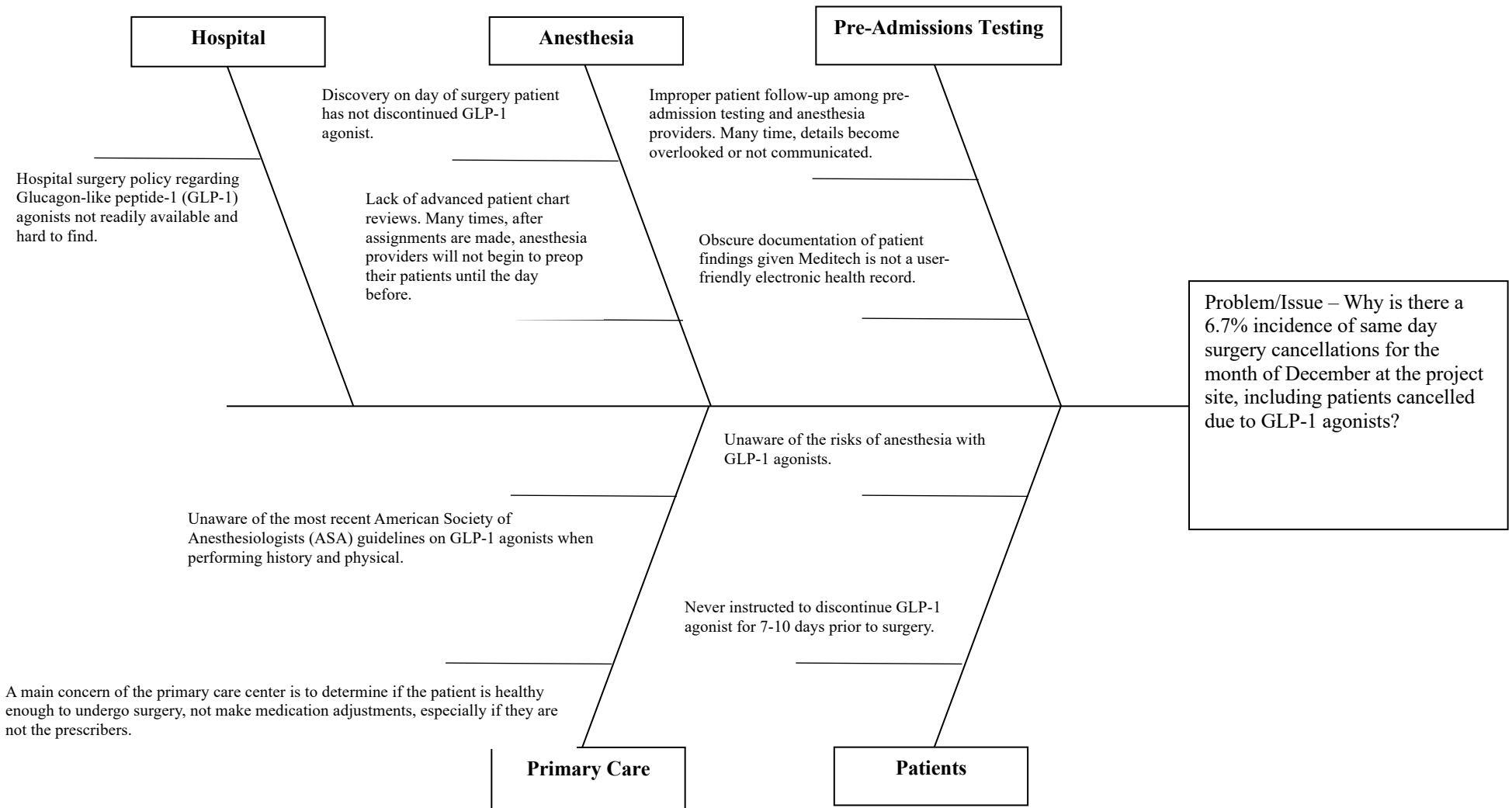
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Appendix A

