ASPAN'S Evidence-Based Clinical Practice Guideline for the Prevention and/or Management of PONV/PDNV

ASPAN Evidence-Based Practice Conceptual Model

Clinical practice guidelines are systematically developed guidelines or statements designed to assist the practitioner and/or patient in making appropriate health care decisions in specific clinical circumstances.[1-3] Guideline development involves a deliberate process of problem identification and validation; exploration and retrieval of literature; rigorous review, critique, and synthesis of the evidence; and design and recommendation of a practice change.[4-6] These recommendations are based on a body of evidence that may arise from multiple sources including meta-analysis, systematic reviews, randomized controlled trials, and expert opinion.[7-9] Characteristics common to quality clinical practice guidelines include development by, or in conjunction with a professional organization; use of reliable methods to integrate appropriate evidence; and comprehensive and specific coverage based on current information.[10] Guidelines are not intended as standards or absolute requirements, but may be adopted, modified, or rejected according to specific clinical needs and constraints. Use of clinical practice guidelines, however, has been shown to positively affect clinical practice and patient outcomes across a wide variety of specialties.[8,11-20]

ASPAN is committed to the promotion of the welfare, health, well-being, and safety of patients, and recognizes evidence-based practice (EBP) as the critical link to improving nursing practice and patient outcomes. To this end, ASPAN convened an EBP Strategic Work Team in June 2004 to develop an organizational model for the development, dissemination, and translation of evidence-based clinical practice guidelines for all perianesthesia practice settings. This model was further refined by the team in October 2005 and includes specific guidelines for problem identification and prioritization, evaluation of evidence quality and strength, and development and quality ranking of practice recommendations.[21]

Quality and Strength of Evidence and Guideline Recommendations

Evidence-rating scales guide the clinician in evaluating the adequacy and sufficiency of research and other types of evidence as they apply to a particular clinical problem. Criteria of interest include the consistency of findings, type and quality of studies, clinical relevance of findings, number of sample characteristics similar to the situation to which the findings will be applied, feasibility of use in practice, and the risk versus benefit.[21,22] Stetler and colleagues'[9] evidence rating scale has been identified as the preferred instrument for evaluation of the strength and quality of evidence used in all ASPAN evidence-based clinical practice guidelines. This tool ranks the strength of the evidence as levels ranging from a Level I, which is a meta-analysis of multiple controlled studies, to a Level VI, which consists of expert opinion. The quality of the evidence is also rated as A through D, with A reflecting the highest quality study, and D representing a seriously flawed study (Table 1).[9]

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Table 1. Stetler's Evidence Rating Scale[9]

Level and Quality of Evidence*	Source of the Evidence
Level I (A-D)	Meta-analysis of multiple controlled studies†
Level II (A-D)	Individual experimental study†
Level III (A-D)	Quasi-experimental study such as nonrandomized controlled single-group, pre/post test, time series, or matched case control studies†
Level IV (A-D)	Nonexperimental study, such as correlational descriptive research and qualitative or case studies†
Level V (A-D)	Case report or systematically obtained, verifiable quality or program evaluation data
Level VI	Opinion of respected authorities (eg, nationally known) based on their clinical experience or the opinions of an expert committee, including their interpretation of nonresearch-based information. This level also includes regulatory or legal opinions.

*Level I = strongest rating per type of research; however, quality for any level can range from A to D and reflects basic scientific credibility of the overall study/project. An *A* reflects a very well-designed study/project. If quality is rated as a *D* (ie, the study/project has a major flaw that raises serious questions about the believability of the findings), it is automatically eliminated from consideration.

†This level includes studies both on the targeted population/issue and studies with other relevant populations/issues (modified with permission[9]).

Based on the type, amount, and quality of available evidence, assessment, intervention, and/or outcome recommendations specific to the clinical problem of interest are made. The recommendations are then ranked to allow clinicians to make informed decisions regarding incorporation of the guidelines into practice. Recommendations in these guidelines are ranked using a modified version of the American College of Cardiology/American Heart Association (ACC/AHA) classifications (modified with permission from the ACC/AHA),[23] which address the risk/benefit ratio, and amount and quality of the evidence supporting the recommendation. Recommendation classes are ranked from I to III, based on the clinical indication of the recommendation and consideration of its risk versus benefit. These classes are defined as follows[23]:

- **Class I:** The benefit far outweighs the risk and the recommendation should be performed or administered.
- **Class IIa:** The benefit outweighs the risk and it is reasonable to perform or administer the recommendation.
- **Class IIb:** The benefit is equal to the risk and it is not unreasonable to perform or administer the recommendation.
- **Class III:** The risk outweighs the benefit and the recommendation should not be performed or administered.

The above classes can be supported by three levels of evidence (Levels A-C), which are defined as follows[23]:

- **Level A:** Evidence from multiple randomized trials or meta-analysis evaluating multiple populations (3-5) with general consistency of direction and magnitude of effect.
- **Level B:** Evidence from single randomized trials or nonrandomized studies evaluating limited (2-3) populations.
- **Level C:** Evidence from case studies, standards of care, or expert opinion involving very limited (1-2) populations.

