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Practice Guidelines for Postanesthetic Care

A Report by the American Society of Anesthesiologists Task Force on Postanesthetic Care

PRACTICE guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints.

Practice guidelines are not intended as standards or absolute requirements. The use of practice guidelines cannot guarantee any specific outcome. Practice guidelines are subject to periodic revision as warranted by the evolution of medical knowledge, technology, and practice. The Guidelines provide basic recommendations that are supported by analysis of the current literature and by a synthesis of expert opinion, open forum commentary, and clinical feasibility data (Appendix).

A. Definition of Postanesthetic Care

The literature does not provide a standard definition for postanesthetic care. For these Practice Guidelines, postanesthetic care refers to those activities undertaken to manage the patient following completion of a surgical procedure and the concomitant primary anesthetic.

B. Purpose of the Guidelines for Postanesthetic Care

The purpose of these Guidelines is to improve postanesthetic care outcomes for patients who have just had anesthesia or sedation and analgesia care. This is accomplished by evaluating available evidence and providing recommendations for patient assessment, monitoring, and management with the goal of optimizing patient safety. It is expected that each recommendation will be individualized according to the needs of each patient.

C. Focus

These Guidelines focus on the perioperative management of patients with the goal of improving postanesthetic quality of life, reducing postoperative adverse events, providing a uniform assessment of recovery, and streamlining postoperative care and discharge criteria.

These Guidelines apply to patients of all ages who have just received general anesthesia, regional anesthesia, or moderate or deep sedation. The Guidelines may need to be modified to meet the needs of certain patient populations, such as children or the elderly. The Guidelines do not apply to patients receiving infiltration local anesthesia without sedation, patients receiving minimal sedation (anxiolysis),[1] or patients receiving intensive care.

D. Application

The Guidelines are intended for use by anesthesiologists and may also serve as a resource for other physicians and healthcare professionals who direct anesthesia or sedation and analgesia care. General medical supervision and coordination of patient care in the postanesthesia care unit (PACU) should be the responsibility of an anesthesiologist.[2]

E. Task Force Members and Consultants

The American Society of Anesthesiologists (ASA) appointed a Task Force of 10 members to review the published evidence and obtain consultant opinion from a representative body of anesthesiologists. The Task Force members consisted of anesthesiologists in both private and academic practices from various geographic areas of the United States, and methodologists from the ASA Committee on Practice Parameters.

The Task Force met its objective in a six-step process. First, original published research studies relevant to postanesthetic care were reviewed and analyzed. Second, Consultants with expertise in postanesthetic care and who practice or work in various settings (*e.g.*, academic

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Readers with special interest in the statistical analyses used in establishing these Guidelines can receive further information by writing to the American Society of Anesthesiologists: 520 North Northwest Highway, Park Ridge, Illinois 60068-2573.

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and private practice) were asked to (1) participate in opinion surveys and (2) review and comment on drafts of the Guidelines. Third, a random sample of active members of the ASA was surveyed regarding various elements of the Guidelines. Fourth, the Task Force held an open forum at a major national meeting to solicit input from attendees on the draft Guidelines. Fifth, all available information was used by the Task Force in developing the Guideline recommendations. Sixth, the Consultants were surveyed to assess their opinions on the feasibility and financial implications of implementing the Guidelines.

F. Availability and Strength of Evidence

Evidence-based guidelines are developed by a rigorous analytic process. To assist the reader, the Guidelines make use of several descriptive terms that are easier to understand than the technical terms and data that are used in the actual analyses. These descriptive terms are defined below:

The following terms describe the *strength* of scientific data obtained from the scientific literature:

Supportive: There is sufficient quantitative information from adequately designed studies to describe a statistically significant relationship ($P < 0.01$) between a clinical intervention and a clinical outcome, using meta-analysis.

Suggestive: There is sufficient information from case reports and descriptive studies to provide a directional assessment of the relationship between a clinical intervention and a clinical outcome. This type of qualitative information does not permit a statistical assessment of significance.

Equivocal: Qualitative data have not provided a clear direction for clinical outcomes related to a clinical intervention and (1) there is insufficient quantitative information or (2) aggregated comparative studies have found no quantitatively significant differences among groups or conditions.

The following terms describe the *lack* of available scientific evidence in the literature:

Inconclusive: Published studies are available, but they cannot be used to assess the relationship between a clinical intervention and a clinical outcome because the studies either do not meet predefined criteria for content as defined in the "Focus of the Guidelines" or do not provide a clear causal interpretation of findings due to research design or analytic concerns.

Insufficient: There are too few published studies to investigate a relation between a clinical intervention and a clinical outcome.

Silent: No studies that address a relationship of interest were found in the available published literature.

The following terms describe *survey responses* for any specified issue. Responses are assigned a numeric value of agree = +1, undecided = 0, or disagree = −1. The average weighted response represents the mean value for each survey item.

Agree: The average weighted response must be equal to or greater than +0.30 (on a scale of −1 to 1) to indicate agreement.

Equivocal: The average weighted response must be between −0.30 and +0.30 (on a scale of −1 to 1) to indicate an equivocal response.

Disagree: The average weighted response must be equal to or less than −0.30 (on a scale of −1 to 1) to indicate disagreement.

Guidelines

I. Perioperative Patient Assessment and Monitoring

Perioperative and postanesthetic management of the patient includes periodic assessment and monitoring of respiratory and cardiovascular function, neuromuscular function, mental status, temperature, pain, nausea and vomiting, drainage and bleeding, and urine output (table 1). Where specific monitoring is recommended, the duration of the intervention will be dependent upon the patient's clinical status. Specific criteria may be useful for clinical documentation.

1. Respiratory Function. The literature *suggests* that assessment and monitoring of respiratory function during recovery, in particular with pulse oximetry, is associated with early detection of hypoxemia. The Consult-

Table 1. Summary of Recommendations for Assessment and Monitoring

Routine	Selected Patients
Respiratory	
Respiratory rate	
Airway patency	
Oxygen saturation	
Cardiovascular	
Pulse rate	Electrocardiogram
Blood pressure	
Neuromuscular	
Physical examination	Neuromuscular blockade
	Nerve stimulator
Mental status	
	Temperature
Pain	
Nausea and vomiting	
	Urine
	Voiding
	Output
	Drainage and bleeding

ants and ASA members agree that periodic assessment and monitoring of airway patency, respiratory rate, and oxygen saturation (Spo_2) should be done during emergence and recovery.

