Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures

An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration*

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, and are not intended to replace local institutional policies. In addition, practice guidelines developed by the American Society of Anesthesiologists (ASA) are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by a synthesis and analysis of the current literature, expert and practitioner opinion, open forum commentary, and clinical feasibility data.

This document updates the "Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration," adopted by the ASA in 1998

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Address correspondence to the American Society of Anesthesiologists: 520 N. Northwest Highway, Park Ridge, Illinois 60068-2573. These Practice Guidelines, as well as all ASA Practice Parameters, may be obtained at no cost through the Journal Web site, www.anesthesiology.org.
Methodology

A. Definition of Preoperative Fasting and Pulmonary Aspiration

For these Guidelines, preoperative fasting is defined as a prescribed period of time before a procedure when patients are not allowed the oral intake of liquids or solids. Perioperative pulmonary aspiration is defined as aspiration of gastric contents occurring after induction of anesthesia, during a procedure, or in the immediate postoperative period.

B. Purposes of the Guidelines

The purposes of these Guidelines are to enhance the quality and efficiency of anesthesia care, stimulate evaluation of clinical practices, and reduce the severity of complications related to perioperative pulmonary aspiration of gastric contents. Enhancements in the quality and efficiency of anesthesia care include, but are not limited to, the cost-effective utilization of perioperative preventive medication, increased patient satisfaction, avoidance of delays and cancellations, decreased risk of dehydration or hypoglycemia from prolonged fasting, and the minimization of perioperative morbidity. Clinical practices include, but are not limited to, withholding solids and liquids for specified time periods before surgery, and prescribing pharmacologic agents to reduce gastric volume and acidity. Complications of aspiration include, but are not limited to, aspiration pneumonia, respiratory disabilities, and related morbidities.

C. Focus

Prevention of perioperative pulmonary aspiration is part of the larger process of preoperative evaluation and preparation of the patient. The Guidelines specifically focus on preoperative fasting recommendations, as well as recommendations regarding the administration of pharmacologic

† American Society of Anesthesiologists: Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration. ANESTHESIOLOGY 1999;90:896-905
agents to modify the volume and acidity of gastric contents during procedures in which upper 
airway protective reflexes may be impaired.

Airway management techniques that are intended to reduce the occurrence of pulmonary 
aspiration are not the focus of these Guidelines. For example, a rapid-sequence 
induction/endotracheal intubation technique or awake endotracheal intubation technique may be 
useful to prevent this problem during the delivery of anesthesia care. The Guidelines do not address 
the selection of anesthetic technique.

The intended patient population is limited to healthy patients of all ages undergoing elective 
procedures. The Guidelines do not apply to patients who undergo procedures with no anesthesia or 
only local anesthesia when upper airway protective reflexes are not impaired, and when no risk 
factors for pulmonary aspiration are apparent. The Guidelines are not intended for women in labor.

The Guidelines may not apply to or may need to be modified for patients with co-existing 
diseases or conditions that can affect gastric emptying or fluid volume (e.g., pregnancy, obesity, 
diabetes, hiatal hernia, gastroesophageal reflux disease, ileus or bowel obstruction, emergency care, 
or enteral tube feeding) and patients in whom airway management might be difficult. 
Anesthesiologists and other anesthesia providers should recognize that these conditions can 
increase the likelihood of regurgitation and pulmonary aspiration, and that additional or alternative 
preventive strategies may be appropriate.

D. Application

These Guidelines are intended for use by anesthesiologists and other anesthesia providers. 
They also may serve as a resource for other health care professionals who advise or care for 
patients who receive anesthesia care during procedures. Anesthesia care during procedures refers 
to general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care). 
Throughout these Guidelines, the term “preoperative” should be considered synonymous with
“preprocedural,” as the latter term is often used to describe procedures that are not considered to be operations.

E. Task Force Members and Consultants

The original guidelines were developed by a Task Force of 10 members, including anesthesiologists in both private and academic practice from various geographic areas of North America, and a consulting methodologist from the ASA Committee on Standards and Practice Parameters.

The Task Force developed the original Guidelines by means of a six-step process. First, they reached consensus on the criteria for evidence. Second, original published research studies from peer-reviewed journals relevant to preoperative fasting were reviewed and evaluated. Third, expert consultants were asked to: (1) participate in opinion surveys on the effectiveness of various preoperative fasting management recommendations and (2) review and comment on a draft of the Guidelines. Fourth, the Task Force held open forums at a national meeting‡ to solicit input on its draft recommendations. Fifth, the consultants were surveyed to assess their opinions on the feasibility of implementing the Guidelines. Sixth, all available information was used to build consensus within the Task Force to finalize the Guidelines (appendix).

In 2009, the American Society of Anesthesiologists (ASA) Committee on Standards and Practice Parameters requested that scientific evidence for these Guidelines be updated. The update consists of an evaluation of literature that includes new studies obtained after publication of the original guidelines, new surveys of expert consultants, and a survey of a randomly selected sample of ASA members.

F. Availability and Strength of Evidence

Preparation of this update used the same methodological process as was used in the original Guidelines to obtain new evidence from two principal sources: scientific evidence and opinion-based evidence (appendix). The protocol for reporting each source of evidence is described below:

Scientific Evidence:

Study findings from published scientific literature were aggregated and are reported in summary form by evidence category, as described below. All literature (e.g., randomized controlled trials, observational studies, case reports) relevant to each topic was considered when evaluating the findings. However, for reporting purposes in this document, only the highest level of evidence (i.e., level 1, 2, or 3 identified below) within each category (i.e., A, B, or C) is included in the summary.

Category A: Supportive Literature. Randomized controlled trials report statistically significant (p < 0.01) differences between clinical interventions for a specified clinical outcome.

Level 1: The literature contains multiple randomized controlled trials, and the aggregated findings are supported by meta-analysis.§

Level 2: The literature contains multiple randomized controlled trials, but there is an insufficient number of studies to conduct a viable meta-analysis for the purpose of these Guidelines.

