

**Implementing Sugammadex Disclosure to Female Patients in the Preoperative and  
Postoperative Setting**

by

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**Author Note**

Emily Janczur is at the University of Maryland, Baltimore.  
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### Abstract

**Problem:** Sugammadex is given to reverse the effects of NMB agents; however, this reversal agent decreases the efficacy of hormonal contraceptives, increasing the risk of unintended pregnancy. At a primary care hospital in Maryland, less than 1% of anesthesia providers correctly completed the sugammadex disclosure form and only 10% of anesthesia providers reported administration of sugammadex intraoperatively during PACU handoff. **Purpose:** The purpose of this quality improvement initiative was to implement sugammadex disclosure in the postoperative setting and include a completed sugammadex disclosure form in the patient's discharge packet to all female patients of childbearing age undergoing laparoscopic procedures. **Methods:** In the months preceding the project, an interdisciplinary team of stakeholders was mobilized to plan evidenced-based structure and workflow changes. Anesthesia and PACU providers were trained on completing the sugammadex disclosure form, reporting intraoperative sugammadex administration, and including the sugammadex disclosure form in the patient discharge instructions. Weekly chart audits were conducted to track project compliance. Approximately eighty female patients of childbearing age were impacted over the implementation period. **Results:** 60% of PACU and anesthesia providers received in-person training and 100% received electronic communication about the new protocol. The rate of completed sugammadex disclosure forms was 43.5% and 24.7% included the sugammadex disclosure form in patient discharge instructions. **Conclusions:** Findings suggest low PACU compliance with including sugammadex disclosure in patient discharge instructions. Low compliance may be related to the multi-step process with some steps done electronically and some done on paper. Inclusion of sugammadex disclosure in patient discharge instructions may be increased if added to the electronic health record.

## **Implementing Sugammadex Disclosure to Female Patients in the Preoperative and Postoperative Setting**

Sugammadex is given by anesthesia providers to reverse the effects of nondepolarizing neuromuscular blocking agents ([NMBAs] Hartman et al., 2020). When compared to other reversal agents for NMBAs such as neostigmine, sugammadex is faster and more effective (Dong et al., 2020). However, when sugammadex is administered to females on hormonal contraception containing progesterone, it binds to the hormonal contraceptive, decreasing the plasma level of progesterone (Dwan et al., 2021). The decrease of plasma progesterone is equivalent to missing one day's dose of oral contraceptive, leading to an increased risk of unintended pregnancy (Hartman et al., 2021).

In the literature, there have been reports of unintended pregnancy related to sugammadex administration to females of childbearing age on hormonal contraceptives. In addition, the Food and Drug Administration (FDA) has placed a black box warning for sugammadex related to the interaction with hormonal contraceptives. A data analysis was completed within the anesthesia department at a local community hospital to determine how many providers complete the existing sugammadex disclosure form within the electronic health record (EHR). Of the 51 anesthesia providers, only two correctly completed the sugammadex disclosure form. Along with the data analysis, a survey was conducted to evaluate how many anesthesia providers report the administration of sugammadex intraoperatively during post-anesthesia care unit (PACU) handoff. The survey revealed that 10% of providers consistently report intraoperative sugammadex administration during PACU handoff.

The root causes for lack of completion of the sugammadex disclosure can be found in Figure 1. The root causes most responsible for lack of disclosing sugammadex administration

and its interaction with hormonal birth control were noncompliance with completing the sugammadex disclosure in the EHR and failure to inform PACU nurses about sugammadex administration intraoperatively. The purpose of this QI project was to implement sugammadex disclosure and include a completed sugammadex disclosure form in the patient's discharge packet to all female patients of childbearing age undergoing laparoscopic procedures.

### **Available Knowledge and Specific Aims**

Tables 1-7 evaluate the evidence reviewed and a synthesis of the findings is seen in Table 8. Of the evidence reviewed, two level one randomized control trials (RCTs) were included that compare the efficacy of reversing neuromuscular blockade between sugammadex and neostigmine (Brueckmann et al., 2015; Dong et al., 2020). Both studies found the use of sugammadex for neuromuscular blockade reversal at the end of surgery is shown to eliminate residual blockade at PACU admission more effectively than neostigmine.

The remaining evidence reviewed explored postoperative education and optimizing handoff between anesthesia providers and PACU nurses. In a systematic review by Fredericks et al. (2010), there was improved patient education and health outcomes when individualizing postoperative patient instructions. Hartman et al. (2021) and David et al. (2022) found that educating PACU nurses on specific drug interactions with hormonal birth control and including a disclosure statement in the patient after visit summary (AVS) increased patient comprehension on drug-drug interaction. In addition, Lopez-Parra et al. (2020) found that implementing an operating room (OR) to PACU report checklist standardizes a way to transmit information and reduces omitted information while increasing patient safety.

The overall quality rating for the available evidence is "B," indicating good quality and consistent evidence to support implementation of sugammadex disclosure pre- and

postoperatively. The purpose of this quality improvement (QI) project was to implement sugammadex disclosure in the preoperative setting and include a completed sugammadex disclosure form in the patients discharge packet to all female patients of childbearing age receiving laparoscopic procedures. The process goal of this project was to ensure all female patients of childbearing age receiving laparoscopic surgery had a completed sugammadex disclosure form in the EHR and anesthesia providers reported the administration of sugammadex to PACU nurses during handoff. The outcome goal was to include sugammadex disclosure in patients discharge packet.

### **Rationale**

The Consolidated Framework for Implementation Research (CFIR), seen in Figure 2, was chosen to successfully implement sugammadex disclosure for females of childbearing age pre- and postoperatively. The first domain assesses the intervention characteristics. The suggested intervention requires collaboration among anesthesia and PACU departments; however, with appropriate communication and education the intervention characteristics are simple in nature. The second and third domain evaluates the outer and inner setting which are described in the next section. Exploring both outer and inner settings helped to identify what barriers and facilitators exist at the project site. The fourth domain analyzes individual characteristics of staff members which helped in selecting project members to incorporate on the project team. The fifth and final domain assesses the implementation process which includes reflecting and evaluating the intervention. Refer to the intervention section. The application of all five domains at the project site ensured sustainability of the QI project before and during implementation.

## **Methods**

### **Context**

Prior to implementation of the interventions, contextual elements including culture, climate, and resources were identified. At the project site, there is a thirty-minute period between operating room (OR) cases. In this time, anesthesia providers are responsible for transporting the previous patient to the PACU, providing report to the PACU nurse, setting up the OR for the next case, and assessing the next patient. The limited time to complete all tasks creates production pressure, resulting in a rushed and inadequate preoperative assessment with not enough time to provide patient education. This directly correlates with the decreased compliance in completing the sugammadex disclosure form found in the EHR.

In addition to the lack of preoperative disclosure, the project site did not include postoperative instructions related to sugammadex and its interaction with hormonal birth control in the patients discharge education. This was partly because PACU nurses were not informed of sugammadex administration intraoperatively during anesthesia handoff. Moreover, discharge instructions were printed by PACU nurses directly from the patients EHR. The sugammadex disclosure form was not included in the discharge order set and could not be printed by the PACU nurse. Refer to Figure 3 for a current process map.

### **Intervention**

To decrease the risk of unintended pregnancy for female patients of childbearing age who receive sugammadex intraoperatively, anesthesia providers must disclose when the medication was administered and educate patients on the interaction with hormonal birth control. To achieve this, anesthesia providers completed a sugammadex disclosure form preoperatively for all female patients who have an HCG drawn. If sugammadex was given intraoperatively, anesthesia

providers reported administration to PACU nurses during handoff report. The PACU nurse completed a sugammadex screening form. Refer to Appendix B. If the administration of sugammadex was reported during PACU handoff and the patient received an HCG test preoperatively, then the PACU nurse included the sugammadex disclosure in the patients discharge instructions. Figure 4 shows a desired process map at the project site. Team members were identified at the project site and roles were assigned to ensure successful implementation. Refer to table 9 for more information.

To ensure accountability, formal written commitments were obtained from key partners including the chief of nurse anesthesia and the PACU manager. In addition, meetings were held with PACU nurses and anesthesia providers to discuss the current lack of sugammadex disclosure and trainings were offered to increase compliance. Champions were identified within the anesthesia department and PACU to help facilitate reporting sugammadex administration intraoperatively, completing sugammadex screening form, and including sugammadex disclosure in the patients discharge instructions. Chart audits were completed to collect and summarize clinical performance data over specified time periods. Finally, educational meetings were held among PACU nurses and anesthesia providers to discuss project implementation. Tables 10-12 are Gantt Charts that depict the project timeline.

### **Measurement**

To evaluate project success structure, process, and outcome measures were identified. Prior to implementation, an educational survey (Appendix A) assessed the number of anesthesia providers and PACU nurses familiar with the sugammadex disclosure form found in the Anesthesia Progress Note in the EHR. In addition, the survey determined how many providers are aware of drug interaction between sugammadex and hormonal contraceptives and whether

the providers regularly inform female patients who have an HCG drawn about the drug-drug interaction.

Process measurements included analyzing how many female patients undergoing a laparoscopic procedure that receive an HCG test preoperatively, have a completed sugammadex disclosure form in the EHR. Another process measurement assessed how many anesthesia providers report sugammadex administration to PACU nurses during handoff. To achieve this, sugammadex administration was added to the PACU handoff form. The outcome measurement analyzed how many female patients that received an HCG test had a completed sugammadex disclosure form in their discharge instructions. Although there are no reliable or valid measurement tools in the literature, other measurement tools were identified, and their operational definitions can be found in Table 13. The measurement plan is detailed in Table 14.

In addition, a project audit tool (Appendix B) was created to assess compliance with the sugammadex disclosure form if an HCG was drawn in the preoperative setting, whether intraoperative administration of sugammadex was reported to the PACU nurse, and if the sugammadex disclosure form was included in the patient discharge instructions. Both the pre-implementation survey and project audit tool are of no cost and helped in project implementation, data tracking, and success.

Weekly chart audits were conducted by the Quality Improvement Project Lead (QI-PL) on eligible patients to retrieve values for the project data elements. The data retrieved during chart audits was entered electronically into the audit tool in REDCap by the QI-PL. To verify that all eligible participants were included, the QI-PL audited any chart that meets project criteria: female patient of childbearing age defined as those with an HCG drawn preoperatively undergoing a laparoscopic procedure. If these criteria were met, the QI-PL reviewed the EHR

for a completed sugammadex disclosure form. In addition, the QI-PL collected audit forms completed by PACU nurses indicating whether sugammadex was administered intraoperatively and if the completed sugammadex form was included in the patients discharge instructions.

