

Combining Preoperative Risk Assessment for PONV with a Clinical Decision Support System

Authors: Megan Moore-Weber, MSN, APRN-CNP, FNP-C, AOCNP® & Victoria Krogg, MS, APRN-CNP, AGPCNP-BC, AOCNP®
Institution: The Ohio State University Comprehensive Cancer Center Arthur G. James Cancer Hospital and Richard J. Solove Research Institute



Significance

What is PONV?

Why does it matter?

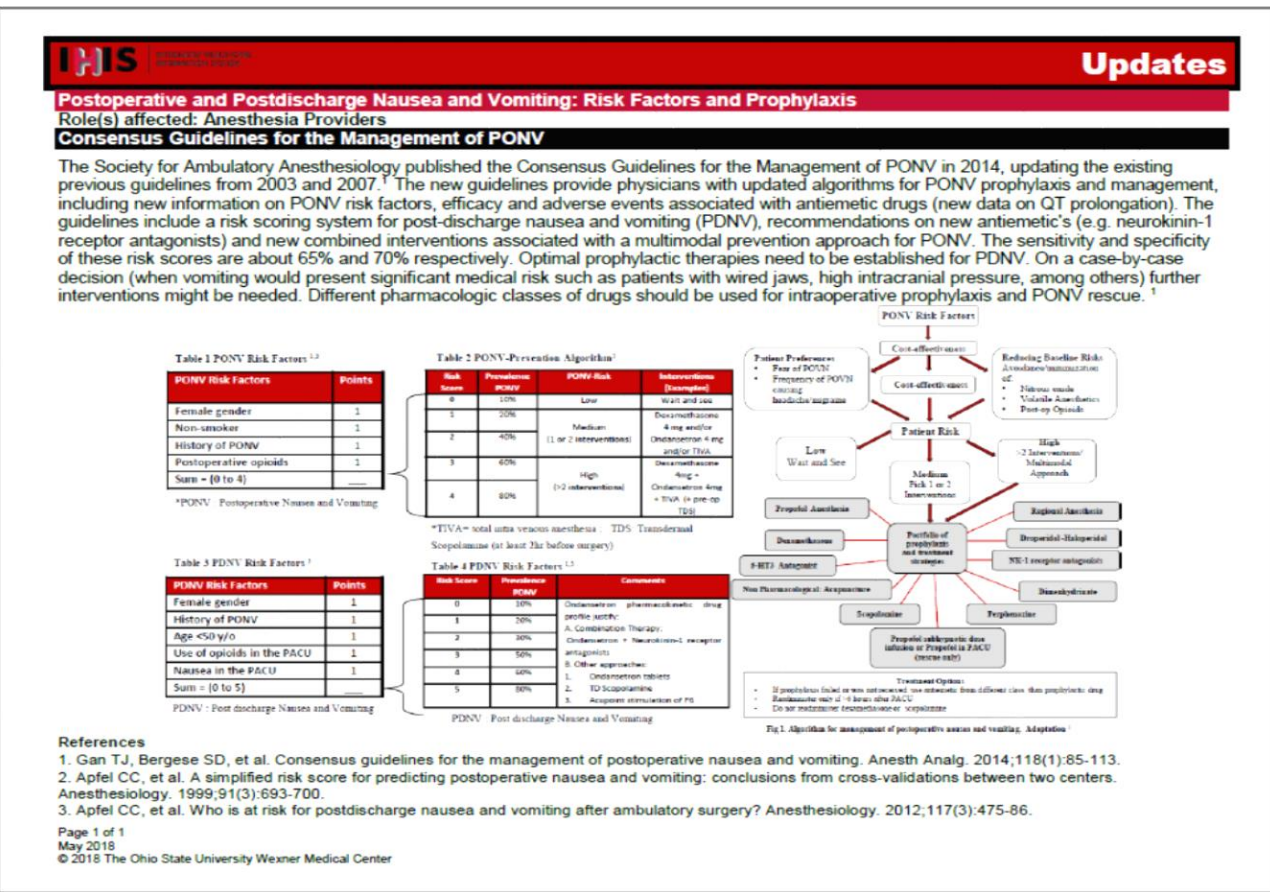
- Electrolyte imbalances
- Development of a pneumothorax
- Aspiration pneumonia
- Wound dehiscence
- Delayed recovery time
- Lengthened hospital stay²
(And all financial implications associated with the aforementioned)

Problem / Clinical Inquiry

Problem: Current practice involves a screening tool with limited decision support for antiemetic strategies. Suggestions for possible antiemetic medications or interventions are **non-specific to risk factor types and overall risk stratification level** (e.g. low risk, medium risk, high risk, or 1-4).

