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Preoperative Application Of Transdermal Scopolamine To Reduce The Rate of Postoperative Nausea and Vomiting in Patients Undergoing Surgery

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Disciplines

Nursing

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Abstract

BACKGROUND: Postoperative nausea and vomiting affects 30% of patients and up to 80% of high-risk patients. Each instance of nausea and vomiting places patients at risk for increased length of stay, health care costs, and a decrease in patient satisfaction. Scopolamine has been shown to decrease the incidence of postoperative nausea and vomiting.

METHODS: A pre-implementation/post-implementation design was utilized for this project. Data were collected by nurses recording rates and severity of postoperative nausea and vomiting. Rates of antiemetic medication administration, number of scopolamine orders, and demographic information were collected. The goal of the project was to increase the usage of scopolamine patches in high-risk patient populations.

INTERVENTION: After obtaining baseline data, flyers were posted in perioperative common areas, emails were sent to all anesthesia staff, and two in-person sessions were held with available anesthesia staff. Surveys were utilized during both phases of the project.

RESULTS: The results indicate no change occurred with intervention or in any of the data when comparing pre-implementation and post-implementation. Run charts were created for the goal criteria with no change occurred. Two proportion Z-tests were used to compare the incidences of nausea with no difference found; however, overall nausea was significantly different.

CONCLUSIONS: The project was unsuccessful in implementing increased use of scopolamine or decreasing the overall rate of nausea. The project experienced multiple internal issues, including poor compliance with survey completion and lack of buy-in from staff. The project provides directions for future actions and the need for other interventions to guide behavior change.

Keywords: nausea, vomiting, female, woman, women, postoperative nausea and vomiting, PONV, quality improvement, QI, survey, TDS, hyoscine, and scopolamine.

Preoperative application of Transdermal Scopolamine to reduce the rate of Postoperative Nausea and Vomiting in Patients undergoing Surgery

Over forty-million patients undergo surgery in the United States each year with postoperative nausea and vomiting (PONV) as the most common adverse outcome of anesthesia and second only to pain (Smith et al., 2012; Shaikh et al., 2016). PONV, defined as the incidence of nausea and/or vomiting or retching in the post-anesthesia care unit (PACU) or the immediate 24-hour postoperative period, occurs for 30% of all surgical patients, with a rate as high as 80% in high-risk patients (Feinleib et al., 2019). High-risk patient populations include female sex, history of previous PONV and/or motion sickness, non-smokers, pediatric, and those treated with postoperative opioids and/or inhalational anesthetics (Feinleib et al., 2019). Additionally, certain surgeries carry a moderately increased risk of PONV, specifically laparoscopic, gynecological, eye, throat, ear, cholecystectomy, and penile/scrotal surgeries (Feinleib et al., 2019).

Adverse outcomes of PONV can range from patient dissatisfaction and discomfort, wound dehiscence, hematoma, increased intracranial pressure, increased intrathoracic pressure, hypertension or hypotension, tachycardia or bradycardia, and tachypnea (Sizemore & Grose, 2018). PONV has a significant effect on patient satisfaction; Patients surveyed stated that they prefer to experience pain over nausea or vomiting (Sizemore & Grose, 2018). These adverse outcomes can lead to increased medical costs, prolonged hospitalization, and increased hospital readmission (Sizemore & Grose, 2018). A retrospective study conducted by Dzwonczyk et al. (2012), reviewing all surgical cases in their institution from June 2005 to June 2007, concluded that PONV prophylaxis is economically beneficial for the hospital, as the cost to treat each case of PONV averaged $24,123.

Ondansetron, a selective 5-HT3 receptor antagonist, is the current standard prophylaxis for PONV. However, in a randomized double-blind, multicenter trial conducted by Gan et al. (2019) where 620 at-risk female patients received either an active transdermal scopolamine patch (TDS) or placebo patch two hours prior to surgery, it was found that TDS administration together with Ondansetron (OND) resulted in a statistically significant reduction, 48% for TDS with OND versus 39% for only OND ($P < 0.02$), in PONV compared to Ondansetron alone 24-hour after surgery. Scopolamine, an anticholinergic medication, is widely administered as a 1.5 mg transdermal patch for the prevention of PONV (Feinleib et al., 2019). An additional study, conducted by Einarsson et al. (2008), concluded that patients undergoing laparoscopic gynecologic surgery who received TDS preoperatively compared to patients who received a placebo had a significant reduction in the incidence of nausea (20.8% vs 62.5%, p=0.003) and vomiting (8.3% vs 37.5%, p=0.016) during the first 24-hour after surgery. Overall, there is evidence supporting that TDS, whether used as unimodal or part of multimodal PONV prophylaxis treatment can reduce the rate of PONV.

TDS, while proven effective, is underutilized as a part of a multimodal approach to the prevention and treatment of PONV as this medication requires application in the preoperative area following submission of orders by an anesthesiologist. The extra steps required outside of the normal preoperative assessment and consenting may lead to a decrease in the utilization of this intervention. The frenetic nature of the preoperative period can also lead to this intervention being underutilized.

Rationale

The purpose of the project is to increase the utilization of TDS patches in high-risk patient populations to reduce the risk and/or severity of PONV. As the site utilized for this quality improvement practice has no mechanism in place to monitor the incidence of PONV, this project will also allow for the estimation of the baseline rate of PONV in the target population.

The effectiveness in reducing PONV using TDS is well established; however, the medication is underutilized as an adjunct in a multimodal approach to the prophylaxis of PONV. This quality improvement project seeks to determine whether the introduction of visual reminders as well as email and verbal communication with staff involved in anesthesia care, i.e. anesthesiologist, certified registered nurse anesthetists (CRNA), and student register nurse anesthetists (SRNA), will increase the usage of TDS while simultaneously decreasing the incidence of PONV.

The Johns Hopkins Nursing Evidence-Based Practice model was utilized for the formulation of this quality improvement project. This model consists of three broad steps: developing a practice question, finding evidence, and translating that evidence into practice (Dang & Dearholt, 2017). This model allowed the authors to determine that the reporting and treatment of PONV were deficient at the project site. Following a systematic review of the evidence, TDS was found to be an effective adjunct for the prevention of PONV in high-risk patients. Finally, a plan was formulated to determine the baseline rates of PONV in our high-risk population, while increasing the application of TDS in our target population, via surveys and visual/verbal reminders of the effectiveness of the medication. This model has a clear format for the successful undertaking of an evidence-based practice quality improvement project.