### **Ethical Consideration**

This is a non-human subject research and therefore is exempt research/QI. Prior to project implementation, the Institutional Review Board (IRB) from both the University of Maryland School of Nursing and the target facility were contacted and permission was granted to proceed with QI project. At the target facility, projects are approved by the management of the intended unit(s) and relevant department heads. A project proposal and timeline was submitted to the chief of nurse anesthesia and PACU manager for review and approval. Health Insurance Portability and Accountability Act (HIPAA) was followed to ensure patient privacy and confidentiality was maintained. The data retrieved during chart audits was entered electronically into the audit tool in REDCap by the QI-PL in a private location. REDCap is a secure website that is password-protected and encrypted. To protect patient confidentiality, all identifies were coded by REDCap and only accessible to the QI-PL. There was no potential conflicts of interest identified.

## **Results**

### **Results and Analytics**

The data collected for this QI project was of quantitative nature reflected by percentages. Descriptive statistics was included to provide summaries about the sample and measures. This promoted organization, simplification, and summarization, as well as quantified and identified the basic characteristics of the data set. Conclusions were drawn based on the patterns and outcomes found with the data collected from the project audit tool as well as weekly chart audits. To understand variation within the data over a period of time, run charts were created during the

implementation phases. The x-axis represents time in weeks during the implementation process and rate of compliance is depicted along the y-axis. This helped identify trends in data/patterns over a specific time period and showed a comparison before and after implementation.

Data collection and results were depicted in three separate run charts: Figure 5 and 6 represent process goals (completed sugammadex disclosure form and intraoperative sugammadex administration reported to PACU nurse), while Figure 7 represents the outcome goal (inclusion of sugammadex disclosure form in patient discharge instructions). After completing weekly audits and developing run charts, the results were analyzed by the QI-PL. A shift is defined as six or more consecutive data points above or below the median. A trend is defined as five or more sequential data points all going up or all going down (“Run Chart Rules Reference Sheet,” 2019). An astronomical point occurs when there is only one value that is very different from the other data values on the chart (“Run Chart Rules Reference Sheet,” 2019). There are no shifts, trends, or astronomical points noted in any of the three run charts. A number of runs is defined as one or more consecutive data points on the same side of the median (“Run Chart Rules Reference Sheet,” 2019). All three run charts analyzed have runs; however, the number of useful observations (those not on the median line) are less than ten. Due to the random variation and lack of useful observations, there is no cause in the process. The lack of chart trends, runs, shifts and astronomical points is most likely related to the short implementation time allotted.

During the first week of project implementation, QI-PL performed educational rounding to both the anesthesia and PACU staff. In the following weeks there was an observed steady increase in compliance. Around week five and seven there was a noticed decrease in compliance.

After repeated educational rounding and sending an email reminder to both the anesthesia and PACU department, another steady increase in compliance was observed.

### **Discussion**

Evidence has found that educating PACU nurses on drug interactions with hormonal birth control and including a disclosure statement in the patient discharge instructions increases patient comprehension on drug-drug interactions (Hartman et al., 2021; David et al., 2022). The cost/benefit of this QI project is a decrease in potentially unwanted pregnancy in female patients of childbearing age. This QI project demonstrated that including a completed sugammadex disclosure form for female patients of childbearing age is a simple way to educate patients of the possible drug interaction with hormonal contraceptives.

The outcome goal of 100% compliance with a completed sugammadex disclosure in the discharge instructions for eligible patients was not achieved. Many limitations presented during the course of this QI project. The original plan was to set a reminder in the EHR whenever sugammadex was administered intraoperatively to include a sugammadex disclosure form in the discharge instructions for female patients of childbearing age. Unfortunately, due to the short implementation time of this QI project, this intervention was not attainable. Instead, inclusion of the sugammadex disclosure form in the discharge instructions was dependent on anesthesia reporting intraoperative administration, PACU nurses identifying eligible patients and collecting a pre-printed form to include in the patients discharge instructions. This multistep process created confusion and added workflow burden to both anesthesia and PACU staff. In addition, multiple students were implementing QI projects at the same clinical site within the anesthesia and PACU departments further burdening staff with additional work.

### **Conclusion**

Sugammadex is becoming the standard of practice for reversal of NMBAs. Including a sugammadex disclosure form in patients' discharge instructions is a simple and cost effective protocol to ensure females of childbearing age are aware of the possible interactions of sugammadex with hormonal contraceptives (Brueckmann et al., 2015; Dong et al., 2020). The results of this QI project show that implementation of a completed sugammadex disclosure in the discharge instructions for eligible patients is a feasible intervention that is of low cost and of minimal effort. For sustainability, the project site is currently enforcing implementation of the project intervention to all female patients of childbearing age that receive sugammadex intraoperatively. Integration of the sugammadex disclosure form into the electronic discharge instructions may increase compliance and further help with project sustainability. Next steps are to work with Information Technology (IT) to integrate an automatic checkbox to include a completed sugammadex disclosure in the discharge instructions for all eligible patients if sugammadex was administered intraoperatively.

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Table 1

## Evidence Review Table Study 1

<b>Citation:</b> Brueckmann, B., Sasaki, N., Grobara, P., Li, M. K., Woo, T., Bie, J. de, Maktabi, M., Lee, J., Kwo, J., Pino, R., Sabouri, A. S., McGovern, F., Staehr-Rye, A. K., & Eikermann, M. (2015). Effects of sugammadex on incidence of postoperative residual neuromuscular blockade: A randomized, controlled study. <i>British Journal of Anaesthesia</i> , 115(5), 743–751. <a href="https://doi.org/10.1093/bja/aev104">https://doi.org/10.1093/bja/aev104</a>		<b>LEVEL: I</b> <b>QUALITY: B</b>
<b>Purpose</b>	The purpose of this study was to investigate whether reversal of rocuronium-induced neuromuscular blockade with sugammadex reduced the incidence of residual blockade and facilitated operating room discharge readiness.	
<b>Type of Evidence Research Design</b>	Multicenter assessor-blinded randomized control trial (anesthesia unblinded to be able to adjust anesthesia and neuromuscular blockade according to treatment group)	
<b>Sample, Population, Size, Setting</b>	<p><b>Sampling Technique:</b> Non-probability convenience sampling</p> <p><b>Eligible Participants:</b> adult patients 18 years of age or older, ASA Class I to III</p> <p><b>Excluded:</b> suspected difficult intubation, neuromuscular disorder(s), known or suspected severe renal insufficiency defined as estimated creatinine clearance of &lt;30ml/min, significant hepatic dysfunction, history or family history of malignant hyperthermia, allergies to sugammadex/opioids/NMBs/other medications used during general anesthesia, toremifene application 24 hours before or within 24 hours after study drug administration, planned ICU admission after surgery or overnight (&gt;12hr) stay in the PACU, cardiac pacemaker, pregnancy and breastfeeding, if patient used any other investigational drugs within 30 days of randomization or participated in another clinical trial within 30 days</p> <p><b>Accepted:</b> n = 151</p> <p><b>Control:</b> n = 77</p> <p><b>Intervention:</b> n = 74</p> <p><b>Power analysis:</b> sample size of 71 patients per treatment group was determined to have a power of 85%, showing a significant difference (alpha = 0.05) in incidence of TOF ratio &lt;0.9 between both groups. A two-sided p value of &lt;0.05 was considered statistically significant</p> <p><b>Group Homogeneity:</b> Homogenous based on similar patient demographics and characteristics shown in table 1</p>	
<b>Intervention Procedures</b>	<p><b>Control Protocol:</b> glycopyrrolate/neostigmine administered for reversal</p> <p><b>Intervention Protocol:</b> sugammadex administered for reversal</p> <p><b>Treatment fidelity:</b> all patients received standard IV induction (most commonly a combination of fentanyl, propofol, sevoflurane), rocuronium was used to facilitate intubation and for maintenance dosing. The level of neuromuscular blockade during surgery was determined via neuromuscular monitoring using acceleromyography at the adductor pollicis muscle. The TOF was calibrated in each patient before performing the measurements. The simulation current was set to 30mA</p>	
<b>Primary Outcomes and Measures</b>	<p><b>Dependent Variables:</b> decreased residual blockade and facilitate operating room discharge readiness</p> <p><b>DV Measure:</b> presence of residual neuromuscular blockade was defined by TOF ratio &lt;0.9 on arrival to the PACU, measured within 5 minutes of arrival by an assessor blinded to the study treatment. Time from start of study medication administration to the time the patient was ready for discharge from the OR defined as the time point deemed by the provide anesthesiologist medically appropriate for patient to leave the OR.</p>	
<b>Results/Conclusions</b>	<p><b>Statistical Results:</b> A total of 33 patients had residual neuromuscular blockade at PACU entry, all of whom received the standard care of glycopyrrolate/neostigmine. Residual blockade was significantly less in the sugammadex group with a p value &lt;0.0001. In addition, geometric mean times from study drug administration to operating room discharge readiness was significantly less in the sugammadex group seen by a p value of 0.02.</p> <p><b>Conclusions:</b> the use of sugammadex for neuromuscular blockade reversal at the end of surgery is shown to eliminate residual blockade at PACU admission more effectively than neostigmine. In addition, sugammadex was shown to facilitate faster operating room discharge readiness than neostigmine</p>	