Recommendations: Periodic assessment of airway patency, respiratory rate, and Spo_2 should be done during emergence and recovery. Particular attention should be given to monitoring oxygenation and ventilation.[2]

2. Cardiovascular Function. The literature is *insufficient* to evaluate the impact of cardiovascular assessment and monitoring on perioperative complications, and the literature is *silent* regarding routine electrocardiographic monitoring. The Consultants and ASA members agree that routine pulse, blood pressure, and electrocardiographic monitoring detect cardiovascular complications, reduce adverse outcomes, and should be done during emergence and recovery. The Task Force notes that there are certain categories of patients or procedures for which routine electrocardiographic monitoring may not be necessary.

Recommendations: Routine monitoring of pulse and blood pressure should be done during emergence and recovery, and electrocardiographic monitors should be immediately available.

3. Neuromuscular Function. Assessment of neuromuscular function primarily includes physical examination and, on occasion, may include neuromuscular blockade monitoring. The literature *suggests* that neuromuscular blockade monitors are effective in detecting neuromuscular dysfunction. The Consultants and ASA members agree that assessment of neuromuscular function identifies potential complications, reduces adverse outcomes, and should be done during emergence and recovery.

Recommendations: Assessment of neuromuscular function should be performed during emergence and recovery for patients who have received nondepolarizing neuromuscular blocking agents or who have medical conditions associated with neuromuscular dysfunction.

4. Mental Status. The literature is *silent* regarding whether assessment of mental status and behavior is associated with fewer postoperative complications. Several scoring systems are available for such assessment. The Consultants and ASA members agree that assessment of mental status detects complications, reduces adverse outcomes, and should be done during emergence and recovery.

Recommendations: Mental status should be periodically assessed during emergence and recovery.

5. Temperature. The literature is *insufficient* regarding whether routine assessment of patient temperature is associated with fewer postoperative complications. The Consultants and ASA members agree that routine assessment of patient temperature detects complications, reduces adverse outcomes, and should be done during emergence and recovery.

Recommendations: Patient temperature should be periodically assessed during emergence and recovery.

6. Pain. The literature is *insufficient* regarding whether routine assessment and monitoring of pain is associated with fewer postoperative complications. The Consultants and ASA members agree that routine assessment and monitoring of pain detects complications, reduces adverse outcomes, and should be done during emergence and recovery.

Recommendations: Pain should be periodically assessed during emergence and recovery.

7. Nausea and Vomiting. The literature is *insufficient* regarding whether the routine periodic assessment of nausea and vomiting is associated with fewer postoperative complications. The Consultants are equivocal, but the ASA members agree that routine assessment and monitoring of nausea and vomiting detects complications and reduces adverse outcomes. Both the Consultants and ASA members agree that routine assessment and monitoring of nausea and vomiting should be done during emergence and recovery.

Recommendations: Periodic assessment of nausea and vomiting should be performed routinely during emergence and recovery.

8. Fluids. The literature is *insufficient* to evaluate the benefits of assessing the hydration status of patients in the PACU. The Consultants and ASA members agree that routine perioperative assessment of patients' hydration status and fluid management reduces adverse outcomes and improves patient comfort and satisfaction.

Recommendations: Postoperative hydration status should be assessed in the PACU and managed accordingly. Certain procedures involving significant loss of blood or fluids may require additional fluid management.

9. Urine Output and Voiding. The literature is *insufficient* regarding whether assessment of *urine output* is associated with fewer postoperative complications. The Consultants and ASA members agree that assessment of urine output detects complications and reduces adverse outcomes. They agree that assessment of urine output during emergence and recovery need not be routine but should be done for selected patients.

The literature is *insufficient* regarding whether assessment and monitoring of *urinary voiding* is associated with fewer postoperative complications. The Consultants agree and ASA members are equivocal that assessment and monitoring of urinary voiding detects complications. Both the Consultants and ASA members are equivocal regarding whether assessment of urinary voiding reduces adverse outcomes, but they agree that urinary voiding should be assessed routinely during recovery.

Recommendations: Assessment of urine output and of urinary voiding should be done on a case-by-case basis for selected patients or selected procedures during emergence and recovery.

10. Drainage and Bleeding. The literature is *silent* regarding whether assessment of drainage and bleeding is associated with fewer postoperative complications. The Consultants and ASA members agree that assessment and monitoring of drainage and bleeding detects complications, reduces adverse outcomes, and should be a routine component of emergence and recovery care.

Recommendations: Assessment of drainage and bleeding should be performed when indicated during emergence and recovery.

II. Treatment during Emergence and Recovery

1. Prophylaxis and Treatment of Nausea and Vomiting. Published evidence *supports* the preoperative and intraoperative use of antiemetic agents (*i.e.*, 5-HT_3 antagonists, droperidol, dexamethasone, and metoclopramide) for the prevention of nausea and vomiting. The literature indicates that some side effects (*e.g.*, agitation, restlessness, or drowsiness) may be associated with the use of some antiemetics. The literature is *equivocal* regarding the efficacy of antiemetics of the antihistamine class for the prevention of nausea but is supportive for the prevention of vomiting. The literature is insufficient to evaluate the efficacy of other pharmacologic agents for the prevention of nausea or vomiting. The Consultants and ASA members agree that the pharmacologic prophylaxis of nausea and vomiting improves patient comfort and satisfaction, reduces time to discharge, and should be done selectively.

Published evidence *supports* the use of antiemetics (*i.e.*, 5-HT_3 antagonists) during recovery for treating nausea and vomiting without encountering significant complications or other adverse events. Although they may be useful, there is *insufficient* evidence to evaluate the efficacy of other antiemetic agents. The Consultants and ASA members agree that the pharmacologic treatment of nausea and vomiting improves patient comfort and satisfaction, reduces time to discharge, and should be done.

The literature *supports* the efficacy of the preoperative or intraoperative use of multiple agents (*e.g.*, 5-HT_3 antagonists plus dexamethasone) in the prophylaxis of nausea and vomiting when compared with single agents. The literature is *equivocal* regarding whether additional complications or other adverse events occur during emergence and recovery when multiple agents are used. The Consultants and ASA members are equivocal regarding whether multiple agents should be used for the prophylaxis of nausea and vomiting.

The literature is *silent* regarding the use of multiple pharmacologic agents compared with single agents in the treatment of nausea and vomiting. The Consultants and ASA members are equivocal regarding whether multiple agents should be used for postoperative treatment of nausea and vomiting.