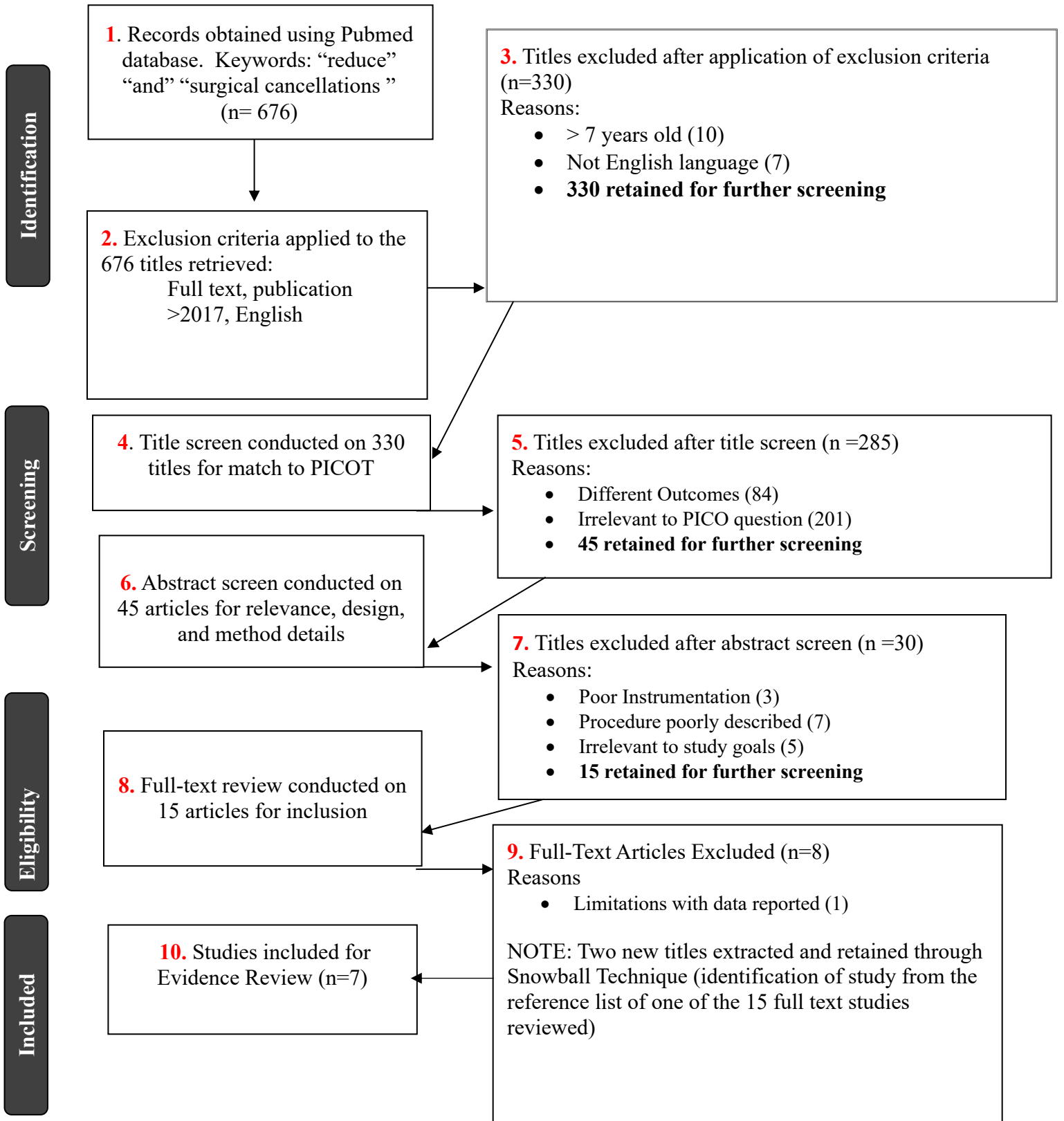
Fishbone Diagram



Note. ASA is the American Society of Anesthesiologists. Glucagon-like peptide-1 agonists are GLP-1 agonists. These medications include GLP-1 agonists such as Ozempic and Wegovy.

Appendix B

PRISMA Search Flow Diagram



Appendix C

Evidence Review Table

Citation: Dimitriadis, P. A., Iyer, S., & Evgeniou, E. (2013). The challenge of cancellations on the day of surgery. *International Journal of Surgery*, 11(10), 1126–1130. <https://doi.org/10.1016/j.ijisu.2013.09.002>
 Level: III-B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of this study was to retrospectively identify the incidence and causes of surgical cancellations. Once identified, possible solutions were formulated to combat the causes of surgical cancellation.</p>	<p>Retrospective quasi-experimental study</p>	<p>Population: Elective and emergency cancellations during the year 2012. Size: 19,368 surgeries were performed with a 5.19% cancellation rate.</p>	<p>A retrospective review of cancellations using the IQ Utopia Software was conducted. This software is used to record operation notes and cancellations. The cancellation reasons were then sorted into patient-initiated cancellations and hospital-initiated cancellations.</p>	<p>Once the cancellation reasons were sorted into patient and hospital-initiated cancellation categories, descriptive statistics were used to determine the incidence of each cancellation. The most common reason for cancellation was patient medically unfit (33.73%), followed by lack of bed availability (21.79%), lack of OR time (17.31%), failed patient attendance (6.87%), and operation no longer necessary (4.08%). A review of the literature was then conducted to provide possible solutions to each of the documented cancellation reasons.</p>	<p>For patients that are medically unfit, or non-compliant with preoperative instructions, pre-admission clinics can help to reduce these cancellations. Patients are screened before their upcoming surgery and their instructions reiterated in a form that the patient understands. For hospital-initiated cancellations, having additional staff, such as an admissions coordinator, can increase communication and mitigate lack of bed availability.</p>

Citation: Hovlid, E., Von Plessen, C., Haug, K., Aslaksen, A. B., & Bukve, O. (2013). Patient experiences with interventions to reduce surgery cancellations: A qualitative study. *BMC Surgery*, 13(1), 30. <https://doi.org/10.1186/1471-2482-13-30>
 Level:III-B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>To study how patients personally experience the interventions used to decrease surgical cancellations. By understanding patient perceptions, interventions can be tailored to decrease cancellations</p>	<p>Research design: comparative qualitative case studies with semi-structured interviews</p>	<p>Sample: Sixteen patients were interviewed in total. Eight patients in the original surgical pathway, and eight in the redesigned surgical pathway.</p> <p>Setting: Hospital A is a district general hospital. Hospital B is a local hospital.</p> <p>Population: Patients were recruited by the clinicians by purposeful sampling. They recruited patients with varying age, gender, and type of surgery. Sample size was deemed sufficient when the last two interviews did not yield additional information, indicating data saturation.</p>	<p>From the recruited patients, phone interviews took place 1-7 months after their surgical procedure. The patients were asked open-ended questions to guide their experiences from the designated groups, Hospital A or Hospital B</p> <p>Redesign intervention: earlier clinical pre-assessment, improved flow of information among surgeons and anesthesia personnel, patient participation in selecting the date for surgery, centralization of preparation and discharge of patients to a single unit, a telephone call to patients two days prior to surgery, and a common computer-based system for scheduling operations across all surgical departments</p>	<p>Following the interviews, content analysis was performed using a coding scheme to reflect interventions used by each hospital. Three common themes were identified: 1) importance of being included in surgical scheduling time. 2) Individualized preparation before the hospital admission. 3) Importance of establishing relationships with a minimum number of clinicians during the hospital stay.</p>	<p>Patients appreciated the interventions that had been implemented to reduce surgical cancellations. Patients felt the care was more patient-centered. Hospital A saw a reduction in cancellations with the redesigned pathway. Telephone reminders created an atmosphere of more patient-centered care and personalized dialogue. Centralization of surgical preparation and discharge processes contributed to improved continuity of care.</p> <p>Limitation: Sample only included those who had surgery and none who were rescheduled.</p>