Level 3: The literature contains a single randomized controlled trial.

Category B: Suggestive Literature. Information from observational studies permits inference of beneficial or harmful relationships among clinical interventions and clinical outcomes.

Level 1: The literature contains observational comparisons (e.g., cohort, case-control research designs) of clinical interventions or conditions and indicates statistically significant differences between clinical interventions for a specified clinical outcome.

§ All meta-analyses are conducted by the ASA methodology group. Meta-analyses from other sources are reviewed but not included as evidence in this document.
Level 2: The literature contains non-comparative observational studies with associative (e.g., relative risk, correlation) or descriptive statistics.

Level 3: The literature contains case reports.

*Category C: Equivocal Literature.* The literature cannot determine whether there are beneficial or harmful relationships among clinical interventions and clinical outcomes.

Level 1: Meta-analysis did not find significant differences among groups or conditions.

Level 2: The number of studies is insufficient to conduct meta-analysis, and (1) randomized controlled trials have not found significant differences among groups or conditions or (2) randomized controlled trials report inconsistent findings.

Level 3: Observational studies report inconsistent findings or do not permit inference of beneficial or harmful relationships.

*Category D: Insufficient Evidence from Literature.* The lack of scientific evidence in the literature is described by the following terms.

Silent: No identified studies address the specified relationships among interventions and outcomes.

Inadequate: The available literature cannot be used to assess relationships among clinical interventions and clinical outcomes. The literature either does not meet the criteria for content as defined in the “Focus” of the Guidelines or does not permit a clear interpretation of findings due to methodological concerns (e.g., confounding in study design or implementation).

*Opinion-Based Evidence:*

All opinion-based evidence relevant to each topic (e.g., survey data, open-forum testimony, Internet-based comments, letters, editorials) was considered in the development of the original Guidelines. New opinion surveys were developed to address each clinical intervention identified in the document, and identical surveys were distributed to both expert consultants and a random
sample of ASA members.

*Category A: Expert Opinion.* Survey responses from Task Force-appointed expert consultants are reported in summary form in the text, with a complete listing of consultant survey responses reported in an appendix.

*Category B: Membership Opinion.* Survey responses from active ASA members are reported in summary form in the text, with a complete listing of ASA member survey responses reported in an appendix.

Survey responses are recorded using a 5-point scale and summarized based on median values.**

- **Strongly Agree:** Median score of 5 (At least 50% of the responses are 5)
- **Agree:** Median score of 4 (At least 50% of the responses are 4 or 4 and 5)
- **Equivocal:** Median score of 3 (At least 50% of the responses are 3, or no other response category or combination of similar categories contain at least 50% of the responses)
- **Disagree:** Median score of 2 (At least 50% of responses are 2 or 1 and 2)
- **Strongly Disagree:** Median score of 1 (At least 50% of responses are 1)

*Category C: Informal Opinion.* Open-forum testimony, Internet-based comments, letters and editorials were all informally evaluated and discussed during the development of the original Guideline recommendations.

**Guidelines:**

I. Preoperative Assessment

No controlled trials were found that address the impact of conducting a preoperative assessment (e.g., history, physical examination, survey/interview) on the frequency or severity of pulmonary aspiration of gastric contents during the perioperative period. *(Category D evidence)* Studies with observational findings suggest that certain predisposing conditions (e.g., age, comorbid disease) may be associated with the risk of perioperative aspiration.1-2 *(Category B2 evidence)*

**When an equal number of categorically distinct responses are obtained, the median value is determined by calculating the arithmetic mean of the two middle values. Ties are calculated by a predetermined formula.
The consultants and ASA members strongly agree that a review of pertinent medical records, a physical examination, and patient survey or interview should be performed as part of the preoperative evaluation. They also strongly agree that patients should be informed of fasting requirements and the reasons for them sufficiently in advance of their procedures. In addition, both the consultants and ASA members strongly agree that verification of their compliance with the fasting requirements should be assessed at the time of the procedure.

**Recommendations for preoperative assessment:** A review of pertinent medical records, a physical examination, and patient survey or interview should be performed as part of the preoperative evaluation. The history, examination, and interview should include pertinent assessment of gastroesophageal reflux disease, dysphagia symptoms, or other gastrointestinal motility disorders, potential for difficult airway management, and metabolic disorders (e.g., diabetes mellitus) that may increase the risk of regurgitation and pulmonary aspiration. Patients should be informed of fasting requirements and the reasons for them sufficiently in advance of their procedures. Verification of their compliance with the fasting requirements should be assessed at the time of their procedures. When the following fasting guidelines are not followed, the practitioner should compare the risks and benefits of proceeding, with consideration given to the amount and type of liquids or solids ingested.

**II. Preoperative Fasting Status (Clear Liquids)**

Meta-analysis of randomized controlled trials comparing fasting times of 2-4 hours versus more than 4 hours report smaller gastric volumes and higher gastric pH values in adult patients given clear liquids 2-4 hours before a procedure; (Category A1 evidence) findings for gastric pH values > 2.5 are equivocal. (Category C1 evidence) Meta-analysis of randomized controlled trials report higher gastric pH values (Category A1 evidence) and equivocal findings regarding differences in gastric volume for children given clear liquids 2-4 hours versus fasting for more than
four hours before a procedure. (Category C1 evidence) Ingested volumes of clear liquids in the above studies range from 100 ml to unrestricted amounts for adults, and 2 ml/kg to unrestricted amounts for children. Published clinical evidence is insufficient to address the relationship between fasting times for clear liquids and the risk of emesis/reflux or pulmonary aspiration. (Category D evidence)

Both the consultants and ASA members strongly agree that for otherwise healthy infants (< 2 years of age), children (2 to 16 years of age), and adults, fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained.

Recommendations for clear liquids: It is appropriate to fast from intake of clear liquids for 2 or more hours before procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care). Examples of clear liquids include, but are not limited to, water, fruit juices without pulp, carbonated beverages, clear tea, and black coffee. These liquids should not include alcohol. The volume of liquid ingested is less important than the type of liquid ingested.