Methods

The project was implemented at a tertiary teaching and clinical research hospital, located in the urban area of a major US city, with 520 inpatient beds and over 28 operating room (OR) suites. While statistics around PONV at the site are not available, an initial investigation revealed that a three month, August – October 2019, rate of PONV at the site was approximately 13.2% based solely on comparing the quantity of Ondansetron 4 mg intravenous vial withdrawal from the electronic medication dispensing system throughout the hospital's PACUs (n=454) to the PACU patient census (n=3,440). We are confident that this rate is lower than the actual rate for the following reasons; first, the incidence of PONV may be underreported by patients; second, there are other medications which can be utilized as a rescue anti-emetic therapy; third, this patient census was not specific to high-risk patient populations, lastly this includes many different types of surgical cases which may present a decreased risk of PONV.

Intervention

To determine the effectiveness of our intervention the project consisted of pre-implementation and post-implementation phases. Inclusion and exclusion criteria for the subject population was based upon the presence of risk factors for PONV. High risk for the incidence of PONV for our study was defined as follows: females aged 18-60 years, undergoing ENT, gynecological or laparoscopic procedures, non-smokers, previous history of PONV and/or motion sickness, and having received opioids and inhalational anesthetic. Exclusion criteria were non-female, aged greater than 60 or less than 18, non-target surgery type, current smoker, hypersensitivity to scopolamine or belladonna alkaloids, urine retention, and closed-angle glaucoma.

Pre-implementation allowed the collection of baseline data regarding the incidence of PONV, the severity of PONV, and any medications administered in the PACU via a survey

(Figure 2) which was completed by PACU nursing. The pre-implementation period consisted of 6 weeks of data collection via the same survey (see Figure 2). PACU bedside nurses completed data collection during the immediate post-anesthesia period and were responsible for evaluating the patients for PONV. The nurses also administered rescue antiemetics and recorded these occurrences directly on the survey forms. Following the discharge of the patient from the recovery unit, the survey was placed into a lockbox located in the PACU.

The post-implementation phase allowed for the collection of data to determine whether increased communication about the usage of TDS in the high-risk patient population resulted in improvements in clinical care. The post-implementation phase ran for six weeks and involved the introduction of visual reminders into the preoperative area, mass email to anesthesia providers, and direct verbal communication with available anesthesia staff. PACU nursing staff collected data in the same manner as the pre-implementation phase. Multiple colorful visual reminders in the form of flyers were placed in high traffic perioperative areas and by the computer terminals used by anesthesia staff. These flyers (see Figure 1) requested that TDS be ordered and placed on the targeted high-risk population.

The PACU nursing staff was integral in the completion of this project as they monitored, treated, and recorded the condition of the patients recovering from anesthesia. Additionally, the nursing staff completed the survey forms needed for both the pre-implementation and implementation phases of the project.

The survey consisted of patient demographics, including their age, height, weight, medical history, and history of smoking, motion sickness, or PONV, along with brief history and an assessment portion that focuses on the incidence and severity of PONV completed by bedside nurse. Additionally, a visual analog scale (VAS) with ratings from 0 to 10 was used to quantify

the severity of nausea if it occurred during the recovery period, which has been well correlated with verbal descriptors of severity (Meek et al., 2009). The survey also included information regarding rescue medications given to treat PONV if applicable.

Study of the Interventions

To determine the effectiveness of the proposed intervention a pre-post design was chosen for this quality improvement project. Results from the pre-implementation stage were compared with post-implementation data obtained from the survey device utilized in both phases of the project.

Measures

Postoperative Nausea and Vomiting (PONV) Incidence

This measure was computed by a summation of all reported incidences of PONV divided by the total number of surveys completed. This was completed for both the presence of nausea and if any vomiting occurred.

Postoperative Nausea and Vomiting (PONV) Severity

The VAS of severity of nausea was also obtained to determine if the overall severity of nausea decreases post-implementation.

Transdermal Scopolamine Patch (TDS) Usage

The number of TDS patch orders placed by the anesthesiologists during the pre-implementation phase was compared to the number of orders placed post-intervention.

Demographics / Patient characteristics

This included age, height, weight, medical history, and history of smoking, motion sickness, or PONV, along with brief medical history.

Rescue Antiemetic usage

If patients were given any medications to treat PONV in the PACU it was reported on each survey.

Analysis

Descriptive statistics were used to compare the pre-implementation and post-implementation groups. Run charts were used to determine if the data was random or was the result of a change. Run charts were used to analyze the usage of TDS, rate of PONV with and without TDS, the overall rate of nausea, and usage of rescue antiemetic medications. The run charts will help establish whether the intervention increased overall usage of TDS in our patient population. A two proportion Z-test was used to compare the overall incidence of PONV between the pre and post phases. Additionally, this test was also used to compare the incidence of PONV with and without TDS across the pre and post groups. The results of the p-values of the A two proportion Z-test was analyzed to determine if there is a statistically significant difference between the pre-implementation and post-implementation groups. Clinical significance was defined as the reduction of the incidence and/or severity of PONV by at least 10% from pre-implementation phase values. TDS, proven moderately effective in the treatment and prevention of PONV, may produce a greater reduction than 10% from baseline (Feinleib et al., 2019).

Ethical Considerations

There is minimal risk of harm to the subjects in this project, as scopolamine is an established standard of care for the prevention of PONV (Feinleib et al., 2019). Additionally, all information obtained for this project was anonymized, no patient identifiers were utilized, and data collection was bedside nurse directed.

Results

Over the course of the data collection period, a total of 52 surveys were completed; however, only 32 of those surveys contained patients that fit our inclusion criteria. The decision was made to include these extra surveys as the completion rate of the surveys was poor, with an average weekly response rate of 4.25 surveys. Initial attempts at data collection utilized the preoperative nurses, but this was determined a failure as no surveys were collected during the first official week of the pre-implementation period. As such, the collection of the data was shifted to the PACU nursing staff, where they would fill out the complete survey including patient demographics and history. The pre-implementation period was reset following this change to ensure a full six-week period for data collection.