Clinical Practice Guideline

Postoperative and postdischarge nausea and vomiting (PONV/PDNV) remains the most commonly occurring postoperative complication,[24] affecting one third of surgical patients each year for a total of approximately 75 million persons.[25] PONV is one of the strongest predictors of prolonged postoperative stay and unanticipated admission,[24,26] the financial impact of which is significant, costing several million dollars a year.[25] Among high-risk patients, the incidence of PONV can be as high as 70 to 80%.[27] PDNV occurs in 35 to 50% of patients; however, it is possible that the incidence of PDNV is higher than estimated because of underreporting of these symptoms.[28-30] PONV is the most commonly reported patient fear before elective surgery,[24,26] and it is rated by patients as being more debilitating than postoperative pain[25,31] or the surgery itself.[24] The adverse effct of both PONV and PDNV are extensive and include aspiration, wound dehiscence, prolonged postoperative hospital stays, unanticipated hospital admission after outpatient surgery, delayed return of a patient's functional ability in the 24-hour period after surgery, and lost time from work for patients and care providers at home.[24-26,30] Despite the significance of this problem, however, nurses, physicians, and pharmacists have yet to reach consensus regarding an evidence-based, multidisciplinary, multimodal treatment approach to PONV/PDNV.

Recognition of the lack of a multidisciplinary, multimodal treatment approach to this significant perianesthesia complication prompted ASPAN to appoint a Strategic Work Team (SWT) consisting of 16 multidisciplinary, multispecialty experts charged with the review and analysis of published evidence and development of consensus regarding evidence-based, multidisciplinary, multimodal clinical practice recommendations addressing the prevention and/or management of PONV and PDNV. Consensus was defined by the group as 100% agreement regarding each guideline recommendation. Although all guideline recommendations were fully supported by all team members, the team had agreed that if full agreement could not be reached on a topic considered clinically important, the majority and minority views would be presented in the guideline discussion. The SWT included national and international academic and private practice experts from a wide variety of geographic areas. Members are listed in Appendix A and included perianesthesia nurses from all perianesthesia phases, one doctorally prepared pharmacist (PharmD), two anesthesiologists representing the American Society of Anesthesiologists (ASA), two nurse anesthetists representing the American Association of Nurse Anesthetists (AANA), a Doctorate of Nursing Practice candidate with expertise in clinical practice guideline development, and representatives from the ASPAN Research and EBP committees.

Goals and Specific Aims

The SWT convened in Boston, Massachusetts in March 2006 with the specific objective to improve health outcomes in adult surgical patients through the development of a multidisciplinary, multimodal evidence-based clinical practice guideline directing the prevention and/or management of PONV and PDNV. The specific aims of this conference were to:

1. Critique and synthesize the evidence regarding the prevention and/or management of PONV/PDNV in the adult population to include:
   a. Identification and stratification of risk factors
   b. Prophylaxis
   c. Treatment
2. Develop multidisciplinary, multimodal, evidence-based recommendations regarding the prevention and/or management of

PONV/PDNV in the adult population to include:

a. Traditional therapeutic management
   i. Pharmacologic
   ii. Hydration
   iii. Oxygen therapy
   iv. NPO status
   v. Other
b. Complementary modalities
   i. Aromatherapy
   ii. Herbal supplements
   iii. Acupressure
   iv. Other

3. Identify areas of needed research to include:
   a. Gaps in the evidence regarding the prevention and management of PONV/PDNV
   b. Research priorities for the translation of the source document (clinical practice guideline) to practice.

Guideline Intent

Although it is commonly agreed that PONV and PDNV exist across all patient populations, the intent of this guideline is to provide clinicians with an evidence-based, practical, bedside approach to the prevention and/or management of PONV and PDNV in the adult patient. The guidelines apply to both inpatient and outpatient settings and to procedures performed in the operating room, as well as in other locations where sedation or anesthesia may be administered. These guidelines are not intended as standards or absolute requirements, but to serve as an evidence-based resource for anesthesia providers and perianesthesia nurses involved in the care of adult patients at risk for, or experiencing PONV and/or PDNV.

For the purposes of this guideline, the major terms are defined as follows:

- **Postoperative nausea and vomiting (PONV):** Nausea and/or vomiting that occurs within the first 24-hour period after surgery.
  - *Early PONV* is nausea and/or vomiting that occurs within the first 2 to 6 hours after surgery, often in the Phase I PACU.
  - *Late PONV* is nausea and/or vomiting that occurs in the 6- to 24-hour period after surgery, often after transfer to the floor or unit.
  - *Delayed PONV* is nausea and/or vomiting that occurs beyond 24 hours postoperatively in the inpatient setting (Fig 1):
- **Postdischarge nausea and vomiting (PDNV):** Nausea and/or vomiting that occurs after discharge from the health care facility after surgery.
  - *Delayed PDNV* is nausea and/or vomiting that occurs beyond the initial 24-hours after discharge postsurgery (Fig 2):
- **Prophylaxis:** Use of antiemetic strategies *before* the onset of symptoms to prevent PONV/PDNV, ie, in general, before the end of anesthesia.
- **Rescue treatment:** Use of antiemetic strategies *after* the onset of symptoms to treat established PONV/PDNV.
- **Risk factor:** An independent predictor, not associated factor, of an untoward event.

Fig 1. PONV timeline.

Fig 2. PDNV timeline.