Table 2

## Evidence Review Table Study 2

<b>Citation:</b> David, A. C., Pereira, K., Hartman, E., Dear, G., Thompson, J., & Funk, E. (2022). Improving Nursing Knowledge and Patient Education about Aprepitant's Effects on Hormonal Contraception: A Performance Improvement Project. <i>Journal of PeriAnesthesia Nursing</i> . <a href="https://doi.org/10.1016/j.jopan.2022.09.008">https://doi.org/10.1016/j.jopan.2022.09.008</a>	<b>LEVEL: II QUALITY: B</b>
<b>Purpose</b>	The purpose of this project was to improve the consistency of verbal and written discharge instructions for women of childbearing age (13-55 years) taking hormonal contraceptives who receive aprepitant perioperatively, to address the need to use a secondary form of birth control for 28 days, as well as to increase the knowledge and confidence of nurses when providing discharge instructions.
<b>Type of Evidence Research Design</b>	Quasi-experimental pre and post design
<b>Sample, Population, Size, Setting</b>	<p><b>Sampling Technique:</b> Nonprobability convenience sampling of two separate groups</p> <p><b>Eligible Participants:</b> female patients of childbearing age (13-55 years of age) who take hormonal contraceptives and received aprepitant before a surgical procedure, discharged on same day of surgery, able to be reached via postoperative phone call. All PACU nurses from both sites (facilities main hospital's PACU and ambulatory surgical center PACU)</p> <p><b>Excluded:</b> women who were premenarche, postmenopausal, history of hysterectomy or female sterilization procedure</p> <p><b>Accepted:</b> Patient Sample n = 30, PACU Nurse Sample n = 73</p> <p><b>Control:</b> Patient Sample n = 15, PACU Nurse Sample n = 73</p> <p><b>Intervention:</b> Patient Sample n = 15, PACU Nurse Sample n = 73</p> <p><b>Power analysis:</b> based on 80% power, alpha set to 0.05, and 60% improvement, a total of 24 patients were needed in the patient sample group. The required nurse sample size of 66 was based on 80% power, alpha of 0.05, and effect size of 0.80</p> <p><b>Group Homogeneity:</b> table 1 and table 2 show similar characteristics of both patients (female, ages 25-45 years old, bachelors education, white race) and PACU nurses (full time status, 1-4 years of experience)</p>
<b>Intervention Procedures</b>	<p><b>Control Protocol:</b> standard after-visit-summary (AVS) given to patients which included college level reading instructions on aprepitant</p> <p><b>Intervention Protocol:</b> revised AVS given to patients which included eight grade level reading instructions on aprepitant. PACU nurses received educational session about aprepitant's mechanism of action, side effects, and drug interactions.</p> <p><b>Treatment fidelity:</b> all patients given AVS with information on aprepitant and received a postoperative phone call by a PACU nurse 1-3 days after surgery to assess patient recall about aprepitant administration and interaction with hormonal birth control. All PACU nurses surveyed on knowledge, attitude, and confidence about aprepitant before and after education.</p>
<b>Primary Outcomes and Measures</b>	<p><b>Dependent Variables:</b> increased patient recall on aprepitant administration and drug interaction with hormonal birth control. Increased knowledge and confidence about aprepitant drug information by PACU nurses</p> <p><b>DV Measure:</b> A postoperative phone by PACU nurse to patient to assess recall on aprepitant receipt and drug interactions: "do you recall reading or hearing any information about a medication called aprepitant (Emend) prior to leaving PACU? What information do you recall about this medication?" This data was entered to a data collection tool after phone call was completed to measure increased patient recall. To measure PACU nurses and confidence providing discharge instructions regarding aprepitant, a test score survey including medication classification and drug interaction with birth control that lasts for 28 days.</p>
<b>Results/Conclusions</b>	<p><b>Statistical Results:</b> significant increase in nurse knowledge about aprepitant from preimplementation to postimplementation seen by a p value of &lt;0.001. Ninety days postimplementation, there was a no significant decline in nursing knowledge (p = 0.096); however, nursing knowledge remained significantly higher than preimplementation scores (p = 0.003)</p> <p><b>Conclusions:</b> After standardized presentation regarding aprepitant mechanism of action and interaction with hormonal birth control, PACU nurses showed an increase in confidence and knowledge. Furthermore, increased patient comprehension and recall with improved AVS and PACU nurses ability to verbalize key information.</p>

Table 3

## Evidence Review Table Study 3

<p><b>Citation:</b> Dong, L. V., Giang, N. T., Luong, N. V., Cuong, N. M., Dinh, N. V., Anh, V. T., Hanh, M. D., Khanh, D. T., Thuy, L. Q., Son, L. T., Thu, N. D., &amp; Kien, N. T. (2020). Reversal of Deep Effect of Rocuronium by Sugammadex or Neostigmine after Abdominal Laparoscopic Surgery: A Single Center Experience in Vietnam. <i>Open Access Macedonian Journal of Medical Sciences</i>, 295–300. <a href="https://doi.org/10.3889/oamjms.2020.4236">https://doi.org/10.3889/oamjms.2020.4236</a></p>	<p><b>LEVEL: I</b> <b>QUALITY: B</b></p>
<p><b>Purpose</b></p>	<p>The purpose of this study is to compare the efficacy of reversing neuromuscular blockade between sugammadex and neostigmine and to evaluate its unwanted effects after laparoscopic abdominal surgery</p>
<p><b>Type of Evidence Research Design</b></p>	<p>Prospective randomized control trial</p>
<p><b>Sample, Population, Size, Setting</b></p>	<p><b>Sampling Technique:</b> Non-probability convenience sampling  <b>Eligible Participants:</b> Patients who underwent abdominal laparoscopic surgery for cholecystectomy, gastrectomy, hepatectomy, and pancreatoduodenectomy between October 2017 and October 2018  <b>Excluded:</b> age under 18 or above 70 years old, liver failure, kidney failure, allergy to rocuronium, neostigmine, or sugammadex, history of epilepsy, mental illness and communication difficulties, coexisting neurological complication of diabetes or neuropathy, and lack of content  <b>Accepted:</b> n= 84  <b>Control:</b> Group N who were reversed with neostigmine, n = 42  <b>Intervention:</b> Group S who were reversed with sugammadex, n = 42  <b>Power analysis:</b> 38 patients with a 1:1 ration between control and intervention would detect a 19% difference in efficacy of reversal to meet 95% Beta and 0.01 alpha. Power analysis met due to sufficient number of eligible candidates, decreasing the risk of Type II Error.  <b>Group Homogeneity:</b> Homogenous based on nonsignificant p values shown in table 1 (patient demographics) and table 2 (clinical data)</p>
<p><b>Intervention Procedures</b></p>	<p><b>Control Protocol:</b> neostigmine 40mcg/kg combined with 10mcg/kg atropine was used for reversal of neuromuscular blocking agents (NMBA) at surgical procedure completion when TOF reached 2  <b>Intervention Protocol:</b> sugammadex 2mg/kg was used for reversal of NMBA at surgical procedure completion when TOF reached 2  <b>Treatment fidelity:</b> All patients were performed under general anesthesia and maintained with sevoflurane. Patients in both groups had an 18-gauge intravenous cannula inserted in the operating room and standard monitoring (non-invasive blood pressure, pulse oximeter, electrocardiography, and capnography) was applied. Neuromuscular function was started monitoring from induction with train-of-four (TOF) and tridimensional sensor pupu on the adductor pollicis muscle to detect any movements. Induction of anesthesia was the same for both groups: 3mcg/kg fentanyl, 2-2.5mg/kg propofol, and 0.6mg/kg rocuronium. Tracheal intubation was implemented when &gt;95% twitch depression was confirmed. Redosing of rocuronium was employed when TOF showed 1 or more twitches using 0.15mg/kg.</p>
<p><b>Primary Outcomes and Measures</b></p>	<p><b>Dependent Variables:</b> efficacy of reversal agent based on TOF ratio after administration at fifteen time points: 0 seconds, 15 seconds, 30 seconds, 1 minute, 2 minute, 3 minute, 4 minute, 5 minute, 6 minute, 8 minute, 10 minute, 20 minute, 1 hour, 12 hour, and 24 hour after extubation  <b>DV Measure:</b> level of NMB just before administering reversal agents and the recovery time (which was defined as the time from injecting the reversal agents to achieving a TOF ratio of 0.9) was recorded. In addition, variables related to reversing NMB were recorded: time to extubation in minutes, temperate at reversal NMB administration, temperature at extubation, respiratory rate before and after extubation.</p>
<p><b>Results/Conclusions</b></p>	<p><b>Statistical Results:</b> time to extubation was significantly faster with sugammadex (3.69 minutes) administration versus neostigmine (11.90 minutes) shown by a p-value of 0.001. In addition, the duration to achieve TOF value &gt; 0.5, &gt; 0.7, &gt; 0.9, and equal to 1 was significantly shorter in the sugammadex group when compared to neostigmine group.  <b>Conclusions:</b> reversal of rocuronium in patients who undergo abdominal laparoscopic surgery with sugammadex is faster and more effective when compared to reversal with neostigmine. In addition, the unwanted effecting of using sugammadex were fewer than neostigmine</p>

Table 4

## Evidence Review Table Study 4

<b>Citation:</b> Fredericks, S., Guruge, S., Sidani, S., & Wan, T. (2010). Postoperative Patient Education: A Systematic Review. <i>Clinical Nursing Research</i> , 19(2), 144–164. <a href="https://doi.org/10.1177/1054773810365994">https://doi.org/10.1177/1054773810365994</a>		<b>LEVEL: I QUALITY: C</b>
<b>Purpose</b>	The purpose of this systematic review was to examine who would most benefit from postoperative education, given in what type of approach and mode, and at what dose.	
<b>Type of Evidence Research Design</b>	Systematic Review	
<b>Sample, Population, Size, Setting</b>	<p><b>Search Strategy:</b> Search for relevant studies was conducted in the following databases: CINAHL, MEDLINE, PUBMED, EMBASE, COCHRANE, and HEALTH STAR. Keywords used were discharge plan, postoperative, surgical education, teaching, postsurgical, postoperative education, postoperative teaching, postsurgical education, postsurgical teaching, discharge education, discharge teaching, recovery teaching, and recovery education.</p> <p><b>Eligible Studies:</b> Sample represented adult (older than 18 years) patients who underwent surgery. Educational intervention involved the provision of self-care information following surgery prior to discharge from hospital. Outcomes assessed were related to self-care knowledge, self-care behavior, and symptom experience. Study report was in English.</p> <p><b>Excluded:</b> 866 out of 924 were excluded due to the reported study assessing the effectiveness of combined pre- and postoperative educational intervention</p> <p><b>Included:</b> 58 studies met the selection criteria and were included in the systematic review</p> <p><b>PRISMA:</b> Included detailing decision making criteria for retaining/omitting studies from the meta-analysis</p> <p><b>Power analysis:</b> Not applicable to SR critique</p>	
<b>Intervention Procedures</b>	<p><b>Control:</b> standardized postoperative education that was provided face-to-face mode of delivery, group mode of delivery, more than one session</p> <p><b>Intervention:</b> individualized postoperative education that was provided using combined media, one-on-one mode of delivery, in one session</p> <p><b>Protocol:</b> Not applicable to SR critique</p>	
<b>Primary Outcomes and Measures</b>	<p><b>Dependent Variables:</b> specific outcomes of interest related to self-care knowledge, self-care behavior, and symptom experience were assessed</p> <p><b>DV Measure:</b> self-report measures capturing: percentage of correct responses to items inquiring about patients' understanding of condition, surgery, and postoperative care; performance of self-care strategies in which patients are expected to engage postoperatively; perceived symptom experience. Data extracted on each outcome to determine whether posttest comparisons showed statistical significant differences (1 = significant differences favoring intervention group; 0 = no significant differences)</p>	
<b>Results/Conclusions</b>	<p><b>Level of Measurement:</b> descriptive statistics used to delineate characteristics of studies included to describe the characteristics of patients and to indicate elements of educational intervention frequently implemented across studies</p> <p><b>Outcome Data Retrieval:</b> Researchers pooled data from all selected articles</p> <p><b>Conclusions:</b> Postoperative patient education through the individualization of content, use of combined media for delivery, provision of education on a one-on-one basis, and in multiple sessions is associated with improvement to educational/health outcomes.</p>	