Table 1 consists of descriptive statistics of the demographics from the pre-implementation sample, while Table 2 consists of descriptive statistics of the demographics from the post-implementation sample. The two groups are similar to each other, with each characteristic within one standard deviation of the other. The post-implementation group had an overall lower median weight as well as BMI.

Table 1

Pre-Implementation Demographics

Age		*Height*	
Mean	48.96428571	Mean	165.3426923
Standard Error	2.760972407	Standard Error	1.584606096
Median	50	Median	164.465
Mode	60	Mode	162.56
Standard Deviation	14.60969273	Standard Deviation	8.079937405
Sample Variance	213.4431217	Sample Variance	65.28538846
Kurtosis	-1.009237678	Kurtosis	-0.036790288
Skewness	0.017785117	Skewness	0.520011372
Range	54	Range	30.48
Minimum	24	Minimum	152.4
Maximum	78	Maximum	182.88

Sum	1371	Sum	4298.91
Count	28	Count	26
Confidence Level(95.0%)	5.66504744	Confidence Level(95.0%)	3.263557346

Weight		BMI	
Mean	96.11979895	Mean	35.32137782
Standard Error	6.760356544	Standard Error	2.49255428
Median	87.5	Median	32.61194441
Mode	75.45454545	Mode	-
Standard Deviation	34.47118994	Standard Deviation	12.70958291
Sample Variance	1188.262936	Sample Variance	161.5334978
Kurtosis	6.514161819	Kurtosis	4.72139589
Skewness	2.125082829	Skewness	1.813120898
Range	168.9090909	Range	58.28547566
Minimum	54.09090909	Minimum	21.10288508
Maximum	223	Maximum	79.38836074
Sum	2499.114773	Sum	918.3558233
Count	26	Count	26
Confidence Level(95.0%)	13.92321493	Confidence Level(95.0%)	5.133511635

Table 2

Post-Implementation Demographics

Age		*Height*	
Mean	51.3478261	Mean	161.5190909
Standard Error	3.70002067	Standard Error	1.606187294
Median	55	Median	161.925
Mode	67	Mode	162.56
Standard Deviation	17.7446758	Standard Deviation	7.533686196
Sample Variance	314.873518	Sample Variance	56.75642771
Kurtosis	-0.8097835	Kurtosis	-0.023422672
Skewness	-0.0746074	Skewness	-0.030708802
Range	66	Range	27.94
Minimum	20	Minimum	147.32
Maximum	86	Maximum	175.26

Sum	1181	Sum	3553.42
Count	23	Count	22
Confidence Level(95.0%)	7.67337322	Confidence Level(95.0%)	3.340249334

Weight		BMI	
Mean	85.4741736	Mean	32.40317946
Standard Error	6.73729426	Standard Error	2.214268916
Median	78.1818182	Median	29.71299346
Mode	169.090909	Mode	-
Standard Deviation	31.6007112	Standard Deviation	10.38584182
Sample Variance	998.604946	Sample Variance	107.8657103
Kurtosis	3.09807668	Kurtosis	3.753608962
Skewness	1.72194829	Skewness	1.800023471
Range	122.272727	Range	45.10882945
Minimum	46.8181818	Minimum	18.87833688
Maximum	169.090909	Maximum	63.98716633
Sum	1880.43182	Sum	712.8699482
Count	22	Count	22
Confidence Level(95.0%)	14.0109704	Confidence Level(95.0%)	4.604824293

The incidence of PONV was determined as an overall value for both the pre and post-implementation groups and was compared via two proportion Z-tests with a statistically significant result. The incidence of PONV with and without scopolamine was not found to be significant. No significant difference was found with the incidences of PONV in the pre-implementation versus implementation groups with and without TDS patches when compared. Table 3 details the results of the two proportion Z-tests.

Table 3

Two Proportion Z-tests

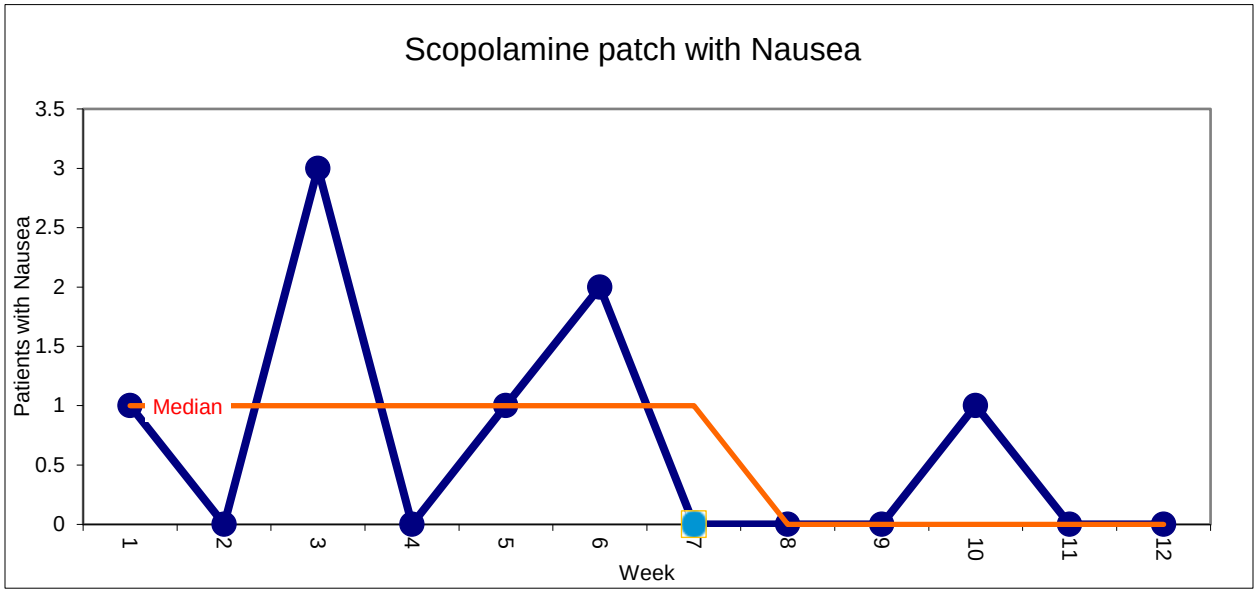
Incidence of PONV with TDS vs Incidence of nausea without TDS:		*Incidence of PONV without TDS pre-implementation vs implementation:*	
Difference	12.77%	Difference	26.19%
95% CI	-11.0320% to 35.1027%	95% CI	-4.9988% to 54.4118%
Chi-squared	1.073	Chi-squared	2.744
DF	1	DF	1
Significance level	P = 0.3003	Significance level	P = 0.0976
Overall Incidence of PONV pre-implementation versus implementation:		*Incidence of PONV with TDS pre-implementation vs implementation:*	
Difference	30.59%	Difference	32.64%
95% CI	6.6148% to 49.9423%	95% CI	-5.7724% to 57.4490%
Chi-squared	6.099	Chi-squared	2.707
DF	1	DF	1
Significance level	P = 0.0135	Significance level	P = 0.0999