Citation: Kim, J. H., Myerson, C. L., Romero, B. A., Glaser, D. L., Kuntz, A. F., & Horneff, J. G. (2023). Day of surgery cancellation in total shoulder arthroplasty: An analysis of surgical cancellation etiologies. *Seminars in Arthroplasty: JSES*, 33(2), 218–223. <https://doi.org/10.1053/j.sart.2022.10.006>
 Level:III-C

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>The purpose of the study is to identify the frequency and causes of cancellations in total shoulder arthroplasty patients, particularly on the day of surgery, and determine which treatment path those patients take following their cancellation.</p>	<p>Retrospective Cross Sectional Epidemiology Study</p>	<p>Sample: 1,189 patients undergoing total shoulder arthroscopy from January 2010 to May 2020 were reviewed.</p> <p>Setting: single-academic institution across two tertiary care hospitals</p> <p>Population: Patients undergoing primary total shoulder arthroscopy for glenohumeral osteoarthritis or cuff tear arthropathy were included. Exclusion criteria included patients receiving arthroplasty for infection, fracture, revision, or patients who cancelled more than twice.</p>	<p>Retrospective chart reviews were conducted on the charts flagged as having a cancellation. Based on the surgery date, patients were grouped into day of surgery cancellations or before surgery cancellations.</p>	<p>Univariate analysis, chi-square test, and analysis of variance were used to compare each patient cohorts. Of the 1198 patients scheduled for TSA, there was a 10.2% rate of cancellation. The most common reason for cancellation in both the day of surgery and prior to surgery groups was due to medical reasons (45.8% vs. 44.0%). Within the medical reasons group, there was 38.6% due to not obtaining preoperative medical clearance, 25% due to infections, and 18.2% due to medication noncompliance.</p>	<p>Within the day of surgery group, infection (40.9%) was the most common reason for medical cancellation, followed by medication noncompliance (22.7%). Within the reasons of medication non-compliance and inadequate medical clearance, increased communication between the patient and surgical and anesthesia staff, could potentially decrease the number of cancellations in these modifiable categories. Institutional changes and new protocol implementations can provide the basis for institutions to decrease surgical cancellations. Healthcare providers can address the factors leading to cancellation and address these issues early on.</p>

Citation: Leite, K. A., Hobgood, T., Hill, B., & Muckler, V. C. (2019). Reducing Preventable Surgical Cancellations: Improving the preoperative anesthesia interview process. *Journal of PeriAnesthesia Nursing*, 34(5), 929–937. <https://doi.org/10.1016/j.jopan.2019.02.001>
 Level:II-A

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>The purpose of this study is to determine if educating the nurses in the preoperative setting, and standardizing the patient interview process, would decrease the incidence of surgical cancellations</p>	<p>This is a retrospective study with a pre-test and post-test chart review design</p>	<p>Setting: Rural 282 bed hospital in the United States. Sample: From July 2016 to July 2017 a total of 7,998 surgical cases were performed. Population: Inclusion criteria was any patient that was randomly selected by the researchers that completed a preoperative interview, in-person or by phone. Retrospective chart review of 105 preoperative anesthesia interview records (PAIRs) took place with 52 records pre-implementation randomly selected, and 53 records post-implementation randomly selected. A study size of 54 was calculated to achieve statistical significance based on an alpha value of 0.05 and power of 0.80.</p>	<p>Educational modules were given to the nurses on the preoperative interview process. The preoperative interview was standardized and developed to meet the specific needs of this population in accordance with American Society of Anesthesiologists and National Institute for Health and Care Excellence guidelines. This new preoperative interview process detailed a focus patient exam, including medical history and previous anesthetic experiences, as well as a preoperative medication guide given to RNs to educate patients on which types of medications to hold prior to surgery.</p>	<p>The rate of surgical cancellations pre- and post-implementation were tracked as the dependent variable. The independent variable includes the new preoperative standardized interview.</p>	<p>105 cancellations occurred in the pre-implementation phase, and 95 cancellations in the post-implementation period. Of these, 34.3% were considered preventable in the pre-implementation period, and 20% post-implementation (p<0.05). Implementation of education modules and standardized pre-operative interviews led to a reduction in surgical cancellations, enhanced perioperative experience, and reduction in costs for the hospital system and patients.</p>