III. Preoperative Fasting Status (Breast Milk)

Studies with observational findings are equivocal regarding the impact of ingesting breast milk 4 hours before a procedure on the risk of higher volumes or lower pH levels of gastric contents during a procedure. (Category C3 evidence) The literature is insufficient to evaluate the effect of the timing of ingestion of breast milk and the perioperative incidence of emesis/reflux or pulmonary aspiration. (Category D evidence)

The consultants agree and the ASA members strongly agree that for otherwise healthy neonates (< 44 gestational weeks) and infants, fasting from the intake of breast milk for 4 or more hours
before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained.

**Recommendations for breast milk:** It is appropriate to fast from intake of breast milk for 4 or more hours before procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care).

IV. Preoperative Fasting Status (Infant Formula)

A study with observational findings is equivocal regarding the impact of ingesting formula 4 hours before a procedure on the risk of higher volumes or lower pH levels of gastric contents during a procedure. (Category C3 evidence) The literature is insufficient to evaluate the effect of the timing of ingestion of formula and the perioperative incidence of emesis/reflux or pulmonary aspiration. (Category D evidence)

Both the consultants and ASA members agree that for neonates and infants, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained.

The consultants agree and the ASA members strongly agree that for children, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained.

**Recommendations for infant formula:** It is appropriate to fast from intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care).

V. Preoperative Fasting Status (Solids and Non-Human Milk)

A randomized controlled trial comparing a light breakfast consumed at an average of less than 4 hours before a procedure with overnight fasting reports equivocal findings regarding gastric volume
and pH levels for adults.\textsuperscript{24} (\textit{Category C2 evidence}) Studies with nonrandomized comparative findings for children given non-human milk 4 hours or less before a procedure \textit{versus} children fasted for more than 4 hours report higher gastric volumes (\textit{Category B2 evidence}) and equivocal gastric pH.\textsuperscript{25-27} (\textit{Category C3 evidence}) A study with observational findings suggests that fasting for more than 8 hours may be associated with hypoglycemia in children.\textsuperscript{27} (\textit{Category B2 evidence}) The literature is insufficient to evaluate the effect of the timing of ingestion of solids and non-human milk and the perioperative incidence of emesis/reflux or pulmonary aspiration. (\textit{Category D evidence})

The consultants agree and the ASA members strongly agree that fasting from the intake of a light meal (\textit{e.g.}, toast and a clear liquid) of 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (\textit{i.e.}, monitored anesthesia care) should be maintained. Both the consultants and ASA members strongly agree that fasting from the intake of a meal that includes fried or fatty foods for 8 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (\textit{i.e.}, monitored anesthesia care) should be maintained.

Both the consultants and ASA members agree that for infants, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (\textit{i.e.}, monitored anesthesia care) should be maintained. The consultants agree and the ASA members strongly agree that for children and adults, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (\textit{i.e.}, monitored anesthesia care) should be maintained.

\textbf{Recommendations for solids and non-human milk:} It is appropriate to fast from intake of a light meal or non-human milk for 6 or more hours before elective procedures requiring general
anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care). The Task Force notes that intake of fried or fatty foods or meat may prolong gastric emptying time.†† Both the amount and type of foods ingested must be considered when determining an appropriate fasting period. Since non-human milk is similar to solids in gastric emptying time, the amount ingested must be considered when determining an appropriate fasting period.

VI. Preoperative gastrointestinal stimulants

Meta-analysis of randomized placebo-controlled trials supports the efficacy of metoclopramide to reduce gastric volume (Category A1 evidence) and is equivocal regarding the effect of metoclopramide on gastric acidity (Category C1 evidence) during the perioperative period. The literature is insufficient to evaluate the effect of administering gastrointestinal stimulants and on the perioperative incidence of emesis/reflux or pulmonary aspiration. (Category D evidence)

Both the consultants and ASA members disagree that gastrointestinal stimulants should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration.

Recommendations for gastrointestinal stimulants: The routine preoperative use of gastrointestinal stimulants to decrease the risks of pulmonary aspiration in patients who have no apparent increased risk for pulmonary aspiration is not recommended.

VII. Preoperative Pharmacologic Blockade of Gastric Acid Secretion

Histamine-2 receptor antagonists: Meta-analysis of double-blind randomized placebo-controlled trials support the efficacy of cimetidine to reduce gastric volume and acidity. Additional fasting time (e.g., 8 or more hours) may be needed in these cases.
during the perioperative period. *(Category A1 evidence)* Meta-analysis of double-blind randomized placebo-controlled trials\(^41-47\) also supports the efficacy of ranitidine to reduce gastric volume and acidity during the perioperative period. *(Category A1 evidence)* Randomized placebo-controlled trials indicate that famotidine is effective in reducing gastric volume and acidity.\(^48-50\) *(Category A2 evidence)*

Proton pump inhibitors: Randomized controlled trials indicate the efficacy of omeprazole in reducing gastric volume and acidity,\(^51-54\) *(Category A2 evidence)* and similar findings are reported for lanzoprazole.\(^54-57\) *(Category A2 evidence)*

The literature is insufficient to evaluate the effect of administering either histamine-2 receptor antagonists or proton pump inhibitors on the perioperative incidence of emesis/reflux or pulmonary aspiration. *(Category D evidence)*

Both the consultants and ASA members disagree that histamine-2 receptor antagonists should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (*i.e.*, monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration. ASA members disagree and the consultants strongly disagree that proton pump inhibitors should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (*i.e.*, monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration.