Note: $p<0.05$ significance level

Run charts were created and analyzed to determine if the intervention at week 7 created a change or if the data were randomly scattered. Figure 3 illustrates the amount of nausea reported by patients who had received a TDS, no signals or runs are notable on this chart indicating randomness.

Figure 3

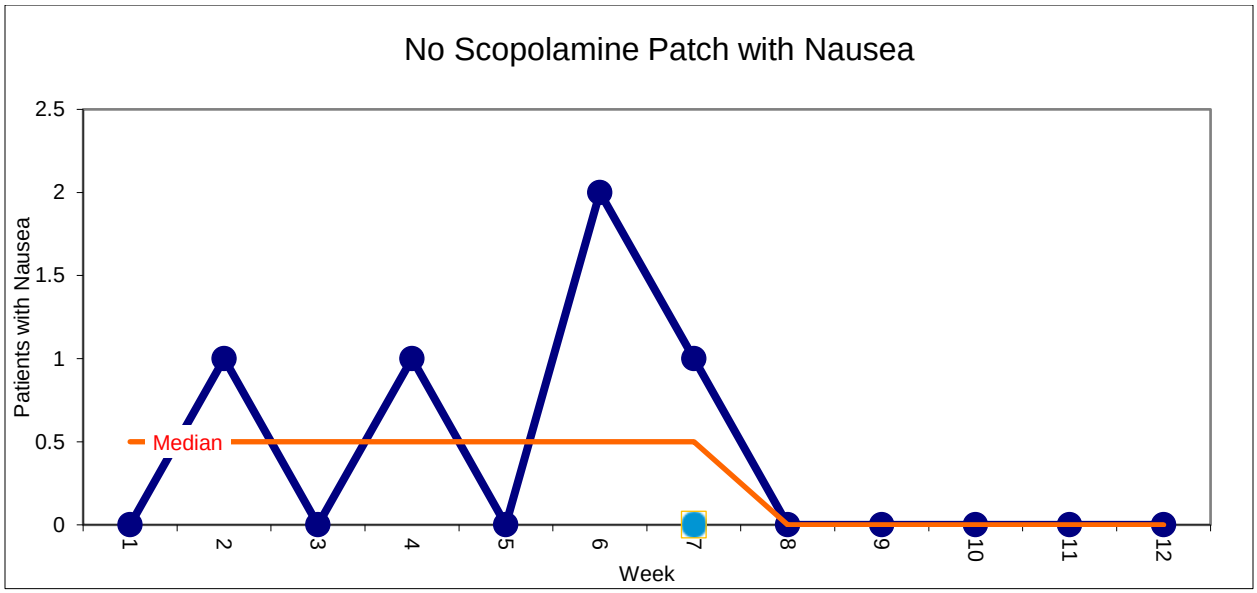
Patients reporting PONV with TDS



The number of patients who reported nausea or vomiting each week is reported in Figure 4 run chart. No signals or runs are notable on this chart indicating randomness.

Figure 4

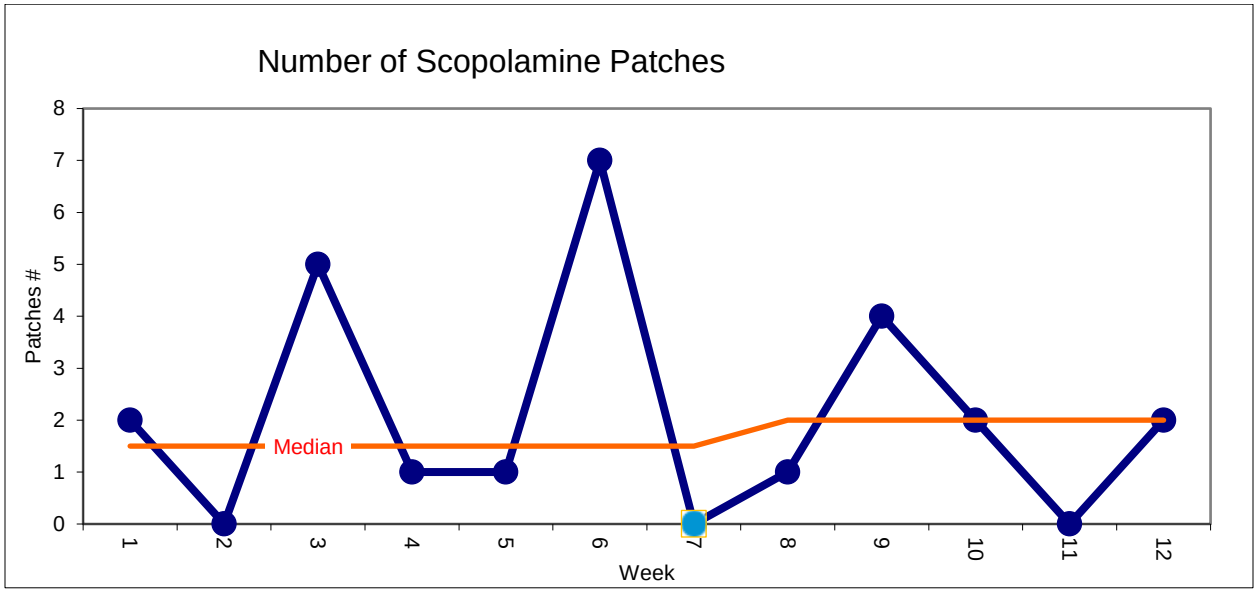
Patients reporting PONV without TDS



The number of TDS that were ordered during each week is reported in Figure 5 run chart. No signal or runs are notable, indicating randomness.