Risk Factors for PONV

The primary purpose of risk factor identification in the preoperative period is to determine the potential risk of a patient developing PONV or PDNV. The group defined a risk factor as an independent predictor, not associated factor, of an untoward event. This distinction is made because some associated, but not unequivocally proven, causal factors (eg, type of surgery) are used in clinical practice for risk assessment, despite being shown to have poor predictive properties.[25] Of the relatively few studies that have identified predictors using multivariable models, most have looked at PONV in general. Two studies looked at vomiting only,[2,3] one study analyzed the use of rescue treatment in the PACU,[32] and one study used a sophisticated statistical model to distinguish between the risk factors for nausea and vomiting.[33] Although one study focused on outpatients,[34] there are no studies to date that address risk factors specific to PDNV.[30] Numerous risk factors are consistently supported by strong evidence, whereas other risk factors are supported by weaker or conflicting research.

Risk Factors Supported by Strong Evidence (Class I, Level A)

- Female gender[2,3,27,33,35-39]
- History of PONV[2,3,27,33,35-38]
- History of motion sickness (subjective as reported by patient)[2,3,27,33,35-38]
- Nonsmoker[2,27,33,35,36,38,40]
- Postoperative use/administration of opioids[27,35,37,39,41]
- Use of volatile anesthetics[33,35,38,41,42]
- Use of nitrous oxide[35,42,43]

Risk Factors Supported by Weak Evidence (Class IIa, Level B)

- Age[2,3,35,38a]
- Duration of surgery[36b]

Risk Factors Supported by Conflicting Evidence (Class IIb, Level B)

- Type of surgery[3,25,33,35,38]

Preadmission Testing/Preoperative Holding Patient Assessment

Several risk factor identification scores and models exist in the literature for the purpose of identifying patients at high risk for experiencing PONV.[27,36-38,46,47] Research indicates, however, that the more simplified risk tools provide better discrimination and calibration for the prediction of PONV.[48] Two simplified risk factor identification tools[27,36] are equally supported by three validation studies[48-50] and are available in Appendix B.

The usefulness of these scores for PDNV is unknown. However, there is no good reason why risk factors for PDNV should be different to those for PONV. Therefore, it was the opinion of the group that simplified risk scores might be useful to rank the

[a] *In pediatric patients older than 3 years, age is a risk factor supported by strong evidence.*[44]

[b] *Duration of surgery in pediatric patients is a risk factor supported by strong evidence.*[45]

Table 2. Prophylaxis Treatment of PONV Based on the Patient's Level of Risk Determined by Risk Factor Assessment

Level of Risk	Low Risk	Moderate Risk	Severe Risk	Very Severe Risk
% chance of PONV	10-20%	40%	60%	80%
Number of prophylactic interventions to consider	0	1	2	3 or more

Increased risk of surgical morbidity/complication risk related to POV would move the patient up at least one risk level and indicate the need for additional interventions. Examples include but are not limited to maxillomandibular fixation, plastic surgery, intracranial surgery, etc.

patients' risk for PDNV even though the absolute risk might not be accurate.

Preadmission Testing/Preoperative Holding Assessment Recommendations

- Assess for PONV/PDNV risk factors using the Apfel[27] or Koivuranta[36] tool[48-50] (PONV assessment: Class I, Level A; PDNV assessment: Class I, Level C).
- Document and communicate risk factor assessment findings to all members of the anesthesia/surgical team[51-53] (Class I, Level A).

Preadmission Testing/Preoperative Holding: Expected Outcomes

- PONV/PDNV risk factors will be identified before surgery.
- PONV/PDNV risk factors will be documented and communicated among anesthesia/surgical team members.

Prophylaxis for PONV

Simplified risk factor identification tools can be used to establish the patient's baseline risk for PONV.[2,3,27,36-38,54] As noted in Appendix C, the level of PONV risk increases for each additional patient risk factor noted.[27,36] The number of prophylactic interventions selected should be based on the level of baseline PONV risk.[55] It is also the opinion of the panel that additional interventions should be considered in the case of increased surgical complication risks related to postoperative vomiting (POV) (Table 2).

Prophylactic recommendations include anesthesia-related, pharmacologic, therapeutic, and complementary interventions. Selection of interventions should be based on[43,56,57]:

- Efficacy of the intervention to include
  - Consideration of success rate
  - Duration of action
- Risk of developing side effects or number and/or severity of side effects
- Cost

PONV Prophylaxis Recommendations (Algorithm 1)

- Use a simplified risk factor identification tool to identify the baseline risk for PONV[2,3,27,36-38,54] (Class I, Level A).
- Consider the baseline PONV risk in the selection of the number and type of prophylactic interventions[55] (Class I, Level A).
- Consider additional interventions in the case of increased surgical risks associated with POV. The number of additional interventions should be based on the total risk to the patient (maxillomandibular fixation, plastic surgery, etc) (Class I, Level C).
- Recommended prophylactic interventions include:
  - Anesthesia considerations[58-60](Class I, Level A)

- Total intravenous anesthesia[55,61] (TIVA)[c]
- Consider nonsteroidal anti-inflammatory drugs[64]
- Regional blocks[38,58]

- Pharmacologic[d,e]
  - Dexamethasone[55,65] (Class I, Level A)
  - 5-HT_3 receptor antagonists[60,66] (Class I, Level A)
  - H1 receptor blockers (antihistamines)[67] (Class I, Level A)
  - Scopolamine patch[68] (Class I, Level A)
  - Droperidol[65,66] (consider Food and Drug Administration [FDA] black box warning)[69,70] (Class IIa, Level A)
  - New drug class: Neurokinin-1 (NK1) antagonists[71,72](Class IIb, Level B)
    - The role of the NK1 antagonists has not yet been firmly established in the management of PONV. Preliminary studies suggest that this group of drugs may be useful at least for prophylaxis of PONV. If this is confirmed by other studies, this class of drugs may be a beneficial addition to the armamentarium of drugs for PONV.

