About the Guide...

Effective risk management is a team effort. To gain a range of perspectives, we suggest that the physician, office manager, and staff complete this assessment. Any significant variations in the answers among those taking the risk assessment should be discussed and addressed.

Most plastic surgical procedures are performed in one of three outpatient settings: hospital-based ambulatory surgical units, freestanding ambulatory surgery centers, or office based surgery facilities. These ambulatory surgery facilities offer several advantages for both patients and providers, including greater control over scheduling, greater privacy and convenience for the patient, increased efficiency and consistency in nursing staff and support personnel, and possibly decreased cost to the patient. Despite the many benefits of ambulatory surgery, there remain inherent risks associated with any surgical care environment that have the potential to jeopardize patient safety. Additionally, many medical malpractice claims occur with patients who request elective procedures and are then dissatisfied with the outcome. This guide offers recommendations on how to best minimize these risks and ultimately improve patient safety and satisfaction.
Letter from the Patient Safety Committee Chair

This evidence based, interactive guide is the end result of a collaborative effort embarked upon by many dedicated individuals. The inspiration for this project originated from Gary Culbertson, MD, who in an October 2010 Committee meeting suggested that the committee compile an evidence-based, comprehensive, concise patient safety resource to serve the needs of community based plastic surgeons, “who like me do not have the time or resources to pull the materials together themselves.” The Patient Safety Committee accepted Dr. Culbertson’s challenge and compiled and edited the contents of this guide.

It should be pointed out that the recommendations discussed throughout this guide are the product of the 2009 ASPS Patient Safety Committee supplement, Evidence Based Patient Safety Advisory for Ambulatory Surgery, spearheaded by Phillip Haeck, MD and the 2011 Venous Thromboembolism Task Force Report, chaired by Robert X Murphy Jr., MD. An updated literature search of the Patient Safety Supplement recommendations was performed in 2011 to ensure that all of the evidence-based recommendations are current. Additionally, on page 2, The Doctors Company, the nation’s leading physician owned medical malpractice insurer, provided tips on risk management and a patient selection checklist. This excellent tool allows you to evaluate your office and key systems as a whole by answering all of the risk management questions or focus only on the sections that are areas of concern. And finally, thanks to staff members Karie Rosolowski Sr. Quality Associate, for the literature reviews and design work and to DeLaine Schmitz Sr. Director of Quality Initiatives for ensuring the resources were available to complete the project.

Loren Schechter, Chair, Patient Safety Committee

PATHWAYS TO PREVENTION GUIDE WORK GROUP MEMBERS

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Patient Selection: Risk Management Tips

There is no scoring system to the checklist below. The options for responding to the statements are Yes or No. The ideal response to every statement is indicated at the beginning of each section. Any other response indicates an area of potential malpractice exposure in your practice that should be addressed and resolved. Respond to the statements as objectively and honestly as you can. The effectiveness of this interactive guide depends on how candid you are.

Step 1: Assess for “Red Flags” Behaviors
*The ideal response is “No”; Any “Yes’s” should be considered “red flags” and investigated further

Yes  No

__  __  Has undergone repeated surgical procedures by other physicians
__  __  Has sued another provider as a result of a plastic surgery outcome
__  __  Appears to have an exaggerated concern over a minor or nonexistent problem
__  __  Has recently experienced a major life change, such as divorce
__  __  Appears to looking for a quick fix to a long-term problem
__  __  Thinks that plastic surgery will fix psychological or social problems
__  __  Exhibits resentment when asked questions and/or answers questions defensively
__  __  The patient appears to be engaged in “doctor shopping”

Step 2: Assess Patient Suitability for Ambulatory Plastic Surgery
*The ideal response is “Yes”; Any “No’s” should be investigated further

Yes  No

__  __  There is a history of compliance with pre- and post-op instructions (if applicable)
__  __  He or she will not experience periods of extended sedentary situations (e.g., long flights, bed rest, extended car rides, etc.) during the two weeks prior to surgery.
__  __  The patient’s risk for VTE has been evaluated (See VTE recommendations on page 5)
__  __  If the patient is a smoker, the patient can desist from smoking for a period of time necessary for maximum healing. (See smoking recommendations on page 8).
__  __  The patient’s BMI is appropriate for ambulatory surgery (See BMI recommendations on page 9).
__  __  The patient’s risk factors for pulmonary complications have been evaluated
(See obstructive lung disease and obstructive sleep apnea recommendations on pages 10 & 11).
__  __  The risk factors associated with the patient’s age (if older than 60) have been considered
(See age recommendations on page 13).
__  __  The patient’s risk factors for cardiovascular conditions have been evaluated
(See cardiovascular recommendations on page 13).
__  __  The patient’s ASA status is appropriate for ambulatory surgery (See ASA recommendations on page 14).

Step 3: Risk Management
*The ideal response is “Yes”; Any “No’s” should be investigated further

Yes  No

__  __  The patient can financially handle the costs associated with the procedure
__  __  The patient is requesting a procedure with which you are credentialed and competent to perform
__  __  You have an in-depth discussion with the patient as to his or her expectations from the surgery.
__  __  You carefully use “before” and “after” pictures of previous patients who have physical features similar to those of the current patient.
__  __  You do not make any implied warranty with the use of imaging.
__  __  You make it absolutely clear there is no guarantee that the degree of improvement will be the same as that in the photos.
__  __  You document this conversation in the record.
__  __  You discuss the patient with staff who may have made observations or heard comments that were not shared with the physician.
__  __  A preoperative pregnancy test has been performed on female patient of childbearing age
__  __  Patient has signed appropriate informed consent and process has been documented

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Evidence Based Medicine

Evidence based medicine is the integration of best research evidence with clinical expertise and patient values. Evidence based medicine is vital to the world of medicine because it allows clinicians and healthcare organizations to use research evidence efficiently for the purposes of implementing best practices and developing quality measures.