Table 5

## Evidence Review Table Study 5

<b>Citation:</b> Hartman, E., Funk, E., Dear, G., Wellman, C., & Pereira, K. (2021). Sugammadex Effects on Hormonal Contraception Effectiveness: Implementation of Uniform Postoperative Teaching. <i>Journal of PeriAnesthesia Nursing</i> , 36, 351e358. <a href="https://doi.org/10.1016/j.jopan.2020.10.007">https://doi.org/10.1016/j.jopan.2020.10.007</a>		<b>LEVEL: II</b> <b>QUALITY: B</b>
<b>Purpose</b>	The purpose of this study was to improve consistency of recall of discharge teaching and reduce the risk of unintended pregnancy in women of childbearing age who use progesterone-containing hormonal contraceptive medications and receive sugammadex during general anesthesia.	
<b>Design</b>	Quasi-experimental pre and post design	
<b>Sample, Population, Size, Setting</b>	<p><b>Sampling Technique:</b> Non-probability convenience sampling of two separate sample groups of patients and postanesthesia case unit (PACU) nurses</p> <p><b>Eligible Participants</b></p> <ul style="list-style-type: none"> <li>• Patient Sample: nonpregnant women of childbearing age (13-55 years) who had received sugammadex intraoperative, spoke English or Spanish, discharged home on day of surgery</li> <li>• PACU Sample: PACU nurses who participated in sugammadex discharge teaching education session</li> </ul> <p><b>Excluded</b></p> <ul style="list-style-type: none"> <li>• Patient Sample: women who were premenarche and postmenopausal, who took chemotherapeutics, or who underwent surgical procedures for sterilization or dilation and evacuation, and patients who were unable to be contacted by the postoperative phone call</li> </ul> <p><b>Accepted:</b> 31 women of childbearing age and 59 PACU nurses</p> <p><b>Control:</b> Patient Sample n = 14; PACU Sample n = 24</p> <p><b>Intervention:</b> Patient Sample n = 17; PACU Sample n = 53</p> <p><b>Power analysis:</b> Nondirectional statistical testing was conducted with a significance level set at alpha 0.05 to detect between group differences for both patient samples.</p> <p><b>Group Homogeneity:</b> Study group was considered homogenous in ASA physical classification and inhalational anesthesia type based on non-significant p values seen in Table 1. However, other characteristics such as age, surgery length, and midazolam administration were not homogenous based on significant p values seen in Table 1.</p>	
<b>Intervention Procedures</b>	<p><b>Control Protocol:</b> No education provided related to sugammadex interaction with hormonal birth control to PACU nurses. Original after-visit-summary (AVS) regarding sugammadex interaction with birth control provided. No examples of backup birth control listed.</p> <p><b>Intervention Protocol:</b> Sugammadex education to PACU nurses provided and updated AVS that included more prominent and clear language about sugammadex interaction with hormonal birth control and examples of backup birth control.</p> <p><b>Treatment fidelity:</b> Both groups received AVS information about sugammadex interaction with hormonal birth control. Phone call to assess patient recall on sugammadex disclosure done by PACU nurses for both groups.</p>	
<b>Primary Outcomes and Measures</b>	<p><b>Dependent Variables:</b> Recall of sugammadex disclosure assessed by phone one to three days after patient discharge. Frequency of discharge teaching, clarity, and comprehension of AVS and knowledge of sugammadex by PACU nurses assessed before and after education received.</p> <p><b>DV Measure:</b> To assess patient recall on sugammadex disclosure, PACU nurses called patients one to three days after patient discharge and asked the following questions: “did you receive information about sugammadex before you left the hospital? What information do you recall about sugammadex? Who gave you the sugammadex information?” PACU nurses were assessed on sugammadex education pre and postimplementation using a survey.</p>	
<b>Results/Conclusions</b>	<p><b>Statistical Results:</b> 35.7% of patients recalled discharge instructions related to sugammadex administration and interaction with hormonal birth control before PACU education was implemented, after implementation, 41.2% of patients recalled discharge instructions making p = 1.000. There is no significant statistical difference. PACU nursing survey results indicated a statistically significant difference in providing women of childbearing age with verbal sugammadex discharge instructions (p = 0.024). <b>Conclusions:</b> Successful simplification of sugammadex discharge information to women of childbearing age achieved, as well as, increased instructions provided by PACU nurses. However, no significant increase in recall related to sugammadex disclosure found pre and postimplementation</p>	

Table 6

## Evidence Review Table Study 6

<b>Citation:</b> Lazowitz, A., Dindinger, E., Aguirre, N., & Sheeder, J. (2020). Pre and post-operative counseling for women on hormonal contraceptives receiving sugammadex at an academic hospital. <i>Journal of Anesthesia</i> , 34(2), 294–297. <a href="https://doi.org/10.1007/s00540-019-02725-2">https://doi.org/10.1007/s00540-019-02725-2</a>		<b>LEVEL: III QUALITY: C</b>
<b>Purpose</b>	The purpose of this study was to assess if patients at a large, academic hospital where sugammadex is administered as a first-line neuromuscular blockade reversal agent were receiving any form of documented counseling on this drug-drug interaction and the potential risk for unintended pregnancy prior to the implementation of any formalized consent process.	
<b>Type of Evidence Research Design</b>	Retrospective, cross-sectional study	
<b>Sample, Population, Size, Setting</b>	<p><b>Sampling Technique:</b> Non-probability convenience sampling</p> <p><b>Eligible Participants:</b> all reproductive aged (18-45 years) women undergoing outpatient or inpatient surgery between January 2016 and December 2017 that received sugammadex</p> <p><b>Excluded:</b> patients who did not have documented contraceptive method at time of surgical admission, patients using reliable nonhormonal contraceptive method (i.e. copper IUD), or patients sterilized or undergoing an immediately-effective sterilization procedure</p> <p><b>Accepted:</b> n = 1000</p> <p><b>Control:</b> n = 134</p> <p><b>Intervention:</b> n = 866</p> <p><b>Power analysis:</b> descriptive analyses was performed the extracted date using a two-sided 95% confidence interval was used. Assuming that at least 10% of patients would meet inclusion criteria and expecting 0% to have documented counseling, reviewing 1,000 charts would allow at least 95% confidence that actual percentage of patients with documented counseling was less than 5%</p> <p><b>Group Homogeneity:</b> no table with p values reported about characteristics/demographics of study participants. However, study reported lack of generalizability to all healthcare settings as it was a quality assessment for one institution</p>	
<b>Intervention Procedures</b>	<p><b>Control Protocol:</b> no standardized process for counseling patients on sugammadex interaction with hormonal birth control</p> <p><b>Intervention Protocol:</b> if sugammadex administered, standardized medication alert added to patient discharge instructions in electronic medical record (EMR)</p> <p><b>Treatment fidelity:</b> all charts were reviewed for pre- or postoperative counseling regarding drug-drug interaction, all documentation by both anesthesia and surgical team for counseling documentation</p>	
<b>Primary Outcomes and Measures</b>	<p><b>Dependent Variables:</b> increased risk for unintended pregnancy without counseling on sugammadex interaction with hormonal birth control</p> <p><b>DV Measure:</b> Unintended pregnancy was measured by reviewing patient follow-up record three months after sugammadex exposure</p>	
<b>Results/Conclusions</b>	<p><b>Statistical Results:</b> one patient had a unintended pregnancy documented within three months of sugammadex administration</p> <p><b>Conclusions:</b> Counseling recommendations included in the sugammadex drug label should be followed including clearly documenting that either consent or counseling has occurred to avoid any unnecessary risk for unintended pregnancy</p>	

Table 7

## Evidence Review Table Study 7

<b>Citation:</b> Lopez-Parra, M., Porcar-Andreu, L., Arizu-Puigvert, M., & Pujol-Caballe, G. (2020). Cohort Study on the Implementation of a Surgical Checklist from the Operating Room to the Postanesthesia Care Unit. <i>Journal of PeriAnesthesia Nursing</i> , 35, 155–159. <a href="https://doi.org/10.1016/j.jopan.2019.08.015">https://doi.org/10.1016/j.jopan.2019.08.015</a>		<b>LEVEL: II</b> <b>QUALITY: B</b>
<b>Purpose</b>	The purpose of this study was to provide evidence of a well-structured information transfer that prevents the loss of information relevant to patient care	
<b>Type of Evidence Research Design</b>	Pre and post quasi experimental design on the implementation of surgical checklist from the operating room to postanesthesia care unit	
<b>Sample, Population, Size, Setting</b>	<b>Sampling Technique:</b> Non-probability convenience sampling <b>Eligible Participants:</b> any patient admitted to the PACU after surgery <b>Excluded:</b> patients that were admitted simultaneously to the PACU (assessor only able to observe one admission at a time) <b>Accepted:</b> n = 122 <b>Control:</b> n = 59 <b>Intervention:</b> n = 63 <b>Power analysis:</b> 61 information transfers in each stage to reach a confidence interval of 90% and a margin of error of 10% <b>Group Homogeneity:</b> 80% of the nurses were OR nurses and 22% were PACU. Ages varied from 22-65 years of age	
<b>Intervention Procedures</b>	<b>Control Protocol:</b> verbal transmission of report with no check sheet <b>Intervention Protocol:</b> educational intervention explaining how to provide information transfer between OR and PACU nurses in a safe way, checklist tool introduced <b>Treatment fidelity:</b> for both groups, handovers were timed and the number of interruptions were recorded. After 20 minutes, PACU nurses were asked about patient's relevant information and the source the nurse used to provide such information was recorded (memory, preoperative anesthesia form, operative report, computerized medical history, check list tool)	
<b>Primary Outcomes and Measures</b>	<b>Dependent Variables:</b> transfer of relevant and correct information by anesthesia provider to PACU nurse <b>DV Measure:</b> expressed as percentage of transmitted items out of the total that should be transmitted, which included patient identification data and basic information, anesthesia information, procedure information, postoperative pain	
<b>Results/Conclusions</b>	<b>Statistical Results:</b> no significant difference in report time was observed between both groups, seen by a p value of 0.143. However, when interruptions were excluded from report time, the average time for report significantly increased in the intervention group, seen by a p value of 0.002. After implementation of the OR to PACU report checklist, 92.1% of the cases included all items, number of interferences decreased. <b>Conclusions:</b> Implementing a OR to PACU report checklist standardizes a way to transmit information and reduces omitted information while increasing patient safety.	