Figure 5

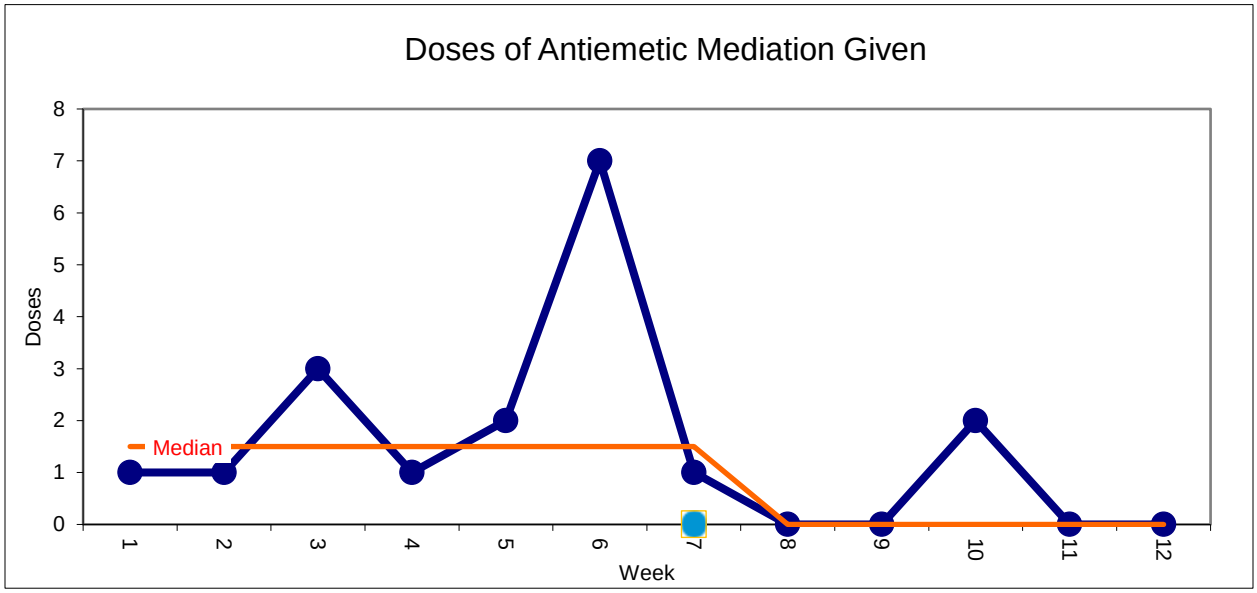
Number of TDS Ordered for Each Week



The number of doses of antiemetics given each week is reported in Figure 6 run chart. No signal or runs are notable, indicating randomness.

Figure 6

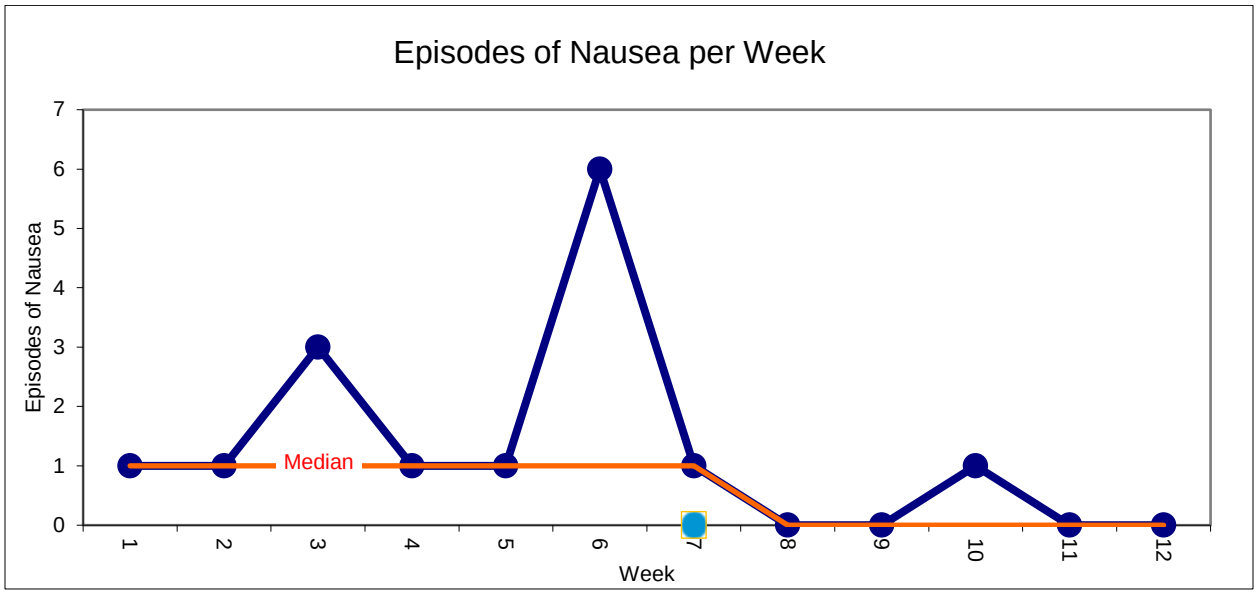
Doses of Antiemetic Medication per Week



The overall number of episodes of PONV is recorded in Figure 7 run chart. No notable signal or runs on this chart, indicating randomness.

Figure 7

Number of Patients Reporting PONV



Discussion

Our key findings indicate that there were no differences found between the pre-implementation and post-implementation data, indicating that there was no change in behavior as a result of our intervention. This is indicated by no difference in the usage of TDS, incidence of PONV, or the use of rescue antiemetic medications as shown by the random assortment of data points on each run chart. Additionally, the two proportion Z-test showed no difference in all incidences measured except overall rates of PONV between the pre-implementation and implementation groups. This correlates with the findings from the run charts that indicate no correlation with change following the correlation. The statistically significant difference, $p<0.05$, between the pre-implementation and post-implementation rates of PONV is most likely due to the small sample size obtained from the survey data. This conclusion is further supported by the

lack of difference between the incidence of PONV with and without TDS when comparing the pre-implementation and implementation groups. The descriptive statistics of the pre-implementation and post-implementation groups were not significantly different from one another, which is most likely not a confounding factor in the equivocal results.