**Recommendations for preoperative pharmacologic blockade of gastric acid secretion:** The routine preoperative use of medications that block gastric acid secretion to decrease the risks of pulmonary aspiration in patients who have no apparent increased risk for pulmonary aspiration is not recommended.
VIII. Preoperative antacids

Randomized controlled trials indicate that preoperative antacids (e.g., sodium citrate or magnesium trisilicate) increase gastric pH during the perioperative period\(^{58-62}\) (Category A2 evidence); with equivocal findings regarding gastric volume. (Category C2 evidence) The literature does not sufficiently examine the relationship between reduced gastric acidity and the frequency of pulmonary aspiration or emesis in humans; nor does the literature sufficiently examine whether reduced gastric acidity or volume is associated with decreased morbidity or mortality in patients given preoperative antacids who have aspirated gastric contents. (Category D evidence)

The consultants and ASA members both disagree that preoperative antacids should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration. The consultants and ASA members both strongly agree that when antacids are indicated for selected patients, only non-particulate antacids should be used.

**Recommendations for preoperative antacids:** The routine preoperative use of antacids to decrease the risks of pulmonary aspiration in patients who have no apparent increased risk for pulmonary aspiration is not recommended. Only non-particulate antacids should be used when antacids are indicated for selected patients for purposes other than reducing the risk of pulmonary aspiration.

IX. Preoperative antiemetics

Randomized controlled trials indicate that the preoperative administration of droperidol\(^{63-65}\) and ondansetron\(^{66-68}\) are effective in reducing nausea and vomiting during the postoperative period. (Category A2 evidence) The literature does not sufficiently examine the relationship
between the preoperative use of antiemetics and the frequency of pulmonary aspiration. 

(Category D evidence)

The consultants and ASA members both disagree that preoperative antiemetics should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration.

Recommendations for preoperative antiemetics:‡‡ The routine preoperative use of antiemetics to reduce the risks of pulmonary aspiration in patients who have no apparent increased risk for pulmonary aspiration is not recommended.

X. Preoperative anticholinergics

Randomized placebo-controlled trials are equivocal regarding the efficacy of atropine and glycopyrrolate to reduce gastric volume or acidity. (Category C2 evidence)

The ASA members disagree and the consultants strongly disagree that preoperative anticholinergics should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) to decrease the risk of pulmonary aspiration.

Recommendations for preoperative anticholinergics:

The use of anticholinergics to decrease the risks of pulmonary aspiration is not recommended.

XI. Preoperative multiple agents

Randomized controlled trials indicate that, when histamine-2 receptor antagonists (i.e., cimetidine, ranitidine) are combined with gastrointestinal stimulants (i.e., metoclopramide), the combined influence of the two drugs is effective in reducing both gastric volume and acidity.74-80

‡‡ These Guidelines do not address the use of antiemetics during the extended postoperative period after upper airway protective reflexes are no longer impaired.
(Category A2 evidence) Therefore, when histamine-2 receptor antagonists combined with gastrointestinal stimulants are compared to histamine-2 receptor antagonists alone, comparable reductions in gastric acidity are reported. Similarly, when the combined drugs are compared to gastrointestinal stimulants alone as the single-drug comparison, equivocal findings for gastric volume are reported. 74-80 Randomized controlled trials comparing other drug combinations versus single drugs alone report inconsistent findings regarding gastric volume or pH outcomes.81-86 (Category C2 evidence)

The ASA members disagree and the consultants strongly disagree that preoperative multiple agents should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent risk for pulmonary aspiration.

Recommendations for preoperative multiple agents: The routine preoperative use of multiple agents in patients who have no apparent increased risk for pulmonary aspiration is not recommended.
References


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§§ A complete bibliography used to develop these Guidelines, arranged alphabetically by author, is available as Supplemental Digital Content 1, http://links.lww.com/....
22. van der Walt JH, Foate JA, Murrell D, Jacob R, Bentley M: A study of preoperative fasting in infants aged less than three months. Anaest Intensive Care 1990; 18:527-531
40. Barnes PJ, Havill JH: Preoperative cimetidine - effects on gastric fluid. Anaesth Intens Care 1980; 8:464-468
78. Pandit SK, Kothary SP, Pandit UA, Mirakhur RK: Premedication with cimetidine and metoclopramide. Effect on the risk factors of acid aspiration. Anaesthesia 41:486-492, 1986
Appendix 1: Summary of Fasting and Pharmacologic Recommendations

A. Summary of Fasting Recommendations

<table>
<thead>
<tr>
<th>Ingested Material</th>
<th>Minimum Fasting Period</th>
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<tbody>
<tr>
<td>Clear liquids</td>
<td>2 h</td>
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<tr>
<td>Breast milk</td>
<td>4 h</td>
</tr>
<tr>
<td>Infant formula</td>
<td>6 h</td>
</tr>
<tr>
<td>Non-human milk</td>
<td>6h</td>
</tr>
<tr>
<td>Light meal</td>
<td>6h</td>
</tr>
</tbody>
</table>

1 These recommendations apply to healthy patients who are undergoing elective procedures. They are not intended for women in labor. Following the guidelines does not guarantee complete gastric emptying.

2 The fasting periods noted above apply to all ages.

3 Examples of clear liquids include water, fruit juices without pulp, carbonated beverages, clear tea, and black coffee.

4 Since non-human milk is similar to solids in gastric emptying time, the amount ingested must be considered when determining an appropriate fasting period.

5 A light meal typically consists of toast and clear liquids. Meals that include fried or fatty foods or meat may prolong gastric emptying time. Additional fasting time (e.g., 8 or more hours) may be needed in these cases. Both the amount and type of foods ingested must be considered when determining an appropriate fasting period.