Table 8

## Evidence Synthesis Table

Project Title: Sugammadex disclosure to female patients of childbearing age receiving laparoscopic procedures to reduce the risk of unintended pregnancy			
JHNEBP Model Level	Total Number of Sources	Author and Quality Rating of each study	Synthesis of Findings
<b>Level I</b> Experimental study · Randomized Controlled Trial (RCT) · Systematic review of RCTs with or without meta-analysis	2 RCT (Brueckmann et al; Dong et al)  1 Systematic Review (Fredericks et al)	Brueckmann et al B Dong et al B Fredericks et al C	Both studies found the use of sugammadex for neuromuscular blockade reversal at the end of surgery is shown to eliminate residual blockade at PACU admission more effectively than neostigmine. In addition, Brueckmann et al. (2015) found that sugammadex facilitated faster operating room discharge readiness than neostigmine.  Fredericks et al. (2010) found that individualizing postoperative patient education improves patient education and health outcomes.
<b>Level II</b> 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 Quasi- experimental pre and post design	David et al B Hartman et al B Lopez-Parra et al B	Hartman et al. (2021) and David et al. (2022) found that educating PACU nurses on specific drug interactions with hormonal birth control and including disclosure statement in patient AVS, increased patient comprehension on drug-drug interaction. In addition, Lopez-Parra et al. (2020) found that implementing a OR to PACU report checklist standardizes a way to transmit information and reduces omitted information while increasing patient safety, which was similar to Fredericks et al. (2010) findings.
<b>Level III</b> 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	1 Retrospective, cross-sectional study	Lazorwitz et al C	Lazorwitz et al. (2020) found that providing and documenting sugammadex disclosure and its interaction with hormonal birth control is necessary to avoid the risk of unintended pregnancy.
Overall Quality Rating w/rational and Recommendation: B; Good and consistent evidence to support practice change			

**Table 9***Site Team Table*

Team Member Name/Credentials/Title	Responsibilities
1. Project Lead	Project lead, gather and organize data, keep members informed of plans.
2. Director of Clinical Training, Site Sponsor	Project sponsor, is aware of the decreased compliance with suggamadex disclosure and the risk of unintended pregnancy, works with all anesthesia students, support for project lead to implement project
3. Clinical Site Representative	Project CSR, works directly with Steven Hochstein, works with all anesthesia students, support for project lead to guide implementation of project
4. Manager of PACU	PACU manager, works directly with PACU nurses and is in charge of PACU handoff sheet between anesthesia and PACU nurses
5. Data Analyst	IT member, helps to compile data reports as requested for background data related to project problem. Agreed to assist with data collection throughout implementation of project
6. All CRNAs and Anesthesiologists at SHB	Directly performs anesthesia including the administration of sugammadex, completing sugammadex disclosure when indicated, providing report to PACU nurses about anesthesia administered to patient
7. All SRNAs and Anesthesia residents at SHB	Directly performs anesthesia including the administration of sugammadex, completing sugammadex disclosure when indicated, providing report to PACU nurses about anesthesia administered to patient

Table 10

Gantt Chart on Project Identification

DNP Project Title: Sugammadex Disclosure to Female Patients to Decrease the Risk of Unintended Pregnancy

Student: Emily Janczur

Site: Sinai Hospital of Baltimore

Project Start: Mon, 1/30/2023  
 Display Week: 1

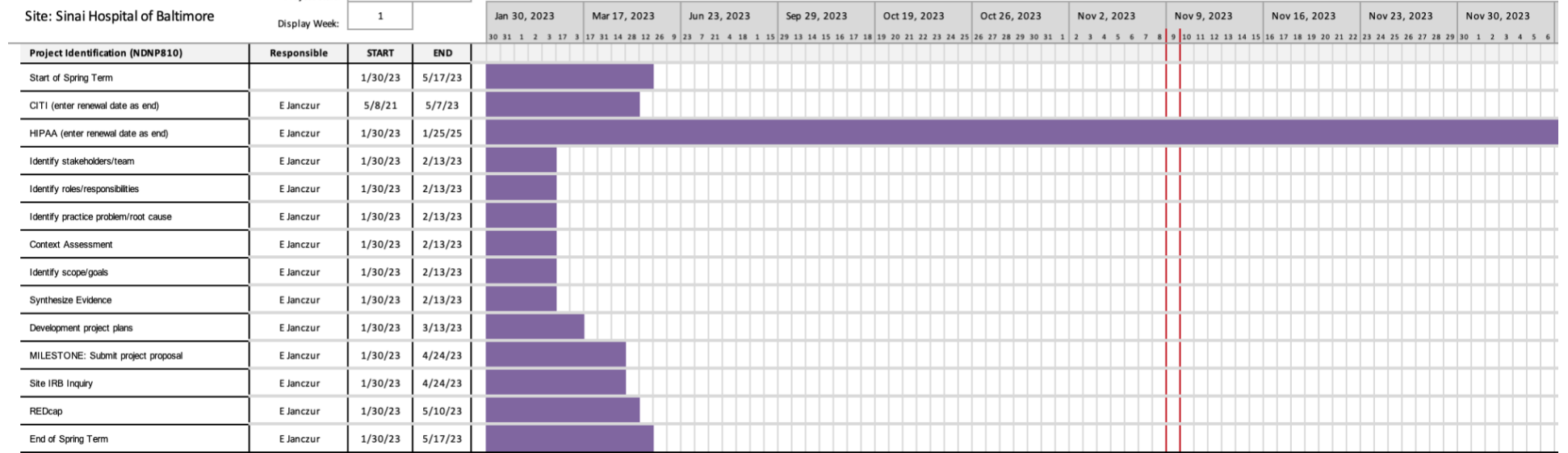


Table 11

Gantt Chart on Project Development

DNP Project Title: Sugammadex Disclosure to Female Patients to Decrease the Risk of Unintended Pregnancy

Student: Emily Janczur

Site: Sinai Hospital of Baltimore

Project Start:

Display Week:

				Jan 30, 2023	Mar 17, 2023	Jun 23, 2023	Sep 29, 2023	Oct 19, 2023	Oct 26, 2023	Nov 2, 2023	Nov 9, 2023
				30 31 1 2 3 17 3	17 31 14 28 12 26 9	23 7 21 4 18 1 15	29 13 14 15 16 17 18	19 20 21 22 23 24 25	26 27 28 29 30 31	1 2 3 4 5 6 7 8	9 10 11 12 13 14 15
<b>Project Development (NDNP811)</b>											
Start of Summer Term		6/5/23	7/28/23								
Develop implementation plans	E Janczur	6/5/23	7/28/23								
Develop teaching plan	E Janczur	6/5/23	7/28/23								
MILESTONE: Site Presentation and Approval	E Janczur	6/5/23	7/20/23								
MILESTONE: IRB Determination	E Janczur	6/5/23	7/20/23								
End of Summer Term		6/5/23	7/20/23								

Table 12

Gantt Chart on Project Implementation

DNP Project Title: Sugammadex Disclosure to Female Patients to Decrease the Risk of Unintended Pregnancy

Student: Emily Janczur

Project Start: Mon, 1/30/2023

Site: Sinai Hospital of Baltimore

Display Week: 1

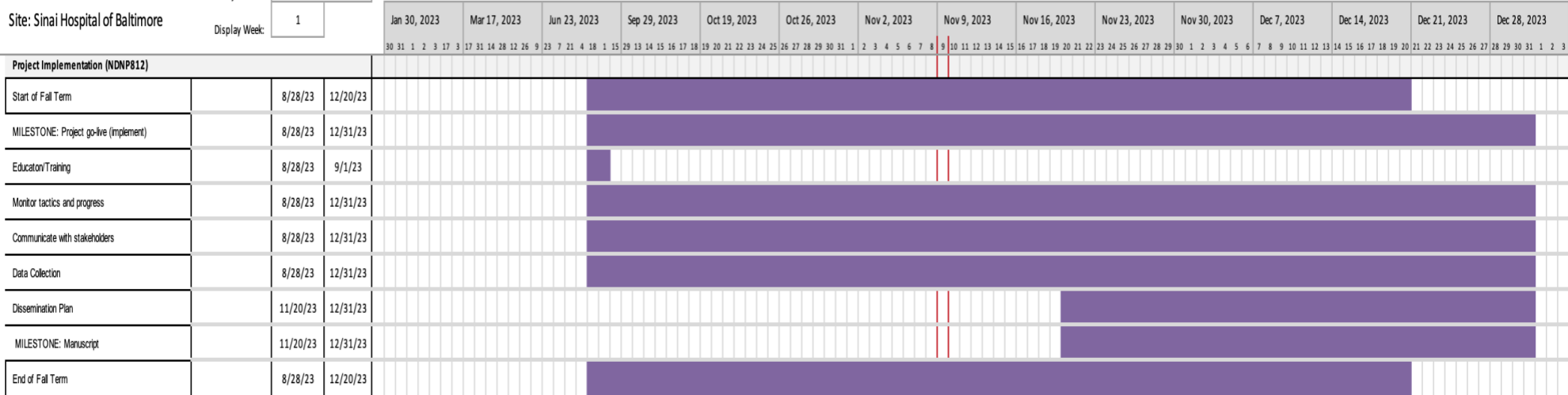


Table 13

Measurement Tools and Operational Definitions

Measures		
Project Goals	Measure Pre-Implementation	Measure During Implementation
<b>Structure</b>		
1. By August 31 <sup>st</sup> , 2023, Anesthesia staff and PACU nurses will receive educational material about Sugammadex disclosure form	Number of anesthesia providers and PACU nurses familiar with sugammadex disclosure form in the Anesthesia Progress Note in EHR	Number of anesthesia providers and PACU nurses familiar with sugammadex disclosure form in the Anesthesia Progress Note in EHR
2. By August 31 <sup>st</sup> , 2023, Sugammadex administration will be added to PACU handoff	Presence/absence of sugammadex administration on PACU handoff	Presence/absence of sugammadex administration on PACU handoff
<b>Process</b>		
1. By December 31 <sup>st</sup> , 2023, 100% of female patients undergoing a surgical procedure that receive an HCG test will have completed sugammadex disclosure form in EHR	<b>Numerator:</b> # of female patients undergoing surgical procedure who received HCG test that have completed sugammadex disclosure form in EHR <b>Denominator:</b> Total # of female patients undergoing surgical procedure who received HCG test	<b>Numerator:</b> # of female patients undergoing surgical procedure who received HCG test that have completed sugammadex disclosure form in EHR <b>Denominator:</b> Total # of female patients undergoing surgical procedure who received HCG test
2. By December 31 <sup>st</sup> , 2023, 100% of anesthesia providers will report sugammadex administration to PACU nurses during handoff	<b>Numerator:</b> # of anesthesia providers that report sugammadex administration to PACU nurses during handoff <b>Denominator:</b> # of patients that receive sugammadex intraoperatively	<b>Numerator:</b> # of anesthesia providers that report sugammadex administration to PACU nurses during handoff <b>Denominator:</b> # of patients that receive sugammadex intraoperatively
<b>Outcome</b>		
1. By December 31 <sup>st</sup> , 2023, 100% of female patients undergoing a surgical procedure that receive an HCG test will have completed sugammadex disclosure form included in their discharge instructions	<b>Numerator:</b> # of female patients undergoing surgical procedure who received HCG test that have sugammadex disclosure included in discharge instructions <b>Denominator:</b> Total # of female patients undergoing surgical procedure who received HCG test	<b>Numerator:</b> # of female patients undergoing surgical procedure who received HCG test that have sugammadex disclosure included in discharge instructions <b>Denominator:</b> Total # of female patients undergoing surgical procedure who received HCG test