Table 2. Summary of Treatment Recommendations

Prophylaxis and treatment of nausea and vomiting
Antiemetic agents (*i.e.*, 5-HT_3 antagonists, droperidol, dexamethasone, or metoclopramide) may be used for prophylaxis or treatment when indicated.
Multiple agents may be used for prophylaxis or treatment when indicated.
Other antiemetics or nonpharmacologic agents may be used for treatment when indicated, although the evidence supporting their use is less robust.
Supplemental oxygen
Supplemental oxygen for patients at risk of hypoxemia is recommended.
Fluid administration and management
Postoperative fluids should be managed in the PACU.
Certain procedures may require additional fluid management.
Normalizing patient temperature
Normothermia should be maintained.
Forced-air warming systems are most effective for treating hypothermia.
Pharmacologic agents for the reduction of shivering
Meperidine is recommended.
Antagonism of the effects of sedatives, analgesics, and neuromuscular block
Antagonism of benzodiazepines
Antagonists should be available.
Flumazenil should not be used routinely.
Flumazenil may be administered to antagonize respiratory depression and sedation.
After pharmacologic reversal, patients should be observed long enough to ensure that cardiorespiratory depression does not recur.
Antagonism of opioids
Antagonists (*e.g.*, naloxone) should be available but should not be used routinely.
Naloxone may be administered to antagonize respiratory depression and sedation.
After pharmacologic reversal, patients should be observed long enough to ensure that cardiorespiratory depression does not recur.
Reversal of neuromuscular blockade
Specific antagonists should be administered for reversal of residual neuromuscular blockade as indicated.

PACU = postanesthesia care unit.

Recommendations: Antiemetic agents should be used for the prevention and treatment of nausea and vomiting when indicated. Multiple agents may be used for the prevention or treatment of nausea and vomiting when indicated (table 2).

2. Administration of Supplemental Oxygen. Published evidence *supports* the use of supplemental oxygen during patient transportation or in the recovery room to reduce the incidence of hypoxemia. The Consultants and ASA members are equivocal regarding whether administration of supplemental oxygen during patient transportation or in the PACU should be routine.

Recommendations: Administration of supplemental oxygen is effective in preventing and treating hypoxemia. Administering supplemental oxygen during transportation or in the recovery room should be done for patients at risk of hypoxemia.

3. Normalizing Patient Temperature. The literature *suggests* that active patient warming is associated with normalizing patient temperature but is *insufficient* in determining whether adverse outcomes are reduced. The literature *supports* the use of forced-air warming devices for normalizing patient temperature and reducing shivering. In addition, the literature *suggests* that forced-air warming is associated with reduced time in recovery. The Consultants and ASA members agree that both the perioperative maintenance of normothermia and the use of forced-air warming reduces shivering and improves patient comfort and satisfaction.

Recommendations: Normothermia should be a goal during emergence and recovery. When available, forced-air warming systems should be used for treating hypothermia.

4. Pharmacologic Agents for the Reduction of Shivering. The literature *supports* the use of meperidine for reducing patient shivering during emergence and recovery. The literature also *supports* the effectiveness of meperidine compared with other opioid agonists or agonist-antagonists for the reduction of shivering. The Consultants and ASA members agree that meperidine is more effective in the treatment of patient shivering than other opioid agonists or agonist–antagonists.

Recommendations: Meperidine should be used for the treatment of patient shivering during emergence and recovery when clinically indicated. The Task Force cautions that hypothermia, a common cause of shivering, should be treated by rewarming. Practitioners may consider other opioid agonists or agonist–antagonists when meperidine is contraindicated or not available.

III. Antagonism of the Effects of Sedatives, Analgesics, and Neuromuscular Blocking Agents

1. Antagonism of Benzodiazepines. Published evidence *supports* the efficacy of flumazenil for the antagonism of the residual effects of benzodiazepines after general anesthesia or sedation. The literature is *equivocal* regarding whether flumazenil is associated with adverse general anesthesia outcomes. The literature does not indicate that significant side effects or other adverse outcomes are associated with the use of flumazenil when antagonizing benzodiazepine sedatives. The Consultants and ASA members *disagree* that *routine* use of flumazenil reduces adverse outcomes or improves patient comfort and satisfaction.

Recommendations: Specific antagonists should be available whenever benzodiazepines are administered. Flumazenil should not be used routinely, but may be administered to antagonize respiratory depression and sedation in selected patients. After pharmacologic antagonism, patients should be observed long enough to ensure that cardiorespiratory depression does not recur.

2. Antagonism of Opioids. The literature *suggests* that naloxone effectively antagonizes respiratory depression but is *insufficient* regarding the effect of naloxone on other patient outcomes. The Consultants and ASA members disagree that *routine* use of naloxone reduces adverse outcomes or improves patient comfort and satisfaction.

Recommendations: Specific antagonists should be available whenever opioids are administered. Opioid antagonists (*e.g.*, naloxone) should not be used routinely but may be administered to antagonize respiratory depression in selected patients. After pharmacologic antagonism, patients should be observed long enough to ensure that cardiorespiratory depression does not recur. The Task Force reminds practitioners that acute antagonism of the effects of opioids may result in pain, hypertension, tachycardia, or pulmonary edema.

3. Reversal of Neuromuscular Blockade. The literature *supports* the efficacy of edrophonium and neostigmine for the antagonism of residual neuromuscular blockade. An increased frequency of postoperative emetic episodes was found to occur with the use of neostigmine; however, the literature is *insufficient* to evaluate the occurrence of complications or other adverse outcomes associated with edrophonium. The Consultants and ASA members are equivocal regarding whether anesthetic regimens designed to avoid the need for antagonism of neuromuscular blockade reduce adverse outcomes or improve patient comfort and satisfaction.

Recommendations: Specific antagonists should be administered for reversal of residual neuromuscular blockade when indicated.

IV. Protocol for Discharge

1. Requiring That Patients Urinate before Discharge. The literature is *insufficient* to evaluate the benefits of requiring patients to urinate before discharge. The Consultants and ASA members disagree that such a requirement reduces adverse outcomes or increases patient satisfaction. They agree that it increases the length of recovery stay and agree that urination before discharge should only be mandatory for selected day surgery patients.

Recommendations: The routine requirement for urination before discharge should not be part of a discharge protocol and may only be necessary for selected patients (tables 3 and 4).