Current practice includes a preoperative assessment for PONV risk that:

- Is based on the Apfel
- Limited number of suggestions for antiemetic strategies based on the published guideline.
- Available hyperlink provides extensive medication list that is not practical or efficient for daily practice.



PICO(T)

P - For patients undergoing surgery with general anesthesia,
I - how does a PONV risk screening tool in conjunction with implementing a CDSS that includes prophylactic interventions
C - compared to current practice, which includes pre-operative assessment with limited intervention suggestions
O - affect the incidence and severity of PONV
T - in the immediate postoperative period (Phase I recovery)

Search Strategy

- **Search terms:** “postoperative nausea vomiting”, “prophylaxis”, “screening”, “PONV”, “risk assessment”, “prevention”, “strategy”.
- **Databases:** CINAHL & PubMed
- **Inclusion Criteria:** English written peer-reviewed journal articles
- **Exclusion criteria:** publication date range limited to 2012-2019

Note: the American Society of Perianesthesia Nurses (ASPAN) guidelines, last updated in 2006, were also included.

Critical Appraisal

Total articles Included: **12**

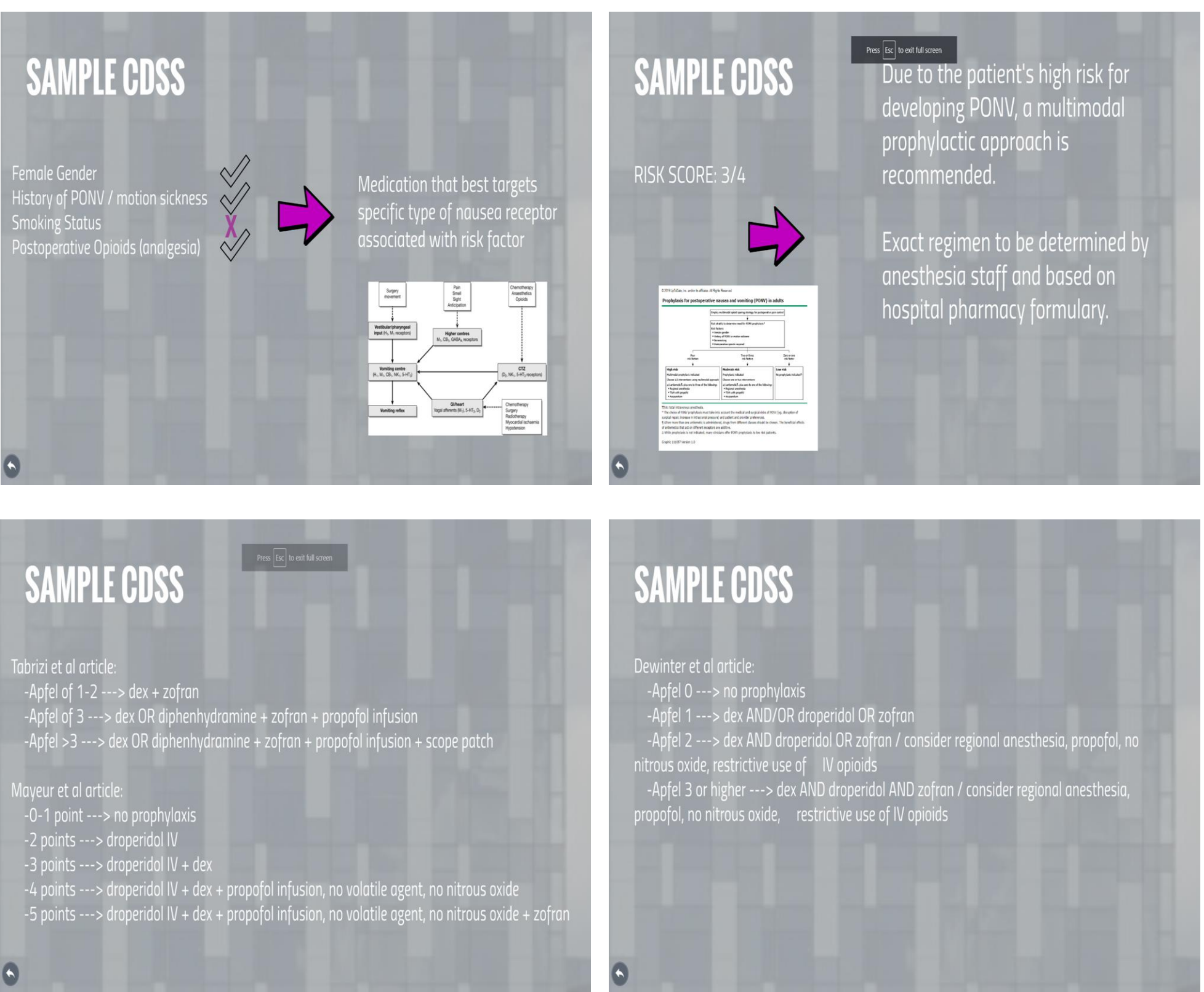
- Guidelines: **SAMBA** (2014) and **ASPAN** (2006)
- RCT: **1**
- SR: **1**
- LR: **1**
- Prospective Studies: **3**
- Retrospective Studies: **3**
- Other: **1**