- Therapeutic interventions[f,g]
  - Hydration
    - Encourage healthy patients undergoing elective procedures to drink clear fluids up to two hours before surgery[78] (Class IIb, Level C).
    - Administer supplemental intravenous fluids in high-risk, ASA I-II patients with insensible losses if there is not concern of fluid volume overload.[79-83] (Class IIa, Level A).
      - Intravenous fluid doses ranging from 15 to 40 mL/kg of lactated ringers have been shown to decrease PONV in this population.[79,81]
  - Pain management:
    - Use a multimodal approach to pain management[27,35,37,39,41,64] (Class I, Level A).
      - Consider the use of nonsteroidal anti-inflammatory drugs.[64,84-86]
      - Consider the use of regional analgesia.[58,87-90]
- Complementary interventions
  - P6 acupoint stimulation[91-93] (Class IIb, Level A).
    - The perianesthesia nurse may consider educating the patient regarding the acquisition and use of over-the-counter acupressure and acustimulation devices in high-risk patients or patients expressing concern over experiencing PONV (Class IIb, Level C).

PONV Prophylaxis: Expected Outcomes

- Appropriate PONV prophylaxis will be initiated as indicated by risk factor assessment.

[c] *Propofol and dexamethasone exert their antiemetic effects in a different manner than traditional antiemetics. Rather than block a receptor, propofol may exert its antiemetic effect by depressing the chemoreceptor trigger zone (CTZ), vagal nuclei, and other centers implicated in causing PONV. Dexamethasone may antagonize prostaglandins or release endorphins that elevate mood, improve one's sense of well-being, and/or stimulate one's appetite. Pharmacologically, scopolamine antagonizes muscarinic type-1 receptors in the cerebral cortex and histamine type-1 receptors in the hypothalamus and vomiting center. Therefore, if one or more of these agents is administered to prevent PONV, a traditional antiemetic that works by blocking dopamine type-2 receptors in the CTZ (eg, prochlorperazine, droperidol, promethazine) or serotonin type-3 receptors (eg, ondansetron, dolasetron, granisetron) can be used as a rescue antiemetic. Rescuing with an agent from a different antiemetic class has been demonstrated to be more effective than repeat administration of the agent used for prophylaxis.*[62,63]

[d] *See footnote c.*

[e] *Metoclopramide has not been shown to be effective in prophylactic management (Level I, Class A).*[65]

[f] *Limited evidence supports the effect of preoperative oral carbohydrate intake on decreasing PONV.*[73]

[g] *Use of supplemental oxygen intraoperatively to reduce PONV is not supported by the evidence.*[74-77]

- The incidence of PONV will be reduced.
- Patient satisfaction will be improved.

Postoperative Patient Management: Phase I PACU/Phase II PACU

It is the consensus of the panel that assessment for the presence of postoperative nausea (yes or no) should be conducted on admission and discharge to the Phase I and/or Phase II PACU, and more frequently as indicated (high-risk patients, after administration of an opioid or antiemetic, etc). If the patient complains of nausea, the severity of that nausea should be quantified using a verbal descriptor scale (VDS) (ie, mild, moderate, severe; scale of 0 to 10) or a visual analogue scale (VAS). If a prophylactic antiemetic has been administered, the antiemetic agent selected for rescue therapy should affect a different receptor site than the prophylactic agent.[62,63]

Postoperative Patient Management Recommendations (Algorithm 2)

- Assess for postoperative nausea on admission, discharge, and more frequently as indicated (high-risk patient, after administration of an opioid or antiemetic, etc) (Class I, Level C).
- If nausea is present, quantify the severity of the nausea using a VDS or VAS (Class I, Level C).
- Implement rescue interventions.
  - Verify adequate hydration and blood pressure[79-83,94] (Class I, Level A).
  - Select and administer appropriate rescue antiemetic.[h]
    - 5-HT_3 receptor antagonists[60,66] (Class I, Level A)
    - H1 receptor blockers (antihistamines)[62] (Class I, Level A)
    - Droperidol[97] (consider FDA black box warning)[69,70](Class IIa, Level A)
    - Late considerations may include (Class IIa, Level C):
      - Metoclopramide[65,98,99]
      - Low-dose promethazine[62]
      - Prochlorperazine[97]
    - New drug class: Neurokinin-1 (NK1) antagonists[100] (Class IIb, Level B)
      - The role of the NK1 antagonists has not yet been firmly established in the management of PONV. Preliminary studies suggest that this group of drugs may be useful at least for prophylaxis of PONV. If this is confirmed by other studies, this class of drugs may be a beneficial addition to the armamentarium of drugs for PONV.
    - Consider aromatherapy[101-104] (Class IIb, Level B/C).

Postoperative Patient Management: Expected Outcomes

- Routine assessment for the presence of PONV will occur.
- Appropriate PONV rescue treatment will be initiated.
- The incidence of PONV will be reduced.
- The incidence of rescue treatment will be reduced.
- Patient satisfaction will be improved.