2. Requiring That Patients Drink Clear Fluids without Vomiting before Discharge. The literature is *insufficient* to evaluate the benefits of drinking and retaining clear fluids before discharge. The Consultants and ASA members disagree that the requirement that patients drink clear fluids before discharge reduces adverse outcomes or increases patient satisfaction. They agree that it increases the length of recovery stay. The Consultants disagree and the ASA members are equivocal

Table 3. Summary of Recommendations for Discharge

Requiring that patients urinate before discharge
The requirement for urination before discharge should not be part of a routine discharge protocol and may only be necessary for selected patients.
Requiring that patients drink clear fluids without vomiting before discharge
The demonstrated ability to drink and retain clear fluids should not be part of a routine discharge protocol but may be appropriate for selected patients.
Requiring that patients have a responsible individual accompany them home
As part of a discharge protocol, patients should routinely be required to have a responsible individual accompany them home.
Requiring a minimum mandatory stay in recovery
A mandatory minimum stay should not be required.
Patients should be observed until they are no longer at increased risk for cardiorespiratory depression.
Discharge criteria should be designed to minimize the risk of central nervous system or cardiorespiratory depression after discharge.

regarding whether drinking clear fluids before discharge should be mandatory.

Recommendations: The requirement of drinking clear fluids should not be part of a discharge protocol and may only be necessary for selected patients, determined on a case-by-case basis (*e.g.*, diabetic patients) (tables 3 and 4).

Table 4. Summary of Recovery and Discharge Criteria

General principles
Medical supervision of recovery and discharge is the responsibility of the supervising practitioner.
The recovery area should be equipped with appropriate monitoring and resuscitation equipment.
Patients should be monitored until appropriate discharge criteria are satisfied.
Level of consciousness, vital signs, and oxygenation (when indicated) should be recorded at regular intervals.
A nurse or other individual trained to monitor patients and recognize complications should be in attendance until discharge criteria are fulfilled.
An individual capable of managing complications should be immediately available until discharge criteria are fulfilled.
Guidelines for discharge
Patients should be alert and oriented. Patients whose mental status was initially abnormal should have returned to their baseline.
Vital signs should be stable and within acceptable limits.
Discharge should occur after patients have met specified criteria. Use of scoring systems may assist in documentation of fitness for discharge.
Outpatients should be discharged to a responsible adult who will accompany them home and be able to report any postprocedure complications.
Outpatients should be provided with written instructions regarding postprocedure diet, medications, activities, and a phone number to be called in case of emergency.

Each patient care facility should develop suitable recovery and discharge criteria. The table lists some of the basic principles that might be incorporated in these criteria.

3. Requiring That Patients Have a Responsible Individual to Accompany Them Home after Discharge. The literature is *silent* regarding whether the presence of a responsible individual to accompany patients home after discharge is associated with a decrease in postdischarge complications or other adverse outcomes. The Consultants and ASA members agree that requiring patients to have a responsible individual to accompany them home after discharge reduces adverse outcomes, increases patient comfort and satisfaction, and should be mandatory.

Recommendations: As part of a recovery room discharge protocol, all patients should be required to have a responsible individual accompany them home (tables 3 and 4).

4. Requiring a Minimum Mandatory Stay in Recovery. The literature is *insufficient* to evaluate the benefits of requiring a minimum mandatory stay in recovery. The Consultants disagree and the ASA members are equivocal regarding whether a minimum stay in a recovery facility improves patient comfort and satisfaction or should be required. The Consultants and ASA members are equivocal regarding whether a minimum stay reduces adverse outcomes. The Task Force consensus is that a mandatory minimum stay is not necessary and that the length of stay should be determined on a case-by-case basis.

Recommendations: Patients should be observed until they are no longer at increased risk for cardiorespiratory depression. A *mandatory* minimum stay should not be required. Discharge criteria should be designed to minimize the risk of central nervous system or cardiorespiratory depression after discharge (tables 3 and 4).

References

1. Continuum of depth of sedation: Definition of general anesthesia and levels of sedation/analgesia, ASA Standards, Guidelines and Statements. Park Ridge, Illinois, American Society of Anesthesiologists, October 1999

2. Standards for postanesthesia care, ASA Standards, Guidelines and Statements. Park Ridge, Illinois, American Society of Anesthesiologists, October 1999

Appendix: Methods and Analyses

The scientific assessment of these Guidelines was based on the following statements, or evidence linkages. These linkages represent directional statements about relationships between perioperative care and postanesthetic clinical outcomes.

Patient Assessment and Monitoring

1. Assessment and monitoring of respiratory function (*e.g.*, respiratory rate, oxygen saturation [Spo_2], end-tidal carbon dioxide [$ETco_2$]) during emergence and recovery: (a) detects respiratory complications and (b) reduces adverse outcomes.
2. Cardiovascular assessment and monitoring (*e.g.*, pulse, blood pressure, electrocardiogram, pump function) during emergence and recovery: (a) detects cardiovascular complications and (b) reduces adverse outcomes.

3. Assessment of neuromuscular function during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
4. Assessment of mental status during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
5. Assessment of temperature during emergence and recovery: (a) detects complications, and (b) reduces adverse outcomes.
6. Assessment and monitoring of pain during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
7. Assessment of nausea and vomiting during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
8. Fluid assessment and management during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
9. Assessment and monitoring of urine output and voiding during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.
10. Assessment of draining and bleeding during emergence and recovery: (a) detects complications and (b) reduces adverse outcomes.

Treatment during Emergence and Recovery

11. *Prophylaxis* of nausea and vomiting: (a) reduces the severity and incidence of nausea and vomiting and (b) improves patient comfort and satisfaction.
12. *Treatment* of nausea and vomiting: (a) reduces the severity and incidence of nausea and vomiting and (b) improves patient comfort and satisfaction.
13. Multiple medications (*vs.* single medications) for the *prophylaxis* of nausea and vomiting: (a) reduce the severity and incidence of nausea and vomiting and (b) improve patient comfort and satisfaction.
14. Multiple medications (*vs.* single medications) for the *treatment* of nausea and vomiting: (a) reduce the severity and incidence of nausea and vomiting and (b) improve patient comfort and satisfaction.
15. Administration of supplemental oxygen: reduces adverse outcomes.
16. Normalizing patient temperature (a) reduces the severity and incidence of adverse outcomes and (b) improves patient comfort and satisfaction.
17. Forced-air warming systems: (a) reduce the severity and incidence of hypothermia and (b) improve patient comfort and satisfaction.
18. Meperidine for shivering: (a) reduces the severity and incidence of shivering and (b) improves patient comfort and satisfaction.
19. Flumazenil, naloxone, neostigmine, and edrophonium: (a) effectively antagonize the effects of sedatives, analgesics, or neuromuscular blocking agents and (b) reduce adverse outcomes.