The project's findings reinforce the need for a comprehensive measure of PONV in the clinical setting, as the authors were unable to conclusively determine any differences between the groups with the survey instrument. However, the survey could easily be utilized as an assessment tool in an electronic medical record, EMR, format. This would allow for easier collection and analysis of PONV data, without the use of paper documentation.

Interpretation

No association was found between the intervention and the outcomes with no decrease in nausea found, which may be the result of the random manner in which the surveys were completed by the PACU nurses. The expected decrease in PONV was not seen following the intervention, which is directly related to no change in the usage of TDS as well as the small sample size, n=51, for the overall project. Additionally, the inconsistent usage of the surveys, an average of 4.25 per week, by PACU RNs is a confounding factor as the patient population was inaccurately represented. The project had a minimal impact on the system or people involved as no changes in behavior were noted. This result did, however, provide insight as to the need for better evaluation of PONV treatment as well as the overall inconsistent treatment for high-risk PONV patient populations. The primary reasons for the differences in our observed versus or anticipated outcomes are due to poor follow-up with the survey tool in both the pre-implementation and post-implementation periods, as well as no change in usage of TDS following the intervention. Other confounding factors are the uncontrolled intraoperative care

differences, such as the use of total intravenous anesthetic or volatile anesthetic gases, as well as additional antiemetic medications administered by anesthesia staff. The primary costs of this project were the increased time required of the PACU nursing staff for PONV assessment and completion of the survey tool. Any increased usage of TDS would have caused a direct increase in monetary costs, however no actual increase occurred during the implementation period.

Limitations

This project's generalizability is limited by the usage of paper survey tools, as they require additional steps, such as printing, distribution, completion, and filling/digitizing of results. This can be ameliorated by integration into an EMR, which would also have the added benefit of requiring completion by PACU staff, avoiding the issues of loss to follow-up that this project experienced. Additionally, the visual reminders, direct communication, and email communication were easy to institute, but were not effective in eliciting a behavior change, as such things such as automatic order sets for high-risk PONV patients within the EMR, can direct the prescription of TDS to more patients.

The internal validity of the project was limited due to design issues that depended upon the bedside nurses to identify high-risk patients that fit criteria as well as complete the survey tool. Lack of buy-in and cooperation led to the loss of patients that fit the requirements decreasing the amount of data collected. Finally, the differences in intraoperative care was an uncontrolled confounding factor, as the actions of the anesthesia provider can either increase or decrease the patient's risk of PONV. Additionally, factors such as length of surgery or postoperative opioid usage were also not accounted for.

The authors made efforts to minimize limitations by increasing the frequency of communication with PACU staff to weekly via email and daily via text message, which was

driven by the perioperative manager. These communications expressed the need to ensure all appropriate patients had surveys completed and that TDS was ordered if possible.

Conclusion

While the usefulness of the work is not directly evident, the multiple issues that the authors experienced highlight the need for a required PONV assessment, as well as the need for stronger drivers of behavior change beyond the interventions utilized, such as automatic order sets in EMR for high-risk PONV patients. This type of active behavior change requires the anesthesia professional to take action to not order TDS versus requiring an action to initiate the usage. The survey instrument could act as a guide for the creation of an electronic assessment tool that when integrated with an anesthesia record would yield significant data for determining the effectiveness of PONV prevention and treatment. This project was not sustainable as no behavior change occurred and no further surveillance of PONV incidence or treatment will be undertaken. As stated previously this project would be sustainable following integration with existing EMR as it allows for easy tracking of PONV incidence and treatment modalities. One of the foundational ideas of the project, risk stratification, was undertaken by the project site and integrated into the EMR as a risk score, presenting patients as low, moderate, or high risk for PONV. This risk score, however, is presented in isolation with no additional steps taken, such as specific prophylactic order sets for PONV prevention, nor were any additional PONV assessment fields added. The implications for practice are perhaps direct at what does not work, specifically the interventions utilized in this project are not successful drivers for behavior change. Additionally, the need for baseline PONV data still exists and would benefit from further study. The authors suggest that the next steps for the facility would be the development of specialized order sets for the EMR for PONV prophylaxis, integration of the risk

score/stratification for PONV into which order sets are automatically initiated, and the development of a PONV assessment tool that allows for the collection of data. This data would allow for further refinement of treatment as the actual incidence of PONV can be determined and tracked over time.