Postdischarge Nausea and Vomiting (PDNV)

PDNV is recognized by the panel as a significant problem, affecting approximately one third of outpatients,[105] yet very little research has been conducted regarding the incidence, prediction, or pharmacologic and nonpharmacologic treatment of this problem.[30] No guidelines to this point have included recommendations for patients past the point of discharge. Based on the limited research and consensus of the panel,

[h] *Dexamethasone and scopolamine patch are not recommended as rescue agents as a result of delayed onset of action based on the pharmacokinetics of these drugs. Plasma levels of transdermal scopolamine are detected after four hours of administration.*[95,96]

however, the following recommendations are made.

Postdischarge Nausea and Vomiting Recommendations (Algorithm 3)

- Assess for PDNV risk factors using the Apfel[27] or Koivuranta[36] tool (Class I, Level C).
- Administer prophylactic antiemetics in high-risk patients[105i] (Class I, Level A).
  - Consider administration of dexamethasone to high-risk patients if not administered pre- or intraoperatively[65] (Level IIa, Class C).
  - Consider scopolamine patch (may be left on for as long as 24 hours)[68,106,107] (Class IIa, Level C).
  - Complementary interventions
    - P6 acupoint stimulation[91-93] (Class IIb, Level C).
      - The perianesthesia nurse may consider educating the patient regarding the acquisition and use of over-the-counter acupressure and acustimulation devices in high-risk patients or patients expressing concern over experiencing PONV (Class IIb, Level C).
  - Include patient education on the management of PDNV in all outpatient discharge education (Class I, Level C).
  - Include assessment for the presence and severity of PDNV in any outpatient follow-up contact (Class I, Level C).
  - Rescue treatment for PDNV may include:
    - Ondansetron dissolving tablets[108] (Class I, Level C)
    - Promethazine suppository or tablets[109] (Class I, Level C)
    - Scopolamine patch[68,106,107] (Class I, Level C)

[i]*This meta-analysis found that, although prophylactic ondansetron is effective with a numbers needed to treat (NNT) of 13, administration of a combination of agents is much more effective, with an NNT of 5.*

PDNV: Expected Outcomes

- PDNV risk factors will be identified before surgery.
- PDNV risk factors will be documented and communicated among anesthesia/surgical team members.
- Appropriate PDNV prophylaxis will be initiated as indicated by risk factor assessment.
- Outpatient education will include the management of PDNV.
- Outpatient follow-up patient contact will include assessment for the presence of and/or severity of PDNV.
- Appropriate PDNV rescue treatment will be initiated.
- The incidence of PDNV will be reduced.
- Patient satisfaction will be improved.
- Time and cost of patient's return to normal activities will be reduced.

Research Indications

In addition to developing evidence-based, multidisciplinary, multimodal clinical practice guidelines for the prevention and/or management of PONV/PDNV, the SWT was also charged with identifying areas of needed research in the prevention and management of PONV/PDNV, as well as research priorities for the translation of the guideline to practice. Areas of needed research in the prevention and management of PONV/PDNV are as follows:

Prophylaxis for PONV:

- What are the effects of prolonged fasting on PONV?
- What is the effect of supplemental oxygen therapy on the incidence of PONV? Further studies focusing on the impact of oxygen therapy on the delivery of blood flow to abdominal organs are recommended.

- Higher-quality research on the effect of various complementary modalities on the reduction of PONV is recommended.

Postoperative Patient Management: Phase I PACU/Phase II PACU:

- What PONV/PDNV assessment scales/techniques are most appropriate for use in this population?
- How often should postoperative assessment for PONV/PDNV occur?
- A meta-analysis on the efficacy of aromatherapy as a rescue agent is recommended.

PDNV:

- What are the risk factors for PDNV?
- What risk identification tools are most effective in the prediction of PDNV?
- What are the most effective prophylactic interventions to prevent PDNV?
- What are the most effective rescue treatments for PDNV?
- What are the most commonly used self-care activities for the management of PDNV? Are they effective?
- What is the most effective patient education content regarding the management of PDNV at home?
- What is the impact of PDNV on patient satisfaction and quality of life?
- What is the economic impact of PDNV?

Priorities for research into the translation of this guideline to practice include:

- Is this guideline usable, easy to follow, and feasible to implement in the practice setting?
- What is the impact of the guideline on recommended expected outcomes?