Citation: Liu, S., Lu, X., Jiang, M., Li, W., Li, A., Fang, F., & Cang, J. (2021). Preoperative assessment clinics and case cancellations: A prospective study from a large medical center in China. *Annals of Translational Medicine*, 9(19), 1501–1501. <https://doi.org/10.21037/atm-21-4665>
 Level:II-B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>The purpose of this study is to determine if a preoperative assessment clinic would provide benefits to patients needing surgery. The researcher’s hypothesis was that a preoperative assessment clinic would decrease cancellations, decrease unnecessary admissions, and decrease medical expenses in patients with multiple comorbidities.</p>	<p>Prospective observational study.</p>	<p>Population: Patients with multiple comorbidities who were not receiving proper treatment. Patients were recruited from November 1st, 2019, to October 31st, 2020. Single center tertiary care center in China.</p> <p>Exclusion Criteria: Patients under 18 years of age who had no comorbidities and were undergoing emergency surgery.</p> <p>Size: 288 patients were included in this study after exclusion criteria applied, and patient cancellations considered.</p>	<p>Patients were grouped into preclinic groups, and anesthesia consultations after admission. In the preclinic group, patients were seen in a preoperative assessment clinic (PAC) by an anesthesiologist for a consultation. If the anesthesiologist and surgeon agreed the patient was not medically ready, the case would be cancelled. Patients who did not go through the PAC and were directly admitted to the hospital, an anesthesiologist consultation was conducted within 12 hours.</p>	<p>Outcomes: The primary outcome was operating room cancellations. Secondary outcomes included major complications, post-operative ICU admissions and readmissions within 30 days of surgery, length of hospital stay, and hospitalization expenses.</p> <p>Measures: The Pearson chi squared test was used to analyze rates of cancellation. The preclinic group saw no cancellations while the inpatient group saw a 7.8% incidence of surgical cancellation (p=0.007). Using multiple linear regression analysis, there was no significant difference between the two groups in length of hospital stay, incidence of ICU admissions, and major complications (p>0.05).</p>	<p>Conclusions: A PAC was shown to be beneficial in reducing the cancellation rates of selective surgeries, and decreased length of stays in patients with multiple comorbidities before surgery. This study also showed a reduction in unnecessary costs for admission.</p>

Citation: Naderi-Boldaji, V., Banifatemi, M., Zandi, R., Eghbal, M. H., Nematollahi, M., & Sahmeddini, M. A. (2023). Incidence and root causes of surgery cancellations at an academic medical center in Iran: A retrospective cohort study on 29,978 elective surgical cases. *Patient Safety in Surgery*, 17(1), 24. <https://doi.org/10.1186/s13037-023-00377-6> Level:III-C

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>The purpose of this study is to identify the main reasons for surgical cancellations and provide recommendations to reduce the rate of potentially avoidable cancellations.</p>	<p>This is a retrospective cohort study</p>	<p>Population: Over the course of two years from January 1, 2020, to March 31, 2022, cancellations from all consecutive elective surgical cases were retrospectively included in this study. Exclusion criteria included elective cases that were performed as emergency cases before the scheduled day of surgery.</p> <p>Setting: Namzi Teaching Hospital in Iran.</p> <p>Sample: Overall, a total of 29,978 elective surgical cases were analyzed.</p>	<p>Patients were evaluated one to seven days before the elective procedure. An operating room nurse recorded operations data such as the number of elective cases scheduled, the number of cancellations, and specialty related cancellation reasons. Once this data was collected the researchers used descriptive statistics to analyze the incidence and causes of cancellations.</p>	<p>Determine the most prevalent reasons for surgical cancellations and provide recommendations to reduce the rate of cancellations. Patients unfit for surgery (37%), followed by failure to follow instructions (10%), lack of time (10.5%), and equipment/supply issues (10%) were the most common reasons for surgical cancellation. Other reasons (20%) such as patient attendance, and surgeon availability accounted for other reasons.</p>	<p>Patient factors such as noncompliance with fasting instructions and medication changes is multifactorial. However, clear instructions in a form the patient can understand, repeating the information in the pre-admission testing, and sending automated reminders can help to mitigate these issues. Although good strategies, these are sometimes unavoidable as each patient cannot be generalized. As for lack of time, determining the exact duration of each surgery is difficult, but using controlled scheduling in conjunction with surgical and anesthesia team experiences, overbooking can usually be eliminated.</p>

Citation: Zhang, K., Rashid-Kolvear, M., Waseem, R., Englesakis, M., & Chung, F. (2021). Virtual preoperative assessment in surgical patients: A systematic review and meta-analysis. *Journal of Clinical Anesthesia*, 75, 110540. <https://doi.org/10.1016/j.jclinane.2021.110540>
 Level: II-B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results/Conclusions
<p>To identify the effectiveness of virtual preoperative assessment for the evaluation of surgical patients, with a focus on surgery cancellation rates and patient experiences.</p>	<p>Systemic Review with Meta-analysis of prospective cohort studies, retrospective cohort studies, randomized controlled trials, and cross-sectional and case series designs.</p>	<p>Sample: Studies addressing virtual preoperative assessment in adult patients 18 years and older were included within this study. Reviews, case reports, conference proceedings, dissertations, and book chapters were excluded from this meta-analysis.</p> <p>A total of 10,054 records were reviewed with 8,454 records being screened. A total of 15 studies were included in the systemic review and 12 studies included in the quantitative analysis.</p>	<p>Primary outcomes extracted from the included studies included surgical cancellation rates and patient experiences. Secondary outcomes included resources saved, staff experience, and success in using the collected data to diagnose and manage patients.</p>	<p>The primary outcomes of surgical cancellation rates and patient experiences were calculated using random effects meta-analysis. The pooled cancellation rate with virtual care was 2%. Using the I² statistic, there was a moderate level of non-significant heterogeneity (I²=45%, p=0.08). The pooled proportion of patients with a positive experience was 90%. There was a high level of heterogeneity across the studies (I²=79%, p<0.01).</p>	<p>Virtual preoperative assessment was effective in preventing the inconvenience and frustration associated with day of surgery cancellations. Compared to in-person evaluation, virtual care resulted in similar cancellation rates. However, virtual care allowed the option of delaying or cancelling the surgery remotely in favor of optimizing the patient. The study's conclusions stated that virtual preoperative care resulted in similar cancellation rates, high patient satisfaction, and reduced costs compared to in-person evaluation.</p>