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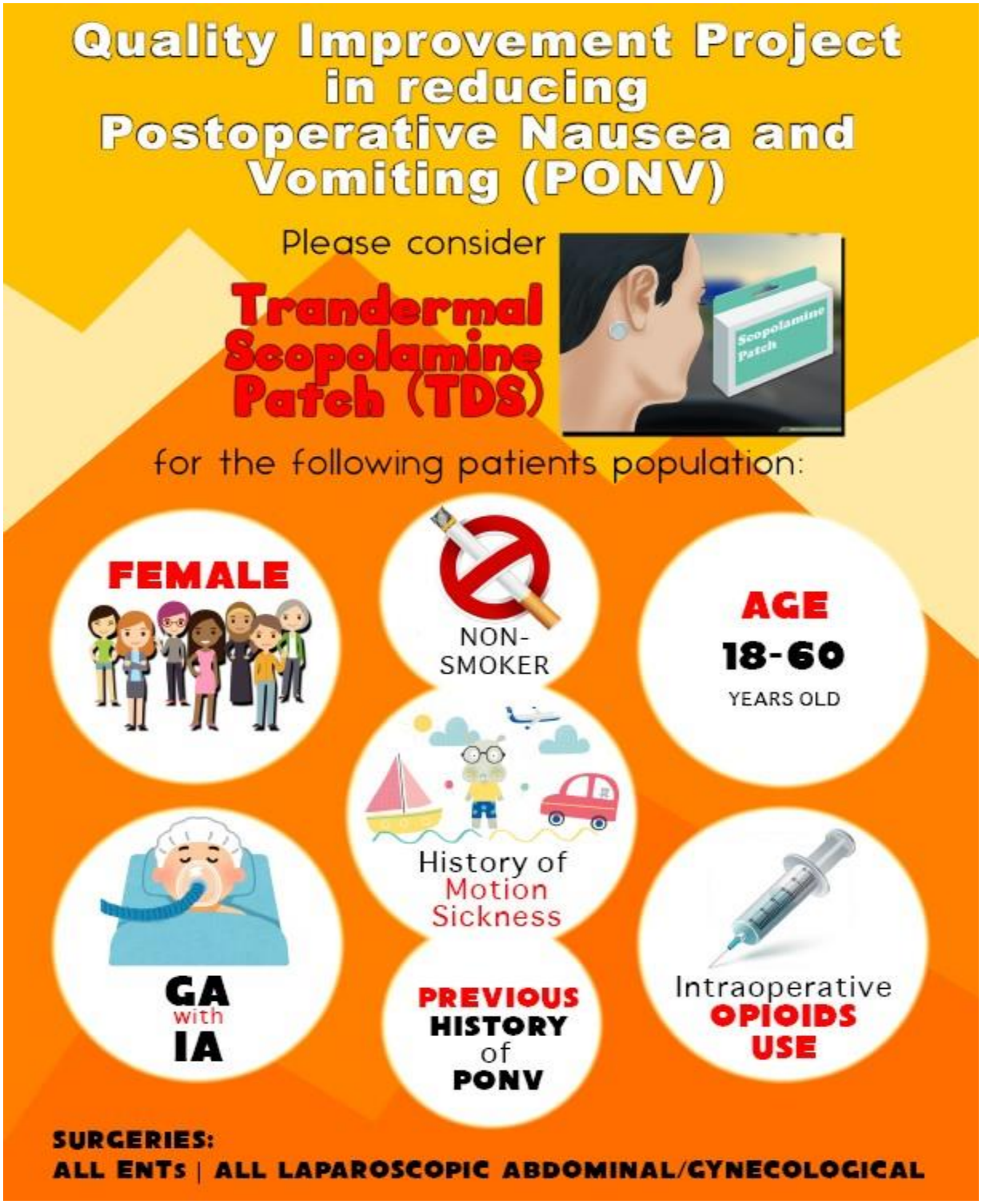
Figure 1

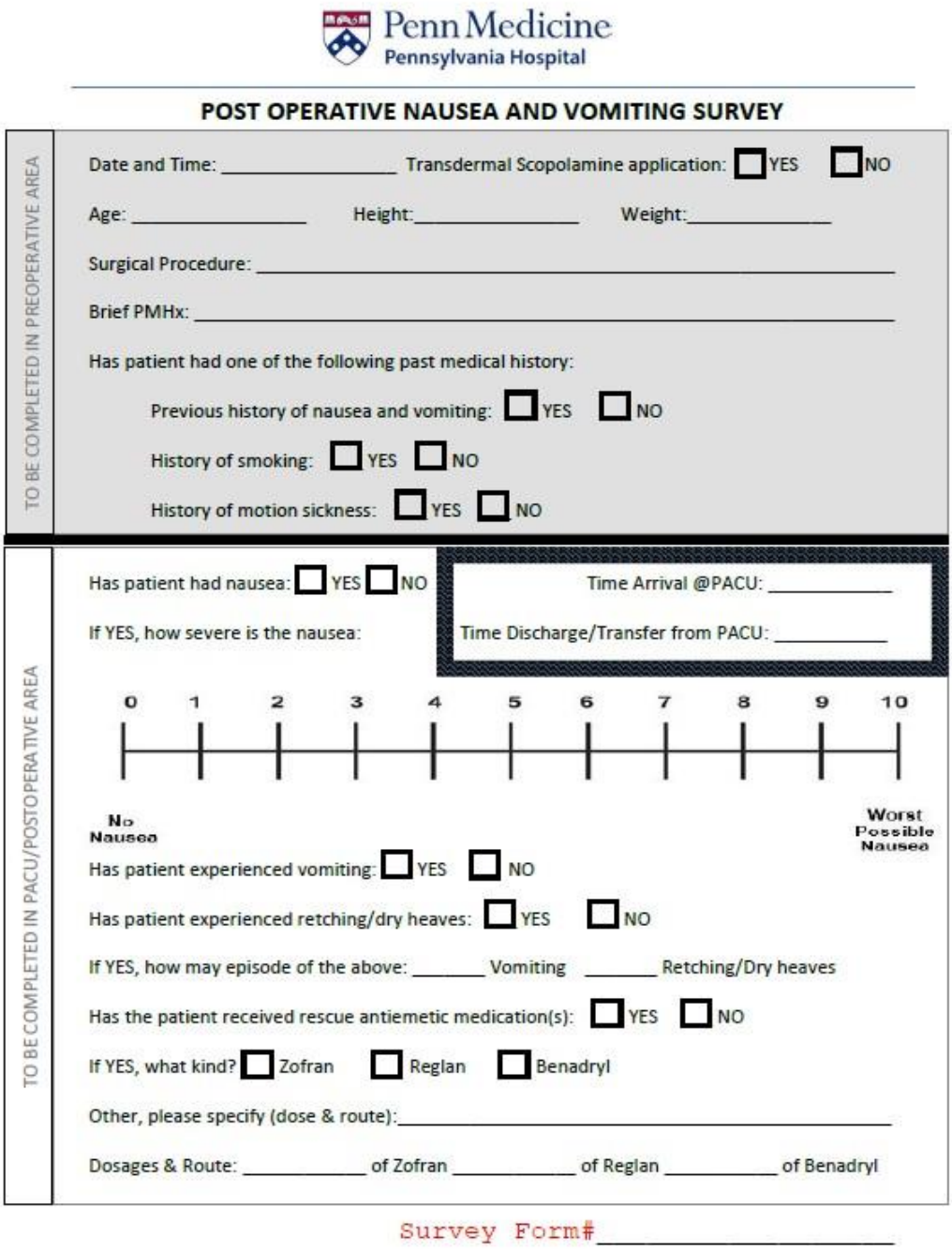
Informational Flyer



Note. The informational flyer was placed in the preoperative patient area and anesthesia workspace.