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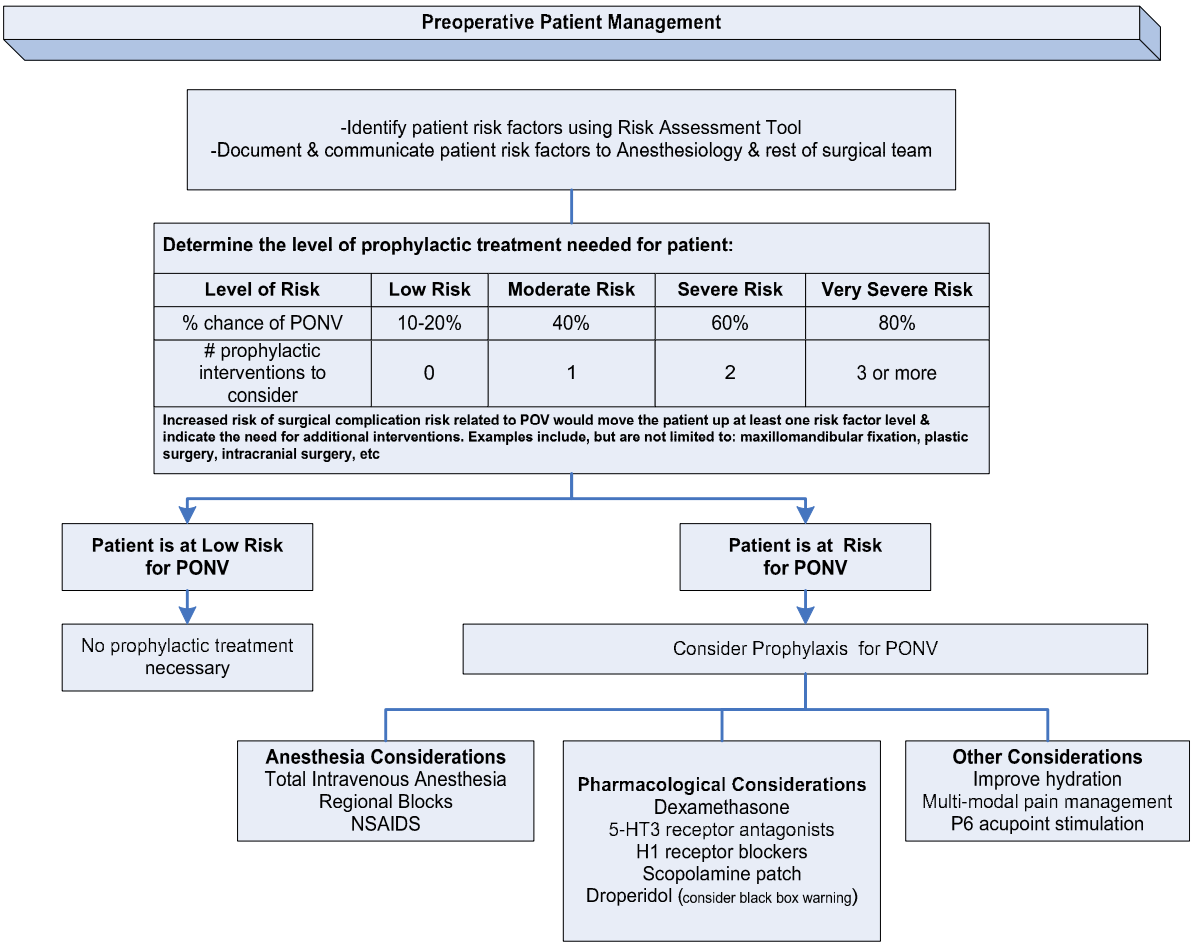