Table 14

*Measurement Plan*

Measurement Plan		
Submit Project Survey(s) and Project Audit Tool from REDCap (Appendix E and F)		
Project Goals	Data Collection Procedures (who, how, when)	Name of Data Collection Tool
By August 31 <sup>st</sup> , 2023, Anesthesia staff and PACU nurses will receive educational material about Sugammadex disclosure form	<b>Who:</b> Project Lead <b>How:</b> in-person education session present at anesthesia staff meeting and PACU huddle <b>When:</b> By August 27 <sup>th</sup> , 2023	Pre-implementation education provider survey (Appendix E)
By August 31 <sup>st</sup> , 2023, Sugammadex administration will be added to PACU handoff	<b>Who:</b> Project Lead <b>How:</b> update current PACU handoff sheet to include sugammadex administration <b>When:</b> By August 27 <sup>th</sup> , 2023	N/A
By December 31 <sup>st</sup> , 2023, 100% of female patients undergoing a surgical procedure that receive an HCG test will have completed sugammadex disclosure form in EHR	<b>Who:</b> Project Lead and Project Sponsor, N. Anglin (IT) <b>How:</b> Chart audits and data analysis report <b>When:</b> throughout implementation period (September-December 2023)	Project Audit Tool generated from RedCap (Appendix F)
By December 31 <sup>st</sup> , 2023, 100% of anesthesia providers will report sugammadex administration to PACU nurses during handoff	<b>Who:</b> Anesthesia providers (MDA, CRNA, SRNA) <b>How:</b> Chart audits and data analysis report <b>When:</b> throughout implementation period (September-December 2023)	Project Audit Tool generated from RedCap (Appendix F)
By December 31 <sup>st</sup> , 2023, 100% of female patients undergoing a surgical procedure that receive an HCG test will have completed sugammadex disclosure form included in their discharge instructions	<b>Who:</b> Anesthesia providers (MDA, CRNA, SRNA) <b>How:</b> Chart audits and data analysis report <b>When:</b> at end of implementation period (December 31 <sup>st</sup> , 2023)	Project Audit Tool generated from RedCap (Appendix F)