Protocol for Discharge from Postanesthesia Care Unit

20. As part of a discharge protocol, *not* requiring that patients urinate before discharge: (a) *does not* increase the severity and incidence of adverse outcomes after discharge and (b) reduces the length of recovery stay.
21. As part of a discharge protocol, *not* requiring that patients drink clear fluids without vomiting before discharge (a) *does not* increase the severity and incidence of adverse outcomes after discharge and (b) reduces the length of recovery stay.
22. As part of a discharge protocol, requiring that patients have a responsible individual to accompany them home after discharge: reduces the severity and incidence of adverse outcomes after discharge.
23. As part of a discharge protocol, requiring a mandatory minimum stay in recovery: reduces the severity and incidence of adverse outcomes after discharge.

Scientific evidence was derived from aggregated research literature and from surveys, open presentations, and other consensus-oriented activities. For purposes of literature aggregation, potentially relevant clinical studies were identified *via* electronic and manual searches of the literature. The electronic search covered a 36-yr period from 1966 through 2001. The manual search covered a 53-yr period from 1949 through 2001. More than 3,000 citations were initially identified, yielding a total of 1,027 nonoverlapping articles that addressed topics related to the 23 evidence linkages. After review of the articles, 490 studies did not provide direct evidence and were subsequently eliminated. A total of 537 articles contained direct linkage-related evidence.

A directional result for each study was initially determined by a literature count, classifying each outcome as supporting a linkage, refuting a linkage, or neutral. The results were then summarized to obtain a directional assessment of support for each linkage. Literature pertaining to seven evidence linkages contained enough studies with well-defined experimental designs and statistical information to conduct formal meta-analyses. These seven linkages were as follows: linkage 11 (prophylaxis of nausea and vomiting), linkage 12 (treatment of nausea and vomiting), linkage 13 (multiple medications for the prophylaxis of nausea and vomiting), linkage 15 (supplemental oxygen), linkage 17 (forced-air warming systems), linkage 18 (meperidine for shivering), and linkage 19 (reversal agents to antagonize the effects of sedatives, analgesics, or neuromuscular blocking agents).

Combined probability tests were applied to continuous data, and an odds-ratio procedure was applied to dichotomous study results. Two combined probability tests were used as follows: (1) the Fisher combined test, producing chi-square values based on logarithmic transformations of the reported p values from the independent studies, and (2) the Stouffer combined test, providing weighted representation of the studies by weighting each of the standard normal deviates by the size of the sample. An odds-ratio procedure based on the Mantel-Haenszel method for combining study results using 2×2 tables was used with outcome frequency information. An acceptable significance level was set at $P < 0.01$ (one-tailed), and effect size estimates were calculated. Tests for heterogeneity of the independent studies were conducted to assure consistency among the study results. DerSimonian-Laird random-effects odd ratios were calculated when significant heterogeneity was found. To control for potential publishing bias, a "fail-safe N" value was calculated for each combined probability test. No search for unpublished studies was conducted, and no reliability tests for locating research results were done.

Meta-analytic results are reported in table 5. To be considered acceptable findings of significance, both the Fisher and weighted Stouffer combined test results must agree. The following outcomes were found to be significant: (1) *recovery time:* linkage 19 (flumazenil to antagonize general anesthesia, flumazenil to antagonize sedation, edrophonium to antagonize neuromuscular blockade, and neostigmine to antagonize neuromuscular blockade); (2) *temperature:* linkage 17 (forced-air warming); and (3) *time to discharge:* linkage 11 (metoclopramide for prophylaxis of nausea and vomiting). Weighted effect size values for these linkages ranged from $r = 0.22$ to $r = 0.99$, representing moderate-to-large effect size estimates.

Odds ratios were significant for the following outcomes: (1) *reduced nausea:* linkage 11 (5-HT_3 prophylaxis— granisetron and ondansetron, droperidol prophylaxis, metoclopramide prophylaxis, and dexamethasone prophylaxis) and linkage 13 (multiple medications prophylaxis); (2) *reduced vomiting:* linkage 11 (antihistamine prophylaxis, 5-HT_3 prophylaxis— granisetron and ondansetron, droperidol prophylaxis, scopolamine prophylaxis, and dexamethasone prophylaxis), linkage 12 (ondansetron treatment), and linkage 13 (multiple medications prophylaxis); (3) *increased vomiting:* linkage 19 (neostigmine to antagonize neuromuscular blockade); (4) *reduced headache:* linkage 11 (droperidol prophylaxis); (5) *increased agitation and restlessness:* linkage 11 (droperidol prophylaxis); (6) *increased drowsiness:* linkage 11 (droperidol prophylaxis); (7) *reduced hypoxemia:* linkage 15 (supplemental oxygen); and (8) *reduced shivering:* linkage 17 (forced-air warming) and linkage 18 (meperidine). To be considered acceptable findings of significance, Mantel-Haenszel odds ratios must agree with combined test results when both types of data are assessed.