EBM Resources

Centre for Evidence Based Medicine
Evidence Based Medicine Tutorial
National Guideline Clearinghouse

ASPS Evidence Rating Scales

The ASPS utilizes evidence based processes when developing clinical practice recommendations. The recommendations included in this guide were developed through a comprehensive search and review of the scientific literature and consensus of the ASPS Patient Safety Committee. The supporting literature was critically appraised for study quality and assigned a corresponding level of evidence (I through V) according to the ASPS Evidence Rating Scales below.

Evidence Rating Scale for Therapeutic Studies

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Qualifying Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>High-quality, multi-centered or single-centered, randomized controlled trial with adequate power; or systematic review of these studies</td>
</tr>
<tr>
<td>II</td>
<td>Lesser-quality, randomized controlled trial; prospective cohort or comparative study; or systematic review of these studies</td>
</tr>
<tr>
<td>III</td>
<td>Retrospective cohort or comparative study; case-control study; or systematic review of these studies</td>
</tr>
<tr>
<td>IV</td>
<td>Case series with pre/post test; or only post test</td>
</tr>
<tr>
<td>V</td>
<td>Expert opinion; case report or clinical example; or evidence based on physiology, bench research or &quot;first principles&quot;</td>
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Evidence Rating Scale for Diagnostic Studies

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Qualifying Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>High-quality, multi-centered or single-centered, cohort study validating a diagnostic test (with &quot;gold&quot; standard as reference) in a series of consecutive patients; or a systematic review of these studies</td>
</tr>
<tr>
<td>II</td>
<td>Exploratory cohort study developing diagnostic criteria (with &quot;gold&quot; standard as reference) in a series of consecutive patient; or a systematic review of these studies</td>
</tr>
<tr>
<td>III</td>
<td>Diagnostic study in nonconsecutive patients (without consistently applied &quot;gold&quot; standard as reference); or a systematic review of these studies</td>
</tr>
<tr>
<td>IV</td>
<td>Case-control study; or any of the above diagnostic studies in the absence of a universally accepted &quot;gold&quot; standard</td>
</tr>
<tr>
<td>V</td>
<td>Expert opinion; case report or clinical example; or evidence based on physiology, bench research or &quot;first principles&quot;</td>
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</table>

Evidence Rating Scale for Prognostic/Risk Studies

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Qualifying Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>High-quality, multi-centered or single-centered, prospective cohort study with adequate power; or a systematic review of these studies</td>
</tr>
<tr>
<td>II</td>
<td>Lesser-quality prospective cohort or comparative study; retrospective cohort or comparative study; untreated controls from a randomized controlled trial; or a systematic review of these studies</td>
</tr>
<tr>
<td>III</td>
<td>Case-control study; or systematic review of these studies</td>
</tr>
<tr>
<td>IV</td>
<td>Case series with pre/post test; or only post test</td>
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<tr>
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ASPS Recommendation Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifying Evidence</th>
<th>Implications for Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Strong Recommendation</td>
<td>Level I evidence or consistent findings from multiple studies of levels II, III, or IV</td>
<td>Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>B: Recommendation</td>
<td>Levels II, III, or IV evidence and findings are generally consistent</td>
<td>Clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences.</td>
</tr>
<tr>
<td>C: Option</td>
<td>Levels II, III, or IV evidence, but findings are inconsistent</td>
<td>Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role.</td>
</tr>
<tr>
<td>D: Option</td>
<td>Level V: Little or no systematic empirical evidence</td>
<td>Clinicians should consider all options in their decision-making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role.</td>
</tr>
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</table>
VTE: ASPS Evidence Based Recommendations

The 2008 release of “Surgeon General’s Call to Action to Prevent Deep Vein Thrombosis and Pulmonary Embolism”, prompted ASPS members to take quick action. ASPS’ first line response was hosting the “Partners in Quality Leadership Summit” in Chicago in July 2009 to discuss the impact of VTE on plastic surgery. During the summit, society members detailed an action plan, which included the formation of the VTE Task Force. In October 2009, the VTE Task Force was convened at Plastic Surgery 2009 in Seattle, WA. The Task Force was charged with developing an action plan to educate members on the impact of VTE, determine the tools and aids that should be developed to assist plastic surgeons across the health system to implement best practices for DVT/PE prevention, and assess the current VTE research efforts underway in plastic surgery and recommend areas where further research is needed.

After thorough review of the literature, the VTE Task Force endorsed the 2005 Caprini Risk Assessment Scale, which can be found on page 6, and developed prophylaxis recommendations geared toward plastic surgery patients, which can be found on page 7. Additionally, VTE resources, including patient handouts, can be found by visiting the links below.

VTE REFERENCES

ASPS Campaign for VTE Awareness

Patient Handout: VTE Signs and Symptoms

DVT Risk: Self Assessor for Patients

The Coalition to Prevent DVT

The Surgeon General’s Call to Action to Prevent Deep Vein Thrombosis and Pulmonary Embolism

AHRQ Preventing Hospital Acquired Venous Thromboembolism

VTE References


* (T)= Therapeutic Study; (R)= Risk Study
GUIDE TO USING THE CAPRINI RISK ASSESSMENT MODEL

The 2005 Caprini Risk Assessment Model (RAM) has been validated for use in plastic surgery patients and consists of a comprehensive list of risk factors associated with the development of deep vein thrombosis (DVT).

