

Optimizing Selection Criteria for Outpatient Anesthesia



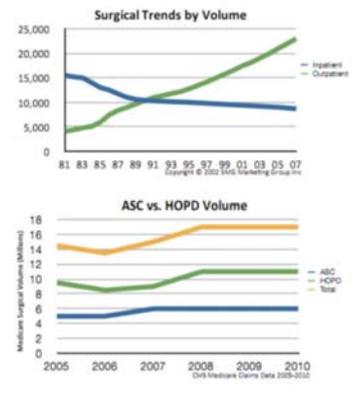
Growing Trend

- Of the 70+ million procedures performed annually in the USA, more than 30% occur at free-standing ambulatory surgical centers (ASCs)
- The number of outpatient surgery visits in the United States increased from 20.8 million visits in 1996 to 34.7 million visits in 2006, according to a report from the Centers for Disease Control and Prevention
- Outpatient surgery visits accounted for about half of all surgery visits in 1996 but nearly 2/3 of all surgery visits in 2006
- Now, some sources state as high as 4/5 surgeries performed in US are outpatient surgeries

Overgo MF, Kozak LJ. Ambulatory and inpatient procedures in the United States, 1996. Vital Health Stat 1998; 139:1-119

Objectives

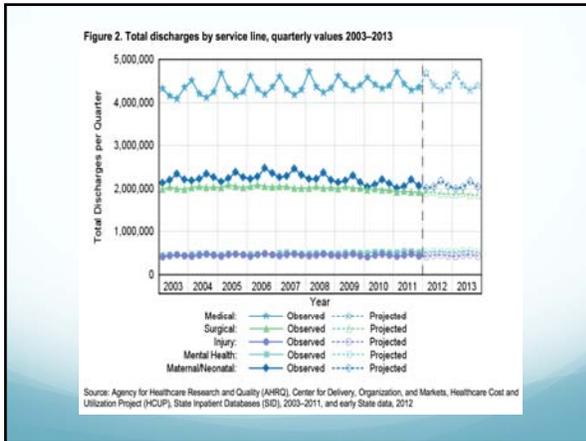
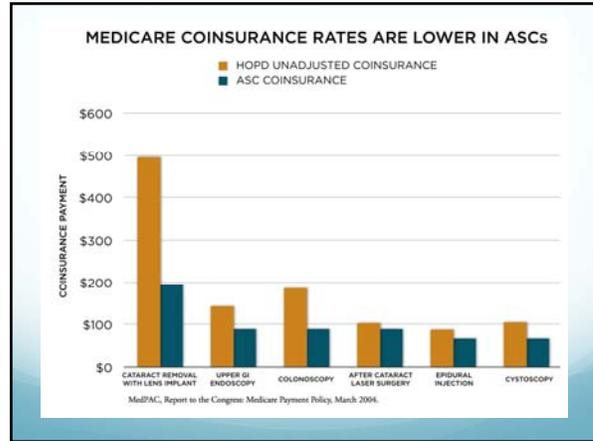
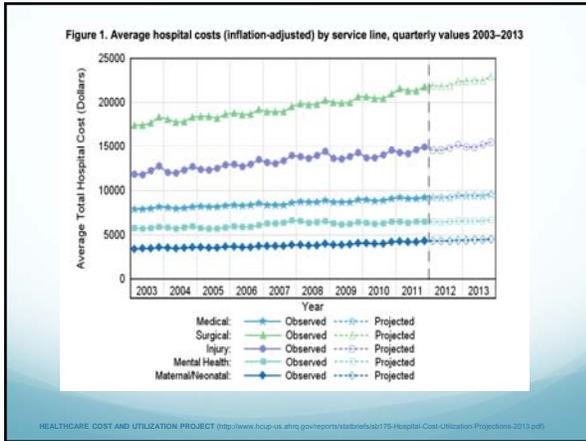
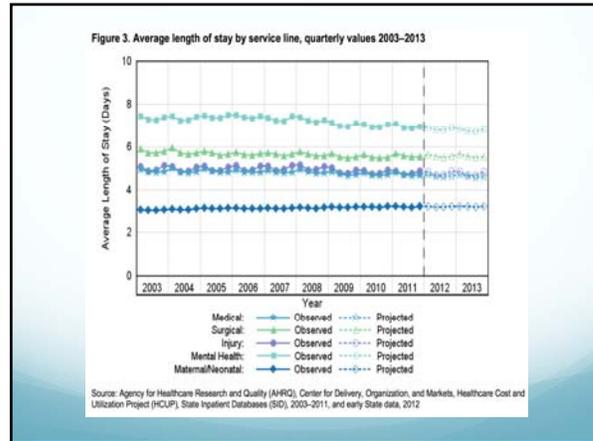
- Discuss factors that influence ambulatory surgery outcomes.
- Review updated perioperative cardiovascular evaluation guidelines.
- Review latest perioperative OSA evaluation guidelines.
- Discuss outpatient surgery selection of special populations.