Appendix D

Evidence Synthesis Table

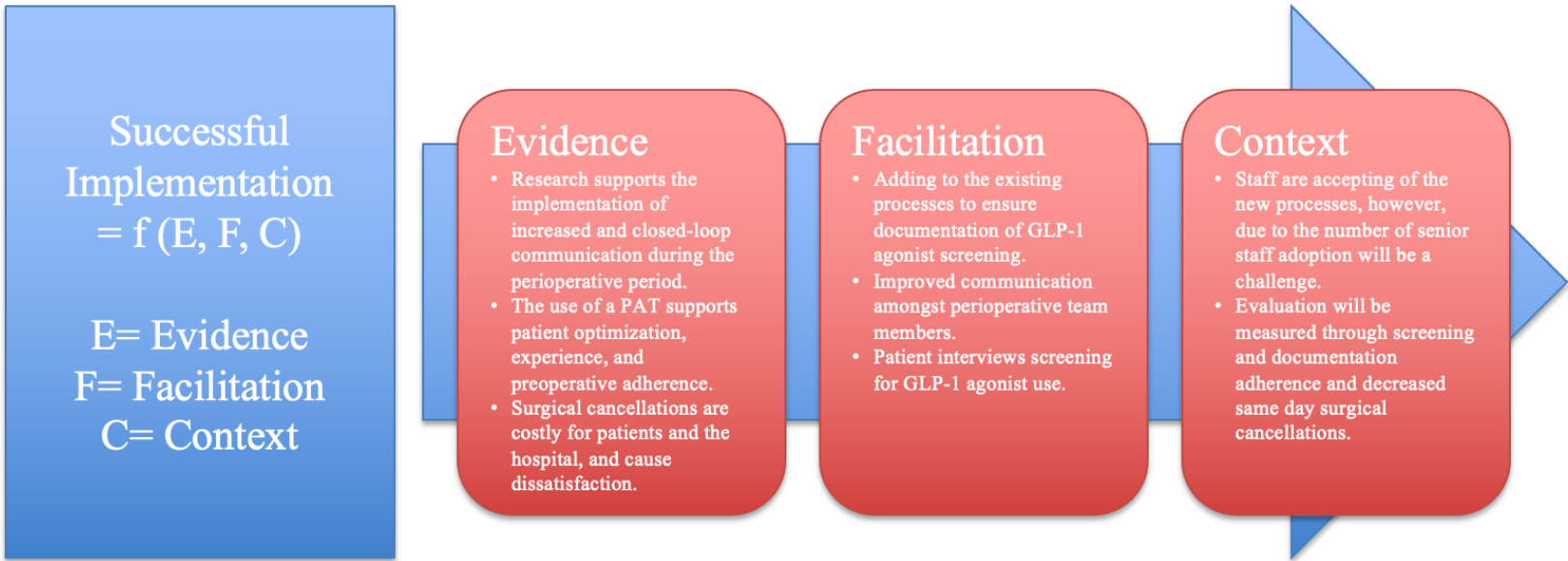
Project Title: Reducing Surgical Cancellations due to GLP-1 Agonists			
PICO Question: At the project site, why are there cancellations in same-day adult surgical patients due to GLP-1 agonists?			
JHNEBP Model Level	Total Number of Sources	Author and Quality Rating of each study	Synthesis of Findings
Level I Experimental study · Randomized Controlled Trial (RCT) · Systematic review of RCTs with or without meta-analysis			
Level II Quasi-experimental studies · Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis	3	Liu et al., 2021 (B) Zhang et al., 2021 (B) Leite et al., 2019 (A)	A preoperative assessment clinic can be effective in reducing surgical cancellations, thereby reducing hospital and patient costs. Virtual interviews can increase patient satisfaction, reduce costs, and allow for remote cancellation of surgical cases instead of the day of surgery. Standardization of the preoperative interview process can be tailored to the patient population and reduce surgical cancellations.
Level III Non-experimental study · Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis · Qualitative study or systematic review of qualitative studies with or without meta-synthesis	4	Dimitriadis et al., 2013 (B) Naderi-Boldaji et al., 2023 (C) Hovlid et al., 2013 (B) Kim et al., 2023 (C)	Increased communication through in person interviews, or virtual interviews can help to reduce surgical cancellations. Providing patients with information in a form they can understand will help the patients comply with their preoperative instructions. However, more studies are needed to show how the flow of communication is increased.
Level IV Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence			

<p>Level V Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports · Opinion of nationally recognized expert(s) based on experiential evidence</p>			
<p>Overall Quality Rating w/rational and Recommendation: Overall quality rating of B given that five out of seven studies can give a consistent recommendation. Based on these findings, using a standardized process within an existing preoperative admission testing at Saint Agnes Hospital would be advantageous in reducing surgical cancellations. However, this would have to be tailored to the specifics of the Saint Agnes Hospital preoperative admissions testing. There is enough evidence retrieved from the evidence reviews to suggest a practice change is reasonable.</p>			
<p>Recommendations Based on Evidence Synthesis</p> <ul style="list-style-type: none"> • Strong, compelling evidence, consistent results: solid indication for a practice change. • Good and consistent evidence – practice change • Good but conflicting evidence: questionable indication for practice change; consider risk/benefit analysis • Little or no evidence: no indication for practice change 			