B. Summary of Pharmacologic Recommendations

<table>
<thead>
<tr>
<th>Medication Type and Common Examples</th>
<th>Recommendation</th>
</tr>
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<tbody>
<tr>
<td>Gastrointestinal stimulants:</td>
<td></td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>No routine use</td>
</tr>
</tbody>
</table>

| Gastric acid secretion blockers:   |                |
| Cimetidine                         | No routine use |
| Famotidine                         | No routine use |
| Ranitidine                         | No routine use |
| Omeprazole                         | No routine use |
| Lansoprazole                       | No routine use |
### Antacids:
- Sodium citrate: No routine use
- Sodium bicarbonate: No routine use
- Magnesium trisilicate: No routine use

### Antiemetics:
- Droperidol: No routine use
- Ondansetron: No routine use

### Anticholinergics:
- Atropine: No use
- Scopolamine: No use
- Glycopyrrolate: No use

**Combinations of the medications above:** No routine use
Appendix 2: Methods and Analyses

A. State of the Literature.

For these Guidelines, a literature review is used in combination with opinions obtained from expert consultants and other sources (e.g., ASA members, open forums, Internet postings). Both the literature review and opinion data are based on evidence linkages, or statements regarding potential relationships between clinical interventions and outcomes. The interventions listed below were examined to assess their impact on pulmonary aspiration and other outcomes.

I. Preoperative Assessment:
   1. Medical records review or patient condition.
   2. Physical examination.
   3. Patient survey/questionnaire.

II. Preoperative Fasting Status:
   1. For adults, clear liquids between 2 and 4 versus more than 4 hours.
   2. For children, clear liquids between 2 and 4 hours versus more than 4 hours.
   3. Breast milk between 2 and 4 hours versus more than 4 hours.
   4. Formula between 2 and 4 hours versus more than 4 hours.
   5. Solids or non-human milk less than 4 versus more than 4 hours.
   6. Solids or non-human milk between 4 and 8 hours versus more than 8 hours.

III. Preoperative Pharmacologic Interventions
   1. Gastrointestinal stimulants (e.g., metoclopramide, cisapride).
   2. Blockage of gastric acid secretion
      a. Histamine-2 receptor antagonists (e.g., cimetidine, ranitidine, famotidine)
      b. Proton pump inhibitors (e.g., omeprazole, lanzoprazole)
   3. Antacids (e.g., sodium citrate, magnesium trisilicate)
   4. Antiemetics (e.g., ondansetron, droperidol)
   5. Anticholinergics (e.g., atropine, glycopyrrolate)
   6. Multiple agents/drugs versus single agents/drugs

For the literature review, potentially relevant clinical studies were identified via electronic and manual searches of the literature. For the original guidelines, electronic and manual searches covered a 57-yr period from 1940 through 1996. The literature search for this update covered a 15-yr period.

*** Outcomes for the listed interventions include, but are not limited to, pulmonary aspiration, volume and acidity of gastric contents, side-effects (e.g., thirst, hunger, nausea, vomiting), adverse outcomes (e.g., pneumonitis, mortality), and other outcomes (e.g., length of stay in hospital, costs).
yr period from 1996 through 2010. This literature update included review of 1223 non-overlapping articles that addressed topics related to the evidence linkages. After review of the articles, 1065 studies did not provide direct evidence and were subsequently eliminated. A total of 158 articles contained findings directly related to at least one of the evidence linkages listed above. No evidence linkage contained sufficient literature with well-defined experimental designs and statistical information to conduct an analysis of aggregated studies (i.e., meta-analysis). A complete bibliography used to develop these updated Guidelines, organized by section, is available as Supplemental Digital Content 2, http://links.lww.com____.

The literature is categorized according to the proximity or directness of the outcome to the intervention. To appropriately evaluate an outcome, a study should either evaluate a direct comparison or institute methodological controls (e.g., control for intervening variables). For these Guidelines, the primary outcomes of interest are pulmonary aspiration and the adverse consequences from aspiration. Therefore, these Guidelines focus on assessing the causal relationship between a preoperative intervention and the frequency of pulmonary aspiration, and assessing the causal relationship between a preoperative intervention and the frequency or severity of an adverse consequence associated with aspiration (e.g., pneumonitis). However, the literature is insufficient to evaluate such relationships. The literature reveals four types of analytic relationships between preoperative interventions and outcomes of interest. These types of relationships are referred to as first, second, third, or fourth-order comparisons (Table 1).

A first-order comparison represents a direct comparison either between an intervention (e.g., antacid administration) and a clinical outcome, or between two outcomes (e.g., gastric volume and emesis). In the studies reviewed with first-order comparisons, the relationship between one of the identified interventions in the Guidelines and the incidence of pulmonary aspiration was not assessed. Therefore, a cause-and-effect relationship between an intervention of interest and
pulmonary aspiration cannot be shown. Although some outcomes (e.g., gastric volume or pH) were considered by the authors to be representative of a predicted “risk” of pulmonary aspiration, results of such comparisons are not sufficient to provide methodologically acceptable evidence.

Levels 2 through 4 represent comparisons that must first control for an intermediate outcome. For example, in order to examine the effectiveness of a histamine-2 receptor antagonist on pulmonary aspiration, the effect of the histamine-2 receptor antagonist on gastric content as well as the occurrence of emesis must be methodologically controlled. Gastric content and emesis “outcomes” are intervening steps between the intervention and pulmonary aspiration. This example would be considered a “third-order” comparison.

Level 2 represents a comparison in which one step, or intermediate outcome, exists between the intervention and the outcome of interest. However, level 2 relationships do not examine the association between an intervention of interest and the occurrence of pulmonary aspiration.

Level 3 contains one relationship of interest to the Guidelines (i.e., intervention/ pulmonary aspiration), and Level 4 contains the other relationship of interest to the Guidelines (i.e., the association between an intervention and clinical consequences from pulmonary aspiration).

Table 1 indicates that outcomes related to preoperative fasting and the administration of pharmacologic agents were insufficient to evaluate cause-and-effect relationships that link the interventions of interest in these Guidelines with the occurrence of pulmonary aspiration or the clinical consequences from pulmonary aspiration.