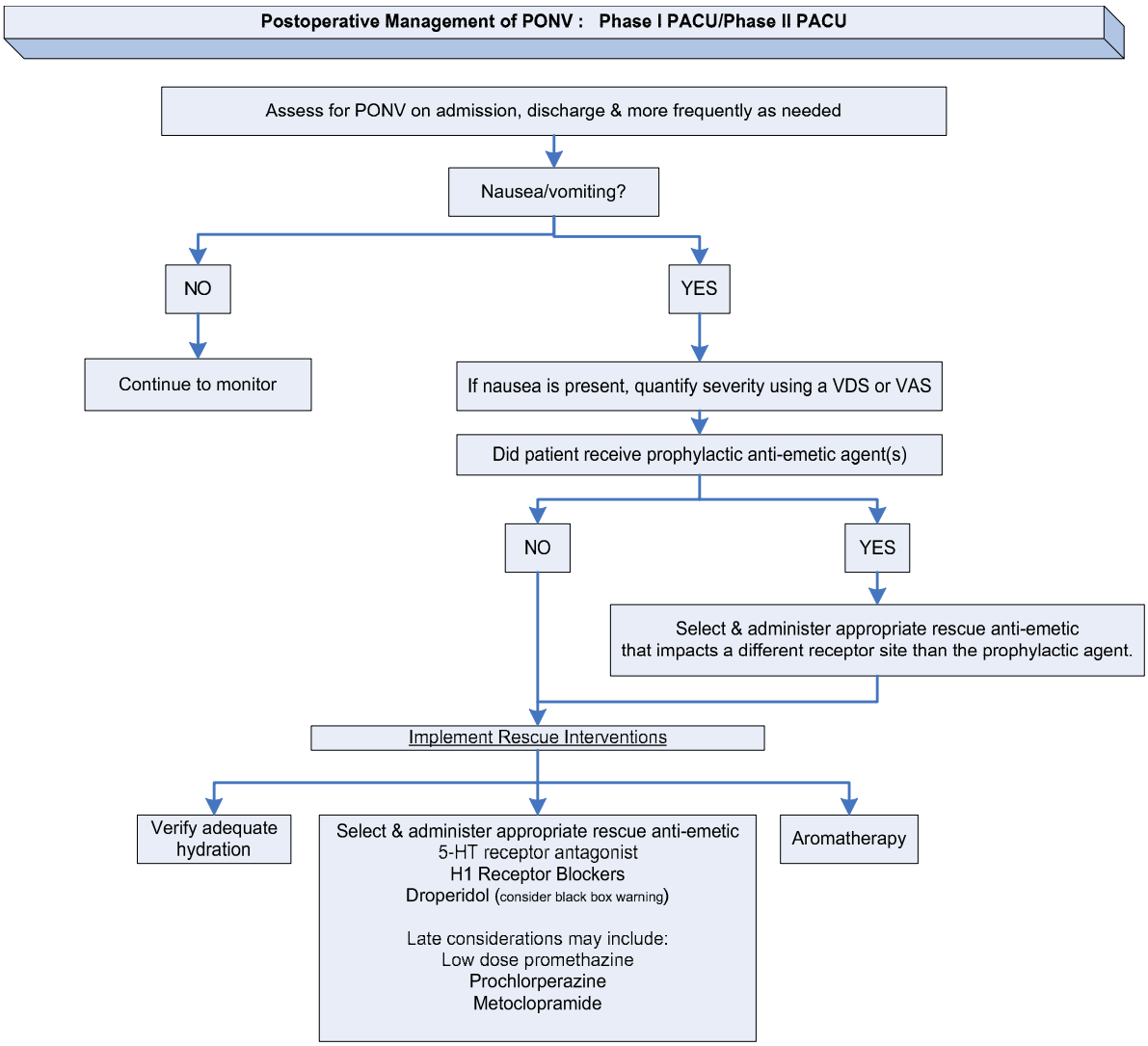
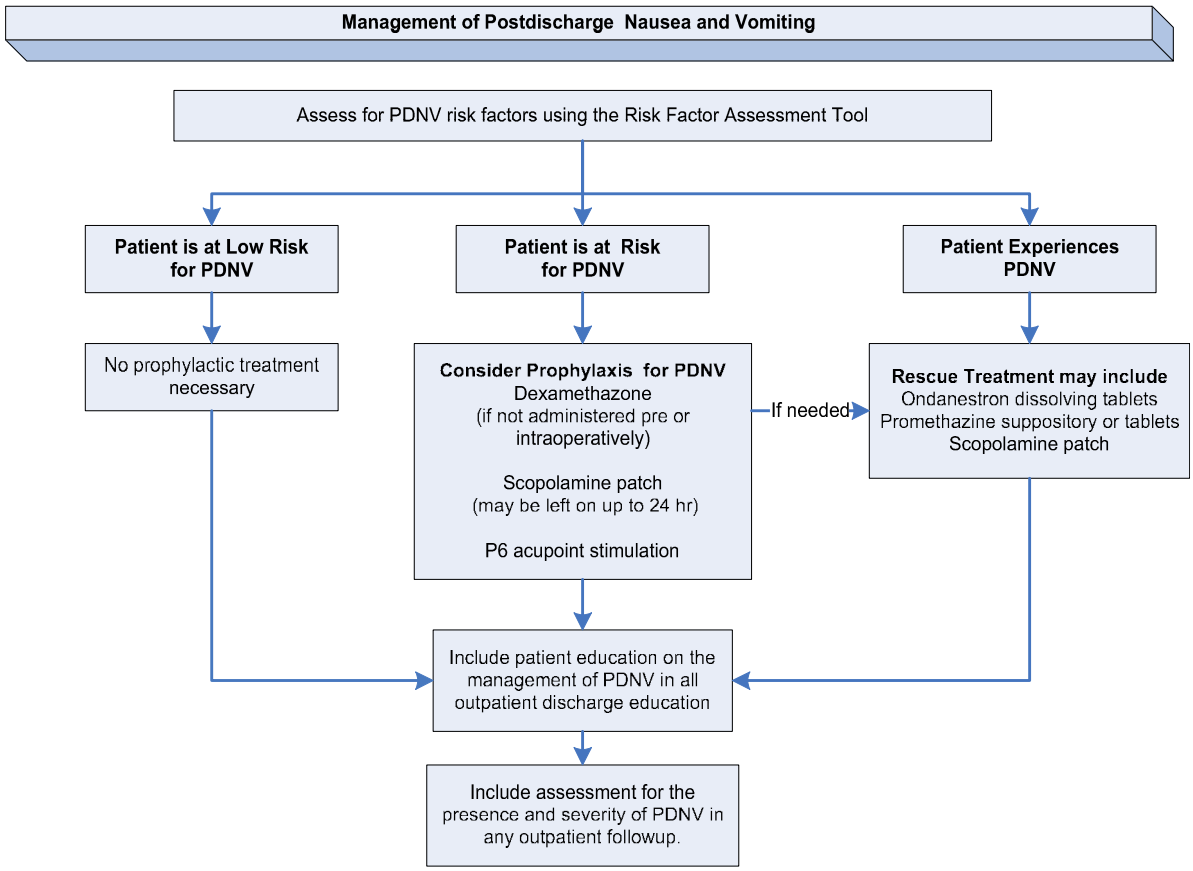
Algorithm 1. Preoperative patient management.