After evaluating the patient with each checklist section, assign the patient a total VTE risk factor score. After you have calculated the patient’s total risk score, refer to the VTE Task Force Recommendations on page 7 when determining the appropriate prophylaxis regimen.

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**Thrombosis Risk Factor Assessment**

Patient’s Name: ____________________ Age: ___ Sex: ___ Wgt: ___ lbs

**Choose All That Apply**

### Each Risk Factor Represents 1 Point
- Age 41-60 years
- Minor surgery planned
- History of prior major surgery (< 1 month)
- Varicose veins
- History of inflammatory bowel disease
- Swollen legs (current)
- Obesity (BMI > 25)
- Acute myocardial infarction
- Congestive heart failure (< 1 month)
- Sepsis (< 1 month)
- Serious lung disease incl. pneumonia (< 1 month)
- Abnormal pulmonary function (COPD)
- Medical patient currently at bed rest
- Other risk factors ____________________

### Each Risk Factor Represents 2 Points
- Age 60-74 years
- Arthroscopic surgery
- Malignancy (present or previous)
- Major surgery (> 45 minutes)
- Laparoscopic surgery (> 45 minutes)
- Patient confined to bed (> 72 hours)
- Immobilizing plaster cast (< 1 month)
- Central venous access

### Each Risk Factor Represents 5 Points
- Elective major lower extremity arthroplasty
- Hip, pelvis or leg fracture (< 1 month)
- Stroke (< 1 month)
- Multiple trauma (< 1 month)
- Acute spinal cord injury (paralysis)(< 1 month)

### For Women Only (Each Represents 1 Point)
- Oral contraceptives or hormone replacement therapy
- Pregnancy or postpartum (<1 month)
- History of unexplained stillborn infant, recurrent spontaneous abortion (>3), premature birth with toxemia or growth-restricted infant

**Total Risk Factor Score**

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* The 2005 Caprini Risk Assessment Model. Reprinted with permission from Joseph A. Caprini, MD
# VTE Risk Assessment and Prophylaxis Recommendations

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Recommendation</th>
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| **In-patient** adult aesthetic and reconstructive plastic surgery who undergo general anesthesia | **Should complete** a 2005 Caprini risk factor assessment tool (or comparable VTE risk assessment and stratification process) in order to stratify patients into a VTE risk category based on their individual risk factors.  
*Grade B*  
Or  
**Should complete** a VTE risk assessment tool comparable to the 2005 Caprini RAM in order to stratify patients into a VTE risk category based on their individual risk factors.  
*Grade D* |

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>2005 Caprini Risk Factor Score</th>
<th>Recommendation</th>
</tr>
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| **Elective Surgery Patients** (when the procedure is scheduled in advance and is not performed to treat an emergency or urgent condition) | 7 or more | **Should consider** completing a 2005 Caprini risk factor assessment tool (or comparable VTE risk assessment and stratification process) in order to stratify patients into a VTE risk category based on their individual risk factors.  
*Grade B*  
Or  
**Should consider completing** a VTE risk assessment tool comparable to the 2005 Caprini RAM in order to stratify patients into a VTE risk category based on their individual risk factors.  
*Grade D* |

<table>
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<th>Recommendation</th>
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</table>
| Patients undergoing the following major procedures when the procedure is performed under general anesthesia lasting more than 60 minutes:  
- Body contouring  
- Abdominoplasty  
- Breast reconstruction  
- Lower extremity procedures  
- Head/neck cancer procedures | 7 or more | **Should strongly consider** the option to use extended LMWH postoperative prophylaxis for a minimum of 7 days.  
*Grade B* |

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<tr>
<th>Patient Population</th>
<th>2005 Caprini Risk Factor Score</th>
<th>Recommendation</th>
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</table>
| | 3 or more | **Should consider** the option to use postoperative LMWH or unfractionated heparin.  
*Grade B* |

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>2005 Caprini Risk Factor Score</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| | 7 or more | **Should consider** the option to utilize mechanical prophylaxis throughout the duration of chemical prophylaxis for non-ambulatory patients.  
*Grade D* |
Smoking: ASPS Evidence Based Recommendations

PATIENT SELECTION
● The patient should be asked about smoking history, including number of pack-years; if the patient is not a smoker, the patient should be asked whether anyone in the household smokes. *Grade B Recommendation*
● The patient should be asked about co-morbidities that could exacerbate the effects of smoking (e.g., airway obstruction, COPD, chronic cough). *Grade B Recommendation*

PREOPERATIVE
● Preoperative smoking cessation should be recommended and should depend on the patient’s overall health and the surgical procedure; optimal timing of cessation has not been fully determined and varies from 24 hr before surgery to 6–8 wk before surgery. *Grade B Recommendation*
● The physician should discuss available options to aid in smoking cessation: counseling and behavioral interventions, nicotine replacement (i.e., gum, transdermal patch, nasal spray, inhaler, and sublingual tablets/lozenges), and drugs such as Zyban (bupropion hydrochloride) and Chantix (varenicline). *Grade A Recommendation*

POSTOPERATIVE
● Continued smoking cessation should be recommended (at least 7 days after surgery). *Grade D Recommendation*

Risk Management
To ensure patient compliance with smoking cessation recommendations, some surgeons test their patient’s nicotine levels through Continine Testing. A simple laboratory test can measure cotinine in:
• blood,
• urine,
• or saliva.