Although the literature was not sufficient for causal assessment related to pulmonary aspiration, findings for each intervention of interest regarding intermediate outcomes is reported. Initially, each pertinent outcome reported in a study is classified as supporting an evidence linkage, refuting a linkage, or equivocal. These results are then summarized to obtain a directional assessment for each evidence linkage before conducting a formal meta-analysis. The literature relating to five evidence
linkages contained enough studies with well-defined experimental designs and statistical
information to conduct formal meta-analyses. These five evidence linkages are: (1) preoperative
fasting status of liquids between 2 and 4 hours for adults, (2) preoperative fasting status of liquids
between 2 and 4 hours for children, (3) preoperative metoclopramide, (4) preoperative cimetidine,
and (5) preoperative ranitidine. Meta-analysis was limited to gastric volume and acidity outcomes
(Table 2).

General variance-based effect-size estimates or combined probability tests are obtained for
continuous outcome measures, and Mantel-Haenszel odds-ratios are obtained for dichotomous
outcome measures. Two combined probability tests are employed 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 x 2 tables is used with outcome frequency information. An acceptable significance
level is set at P < 0.01 (one-tailed). Tests for heterogeneity of the independent studies are
conducted to assure consistency among the study results. DerSimonian-Laird random-effects odds
ratios are obtained when significant heterogeneity was found (P < 0.01). To control for potential
publishing bias, a "fail-safe n" value is calculated. No search for unpublished studies was
conducted, and no reliability tests for locating research results were done. To be accepted as
significant findings, Mantel-Haenszel odds-ratios must agree with combined test results whenever
both types of data are assessed. In the absence of Mantel-Haenszel odds-ratios, findings from both
the Fisher and weighted Stouffer combined tests must agree with each other to be acceptable as
significant.
For the original guidelines, interobserver 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 are as follows: (1) type of study design, \( k = 0.75 \) to 0.95; (2)
type of analysis, \( k = 0.54 \) to 0.85; (3) evidence linkage assignment, \( k = 0.68 \) to 0.82; and (4)
literature inclusion for database, \( k = 0.64 \) to 0.78. Three-rater chance-corrected agreement values
are: (1) design, \( \text{Sav} = 0.81 \), \( \text{Var (Sav)} = 0.006 \); (2) analysis, \( \text{Sav} = 0.66 \), \( \text{Var (Sav)} = 0.014 \); (3)
linkage identification, \( \text{Sav} = 0.75 \), \( \text{Var (Sav)} = 0.005 \); (4) literature database inclusion, \( \text{Sav} = 0.67 \),
\( \text{Var (Sav)} = 0.050 \). These values represent moderate to high levels of agreement.

**B. Consensus-Based Evidence.**

Consensus was obtained from multiple sources, including: (1) survey opinion from
consultants who were selected based on their knowledge or expertise in preoperative fasting and
prevention of pulmonary aspiration, (2) survey opinions solicited from active members of the
ASA membership, (3) testimony from attendees of a publicly-held open forum for the original
guidelines held at a national anesthesia meeting, (4) Internet commentary, and (5) task force
opinion and interpretation. The survey rate of return is 59.7% (\( n = 37 \) of 62) for the consultants
(Table 3), and 471 responses were received from active ASA members (Table 4).

For the original Guidelines, an additional survey was sent to the consultants asking them to
indicate which, if any, of the evidence linkages would change their clinical practices if the
Guidelines were instituted. The percent of consultants expecting no change associated with each
linkage were as follows: preoperative assessment - 95%; preoperative fasting of solids - 75%;
preoperative fasting of liquids - 67%; preoperative fasting of breast milk - 78%; gastrointestinal
stimulants - 95%; pharmacologic blockage of gastric secretion - 91%; antacids - 100%; antiemetics
- 98%, anticholinergics - 100%, and multiple agents - 98%. Ninety-six percent of the respondents
indicated that the Guidelines would have no effect on the amount of time spent on a typical case.
For all respondents, the mean increase in the amount of time spent on a typical case was 2.4 minutes. Two respondents reported that the Guidelines would increase the amount of time spent per case. The anticipated increase for these two respondents was 5 and 120 minutes.

Table 1: Summary of First, Second, Third and Fourth-Order Comparisons of Outcomes Related to Fasting and Pharmaceutical Interventions

<table>
<thead>
<tr>
<th>Fasting or Pharmaceutical Intervention</th>
<th>Number of Studies</th>
</tr>
</thead>
</table>

**First-order comparisons:**
- Intervention - Gastric Outcomes: 132
- Gastric Volume or pH - Emesis/Reflux: 1
- Emesis/Reflux - Pulmonary Aspiration: 0
- Pulmonary Aspiration - Adverse Outcomes: 3

**Second-order comparisons:**
- Intervention - Emesis/Reflux: 15
- Gastric Volume or pH - Pulmonary Aspiration: 1
- Emesis/Reflux - Adverse Outcomes: 0