No Disclosures

Outpatient Surgery Benefits

- Increased throughput of patients
- Reduction in staff and surgical costs
- More personalized care
- Recovery at home
- →using increasingly specialized anesthesia techniques
- →increased complexity of cases
- →increased numbers of patients with more complex medical problems

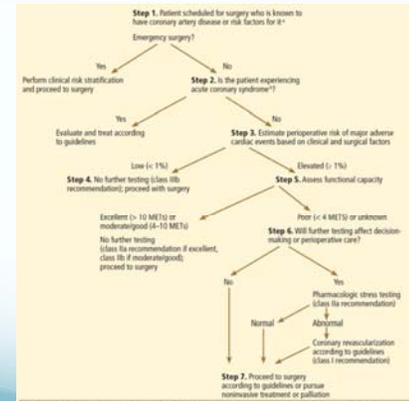


- ## But...
- The decreases in cost must be balanced with:
 - Increased preoperative assessment and preparation for those with complex medical conditions
 - Increased need for intraoperative tools to treat complex medical conditions
 - Unplanned hospital admissions to treat postoperative complications
 - Increased need for postoperative medical and social support

Outpatient Surgery Pitfalls

- The following factors identified in the literature predict an increased risk for hospital admission or death following outpatient surgery:
 - Patient age greater than 85 years
 - Peripheral vascular disease
 - Operating room (OR) time greater than one hour
 - Malignancy
 - Positive HIV status
 - Heart disease
 - A requirement for general anesthesia
 - Obstructive sleep apnea
 - Cardiovascular disease
 - Hyperactive reactive airway disease
 - Obesity
 - End-stage renal disease (ESRD)

Expecting the unexpected, ambulatory surgical facilities and unanticipated care. PA PRRS Patient Saf Advis [online]. 2005 Sep [cited 2008 Nov 13]. Available from Internet: <http://pubmed.ncbi.nlm.nih.gov/16150518/>



ACC/AHA Clinical Practice Guideline

2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American College of Surgeons, American Society of Anesthesiologists, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Vascular Medicine

Endorsed by the Society of Hospital Medicine

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Surgical Risk

- Surgical risk is now classified as either low (< 1% risk of major adverse cardiac events)
 - endoscopic procedures, superficial procedures, cataract surgery, breast surgery, and ambulatory surgery
- or elevated (≥ 1%)
 - vascular surgery, intraperitoneal and intrathoracic surgery, head and neck surgery, orthopedic surgery, and prostate surgery

Updates

- (Recommends preoperative cardiac testing only when the results may influence the patient's management)
- Preoperative intervention is rarely necessary just to get the patient through surgery, unless it is otherwise indicated independent of the need for surgery
- Modified algorithm for preoperative risk assessment and management
- Suggests using a new calculator of surgical risk
- Updates information on the timing of surgery after percutaneous coronary intervention, as well as on antiplatelet therapy, other medical therapy, and biomarkers.

Estimating Clinical Risk

- Suggest incorporating the Revised Cardiac Risk Index (RCRI) with an estimation of surgical risk or
- Using the surgical risk calculator derived from a database of the American College of Surgeons' National Surgical Quality Improvement Project (ACS NSQIP)

RCRI

- **RCRI** is based on six risk factors, each worth 1 point:
 - High-risk surgery
 - Ischemic heart disease
 - Heart failure
 - Stroke or transient ischemic attack
 - Diabetes requiring insulin
 - Renal insufficiency (serum creatinine > 2.0 mg/dL)

Davis C, Tai G, Carol J, Wijesundera DN, Beattie WS. The Revised Cardiac Risk Index in the new millennium: a single-centre prospective cohort re-evaluation of the original variables in 9,519 consecutive elective surgical patients. Can J Anaesth 2013; 60:855-863

Reconstructed RCRI

- **Reconstructed RCRI**
 - serum creatinine level greater than 2 mg/dL in the original RCRI is replaced by a glomerular filtration rate less than 30 mL/min
 - diabetes is eliminated
 - may outperform the standard RCRI
- A patient with a score of 0 or 1 would be considered to be at low risk
- A patient with two or more risk factors would have an elevated risk