Smoking References

Risk/Complications
● Level II (R): Skolnick ET, Vomvolakis MA, Buck K, Mannino SF, Sun LS. Exposure to environmental tobacco smoke and the risk of adverse respiratory events in children receiving general anesthesia. Anesthesiology 1998;88:1144–1153. [Article Link]

*T=Therapeutic Study; R=Risk Study*

Treatment

Smoking Resources
American Cancer Society Guide to Quitting Smoking
Smokefree.gov
American Heart Association Quit Smoking Program
American Lung Association Freedom from Smoking Program
CDC Smoking Cessation Materials
BMI: ASPS Evidence Based Recommendations

- Ambulatory surgery can be considered for patients with:
  - BMI 18.5–24.9 (normal weight)
  - BMI 25–29.9 (overweight)
  - BMI 30–34.9 (moderately obese)  
    Grade D Recommendation
- A hospital setting should be considered for patients with:
  - BMI 35–39.9 (severely obese)  
    Grade D Recommendation
- A hospital setting is recommended for patients with:
  - BMI ≥40 (morbidly obese)  
    Grade D Recommendation
- General management of obese patients:
  - Consider histories/comorbidities that may complicate patient management.  
    Grade B Recommendation
  - Consider prophylaxis against DVT (i.e., with low-dose heparin, sequential compression devices, and postoperative ambulation). See VTE Recommendations on page 4
  - Management of obese patients with respiratory abnormalities:
    - Ensure proper patient positioning and monitoring. Grade B Recommendation
    - Use a semi-upright position in a chair for patients under sedation.  
      Grade B Recommendation
    - Consider supplemental oxygen. Grade D Recommendation
    - Carefully sized airway adjuncts (e.g., oral/nasal pharyngeal airways, endotracheal tubes, laryngeal mask airways) should be immediately available for patients under moderate sedation or general anesthesia. Grade D Recommendation
    - Consider intravascular monitoring of arterial pressure (or other approaches) if blood pressure measurements and auscultation of the heart and lungs is difficult to obtain. Grade D Recommendation
- Pharmacologic approaches to sedation and pain management in obese patients: All Grade D Recommendations
  - Use a catheter-over-needle system to prevent loss of intravenous access.
  - Short operation times and lighter levels of sedation are recommended.
  - Consider a hospital setting if deeper anesthesia is required.
  - Calculate initial doses of pharmacologic agents based on ideal body weight (as a reflection of lean body mass) rather than actual body weight.
  - Consider possible drug interactions.
    - Exercise caution for patients taking appetite suppressants or other medications.
    - Consider avoiding opioids, especially in patients with diagnosed or suspected OSA

BMI References


(R)= Risk Study
Obstructive Lung Disease: ASPS Evidence Based Recommendations

PATIENT SELECTION
All Recommendations below are Grade D

- The medical history should include questions about current symptoms (e.g., cough, dysnea, wheezing) and frequency of symptoms; intensity of treatment (did patient require therapy at a medical facility?); current medications; recent use of rescue medications; tolerance to aspirin, cold air, dust, or smoke; smoking history; and previous exposures to general anesthesia and endotracheal intubation.
- A complete physical examination should be performed, including chest auscultation, assessment of skin coloration, and chest radiography when indicated.
- Patients should be free of symptoms and have optimal lung function. If a patient presents with symptoms, elective surgery should be postponed, if possible, pending resolution of symptoms.
- Patients with severe or uncontrolled disease, or those in which pulmonary status is uncertain, should be referred to a pulmonologist for assessment of pulmonary function.
- If patients have been on steroid therapy during the past 6 mo before surgery, additional steroid support may be necessary.

PREOPERATIVE
- If endotracheal intubation is required, consider preoperative prophylaxis (corticosteroids, topical lidocaine, β2-adrenergic agonists). Grade A Recommendation
- Consider preoperative sedation with benzodiazepines. Grade D Recommendation

INTRAOPERATIVE
- If possible, consider regional anesthesia over general anesthesia. Grade D Recommendation
- If general anesthesia is required, consider the volatile anesthetics, halothane and sevoflurane, or intravenous propofol. Grade A Recommendation
- Avoid anesthetics and muscle relaxants with histamine-releasing properties (e.g., thiopental, atracurium, mivacurium, succinylcholine). Grade D Recommendation

TREATMENT OF INTRAOPERATIVE BRONCHOSPASM
Grade D Recommendations
- If intraoperative bronchospasm is suspected, it is important to first rule out alternative diagnoses (e.g., mechanical obstructions, pneumothorax, pulmonary edema).
- If the diagnosis of intraoperative bronchospasm is confirmed, initial treatment includes deepening of anesthesia.
- For persistent bronchospasm, additional options for treatment include administration of β2-adrenergic agonists, parasympatholytics, systemic corticosteroids, magnesium, and lidocaine.

POSTOPERATIVE
Grade D Recommendations
- Avoid analgesics with histamine-releasing properties (e.g., meperidine, morphine).
- Consider the use of lung expansion maneuvers.