**Third-order comparisons:**
- Intervention – Pulmonary Aspiration: 3
- Gastric volume or pH - Adverse Outcomes: 0

**Fourth-order comparisons:**
- Intervention - Adverse Outcomes: 0
### Table 2. Meta-Analysis Summary

<table>
<thead>
<tr>
<th>Evidence Linkages</th>
<th>N</th>
<th>Fisher Chi-Sq</th>
<th>Weighted Stouffer Zc</th>
<th>Effect Size</th>
<th>Odds Ratio</th>
<th>Confidence Interval</th>
<th>Heterogeneity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preoperative fasting for clear liquids:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults; 2-4 hours versus &gt; 4 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric volume</td>
<td>8</td>
<td>39.80</td>
<td>0.001</td>
<td>-2.44</td>
<td>0.007</td>
<td>-0.11</td>
<td>ns</td>
</tr>
<tr>
<td>Gastric volume &lt; 25 ml</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric pH</td>
<td>8</td>
<td>36.26</td>
<td>0.005</td>
<td>2.69</td>
<td>0.004</td>
<td>0.12</td>
<td>ns</td>
</tr>
<tr>
<td>Gastric pH &gt; 2.5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk***</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Preoperative fasting for clear liquids:</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Children; 2-4 hours versus &gt; 4 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gastric volume</td>
<td>9</td>
<td>39.07</td>
<td>0.005</td>
<td>-1.37</td>
<td>0.085</td>
<td>-0.05</td>
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<tr>
<td>Gastric volume &lt; 0.04 ml/kg</td>
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</tr>
<tr>
<td>Gastric pH</td>
<td>9</td>
<td>35.88</td>
<td>0.006</td>
<td>2.89</td>
<td>0.002</td>
<td>0.10</td>
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<tr>
<td>Gastric pH &gt; 2.5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Low risk**</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Metoclopramide versus placebo:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric volume</td>
<td>6</td>
<td>49.61</td>
<td>0.001</td>
<td>-5.06</td>
<td>0.001</td>
<td>-0.34</td>
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<tr>
<td>Gastric pH</td>
<td>5</td>
<td>37.06</td>
<td>0.001</td>
<td>3.56</td>
<td>0.001</td>
<td>0.28</td>
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<tr>
<td><strong>Cimetidine versus placebo:</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>Gastric volume ***</td>
<td>5</td>
<td>54.24</td>
<td>0.001</td>
<td>-5.50</td>
<td>0.001</td>
<td>-0.39</td>
<td>ns</td>
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<tr>
<td>Gastric volume &lt; 25 ml</td>
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<td></td>
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</tr>
<tr>
<td>Gastric pH ***</td>
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<td>93.37</td>
<td>0.001</td>
<td>11.73</td>
<td>0.001</td>
<td>0.78</td>
<td>0.005 0.001</td>
</tr>
<tr>
<td>Gastric pH &gt; 2.5</td>
<td>11</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Low risk**</td>
<td>5</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Ranitidine versus placebo:</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gastric volume ***</td>
<td>7</td>
<td>78.73</td>
<td>0.001</td>
<td>-9.46</td>
<td>0.001</td>
<td>-0.55</td>
<td>0.001 0.001</td>
</tr>
<tr>
<td>Gastric volume &lt; 25 ml</td>
<td>14</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gastric pH ***</td>
<td>7</td>
<td>106.41</td>
<td>0.001</td>
<td>14.05</td>
<td>0.001</td>
<td>0.85</td>
<td>ns</td>
</tr>
<tr>
<td>Gastric pH &gt; 2.5***</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk***</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>
PRACTICE GUIDELINES: DRAFT

* Random-effects odds-ratio; ** Low risk = gastric volume < 25 ml and ph > 2.5; *** Double-blind studies odds-ratio
## Table 3. Consultant Survey Responses†††

<table>
<thead>
<tr>
<th>Percent Responding to Each Item</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### I. Preoperative Assessment:

1. A review of pertinent records, a physical examination, and patient survey or interview should be performed as part of the preoperative evaluation  
   - 37 consultants responded  
     - 86.5% strongly agree  
     - 13.5% agree  
     - 0.0% equivocal  
     - 0.0% disagree  
     - 0.0% strongly disagree

2. Patients should be informed of fasting requirements and the reasons for them sufficiently in advance of their procedures  
   - 37 consultants responded  
     - 97.3% strongly agree  
     - 2.7% agree  
     - 0.0% equivocal  
     - 0.0% disagree  
     - 0.0% strongly disagree

3. Verification of patient compliance with the fasting requirements should be assessed immediately prior to the time of the procedure  
   - 36 consultants responded  
     - 94.4% strongly agree  
     - 5.6% agree  
     - 0.0% equivocal  
     - 0.0% disagree  
     - 0.0% strongly disagree

### II. Preoperative NPO Status

**Clear Liquids:**

4a. For otherwise healthy infants (< 2 years of age), fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained  
   - 37 consultants responded  
     - 59.5% strongly agree  
     - 27.0% agree  
     - 10.8% equivocal  
     - 0.0% disagree  
     - 2.7% strongly disagree

4b. For otherwise healthy children (2 to 16 years of age), fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained  
   - 37 consultants responded  
     - 54.1% strongly agree  
     - 32.4% agree  
     - 10.8% equivocal  
     - 2.7% disagree  
     - 0.0% strongly disagree

4c. For otherwise healthy adults, fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained  
   - 37 consultants responded  
     - 56.8% strongly agree  
     - 40.5% agree  
     - 2.7% equivocal  
     - 0.0% disagree  
     - 0.0% strongly disagree

†††  N = number of consultants who responded to each item; * = median.
Breast Milk:

5a. For otherwise healthy neonates (< 44 gestational weeks), fasting from the intake of breast milk for 4 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>37.8</td>
<td>35.1*</td>
<td>18.9</td>
<td>8.1</td>
</tr>
</tbody>
</table>

5b. For otherwise healthy infants, fasting from the intake of breast milk for 4 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>43.2</td>
<td>37.8*</td>
<td>18.9</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Infant Formula:

6a. For neonates, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>27.0</td>
<td>32.4*</td>
<td>24.3</td>
<td>13.5</td>
</tr>
</tbody>
</table>

6b. For infants, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>36.1</td>
<td>30.6*</td>
<td>16.7</td>
<td>13.9</td>
</tr>
</tbody>
</table>

6c. For children, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>32.4</td>
<td>40.5*</td>
<td>21.6</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Non-Human Milk:

7a. For infants, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>31.4</td>
<td>34.3*</td>
<td>22.9</td>
<td>11.4</td>
</tr>
</tbody>
</table>
### 7b. For children, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>N</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>29.7</td>
<td>46.0*</td>
<td>18.9</td>
<td>5.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### 7c. For adults, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>N</th>
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<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>37</td>
<td>43.2</td>
<td>46.0*</td>
<td>5.4</td>
<td>5.4</td>
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</tr>
</tbody>
</table>

### Solids:

8. Fasting from the intake of a light meal (e.g., total and a clear liquid) for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>N</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tbody>
<tr>
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<td>41.7</td>
<td>44.4*</td>
<td>0.0</td>
<td>13.9</td>
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</tr>
</tbody>
</table>