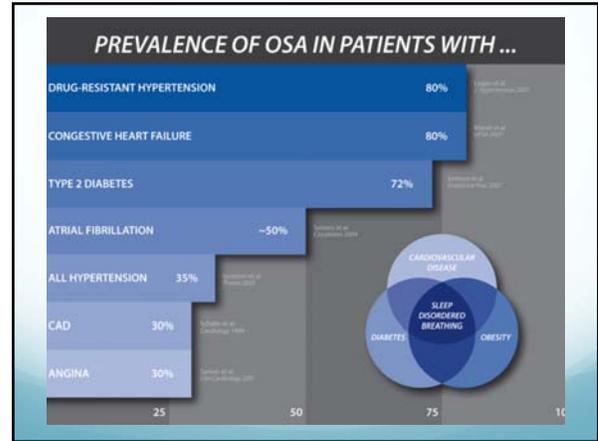
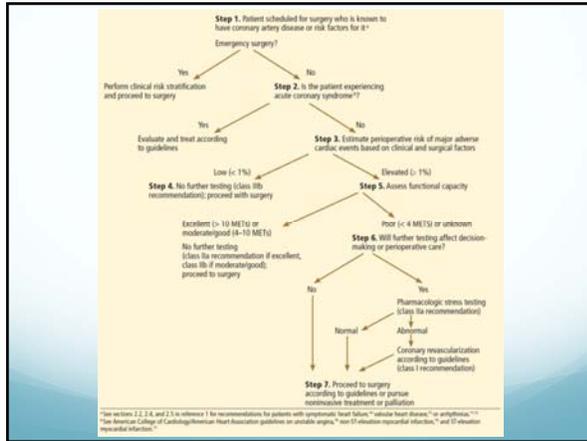
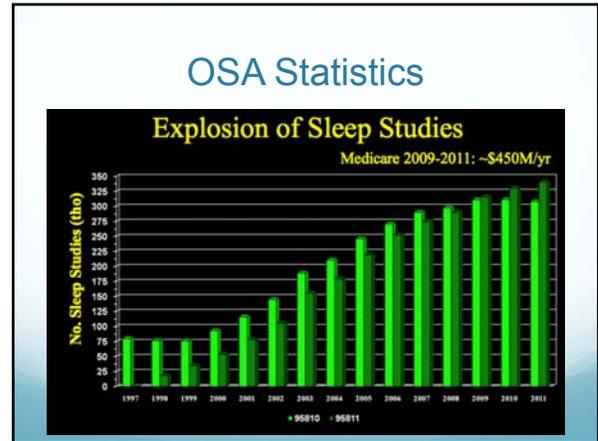
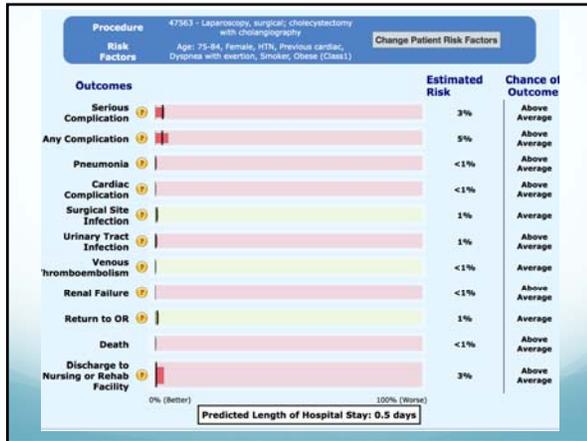
ACS NSQIP Risk Calculator

- Provides an estimate of procedure-specific risk
 - Based on Current Procedural Terminology code
 - Includes 21 patient-specific variables to predict death, major adverse cardiac events, and eight other outcomes
 - More comprehensive
 - Yet to be validated outside of the ACS NSQIP database

Bilimoria KY, Liu Y, Peruch JL, et al. Development and evaluation of the universal ACS NSQIP surgical risk calculator: a decision aid and informed consent tool for patients and surgeons. J Am Coll Surg 2013; 217:833-842; e1-3

Outcomes	Estimated Risk	Chance of Outcome
Serious Complication	5%	Above Average
Any Complication	6%	Above Average
Pneumonia	<1%	Above Average
Cardiac Complication	<1%	Above Average
Surgical Site Infection	1%	Average
Urinary Tract Infection	3%	Above Average
Venous Thromboembolism	<1%	Above Average
Renal Failure	<1%	Above Average
Return to OR	2%	Above Average
Death	<1%	Above Average
Discharge to Nursing or Rehab Facility	3%	Above Average

Predicted Length of Hospital Stay: 0.5 days



OSA

- Obstructive sleep apnea (OSA) is undiagnosed in an estimated 80% of affected patients
- The incidence of presumed or diagnosed OSA is predicted to rise five- to tenfold during the next decade

Young T, Skatrud J, Peppard PE. Risk factors for obstructive sleep apnea in adults. JAMA 2004 Apr 29;291(16):2013-8.

OSA: Adverse Events?