Appendix E

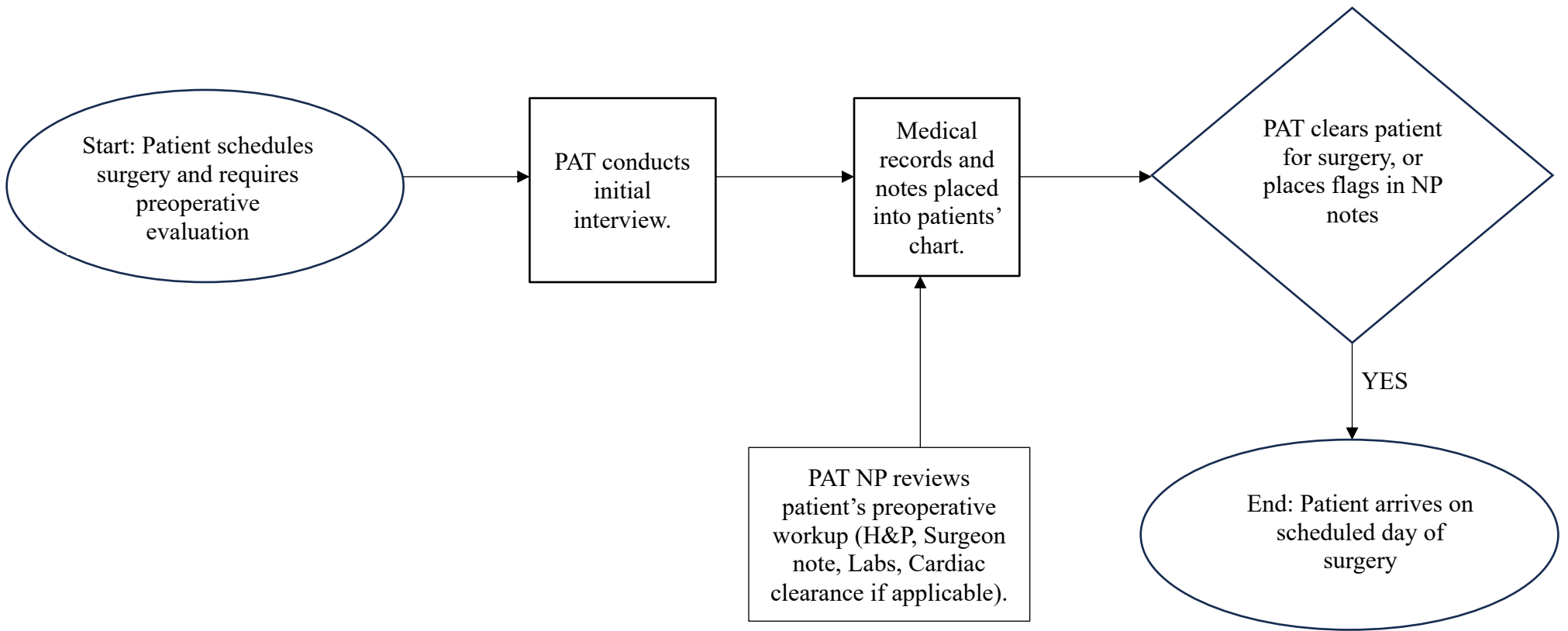
PARIHS Framework Model

Promoting Action on Research Implementation in Health Services (PARIHS)