Table 5. Meta-analysis Summary

Linkages	No. of Studies	Fisher Chi-square	*P*	Weighted Stouffer Zc	*P*	Effect Size	Mantel-Haenszel Chi-square	*P*	Odds Ratio	Heterogeneity: Significance	Heterogeneity: Effect Size
Nausea and vomiting prophylaxis											
Antihistamines											
Nausea	6	—	—	—	—	—	0.31	> 0.10 (NS)	0.86	—	> 0.02 (NS)
Vomiting	8	—	—	—	—	—	7.78	< 0.01	1.77	—	> 0.10 (NS)
Prochlorprazine											
Nausea	5	—	—	—	—	—	0.81	> 0.30 (NS)	0.78	—	> 0.02 (NS)
Vomiting	6	—	—	—	—	—	4.15	> 0.02 (NS)	1.58	—	> 0.30 (NS)
5-HT$_3$ prophylaxis											
Dolasetron											
Vomiting	5	—	—	—	—	—	56.03	< 0.001	2.56§	—	< 0.001
Granisetron											
Nausea*	5	—	—	—	—	—	27.60	< 0.001	3.97	—	> 0.02 (NS)
Vomiting*	5	—	—	—	—	—	38.29	< 0.001	4.88	—	> 0.02 (NS)
Ondansetron											
Nausea†	6	—	—	—	—	—	13.83	< 0.001	1.61	—	> 0.20 (NS)
Vomiting†	11	—	—	—	—	—	75.18	< 0.001	2.04	—	> 0.20 (NS)
Headache†	5	—	—	—	—	—	3.90	> 0.02 (NS)	0.77	—	> 0.80 (NS)
Dizziness	5	—	—	—	—	—	3.51	> 0.05 (NS)	1.27	—	> 0.10 (NS)
Drowsiness	8	—	—	—	—	—	0.01	> 0.90 (NS)	1.01	—	> 0.20 (NS)
Time to discharge	5	19.81	> 0.02 (NS)	0.94	> 0.10 (NS)	0.05	—	—	—	> 0.30 (NS)	> 0.30 (NS)
Tropisetron											
Vomiting	5	—	—	—	—	—	5.80	> 0.01 (NS)	1.46	—	> 0.50 (NS)
Droperidol											
Nausea‡	9	—	—	—	—	—	52.68	< 0.001	2.02	—	> 0.10 (NS)
Vomiting‡	12	—	—	—	—	—	61.77	< 0.001	2.95	—	> 0.01 (NS)
Headache	7	—	—	—	—	—	8.41	< 0.01	1.44	—	> 0.10 (NS)
Agitation and restlessness	6	—	—	—	—	—	15.45	< 0.001	0.40	—	> 0.70 (NS)
Dizziness	5	—	—	—	—	—	1.09	> 0.20 (NS)	1.17	—	> 0.10 (NS)
Drowsiness	7	—	—	—	—	—	6.96	< 0.01	0.73	—	> 0.02 (NS)
Time to discharge	6	26.64	< 0.01	0.07	> 0.40 (NS)	0.01	—	—	—	> 0.20 (NS)	> 0.20 (NS)
Metoclopramide											
Nausea	10	—	—	—	—	—	14.43	< 0.001	1.79	—	> 0.10 (NS)
Vomiting‡	10	—	—	—	—	—	11.86	< 0.001	1.67	—	> 0.30 (NS)
Time to discharge	5	35.46	< 0.001	3.18	< 0.001	0.22	—	—	—	> 0.02 (NS)	< 0.01
Scopolamine											
Vomiting	5	—	—	—	—	—	21.14	< 0.001	2.36	—	> 0.30 (NS)
Dexamethasone											
Nausea	6	—	—	—	—	—	8.00	< 0.01	1.88	—	> 0.70 (NS)
Vomiting	11	—	—	—	—	—	25.59	< 0.001	2.46§	—	< 0.01
Nausea and vomiting treatment											
Ondansetron											
Vomiting	7	—	—	—	—	—	174.83	< 0.001	5.66§	—	< 0.01
Multiple medicine prophylaxis											
Nausea	10	—	—	—	—	—	15.87	< 0.001	2.17	—	> 0.30 (NS)
Vomiting‡	12	—	—	—	—	—	7.87	< 0.01	1.69	—	> 0.50 (NS)
Headache*	7	—	—	—	—	—	0.00	> 0.50 (NS)	1.00	—	> 0.99 (NS)
Drowsiness*	5	—	—	—	—	—	0.04	> 0.90 (NS)	1.08	—	> 0.90 (NS)
Supplemental oxygen											
Hypoxemia	5	—	—	—	—	—	46.77	< 0.001	6.18	—	> 0.80 (NS)
Forced-air warming											
Temperature	8	107.43	< 0.001	17.67	< 0.001	0.99	—	—	—	< 0.001	< 0.001
Shivering	5	—	—	—	—	—	14.11	< 0.001	3.75	—	> 0.70 (NS)
Meperidine											
Versus placebo											
Shivering	8	—	—	—	—	—	107.56	< 0.001	10.17	—	> 0.20 (NS)
Versus opioids											
Shivering	5	—	—	—	—	—	22.00	< 0.001	4.47	—	> 0.02 (NS)
Reversal agents											
Flumazenil (general anesthesia)											
Recovery time	6	50.17	< 0.001	2.94	< 0.002	0.32	—	—	—	> 0.90 (NS)	> 0.80 (NS)
Flumazenil (sedation)											
Nausea	6	—	—	—	—	—	0.48	> 0.30 (NS)	0.82	—	> 0.80 (NS)
Blood pressure	5	30.98	< 0.010	2.22	> 0.01 (NS)	0.24	—	—	—	> 0.30 (NS)	> 0.20 (NS)
Agitation and restlessness	5	31.52	< 0.001	1.13	> 0.10 (NS)	0.15	—	—	—	> 0.20 (NS)	> 0.95 (NS)
Dizziness	6	—	—	—	—	—	0.42	> 0.50 (NS)	0.85	—	> 0.10 (NS)
Drowsiness	5	—	—	—	—	—	2.64	> 0.10 (NS)	0.56	—	> 0.20 (NS)
Recovery time	7	78.62	< 0.001	5.51	< 0.001	0.54	—	—	—	< 0.001	< 0.001
Edrophonium											
Recovery time	6	73.24	< 0.001	8.50	< 0.001	0.99	—	—	—	> 0.02 (NS)	< 0.001
Neostigmine											
Vomiting	5	—	—	—	—	—	9.40	< 0.01	0.44	—	> 0.10 (NS)
Recovery time	10	115.26	< 0.001	9.72	< 0.001	0.79	—	—	—	< 0.001	< 0.001

* Caution: Same authors for 70–80% of studies. † Inclusion criteria include N over 100, study date 1995 and later; no abstracts. ‡ Inclusion criteria include study date 1995 and later; no abstracts. § DerSimonian-Laird random-effects odds ratio.

NS = not significant.