Figure 2

PONV Survey



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POST OPERATIVE NAUSEA AND VOMITING SURVEY

TO BE COMPLETED IN PREOPERATIVE AREA

Date and Time: _____ Transdermal Scopolamine application: ☐ YES ☐ NO

Age: _____ Height:_____ Weight:_____

Surgical Procedure: _____

Brief PMHx: _____

Has patient had one of the following past medical history:

Previous history of nausea and vomiting: ☐ YES ☐ NO

History of smoking: ☐ YES ☐ NO

History of motion sickness: ☐ YES ☐ NO

TO BE COMPLETED IN PACU/POSTOPERATIVE AREA

Has patient had nausea: ☐ YES ☐ NO

Time Arrival @PACU: _____

If YES, how severe is the nausea:

Time Discharge/Transfer from PACU: _____

0 1 2 3 4 5 6 7 8 9 10

No Nausea

Worst Possible Nausea

Has patient experienced vomiting: ☐ YES ☐ NO

Has patient experienced retching/dry heaves: ☐ YES ☐ NO

If YES, how may episode of the above: _____ Vomiting _____ Retching/Dry heaves

Has the patient received rescue antiemetic medication(s): ☐ YES ☐ NO

If YES, what kind? ☐ Zofran ☐ Reglan ☐ Benadryl

Other, please specify (dose & route):_____

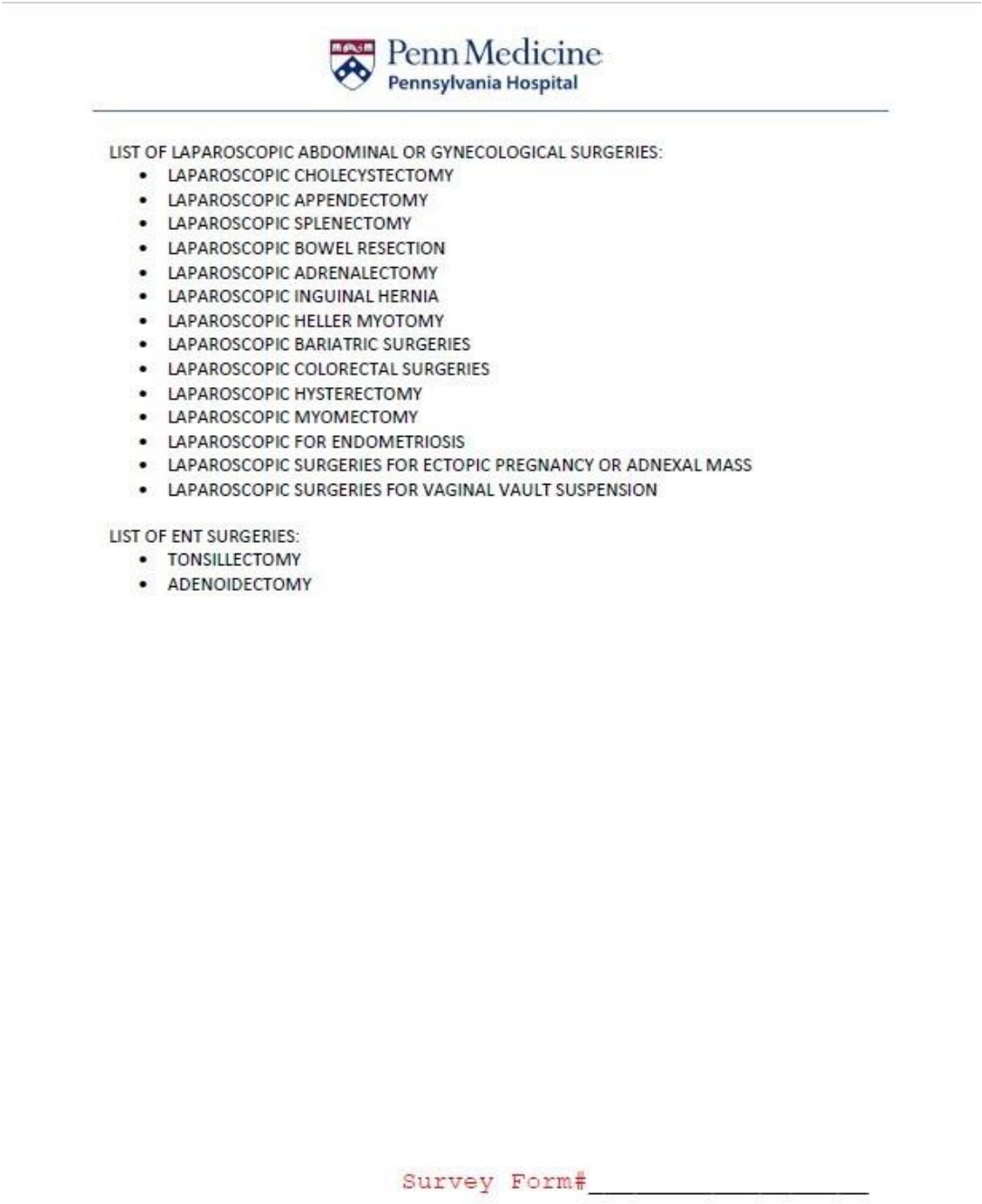
Dosages & Route: _____ of Zofran _____ of Reglan _____ of Benadryl

Survey Form#_____

Note: Font and back of survey instrument used in pre-implementation and implementation phases of the project.

Figure 2

PONV Survey



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LIST OF LAPAROSCOPIC ABDOMINAL OR GYNECOLOGICAL SURGERIES:

- LAPAROSCOPIC CHOLECYSTECTOMY
- LAPAROSCOPIC APPENDECTOMY
- LAPAROSCOPIC SPLENECTOMY
- LAPAROSCOPIC BOWEL RESECTION
- LAPAROSCOPIC ADRENALECTOMY
- LAPAROSCOPIC INGUINAL HERNIA
- LAPAROSCOPIC HELLER MYOTOMY
- LAPAROSCOPIC BARIATRIC SURGERIES
- LAPAROSCOPIC COLORECTAL SURGERIES
- LAPAROSCOPIC HYSTERECTOMY
- LAPAROSCOPIC MYOMECTOMY
- LAPAROSCOPIC FOR ENDOMETRIOSIS
- LAPAROSCOPIC SURGERIES FOR ECTOPIC PREGNANCY OR ADNEXAL MASS
- LAPAROSCOPIC SURGERIES FOR VAGINAL VAULT SUSPENSION

LIST OF ENT SURGERIES:

- TONSILLECTOMY
- ADENOIDECTOMY

Survey Form#_____

Note: Font and back of survey instrument used in pre-implementation and implementation phases of the project.