Algorithm 2. Postoperative management of PONV: Phase I PACU/phase II PACU.



Algorithm 3. Management of PDNV.



Appendix A: Strategic Work Team Members

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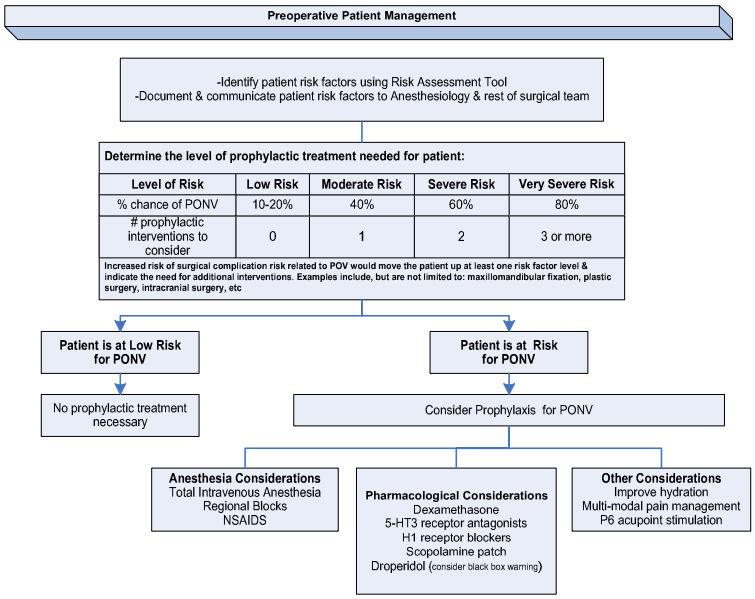
Appendix B: Simplified Risk Factor Identification Tools

Apfel et al[27]	
Risk Factors	Points
Female gender	1
Non-smoker	1
History of PONV/Motion sickness	1
Postoperative opioids	1
Sum =	0 . . . 4

Koivuranta et al[36]	
Risk Factors	Points
Female gender	1
Non-smoker	1
History of PONV	1
History of motion sickness	1
Duration of surgery > 60 minutes	1
Sum =	0 . . . 5

Appendix C: Relationship Of # Of Risk Factors To Level Of Risk[27,36]

# of Risk Factors	Level of Risk	% of Risk of PONV
0-1	Low	10-20
2	Moderate	40
3	Severe	60
4-5	Very severe	80+



Glossary

Acupoint Stimulation: A technique of stimulating acupoints to achieve a therapeutic response. Stimulation can be achieved by insertion of a fine, wire-thin needle (acupuncture); transcutaneous, electrical stimulation (acustimulation); or physical pressure from fingers or wristband. The P6 acupoint is most commonly used in the treatment of nausea and vomiting and is located on the plantar aspect of the wrist, between the tendons of palmaris longus and flexor carpii radialis muscles, 4 to 5 centimeters proximal to the wrist crease.[92]

Aromatherapy: The use of inhaled fragrances, such as isopropyl alcohol or peppermint, to relieve nausea.

Complementary Interventions: Nonconventional treatment options used in conjunction with traditional or conventional therapy in the management of nausea and vomiting.

Nausea: Subjective report of an unpleasant feeling in the epigastrium and/or in the back of the throat. Common patient descriptors include:

- "Feeling sick to my stomach"
- "Feeling queasy"
- "Turning stomach"
- "Feeling squeamish"

Pharmacologic Interventions: Prescribed medications used to prevent and/or treat nausea and vomiting.

Phase I PACU: Nursing care focuses on the provision of care to the patient in the immediate postanesthesia period, transitioning them to Phase II, the inpatient setting, or to an intensive care setting for continued care.

Phase II PACU: Nursing care focuses on preparing the patient/family/significant other for care in the home, Phase III, or an extended care environment.

Postdischarge Nausea and Vomiting (PDNV): Nausea and/or vomiting that occurs after discharge from a health care facility after surgery.

- *Delayed PDNV* is nausea and/or vomiting that occurs beyond the initial 24 hours after discharge postsurgery.

Postoperative Nausea and Vomiting (PONV): Nausea and/or vomiting that occurs within the first 24-hour period after surgery.

- *Early PONV* is nausea and/or vomiting that occurs within the first 2 to 6 hours after surgery, often in the Phase I PACU.
- *Late PONV* is nausea and/or vomiting that occurs in the 6- to 24-hour period after surgery, often after transfer to the floor or unit.
- *Delayed PONV* is nausea and/or vomiting that occurs beyond 24 hours postoperatively in the inpatient setting .

Preadmission Testing: Nursing care focuses on preparing the patient/family/significant other physically, psychologically, socioculturally, and spiritually for his or her surgical experience. Interview and assessment techniques are used to identify actual or potential problems, and education and interventions are initiated to optimize patient outcomes.

Preoperative Holding: Nursing care focuses on validation of existing information and completion of preparation of the patient/family/significant other both physically and emotionally for his or her surgical experience.

Prophylaxis Interventions: Antiemetic strategies implemented *prior to* the onset of symptoms to prevent PONV/PDNV.

Rescue Treatment: Antiemetic strategies implemented *after* the onset of symptoms to treat established PONV/PDNV.

Retching: An attempt to vomit without expelling any material. Common patient descriptor is "dry heaves."

Risk Factor: An independent predictor, not associated factor, of an untoward event.

Therapeutic Interventions: Treatment options other than medications, requiring a physician's order, that are commonly used in the management of PONV/PDNV.

Vomiting: The forceful expulsion of the contents of stomach, duodenum, and jejunum through the oral cavity as a result of change in intrathoracic positive pressure. Common patient descriptors include:

- "Puking"
- "Upchucking"
- "Throwing up"
- "Tossing my cookies"
- "Barfing"