Table 6. Consultant and ASA Membership Survey Summary

		Consultants Percentage Response				Membership Percentage Response			
Intervention or Linkage	Outcome	N	Agree (%)	Disagree (%)	Don't Know (%)	N	Agree (%)	Disagree (%)	Don't Know (%)
Continual assessment of airway patency, respiratory rate	Should be done	55	98.2	1.8	0.0	211	100.0	0.0	0.0
	Detects respiratory comp	55	98.2	1.8	0.0	211	98.1	0.0	1.9
	Reduces adverse outcomes	55	87.3	1.8	10.9	211	92.4	1.0	6.7
Routine monitoring of pulse rate and blood pressure	Should be done	56	100.0	0.0	0.0	211	100.0	0.0	0.0
	Detects cardiovascular complications	56	94.6	0.0	5.4	211	90.5	4.8	4.8
	Reduces adverse outcomes	56	76.8	1.8	21.4	211	77.1	2.9	20.0
Routine electrocardiographic monitoring	Should be done	55	70.9	27.3	1.8	211	89.5	7.6	2.9
	Detects cardiovascular complications	55	83.6	9.1	7.3	211	82.9	6.7	10.5
	Reduces adverse outcomes	55	47.3	16.4	36.4	211	64.8	8.6	26.7
Assessment of neuromuscular function	Should be done	55	70.9	20.0	9.1	211	78.1	16.2	5.7
	Detects complications	55	63.6	21.8	14.5	211	69.5	12.4	18.1
	Reduces adverse outcomes	55	54.5	14.5	30.9	211	59.0	12.4	28.6
Assessment of mental status	Should be done	56	96.4	3.6	0.0	211	98.1	1.9	0.0
	Detects complications	56	75.0	12.5	12.5	209	81.0	4.8	14.3
	Reduces adverse outcomes	56	62.5	5.4	32.1	209	65.7	8.6	25.7
Assessment of temperature	Should be done	55	74.5	18.2	7.3	211	86.7	10.5	2.9
	Detects complications	55	60.0	20.0	20.0	211	58.1	21.9	20.0
	Reduces adverse outcomes	55	49.1	16.4	34.5	211	58.1	18.1	23.8
Assessment of pain	Should be done	56	98.2	0.0	1.8	211	98.1	0.0	1.9
	Detects complications	55	69.1	18.2	12.7	211	67.9	20.8	11.3
	Reduces adverse outcomes	55	61.8	14.5	23.6	211	71.7	10.4	17.9
Assessment of nausea and vomiting	Should be done	56	89.3	5.4	5.4	211	84.8	10.5	4.8
	Detects complications	56	57.1	33.9	8.9	211	55.2	23.8	21.0
	Reduces adverse outcomes	56	51.8	26.8	21.4	211	53.3	21.0	25.7
Assessment of hydration status and fluid management	Reduces adverse outcomes	55	81.8	3.6	14.5	211	88.7	2.8	8.5
	Improves comfort and satisfaction	55	65.5	12.7	21.8	211	75.5	5.7	18.9
Assessment of urine output	Routinely	56	1.8	96.4	1.8	211	5.7	91.5	2.8
	Selectively	56	98.2	1.8	0.0	211	94.3	4.7	0.9
	Detects complications	54	72.2	9.3	18.5	210	68.9	10.4	20.8
	Reduces adverse outcomes	54	55.6	13.0	31.5	210	54.7	14.2	31.1
Assessment of urinary voiding	Routinely	56	12.5	83.9	3.6	211	21.7	72.6	5.7
	Selectively	56	66.1	26.8	7.1	211	67.0	25.5	7.5
	Detects complications	55	52.7	20.0	27.3	209	48.1	18.9	33.0
	Reduces adverse outcomes	55	43.6	20.0	36.4	209	43.4	20.8	35.8
Assessment of drainage and bleeding	Should be done	56	100.0	0.0	0.0	211	99.1	0.9	0.0
	Detects complications	56	100.0	0.0	0.0	211	96.2	1.9	1.9
	Reduces adverse outcomes	56	89.3	0.0	10.7	211	87.7	3.8	8.5
Pharmacologic prophylaxis of nausea and vomiting	Routinely	56	8.9	85.7	5.4	211	16.0	79.2	4.7
	Selectively	55	89.1	10.9	0.0	211	84.0	12.3	3.8
	Improves comfort and satisfaction	56	80.4	7.1	12.5	210	85.8	5.7	8.5
	Reduces time to discharge	56	66.1	14.3	19.6	210	64.2	13.2	22.6
Pharmacologic treatment of nausea and vomiting	Should be done	56	100.0	0.0	0.0	211	100.0	0.0	0.0
	Improves comfort and satisfaction	56	96.4	1.8	1.8	211	98.1	0.0	1.9
	Reduces time to discharge	56	71.4	10.7	17.9	211	76.4	2.8	20.8
Nonpharmacologic treatment of nausea and vomiting	Should be done	56	50.0	21.4	28.6	210	44.3	14.2	41.5
	Improves comfort and satisfaction	56	37.5	21.4	41.1	210	38.7	13.2	48.1
	Reduces time to discharge	56	26.8	26.8	46.4	210	27.4	14.2	58.5
Single or multiple meds for nausea and vomiting prophylaxis	Single agents should be used	53	52.8	37.7	9.4	210	57.1	30.5	12.4
	Multiple agents should be used	53	54.7	34.0	11.3	210	53.3	33.3	13.3
Single or multiple medicine for nausea and vomiting treatment	Single agents should be used	55	60.0	32.7	7.3	209	55.7	30.2	14.2
	Multiple agents should be used	55	56.4	27.3	16.4	209	55.7	29.2	15.1
Supplemental oxygen during transport	Should be done	56	48.2	46.4	5.4	210	38.7	53.8	7.5
	Reduces adverse outcomes	55	29.1	27.3	43.6	210	28.3	36.8	34.9
Supplemental oxygen in postanesthesia care unit	Should be done	56	50.0	46.4	3.6	211	57.5	37.7	4.7
	Reduces adverse outcomes	55	36.4	23.6	40.0	211	41.5	28.3	30.2
Normothermia management	Reduces adverse outcomes	56	82.1	7.1	10.7	211	85.8	3.8	10.4
	Reduces shivering	56	83.9	3.6	12.5	211	79.2	8.5	12.3
	Improves comfort and satisfaction	56	98.2	0.0	1.8	211	92.5	0.0	7.5
Forced-air warming *versus* other warming	Reduces adverse outcomes	56	55.4	8.9	35.7	211	68.9	6.6	24.5
	Reduces shivering	56	71.4	5.4	23.2	211	77.4	2.8	19.8
	Improves comfort and satisfaction	56	85.7	3.6	10.7	211	84.9	0.9	14.2