Figure 1

*Fishbone Diagram for Lack of Sugammadex Disclosure to Patients at project site*

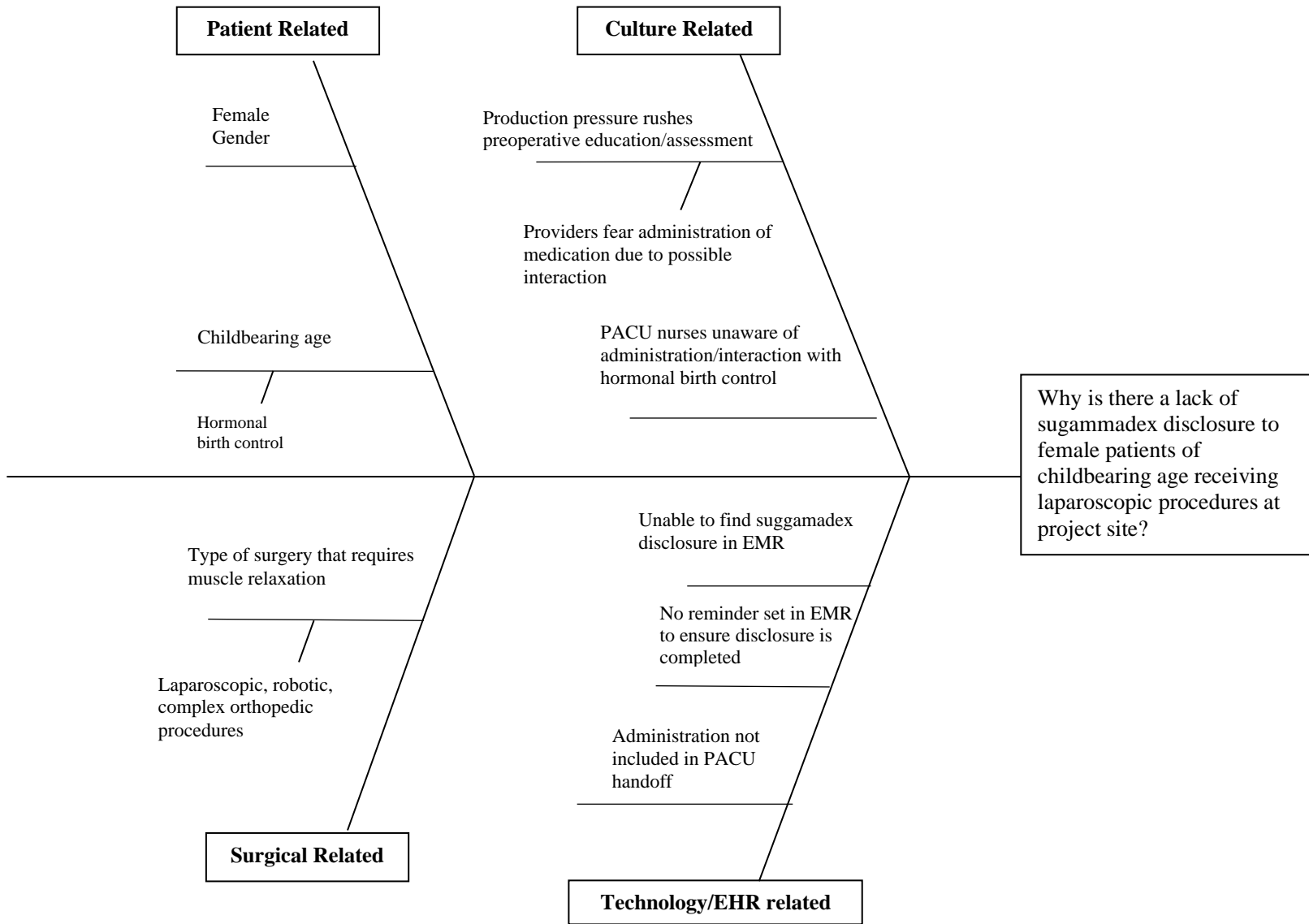


Figure 2

Consolidated Framework for Implementation Research

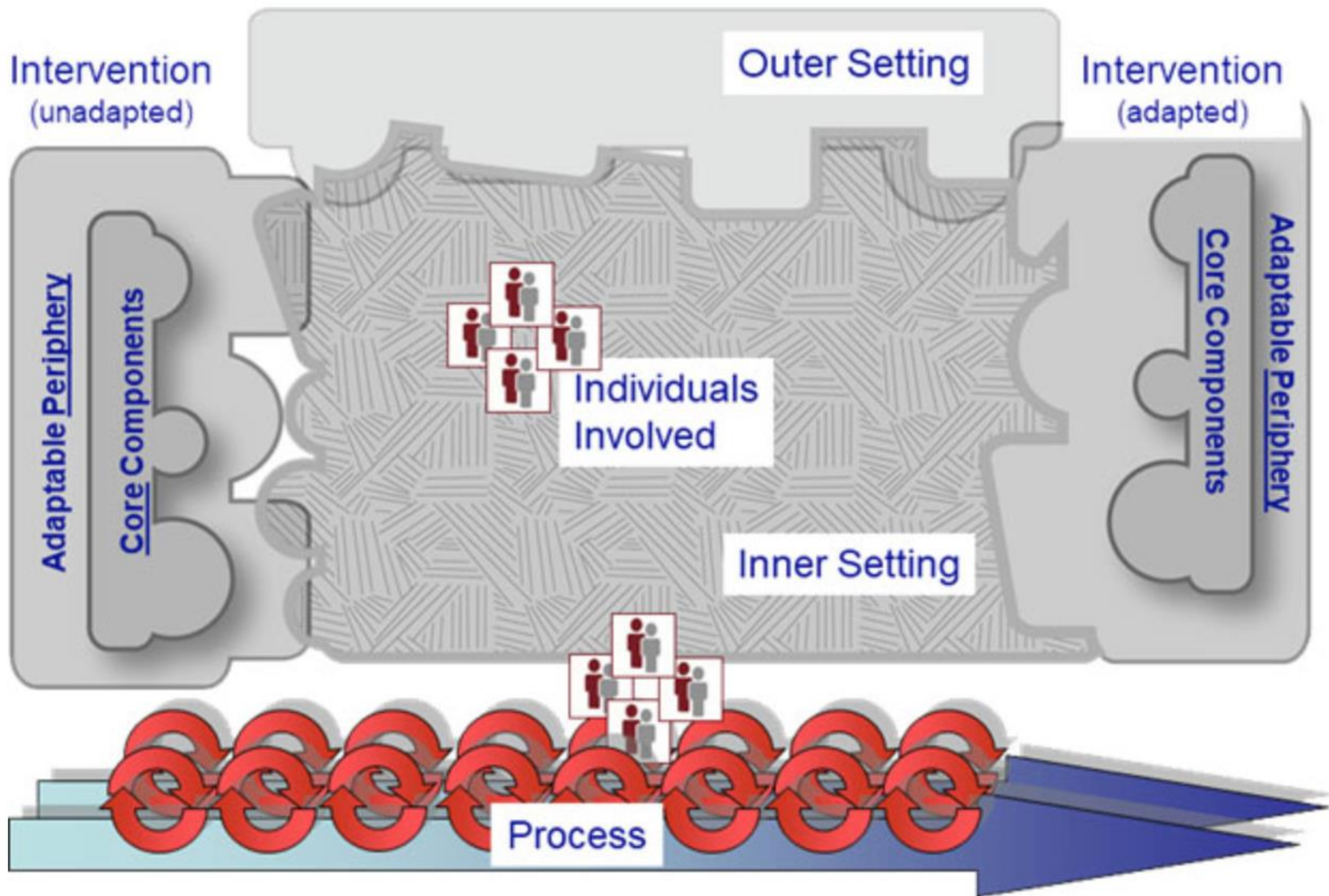
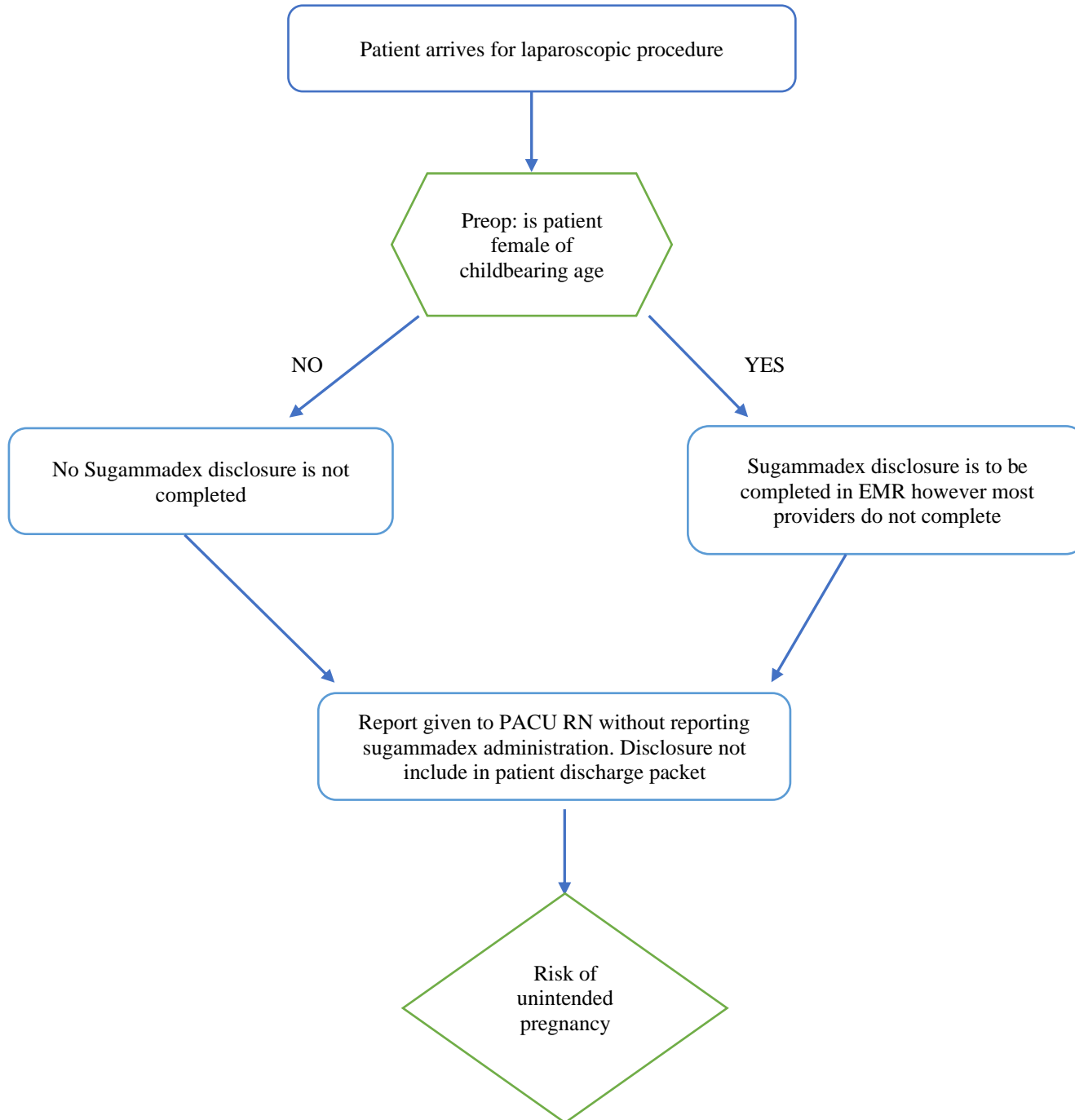