9. Fasting from the intake of a meal that includes fried or fatty foods for 8 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th>N</th>
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<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
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<tr>
<td>36</td>
<td>63.9*</td>
<td>27.8</td>
<td>2.8</td>
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</table>

### III. Preoperative Gastrointestinal Stimulants

10. Gastrointestinal stimulants should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
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<th>Strongly Disagree</th>
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<td>47.2</td>
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</table>

### IV. Preoperative Pharmacologic Blockade of Gastric Acid Secretion

11. Histamine-2 receptor antagonists should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
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<tbody>
<tr>
<td>36</td>
<td>0.0</td>
<td>2.8</td>
<td>5.6</td>
<td>44.4*</td>
<td>47.2</td>
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</tbody>
</table>
12. Proton pump inhibitors should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
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<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>37</td>
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</table>

V. Preoperative Antacids

13a. Preoperative antacids should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
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</table>

13b. When antacids are indicated for selected patients, only non-particulate antacids should be used

<table>
<thead>
<tr>
<th>N</th>
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VI. Preoperative Antiemetics

14. Preoperative antiemetics should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
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<td>43.2</td>
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VII. Preoperative Anticholinergics

15. Preoperative anticholinergics should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) to decrease the risk of pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
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VIII. Preoperative Multiple Agents

16. Preoperative multiple agents should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
<th>N</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
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<td>43.2</td>
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Table 4. ASA Members Survey Responses

<table>
<thead>
<tr>
<th>Percent Responding to Each Item</th>
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<th>Equivocal</th>
<th>Disagree</th>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>470</td>
<td>60</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>I. Preoperative Assessment:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. A review of pertinent records, a physical examination, and patient survey or interview should be performed as part of the preoperative evaluation</td>
<td>470</td>
<td>93.2*</td>
<td>6.0</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>2. Patients should be informed of fasting requirements and the reasons for them sufficiently in advance of their procedures</td>
<td>470</td>
<td>93.4*</td>
<td>6.4</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>3. Verification of patient compliance with the fasting requirements should be assessed immediately prior to the time of the procedure</td>
<td>468</td>
<td>88.5*</td>
<td>9.6</td>
<td>1.3</td>
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</tr>
<tr>
<td><strong>II. Preoperative NPO Status</strong></td>
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</tr>
<tr>
<td><strong>Clear Liquids:</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4a. For otherwise healthy infants (&lt; 2 years of age), fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained</td>
<td>471</td>
<td>66.9*</td>
<td>25.1</td>
<td>5.7</td>
<td>2.1</td>
</tr>
<tr>
<td>4b. For otherwise healthy children (2 to 16 years of age), fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained</td>
<td>467</td>
<td>67.0*</td>
<td>23.3</td>
<td>5.6</td>
<td>3.6</td>
</tr>
<tr>
<td>4c. For otherwise healthy adults, fasting from the intake of clear liquids for 2 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained</td>
<td>465</td>
<td>64.5*</td>
<td>21.5</td>
<td>6.0</td>
<td>6.5</td>
</tr>
</tbody>
</table>

‡‡‡ N = number of ASA members who responded to each item; * = median.
Breast Milk:

5a. For otherwise healthy neonates (< 44 gestational weeks), fasting from the intake of breast milk for 4 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>465</td>
<td>53.6*</td>
<td>29.5</td>
<td>13.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

5b. For otherwise healthy infants, fasting from the intake of breast milk for 4 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
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<td>55.6*</td>
<td>32.4</td>
<td>8.6</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Infant Formula:

6a. For neonates, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
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<th>Strongly Agree</th>
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<th>Equivocal</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
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<td>45.7</td>
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</tbody>
</table>

6b. For infants, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>459</td>
<td>47.9</td>
<td>33.8*</td>
<td>12.4</td>
<td>4.8</td>
</tr>
</tbody>
</table>

6c. For children, fasting from the intake of infant formula for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
<thead>
<tr>
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<th>Agree</th>
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<th>Disagree</th>
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<td>32.5</td>
<td>10.5</td>
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</tr>
</tbody>
</table>

Non-Human Milk:

7a. For infants, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

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<th></th>
<th>Strongly Agree</th>
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<th>Disagree</th>
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</tr>
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<tbody>
<tr>
<td>N</td>
<td>458</td>
<td>47.6</td>
<td>33.4*</td>
<td>12.5</td>
<td>5.0</td>
</tr>
</tbody>
</table>
7b. For children, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

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<tr>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>460</td>
<td>51.1*</td>
<td>34.4</td>
<td>8.4</td>
<td>4.8</td>
</tr>
</tbody>
</table>

7c. For adults, fasting from the intake of non-human milk for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

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<thead>
<tr>
<th></th>
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<th>Disagree</th>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>462</td>
<td>55.6*</td>
<td>33.3</td>
<td>5.0</td>
<td>4.8</td>
</tr>
</tbody>
</table>

**Solids:**

8. Fasting from the intake of a light meal (e.g., total and a clear liquid) for 6 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

<table>
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<th>Disagree</th>
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</thead>
<tbody>
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<td>59.0*</td>
<td>29.7</td>
<td>4.1</td>
<td>6.2</td>
</tr>
</tbody>
</table>

9. Fasting from the intake of a meal that includes fried or fatty foods for 8 or more hours before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) should be maintained

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<td>68.5*</td>
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</table>

**III. Preoperative Gastrointestinal Stimulants**

10. Gastrointestinal stimulants should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
<thead>
<tr>
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<td>1.9</td>
<td>4.5</td>
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<td>48.8*</td>
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**IV. Preoperative Pharmacologic Blockade of Gastric Acid Secretion**

11. Histamine-2 receptor antagonists should be routinely administered before elective procedures requiring general anesthesia, regional anesthesia, or sedation/analgesia (i.e., monitored anesthesia care) in patients who have no apparent increased risk for pulmonary aspiration

<table>
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<tr>
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<tr>
<td>V</td>
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<td>VI. Preoperative Antiemetics</td>
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