Table 6. Continued

Intervention or Linkage	Outcome	Consultants Percentage Response N	Agree (%)	Disagree (%)	Don't Know (%)	Membership Percentage Response N	Agree (%)	Disagree (%)	Don't Know (%)
Meperidine *versus* no treatment	Reduces adverse outcomes	56	23.2	17.9	58.9	211	26.4	23.6	50.0
	Reduces shivering	56	92.9	0.0	7.1	211	88.7	4.7	6.6
	Improves comfort and satisfaction	56	82.1	3.6	14.3	211	82.1	5.7	12.3
Meperidine *versus* other opioid agonists	Reduces adverse outcomes	56	17.9	21.4	60.7	211	25.5	25.5	49.1
	Reduces shivering	56	75.0	0.0	25.0	211	78.3	6.6	15.1
	Improves comfort and satisfaction	56	62.5	3.6	33.9	211	67.9	7.5	24.5
Routine use of flumazenil and naloxone	Reduces adverse outcomes	56	3.6	80.4	16.1	211	5.7	77.4	17.0
	Improves comfort and satisfaction	56	1.8	80.4	17.9	211	4.7	80.2	15.1
Regimens for avoiding neuromuscular blockade reversal	Reduces adverse outcomes	56	32.1	32.1	35.7	211	40.6	33.0	26.4
	Improves comfort and satisfaction	56	30.4	35.7	33.9	211	40.6	31.1	28.3
Requiring urination before discharge	Reduces adverse outcomes	56	14.3	58.9	26.8	210	13.2	56.6	30.2
	Increases recovery stay	56	94.6	3.6	1.8	210	91.5	5.7	2.8
	Increases comfort and satisfaction	56	10.7	71.4	17.9	210	11.3	64.2	24.5
	Mandatory for all day surgery	56	3.6	89.3	7.1	210	9.4	83.0	7.5
	Mandatory for select day surgery	56	76.8	16.1	7.1	210	71.7	19.8	8.5
Requiring drinking before discharge	Reduces adverse outcomes	56	10.7	67.9	21.4	211	19.0	51.4	29.5
	Increases recovery stay	56	76.8	14.3	8.9	211	60.0	26.7	13.3
	Increases comfort and satisfaction	56	17.9	67.9	14.3	211	34.3	40.0	25.7
	Mandatory for all day surgery	56	12.5	78.7	8.9	211	24.8	64.8	10.5
	Mandatory for select day surgery	54	25.9	64.8	9.3	211	29.8	52.9	17.3
Responsible individual for escort	Should be mandatory	56	98.2	1.8	0.0	211	98.1	1.9	0.0
	Reduces adverse outcomes	56	76.8	1.8	21.4	211	69.8	2.8	27.4
	Increases comfort and satisfaction	56	50.0	17.9	32.1	211	54.7	10.4	34.9
Responsible individual to stay for 24 h	Should be mandatory	56	30.4	44.6	25.0	211	36.8	46.2	17.0
	Reduces adverse outcomes	56	28.6	19.6	51.8	211	33.0	21.7	45.3
	Increases comfort and satisfaction	56	32.1	21.4	46.4	211	33.0	23.6	43.4
Early discharge for regional extremity block patients	Improves comfort and satisfaction	55	61.8	14.5	23.6	210	52.8	18.9	28.3
	Is acceptable clinical practice	55	83.6	9.1	7.3	210	69.8	25.5	4.7
Early discharge for spinal or epidural patients	Improves comfort and satisfaction	56	51.8	16.1	32.1	210	50.9	18.9	30.2
	Is acceptable clinical practice	56	78.6	10.7	10.7	210	73.6	17.9	8.5
Minimum stay after intravenous narcotic	Should be required	56	73.2	23.2	3.6	211	72.6	22.6	4.7
	Reduces adverse outcomes	56	46.4	12.5	41.1	211	48.1	20.8	31.1
Minimum stay after vasoactive agents	Should be required	56	80.4	12.5	7.1	211	89.6	10.4	0.0
	Reduces adverse outcomes	56	53.6	8.9	37.5	211	58.5	7.5	34.0
Minimum stay in recovery facility	Should be required	56	30.4	67.9	1.8	210	38.7	54.7	6.6
	Reduces adverse outcomes	55	25.5	52.7	21.8	209	32.1	38.7	29.2
	Improves comfort and satisfaction	55	16.4	61.8	21.8	209	25.5	42.5	32.1
Requiring separate phase 1 and 2 facilities	Should be required	56	21.4	64.3	14.3	210	19.8	55.7	24.5
	Reduces adverse outcomes	56	10.7	53.6	35.7	210	10.4	47.2	42.5
	Improves comfort and satisfaction	56	41.1	33.9	25.0	210	23.6	41.5	34.9

ASA = American Society of Anesthesiologists.

Agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a kappa (κ) statistic for two-rater agreement pairs were as follows: (1) type of study design, $\kappa = 0.80–1.00$; (2) type of analysis, $\kappa = 0.55–1.00$; (3) evidence linkage assignment, $\kappa = 0.91–1.00$; and (4) literature inclusion for database, $\kappa = 0.78–1.00$. Three-rater chance-corrected agreement values were as follows: (1) study design, Sav = 0.86, Var (Sav) = 0.011; (2) type of analysis, Sav = 0.65, Var (Sav) = 0.026; (3) linkage assignment, Sav = 0.81, Var (Sav) = 0.005; and (4) literature database inclusion, Sav = 0.84, Var (Sav) = 0.045. These values represent moderate to high levels of agreement.

The findings of the literature analyses were supplemented by the opinions of Task Force members as well as by surveys of the opinions of a panel of Consultants and a random sample of the American Society of Anesthesiologists (ASA) membership, as described in the text of the Guidelines. The rate of return was 50% (N = 56/112) for the Consultants and 21% (N = 211/1,000) for the membership. The percentage of Consultants and ASA members supporting each linkage is reported in table 6. Consultants and ASA members were supportive of all of the linkages, with the following exceptions: linkage 9 (*routine* assessment of urinary output and voiding), linkage 11 (*routine* pharmacologic prophylaxis of nausea and vomiting), linkage 12 (nonpharmacologic treatment of nausea and vomiting), linkage 15 (supplemental oxygen during transport or in the postanesthesia care unit), linkage 19 (*routine* use of flumazenil and naloxone), linkage 20 (requiring that patients urinate before discharge), linkage 21 (requiring that patients drink water before discharge), and linkage 23 (requiring a minimum stay in recovery).

The Consultants were asked to indicate which, if any, of the evidence linkages would change their clinical practices if the Guidelines were instituted. The rate of return was 35% (N = 39/112). The percent of responding Consultants expecting *no change* associated with each linkage were as follows: assessment and monitoring of respiratory function—100%; cardiovascular assessment/monitoring—95%; assessment of neuromuscular function—95%; assessment of mental status—97%; assessment of temperature—95%; assessment and monitoring of pain—100%; assessment of nausea and vomiting—97%; fluid assessment and management—100%; assessment and monitoring of urine output and voiding—95%; assessment of draining and bleeding—100%; prophylaxis of nausea and vomiting—95%; treatment of nausea and vomiting—97%; multiple medications for the prophylaxis of nausea and vomiting—95%; multiple medications for the treatment of nausea and vomiting—97%; administration of supplemental oxygen—100%; normalizing patient temperature—100%; forced-air warming systems—85%; meperidine for shivering—92%; flumazenil for reversal of general anesthesia—95%; flumazenil for reversal of sedation—97%; naloxone for opioid reversal—100%; edrophonium for reversal of neuromuscular blockade—97%; neostigmine for reversal of neuromuscular blockade—100%; not requiring that patients urinate before discharge—92%; not requiring patients to drink water without vomiting before discharge—85%; requiring that patients have a responsible individual accompany them home—95%; and not requiring a mandatory minimum stay in recovery—85%. Eighty-two percent of the respondents indicated that the Guidelines would have *no effect* on the amount of time spent on a typical case.