Synthesis Tables

Study / Author	Year	# of Participants	Sample Characteristics	Study Design	Intervention	Major Finding
Apfel et al. (2003)	2003	21 patients with 10 PONV patients	General anesthesia	Retrospective	Quantitative statistical analysis to measure postoperative nausea and vomiting (PONV) risk factors.	Female gender is the strongest predictor of PONV.
Kaplan et al. (2006)	2006	11,651 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	1,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Kaplan et al. (2006)	2006	2,480 patients	General anesthesia	Prospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.

Study / Author	Year	Participants	Sample Characteristics	Study Design	Intervention	Major Finding
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.
Moore et al. (2012)	2012	817 patients	General anesthesia	Retrospective	Intervention group underwent preoperative risk assessment.	Intervention group had lower incidence of PONV.

Sample Clinical Decision Support (CDSS)

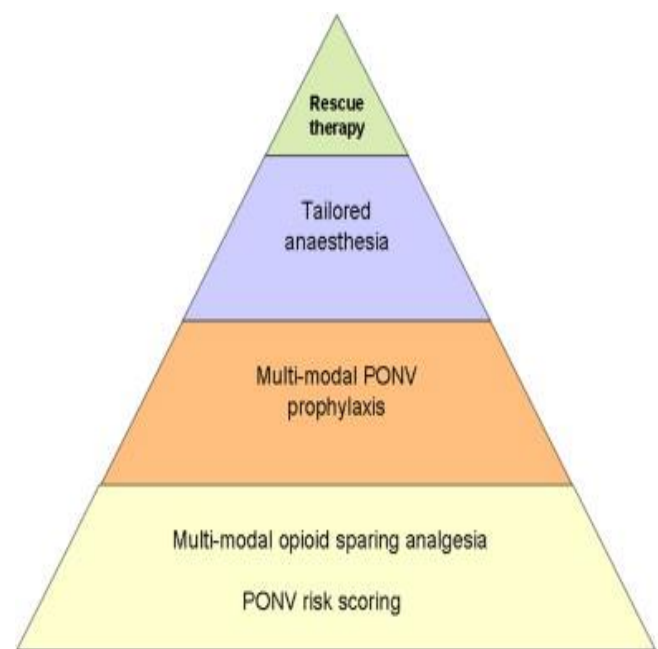


Used in conjunction with a preoperative risk assessment for PONV. After calculating a risk score for PONV, a CDSS can then be used to guide interventions.

Slide 3³, 4 Slide 5⁵

EBP Change Recommendations and Implementation

- Continue using a simplified risk tool based on the Apfel scoring system
- **Blend the risk tool into a newly developed clinical decision support system (CDSS)**
- The risk tool will aid in the assessment of prior history and risk factors to yield a score
- **The score result will prompt a suggestive list of possible prophylactic interventions specific to the patient's risk score / risk type**
- This suggestive list will be synthesized using evidence and anesthesia staff recommendations, with attention to hospital formulary
- **Establish committee/implementation group with both anesthesia providers and perianesthesia nurses**
- Develop formal project protocol
- **Meet with implementation group to discuss barriers and facilitators; discuss strategies to mitigate or reduce identified barriers**
- Keep stakeholders informed and involved
- **Design and implement an updated risk assessment flowsheet blended with a CDSS**
- Assure methods for data extrapolation are possible to best monitor compliance and whether the intervention positively affects the incidence of PONV



(Öbrink, et al, 2015) ¹

Implications for Practice

- PONV continues to be an ongoing issue.
- Evidence among multidisciplinary publications supports the use of a simplified algorithm, predominantly suggesting the Apfel SRS, in order to best promote adherence in clinical practice.⁶
- Evidence also supports incorporating recommendations for interventions and antiemetics according to the risk stratification.⁷
- Perioperative staff can use this evidence to reduce the incidence of PONV within their own institutions and positively impact their patients' outcomes, comfort, and satisfaction.⁸

References

¹Apfel, C. C., et al. (2012). Evidence-based analysis of risk factors for postoperative nausea and vomiting. *British Journal of Anaesthesia*, 109(5), 742-753.