References


Level IV (R): Celiker V, Basgil I E. Anaesthesia in aspirin-induced asthma. Allergol Immunopathol (Madr.) 2003;31:338–341. Article Link

* (T)= Therapeutic Study; (R)= Risk Study
PATIENT SELECTION

- For patients without previous diagnosis of OSA, inquire about the following symptoms: airway obstruction during sleep; loud and frequent snoring; frequent arousal from sleep, especially with choking sensation; daytime somnolence or fatigue; falling asleep in nonstimulating environments (e.g., watching television, reading, driving); it may also be helpful to interview family members, as they may have witnessed some of the symptoms (e.g., apneic events, restless sleep, vocalizations). Grade D Recommendation
- For patients with suspected OSA, the surgeon and anesthesia provider may decide to refer the patient for additional tests (e.g., sleep studies, more extensive airway assessment) and OSA treatment before surgery.
- The physical examination should include an evaluation of the airway, nasopharyngeal characteristics, tonsil and tongue size, neck circumference, and BMI. Grade B Recommendation

SURGICAL SETTING

All Recommendations below are Grade D

- Only minor procedures under local or regional anesthesia should be performed in a freestanding ambulatory or office-based settings.
- Much consideration should be given to factors such as sleep apnea status, anatomical and physiologic abnormalities, status of comorbidities, nature of surgery, type of anesthesia, need for postoperative opioids, patient age, adequacy of postdischarge observation, and capabilities of the outpatient facility.
- The ASA believes that patients at significantly increased risk of perioperative complications generally are not appropriate candidates for procedures in freestanding outpatient settings.
- If it is determined that a patient with OSA can safely undergo ambulatory surgery, the facility should be appropriately equipped to handle potential complications and have transfer arrangements with an inpatient facility.

PREOPERATIVE

- CPAP has been shown to be effective at treating OSA; preoperative CPAP may be beneficial, especially in patients who are already using home CPAP. Grade B Recommendation
- If premedication, such as benzodiazepines, will be administered, patients must be monitored continuously for any signs of respiratory compromise; CPAP should be available for use if the patient becomes sleepy and cannot control his or her own airway. Grade B Recommendation

INTRAOPERATIVE

- If possible, consider local or regional anesthesia. Grade D Recommendation
- If sedatives will be used, ventilation should be monitored by capnography. Grade D Recommendation
- Patients who have been using CPAP preoperatively may benefit from its continued use during sedation. Grade B Recommendation
- If general anesthesia is necessary, it is important to secure the airway, especially for procedures that may compromise the airway; consider shortacting drugs; avoid large doses of long-acting drugs, such as neuromuscular blockers. Grade D Recommendation
- If endotracheal intubation is necessary, consider intubating in the sniffing position under fiberoptic scope. Recommendation Grade D
- Time to extubate should be based on severity of OSA, surgical site, cardiopulmonary comorbidities, difficult intubation, and intraoperative course; if possible, extubate in semiupright, lateral, or prone position when patient is fully awake with adequate airway muscle tone. Grade D Recommendation

POSTOPERATIVE

- If possible, systemic opioids should be avoided; other options, such as local or regional anesthetics and analgesics, a pain pump, nonsteroidal antiinflammatory drugs, or ice, should be considered to avoid use of opioids. Grade D Recommendation
- For patients at increased perioperative risk from OSA, consider administering continuous supplemental oxygen. Grade D Recommendation
- If patient experiences recurrent hypoxemia, consider treatment with CPAP and supplemental oxygen. If patient used CPAP preoperatively, resume CPAP when patient is awake and alert. Grade B Recommendation
- Monitor patients longer than non-OSA counterparts; if an episode of airway obstruction or hypoxemia occurs, patients should be continually monitored after the last episode while breathing room air in unstimulated environment; if the patient is in an ambulatory setting, transfer arrangements to an inpatient facility should be made for further monitoring. Grade D Recommendation
**OSA References**


* (T)= Therapeutic Study; (R)= Risk Study

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**APNEA-HYPOPNEA INDEX**

The American Academy of Sleep Disorders has classified the severity of sleep apnea by the apnea-hypopnea index (AHI). The AHI is a measurement of the average number of apneas and hypopneas that occur per hour of sleep.

**Severity of OSA**

<table>
<thead>
<tr>
<th>AHI</th>
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<tbody>
<tr>
<td>Mild</td>
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<tr>
<td>Moderate</td>
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<tr>
<td>Severe</td>
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**OBSURCITIVE SLEEP APNEA RESOURCES**

[American Academy of Sleep Medicine](#)

[American Sleep Apnea Association](#)
Age: ASPS Evidence Based Recommendations

All recommendations below are Grade B:

- Patients older than 60 years can be considered for ambulatory surgery but may be at increased risk for cardiac events, other complications, and unanticipated admissions.
- Cardiovascular monitoring is important; however, the level of monitoring depends on the patient’s overall health, the presence and severity of cardiovascular disease, and the nature of the surgical procedure.
- Standard monitoring should include:
  - Noninvasive blood pressure
  - Heart rate
  - Electrocardiography
  - Pulse oximetry
  - Respiratory rate

Cardiovascular Conditions: ASPS Evidence Based Recommendations

- Patients with a history of cardiovascular conditions can be considered for ambulatory surgery; however, the surgery location depends on the severity of disease. Patients with moderate to severe cardiovascular disease may not be appropriate candidates for surgery outside of the hospital setting. Grade D Recommendation
- General management of patients with cardiovascular conditions: Grade B Recommendations
  - Evaluate the risk of bleeding and thromboembolism.
  - Adjust medications such as aspirin, warfarin, or clopidogrel bisulfate accordingly.
  - Refer patients to their cardiologist, hematologist, or internist for preoperative evaluation and treatment.