Figure 3

Current Process Map



*Desired Process Map*

**Figure 4**

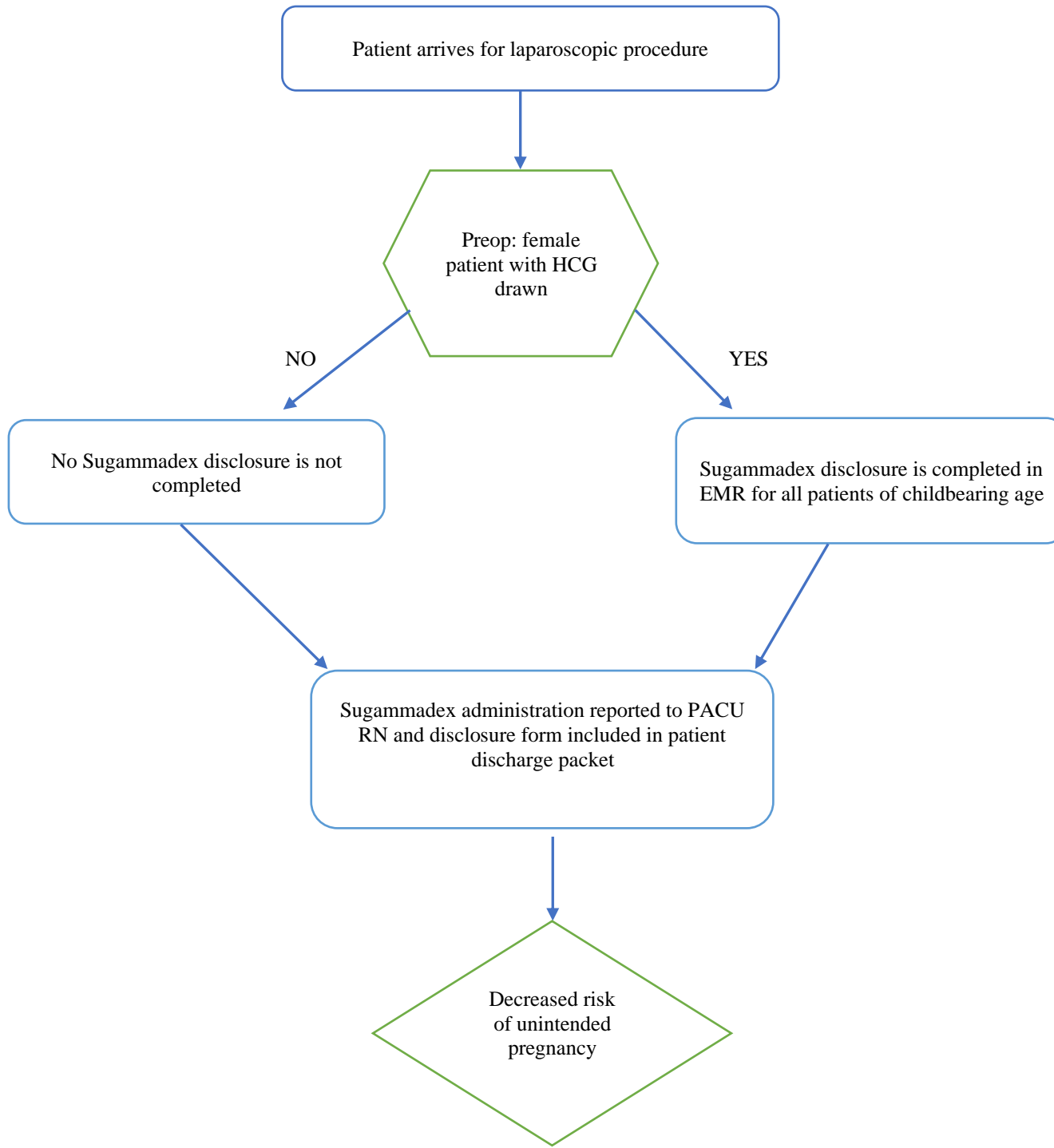


Figure 5

*Sugammadex Disclosure Form in EHR*

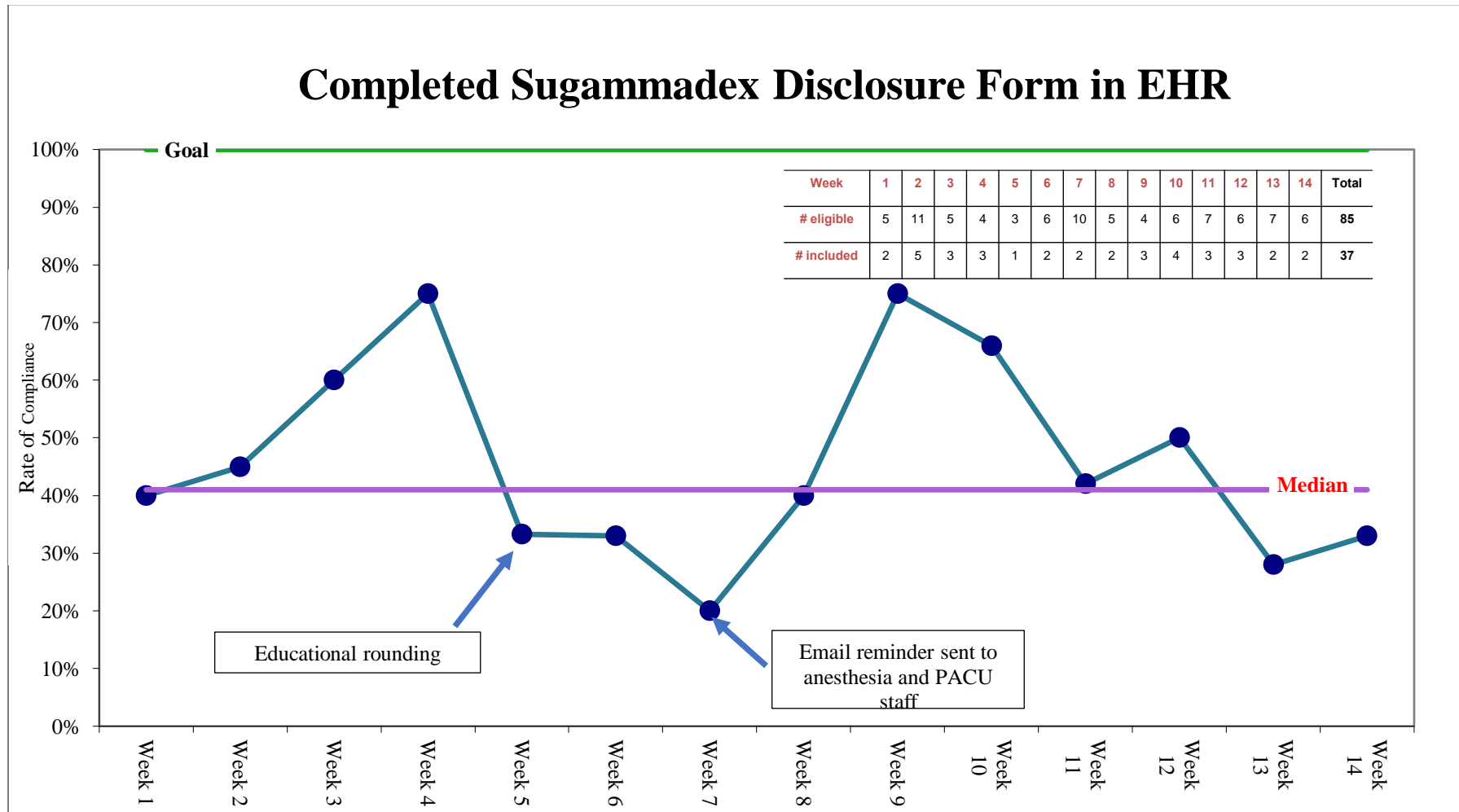


Figure 6

*Intraoperative Sugammadex Administration Reported to PACU Nurse*

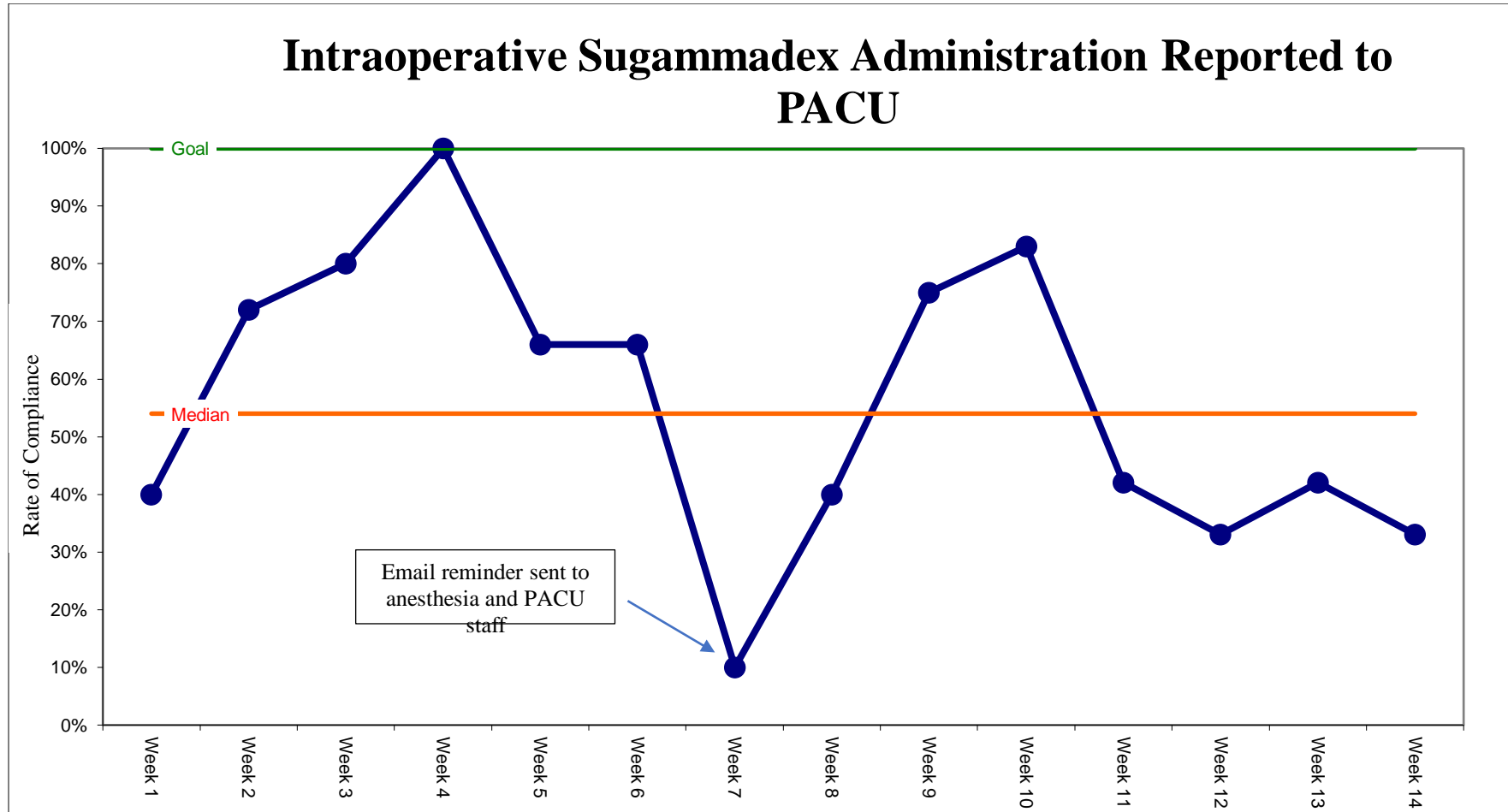
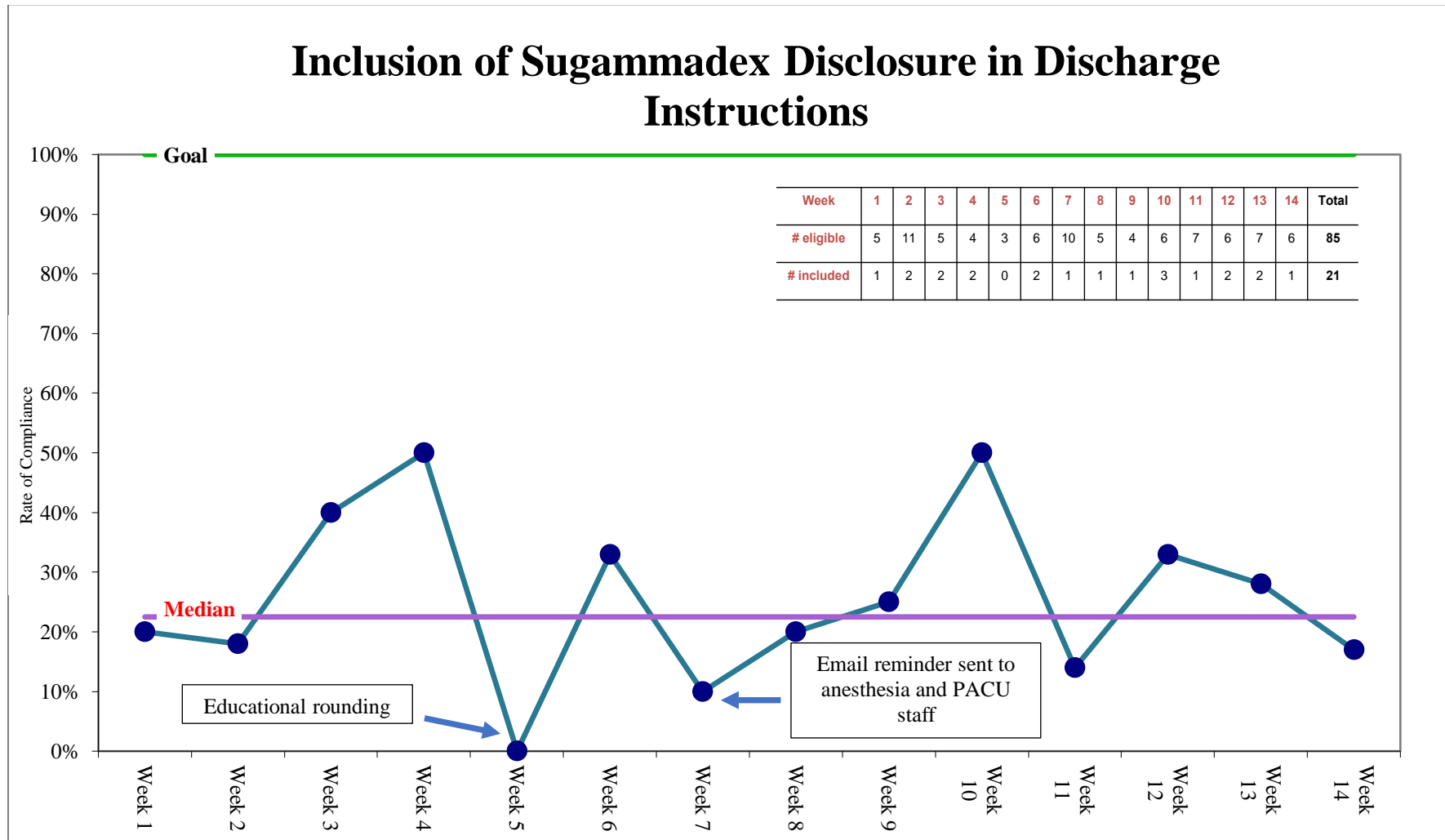


Figure 7

*Sugammadex Disclosure Form Included in Patient Discharge Instructions*



## Appendix A

REDCap Project Survey

Sugammadex Disclosure to Female Patients to Decrease the Risk of Unintended Pregnancy  
Page 1**Pre-implementation Education Survey**

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Please select your title.

- Anesthesia Provider (MDA, CRNA, SRNA)  
 PACU Nurse

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Are you aware that Sugammadex can decrease the efficacy of hormonal contraceptives?

- Yes  
 No

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Are you aware that a Sugammadex Disclosure Form exists in the Anesthesia Progress Note?

- Yes  
 No

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Do you regularly educate female patients that have an HCG drawn undergoing a surgical procedure the possible interactions with hormonal contraceptives and medications such as Sugammadex and Aprepitant?

- Yes  
 No

Appendix B

REDCap Project Audit Tool

*Sugammadex Disclosure to Female Patients to Decrease the Risk of Unintended Pregnancy*  
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**Sugammadex Disclosure Audit Tool**

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MRN \_\_\_\_\_

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HCG Drawn?  Yes  
 No

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Date of Surgery \_\_\_\_\_

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Type of Surgery \_\_\_\_\_

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Sugammadex Disclosure Form Completed?  Yes  
 No

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Was the administration of Sugammadex intraoperatively reported to PACU nurse?  Yes  
 No

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Was the Sugammadex Disclosure Form included in patient discharge instructions?  Yes  
 No