ASPAN's Evidence-Based Clinical Practice Guideline for the Prevention and/or Management of PONV/PDNU Algorithms. (2006). *Journal of PeriAnesthesia Nursing*, 21(6), 374-376.

Cao, X., White, P. F., & Ma, H. (2017). An update on the management of postoperative nausea and vomiting. *Journal of Anesthesia*, 31(4), 617-626. doi:10.1007/S00540-017-2363-X

²Dewinter, G., Staelens, W., Veef, E., Teunkens, A., Velde, M. V., & Rex, S. (2018). Simplified algorithm for the prevention of postoperative nausea and vomiting: A before-and-after study. *British Journal of Anaesthesia*, 120(1), 156-163. doi:10.1016/j.bja.2017.08.003

Gan, T. J., et al. (2014). "Consensus guidelines for the management of postoperative nausea and vomiting." *Anesthesia & Analgesia*, 118(1): 85-113.

Geralemou, S., & Gan, T. J. (2016). Assessing the value of risk indices of postoperative nausea and vomiting in ambulatory surgical patients. *Current Opinion in Anaesthesiology*, 29(6), 668-673. doi:10.1097/aco.0000000000000400

Kaplan, T. H., Vergouwe, Y., Wolswinkel, L. V., Kalkman, C. J., Moons, K. G., & Van Klei, W. A. (2015). Impact of adding therapeutic recommendations to risk assessments from a prediction model for postoperative nausea and vomiting. *British Journal of Anaesthesia*, 114(2), 252-260. doi:10.1093/bja/aeu321

Keyes, M. (2013). Management of Postoperative Nausea and Vomiting in Ambulatory Surgery: The Big Little Problem. *Clinics in Plastic Surgery*, 40, 447-452. doi:10.1016/j.cps.2013.04.007

Kooji, F. O., et al. (2012). "Automated reminders decrease postoperative nausea and vomiting incidence in a general surgical population." *British Journal of Anaesthesia*, 109(6): 961-965.

⁴Mayer, C., Robin, E., Kipnis, E., Vallet, B., Andrieu, G., Feyf, M., Petitot, P., & Lebuffe, G. (2012). Impact of a prophylactic strategy on the incidence of nausea and vomiting after general surgery. *Annales Françaises d'Anesthésie et de Réanimation* 31, e53-e57. doi: 10.1016/j.annfar.2015.01.024

Myklejord, D. J., Yao, L., Liang, H., & Glurich, I. (2012). Consensus guideline adoption for managing postoperative nausea and vomiting. *WMA: Official Publication of the State Medical Society of Wisconsin*, 111(5), 202-213.

⁶Öbrink, E., Jildensstål, P., Ödby, E., & Jakobsson, J. G. (2015). Post-operative nausea and vomiting: Update on predicting the probability and ways to minimize its occurrence, with focus on ambulatory surgery. *International Journal of Surgery*, 15, 100-106. doi: 10.1016/j.ijsu.2015.01.024

Smith, C. A., Haas, R. E., Zepp, J. C., & Klein, M. (2016). Improving the quality of post-anesthesia care: An evidence based initiative to decrease the incidence of postoperative nausea and vomiting in the post-anesthesia care unit. *Perioperative Care and Operating Room Management*, 4, 12-16. doi:10.1016/j.pcor.2016.08.003

Smith, C. A., & Ruth-Sahd, L. (2016). Reducing the Incidence of Postoperative Nausea and Vomiting Begins With Risk Screening: An Evaluation of the Evidence. *Journal of PeriAnesthesia Nursing*, 31(2), 158-171. doi:10.1016/j.jopan.2015.03.011

⁷Tabrizi, S., Malhotra, V., Turnbull, Z. A., & Goode, V. (2019). Implementation of postoperative nausea and vomiting guidelines for female adult patients undergoing anesthesia during gynecologic and breast surgery in an ambulatory setting. *Journal of PeriAnesthesia Nursing*, 34(4), 851-860. doi: 10.1016/j.jopan.2018.10.006

Thomas, J. S., Maple, I. K., Norcross, W., & Muckler, V. C. (2019). Preoperative Risk Assessment to Guide Prophylaxis and Reduce the Incidence of Postoperative Nausea and Vomiting. *Journal of PeriAnesthesia Nursing*, 34(1), 74-85. doi:10.1016/j.jopan.2018.02.007