Cardiovascular References


* (T)= Therapeutic Study; (R)= Risk Study
ASA Status: ASPS Evidence Based Recommendations

- Patients categorized as ASA class 1–3 can be considered for ambulatory surgery; however, the setting should be determined by the ASA class, the type of procedure, and the type of anesthesia. Grade B Recommendation
- ASA class 4 patients can be considered for ambulatory surgery; however, the setting is dependent on the type of procedure and type of anesthesia. Grade D Recommendation
- Office-based procedures: All Recommendations below are Grade D
  - ASA class 1 and 2 patients are generally considered the best candidates for ambulatory surgery and reasonable candidates for the office-based surgery setting.
  - ASA class 3 patients may also be reasonable candidates for office-based surgery facilities when local anesthesia, with or without sedation, is planned and the facility is accredited.
  - ASA class 4 patients are appropriate candidates for the office-based surgery setting only when local anesthesia without sedation is planned.
- If a free-standing ASC or office-based setting is chosen, it should be accredited with appropriate hospital transfer arrangements.

ASA Status: Plastic Surgery Example

**ASA 1**: A fit patient with no underlying systemic disease or on no medications:
- A 43 year old female for bilateral breast enhancement.
- A 32 year old male for cosmetic rhinoplasty.
- A 16 year old female for ear lobe reconstruction due congenital anomaly.

**ASA 2**: A patient with mild systemic disease, i.e. slightly limiting organic heart disease, mild diabetes, essential hypertension or anemia, obesity (by itself), chronic bronchitis, or any healthy individual under 1 year old or over 70 years old. e.g. Patients:
- who smoke, drink alcohol frequently or excessively, or use street drugs.
- who are obese.
- who have any of the following but under control without systemic compromise: diabetes, hypertension, asthma, GERD, PUD, hematological disorders, arthritis, neuropathy.
- with anatomic abnormalities of significance to health, such as hiatal hernia, difficult airways, non-debilitating heart anomaly, Down syndrome patients.
- with mild psychiatric illness that is under control, such as depression or anxiety disorder
- with a remote history of coronary artery disease and no other systemic illnesses, and their progress afterwards showed no further chest pain and documented good exercise tolerance.
- A 4-month-old male or female for cleft palate repair.
- A 73 year old female for bilateral breast enhancement.
- A 21 year old female for breast augmentation with truncal obesity.
- A 43 year old female for bilateral breast enhancement, who is a smoker and has COPD.
- A 32 year old asthmatic male for cosmetic rhinoplasty.

**ASA 3**: A patient with a systemic disease or multiple significant mild systemic diseases, organic heart diseases, severe diabetes with vascular complications, moderate to severe degrees of pulmonary insufficiency, angina pectoris, or healed myocardial infarction:
- Any 3rd and 4th degree burn patient who is hemodynamically stable and undergoing graft surgery.
- A 16 year old female for ear lobe reconstruction due congenital anomaly, with a symptomatic VSD.
- A 26 year old male for back lipoma excision, with controlled end-stage renal disease.
- A 53 year old male for liposuction, who is hypertensive and has occasional chest pain.

**ASA 4**: Organic heart disease showing marked signs of cardiac insufficiency, persistent anginal syndrome, active myocarditis, advanced degrees of pulmonary, hepatic, renal or endocrine insufficiency.
- A 71 year old female for bilateral breast enhancement under general anesthesia, who is asthmatic, a smoker and has COPD.
- A 16 year old female for ear lobe reconstruction due congenital anomaly, with a cyanotic heart anomaly.
- A 53 year old male for liposuction, who is hypertensive and has CHF within the last 6 month.

*Examples of ASA classifications created by Rebecca S. Twersky, M.D., member of the ASPS Task Force on Patient Safety in Office*
Hypothermia: ASPS Evidence Based Recommendations

All Recommendations below are Grade B:

- General strategies:
  - Equip the ambulatory surgery suite so that temperatures can be adequately monitored and adjusted.
  - Have equipment available such as forced-air arming blankets, intravenous fluid warmers to warm the patient, as necessary, especially during more extensive procedures.
  - When no hypothermia prevention measures are available, the procedures performed should be of short duration (1–2 hr) and limited to no more than 20% of the body surface area.

- Recommended protocol for hypothermia prevention during general or regional anesthesia:
  - Actively pre-warm patients.
  - Monitor core temperature throughout administration of general and regional anesthesia.
  - Cover as much body surface area as possible with blankets or drapes to reduce radiant and convective heat loss through the skin.
  - Actively warm patients intraoperatively with a forced-air heater or resistive-heating blanket to prevent heat loss and add heat content; re-arrange covers every time the patient is repositioned to warm as much surface area as possible.
  - Minimize repositioning time as much as possible so that the active warming method can be quickly continued.
  - Warm intravenous fluids and/or infiltration fluids if large volumes are used.
  - Warm incision irrigation fluids.
  - Aggressively treat postoperative shivering with a forced-air heater or resistive-heating blanket and consider pharmacologic intervention.

Hyperthermia References

Level I (T): Ng SF, Oo CS, Loh KH, Lim PY, Chan YH, Ong BC. A comparative study of three warming interventions to determine the most effective in maintaining perioperative normothermia. Anesth Analg. 2003;96:171–176. Article Link


(T)= Therapeutic Study; (R)= Risk Study
## Wrong Site Surgery

Evidence-based data for the prevention of wrong site surgery is presently not available; however, the implementation of protocols for preventing wrong site surgery, such as checklists, are required by many accrediting agencies. Wrong site surgery is considered a reportable event in many states and is classified as a “never event” by the Centers for Medicare and Medicaid Services and other payers. Below is an example of a comprehensive surgical safety checklist, developed by the Association of periOperative Registered Nurses (AORN), that incorporates the safety checks from both the World Health Organization’s Surgical Safety Checklist and The Joint Commission’s Universal Protocol. This comprehensive checklist can be used in all facility types.