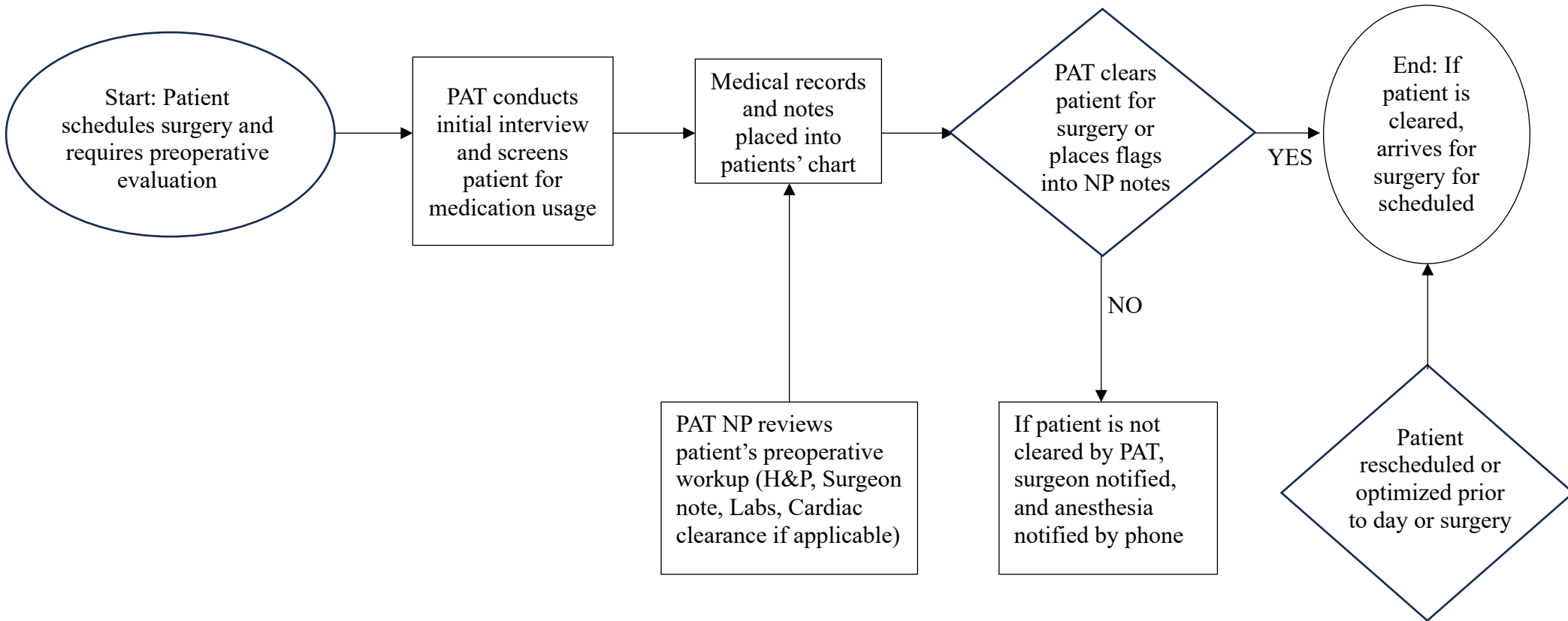
Kitson et al, 2008

Appendix F
Current Process Map



Appendix G

Desired Process Map

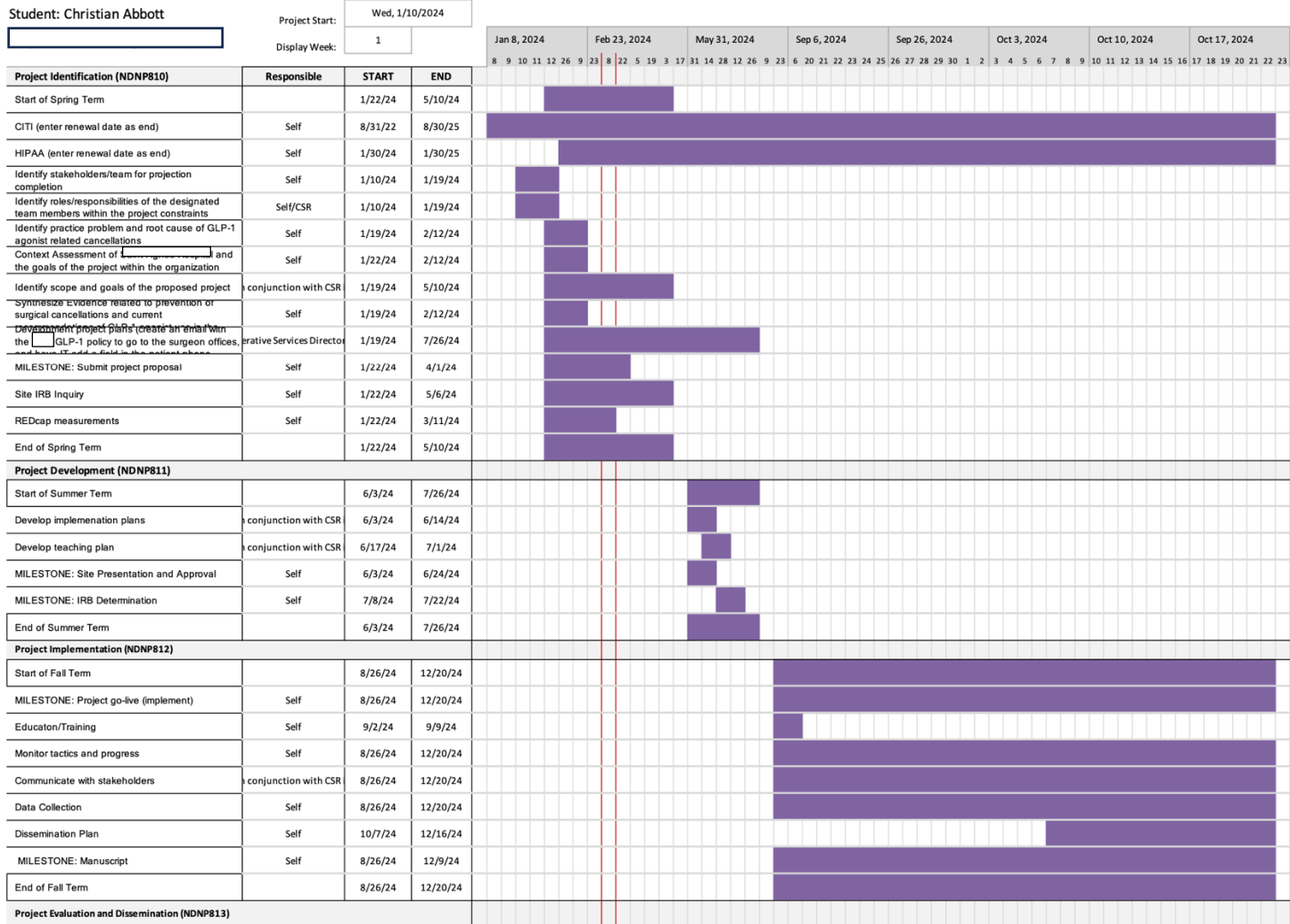


Appendix H

GANTT Chart

DNP Project Title: Decreasing the Incidence of Same-Day Surgical Cancellations due to GLP-1 Agonists