### COMPREHENSIVE SURGICAL CHECKLIST

<table>
<thead>
<tr>
<th>PREPROCEDURE CHECK-IN</th>
<th>SIGN-IN</th>
<th>TIME-OUT</th>
<th>SIGN-OUT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In Holding Area</strong></td>
<td>Before Induction of Anesthesia</td>
<td>Before Skin Incision</td>
<td>Before the Patient Leaves the Operating Room</td>
</tr>
<tr>
<td><strong>Patient/patient representative actively confirms with Registered Nurse (RN):</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity □ Yes Procedure and procedure site □ Yes Consent(s) □ Yes Site marked □ Yes □ N/A by person performing the procedure</td>
<td>RN and anesthesia care provider confirm:</td>
<td>Initiated by designated team member</td>
<td>RN confirms:</td>
</tr>
<tr>
<td>History and physical □ Yes Preanesthesia assessment □ Yes</td>
<td>Confirmation of: identity, procedure, procedure site and consent(s) □ Yes Site marked □ Yes □ N/A by person performing the procedure</td>
<td>All other activities to be suspended (unless a life-threatening emergency)</td>
<td></td>
</tr>
<tr>
<td>Diagnostic and radiologic test results □ Yes □ N/A Blood products □ Yes □ N/A</td>
<td>Patient allergies □ Yes □ N/A Difficult airway or aspiration risk? □ No □ Yes (preparation confirmed) Risk of blood loss (&gt; 500 ml) □ Yes □ N/A # of units available</td>
<td>Introduction of team members □ Yes All: Confirmation of the following: identity, procedure, incision site, consent(s) □ Yes Site is marked and visible □ Yes □ N/A Relevant images properly labeled and displayed □ Yes □ N/A</td>
<td></td>
</tr>
<tr>
<td>Any special equipment, devices, implants □ Yes □ N/A</td>
<td>Any equipment concerns?</td>
<td>Any equipment problems to be addressed? □ Yes □ N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Anticipated Critical Events

- **Surgeon:**
  - States the following:
    - critical or nonroutine steps
    - case duration
    - anticipated blood loss

- **Anesthesia Provider:**
  - Antibiotic prophylaxis within one hour before incision □ Yes □ N/A
  - Additional concerns?

- **Scrub and circulating nurse:**
  - Sterilization indicators have been confirmed
  - Additional concerns?

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The JC does not stipulate which team member initiates any section of the checklist except for site marking. The Joint Commission also does not stipulate where these activities occur. See the Universal Protocol for details on the Joint Commission requirements.

*Reprinted with permission from AORN (http://www.aorn.org/PracticeResources/Toolkits/CorrectSiteSurgeryToolKit/Comprehensivechecklist/)*
Multiple Procedures: ASPS Evidence Based Recommendations

All Recommendations below are Grade B:
- The presumed benefits of combining procedures, particularly liposuction, must be weighed against the possibility of adverse events.
- Liposuction can be performed safely in the ambulatory setting when performed in accordance with ASPS recommendations to limit the total aspirant (supernatant fat and fluid) to \(<\)5000 cc.
- Combining large-volume liposuction with certain other procedures (e.g., abdominoplasty) should be avoided because of the possibility of serious complications.

Procedure Duration: ASPS Evidence Based Recommendations

All Recommendations below are Grade B:
- Long procedures should be scheduled sufficiently early in the day to allow for adequate recovery time before discharge.
- If possible, surgery should be completed by 3 pm to allow adequate time for recovery and discharge.
- The overall duration of the procedure(s) should ideally be completed within 6 hr.
- Attention to patient selection, intraoperative management, and postoperative care is of particular importance when procedures of longer duration are to be performed in the ambulatory setting.

Multiple Procedure References


(T)= Therapeutic Study
Surgical Fires: ASPS Evidence Based Recommendations

All Recommendations below are Grade D:

PREOPERATIVE
- The surgeon, anesthesia provider, and all members of the surgical staff should be apprised of the surgical plan with respect to the use of potential oxidizers, ignition sources, and fuel sources.
- Drapes should be positioned to prevent accumulation of oxidizers under the drapes and should not be placed on patient until flammable preparations have dried.
- Moistened towels should be placed around the face and neck if a laser is used on the face or oral region.
- If endotracheal intubation is necessary, the use of metal or laser-safe tubes should be considered if appropriate for the procedure, or the tube should be wrapped in a nonflammable material such as aluminum foil or moistened gauze, cotton, or sponges.
- If supplemental oxygen is required, the lowest oxygen concentration needed to provide adequate saturation should be considered.
- If possible, nitrous oxide anesthetics should be avoided and alternatives such as intravenous sedation and localized blocks should be considered.
- If the use of oxygen and/or nitrous oxide is unavoidable, a separate suction tube is recommended for scavenging excess gases in the oropharynx.

INTRAOPERATIVE
- The surgeon, anesthesia provider, and other surgical staff should communicate effectively to avoid simultaneous use of potential oxidizers, ignition sources, and fuel sources.
- If possible, oxygen administration should be discontinued at least 1 min before and during the use of potential ignition sources (e.g., electrocautery and electrosurgical units, lasers, and fiberoptic lights).
- Potential ignition sources should be placed in standby mode when not in immediate use.

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Fig. 1. The surgical fire triangle and examples of common oxidizers, ignition sources, and fuel sources used in the operating room. (Source: Haeck et al, 2009)

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Malignant Hyperthermia: ASPS Evidence Based Recommendations

PATIENT SELECTION
- During patient assessment, patients should be asked about personal and family history of (Grade D Recommendation):
  - MH
  - Adverse anesthesia reactions (unexplained fever or death during anesthesia)
- Patients with suspected MH should be referred for appropriate diagnostic testing (Grade B Recommendation):
  - CHCT or in vitro contracture test is the standard.
  - Genetic testing for mutations in the RYR1 gene may be considered; however, it typically cannot replace contracture tests, as it has low sensitivity. Results do not always correlate with a positive contracture test, which suggests that there may be other loci involved with MH.
- Patients susceptible to MH may undergo outpatient surgery, provided that non-triggering anesthetics are used. All office surgical suites should be equipped to manage an MH emergency. However, anyone identified with MH susceptibility should be referred to an accredited ambulatory surgical center or hospital for surgery. Grade D Recommendation

ANESTHESIA
All Recommendations below are Grade D:
- Local or regional anesthesia and monitored anesthesia care are considered to be safe for individuals susceptible to MH; this includes spinal, epidural, and nerve block anesthesia using local anesthetics (e.g., lidocaine, bupivacaine).
- General anesthesia can be performed with alternative anesthetic regimens, including barbiturates (e.g., thiopental), propofol, nondepolarizing paralytic agents (e.g., vecuronium) and their reversal agents, nitrous oxide, and opioids (e.g., fentanyl) (anesthesia machine preparation: change circuits, disable or remove the vaporizers, flush the machine at a rate of 10 liters/min for 20 min).
- If general anesthesia will be used, patients should undergo body temperature and capnographic monitoring.

INTRAOPERATIVE MANAGEMENT
All Recommendations below are Grade D:
- Monitor for clinical signs of MH:
  - Signs of respiratory acidosis: ETCO$_2$ >55 mmHg, PaCO$_2$ >60 mmHg (with appropriately controlled ventilation); ETCO$_2$ >60 mmHg, PaCO$_2$ >65 mmHg (with spontaneous ventilation); inappropriate hypercarbia and/or tachypnea
  - Trunk or total body rigidity
  - Masseter muscle spasm or trismus
  - Sinus tachycardia; ventricular tachycardia; ventricular fibrillation
  - Rapidly increasing temperature, or inappropriately increased temperature (>38.8°C); may be a late sign
  - Signs of muscle breakdown: elevated serum creatine kinase after anesthetics that included succinylcholine (>20,000 IU) or anesthetics without succinylcholine (>10,000 IU); cola-colored urine; excess myoglobin in urine (>60 mg/liter) and serum (>170 mg/liter); blood/plasma/serum K$^+$ >6 mEq/liter (in absence of renal failure)
  - Other: arterial base excess <−8 mEq/liter; arterial pH <7.25; rapid reversal of MH signs of respiratory and/or metabolic acidosis with IV administration of dantrolene

PREOPERATIVE MANAGEMENT
- In patients susceptible to MH, do not use the following MH-triggering drugs (Grade B Recommendation):
  - Desflurane
  - Enflurane
  - Halothane
  - Isoflurane
  - Depolarizing muscle relaxants:
    - Succinylcholine
  - The surgical suite should be equipped to manage malignant hyperthermia. Drugs and supplies should include:
    (Grade D Recommendation)
    - Dantrolene sodium IV (The number of vials is often determined by the location of the ASC/OBSC or by the accrediting agency)
    - Sterile water for dantrolene reconstitution
    - Sodium bicarbonate
    - Furosemide
    - Dextrose
    - Calcium chloride
    - Regular insulin (refrigerated)

TREATMENT OF MH CRISIS
- Call for help; summon emergency medical service.
- Patient should be transferred to an acute care facility as soon as possible.
- Administer dantrolene. Grade B Recommendation
- Hyperventilate with 100% oxygen. Grade D Recommendation
- Cool the patient.
- Check electrolytes, especially potassium.
- For specific treatment recommendations, consult the Malignant Hyperthermia Association of the United States Guidelines at: http://medical.mhaus.org/

MH Crisis Hotline for Medical Professionals

1-800-MH-HYPER
(1-800-644-9737)

The hotline provides medical professionals with access to MH experts who can be reached for help with MH crises treatment 24 hours per day, 365 days per year.

For more information, visit:
MH Hotline Information
Malignant Hyperthermia References


(T)= Therapeutic Study; (R)= Risk Study; (D)= Diagnostic Study

MH RESOURCES

Dantrolene FAQs

Testing for Malignant Hyperthermia

MH Association of the United States

MH Educational Case Reviews

North American MH Registry

European MH Group

EVIDENCE BASED PATIENT SAFETY ADVISORY FOR AMBULATORY SURGERY SUPPLEMENT ARTICLES

Patient Selection and Procedures in Ambulatory Surgery

Liposuction

Patient Assessment and Prevention of Pulmonary Side Effects in Surgery. Part 1- Obstructive Sleep Apnea and Obstructive Lung Disease


Malignant Hyperthermia

Blood Dyscrasias
Online ASPS Resources

ASPS Key Issues in Plastic Surgery

ASPS Clinical Practice Guidelines

ASPS Policy Statements/ Guiding Principles

Patient Safety Resources

Plastic Surgery Foundation: Grant Opportunities

ASPS Publications & Online Education

Online Educational Courses:
- MOC and CME

Plastic Surgery News Extra

Plastic and Reconstructive Surgery Journal

The American Society of Plastic Surgeons
Plastic Surgery Foundation

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