Student: Christian Abbott

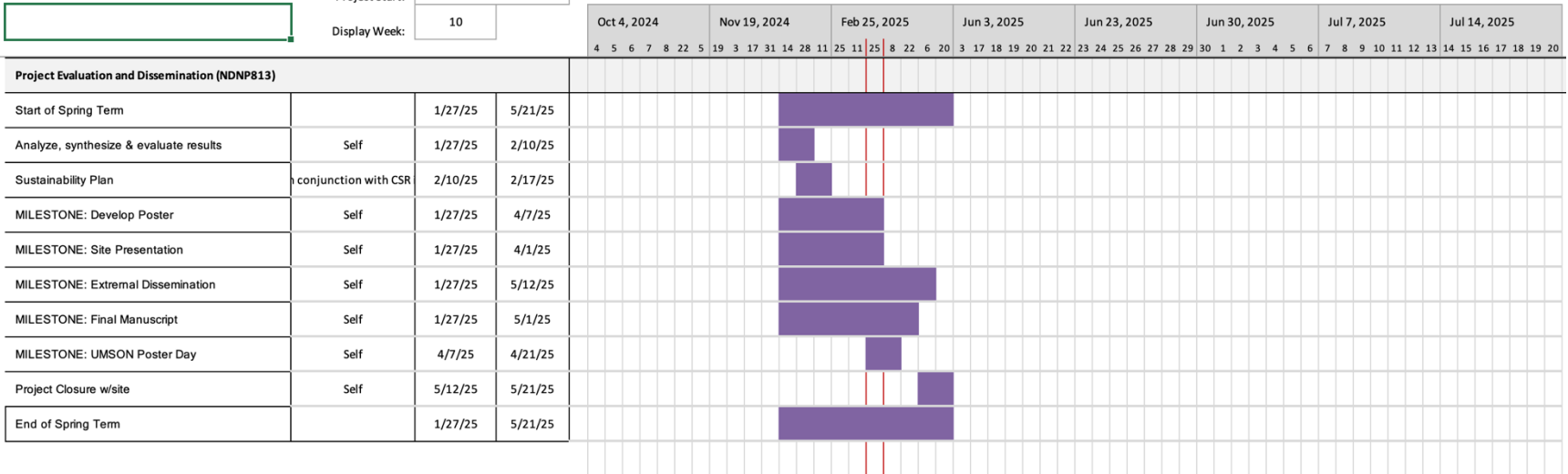


DNP Project Title: Decreasing the Incidence of Same-Day Surgical Cancellations due to GLP-1 Agonists

Student: Christian Abbott

Project Start: Wed, 1/10/2024

Display Week: 10



Appendix I

Measurement Tools

Figure 1I

GLP-1 Agonist Screening Measurement Tool

GLP-1 Agonist Screening

Page 1

Please complete the survey below.

Thank you!

- 1) Project Week _____
- 2) Patient Number _____
- 3) Was there a case cancellation due to GLP-1 agonist use? Yes No
- 4) Did the patient receive GLP-1 agonist screening by PAT? Yes No

Figure 2I

GLP-1 Agonist Policy Recognition Tool

GLP-1 Agonist Policy Recognition

Page 2

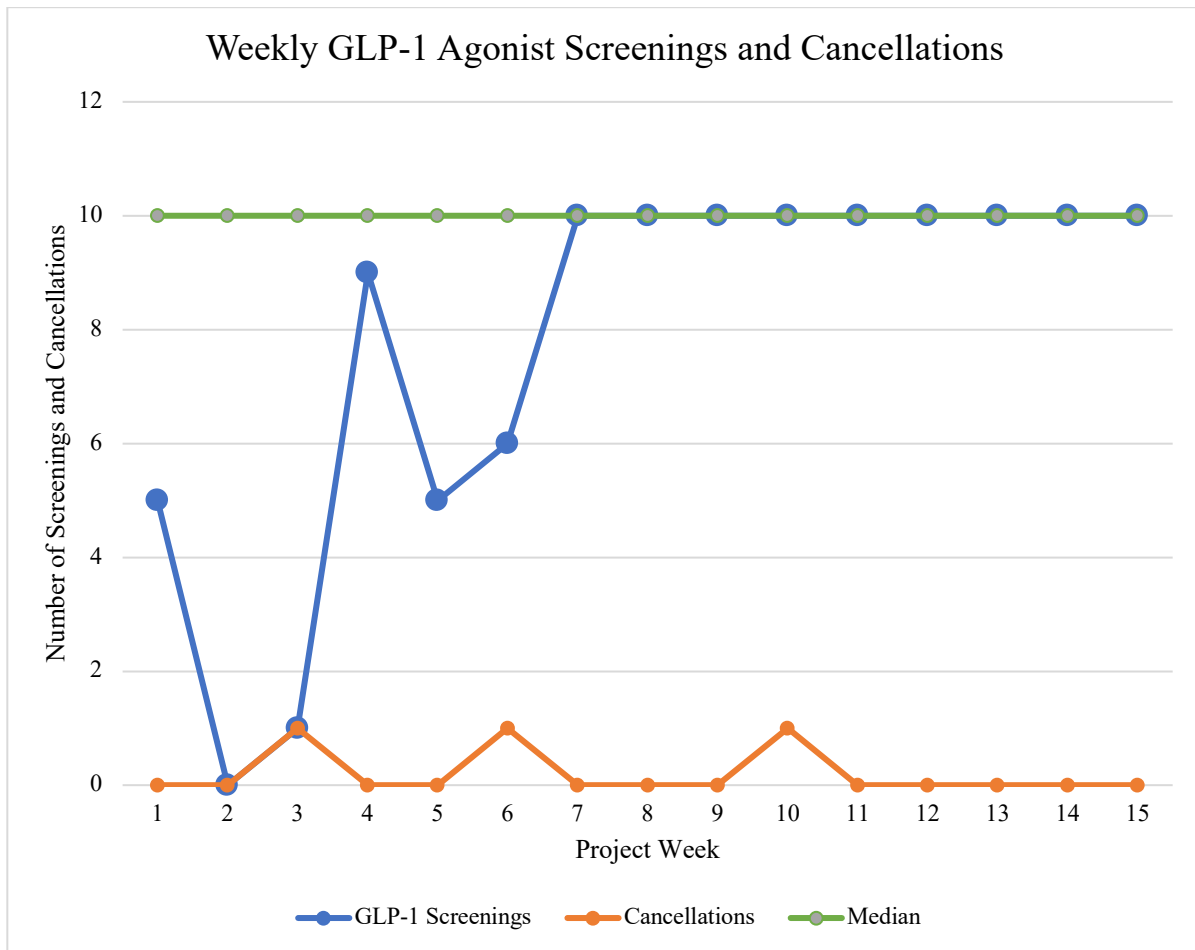
Please complete the survey below.

Thank you!

- 4) I have read and acknowledge the Project site policy regarding GLP-1 agonist medications Yes

Appendix J

Run-Chart



Note. Week 3 shows one surgical cancellation incorrectly recorded due to a SGLT-2 inhibitor medication. One shift is observed in the GLP-1 agonist screenings within the run-chart.