- Prospective cohort study of patients undergoing outpatient anesthesia found increased:
 - numbers of laryngoscopy attempts
 - difficult laryngoscopic grade view
 - use of fiberoptic intubation
 - use of intraoperative ephedrine, metoprolol, labetalol
 - use of postoperative oxygen
- No difference in unanticipated hospital admission between the two groups

Stevier TL, Wright C, George A, et al. Risk assessment of obstructive sleep apnea in a population of patients undergoing ambulatory surgery. J Clin Sleep Med 2010; 6:467-472.

SPECIAL ARTICLES

Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea

An Updated Report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea

A. Severity of sleep apnea based on sleep study (or clinical indicators if sleep study is not available)	
Point score (0-3):	
Severity of OSA (table 1)	Points
None	0
Mild	1
Moderate	2
Severe	3
B. Invasiveness of surgery and anesthesia	
Point score (0-3):	
Type of surgery and anesthesia	Points
Superficial surgery under local or peripheral nerve block anesthesia without sedation	0
Superficial surgery with moderate sedation or general anesthesia	1
Peripheral surgery with spinal or epidural anesthesia (with no more than moderate sedation)	1
Peripheral surgery with general anesthesia	2
Airway surgery with moderate sedation	2
Major surgery, general anesthesia	2
Airway surgery, general anesthesia	3
C. Requirement for postoperative opioids	
Point score (0-3):	
Opioid requirement	Points
None	0
Low-dose oral opioids	1
High-dose oral opioids, parenteral or neuraxial opioids	3
D. Estimation of perioperative risk:	
Overall point score: the score for A plus the greater of the score for either B or C; (0-6):	

A scoring system similar to the above may be used to estimate whether a patient is at increased perioperative risk of complications from OSA. This example, which has not been clinically validated, is meant only as a guide, and clinical judgment should be used to assess the risk of an individual patient. 1. One point may be subtracted if a patient has been on CPAP or NIPPV before surgery and will be using this or has equipment consistently during the postoperative period. 2. One point should be added if a patient with mild or moderate OSA also has a resting PaCO₂ >50 mmHg. 3. Patients with a score of 4 may be at increased perioperative risk from OSA. Patients with a score of 5 or 6 may be at significantly increased perioperative risk from OSA. CPAP = continuous positive airway pressure; NIPPV = noninvasive positive pressure ventilation; OSA = obstructive sleep apnea.

OSA Evaluation

- Factors to be considered:
 - sleep apnea status
 - anatomical and physiologic abnormalities
 - status of coexisting diseases
 - nature of surgery
 - type of anesthesia
 - need for postoperative opioids
 - patient age
 - adequacy of postdischarge observation
 - capabilities of the outpatient facility
- "The literature is insufficient to offer guidance regarding which patients with OSA can be safely managed on an inpatient versus an outpatient basis. The consultants and ASA members strongly agree that before patients at increased perioperative risk from OSA are scheduled to undergo surgery, a determination should be made regarding whether a surgical procedure is most appropriately performed on an inpatient or outpatient basis."

American Society of Anesthesiologists. Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea. Practice guidelines for the perioperative management of patients with obstructive sleep apnea: an updated report by the American Society of Anesthesiologists Task Force on perioperative management of patients with obstructive sleep apnea. Anesthesiology 2014; 120:209-234.

Points

- Preoperative evaluation important, especially if coexisting diseases are present
- Determine what time/preparation/risk seems acceptable for your group
- "Preoperative initiation of CPAP should be considered, particularly if OSA is severe. For patients who do not respond adequately to CPAP, NIPPV should be considered."

A. Clinical signs and symptoms suggesting the possibility of OSA.

1. Predisposing physical characteristics

- Adult patients (BMI >30 kg/m²)
- Pediatric patients: 5th percentile for age and sex
- Neck circumference (17 inches [male] or 16 inches [female])
- Craniofacial abnormalities affecting the airway
- Anatomical nasal obstruction
 - Nasal mucus, foreign body or swelling in the middle

2. History of reported apnea or obstruction during sleep

Two or more of the following are present: if patient has apnea or sleep is not obtained by another person then only one condition needs to be present:

- Loud snoring (loud enough to be heard through closed door)
- Frequent choking
- Observed pauses in breathing during sleep
- Awakeners from sleep with choking sensation
- Frequent awakeners from sleep
- Pediatric patients:
 - Intermittent vocalization during sleep
 - Parental report of restless sleep, difficulty breathing, or stragging respiratory efforts during sleep
 - Child with night terrors
 - Child sleeps in unusual positions
 - Child with low-level arousals

3. Susceptibility (one or more of the following is present)

- Frequent daytime somnolence or fatigue despite adequate "sleep"
- Falls asleep easily in a nonstimulating environment (e.g., watching television, reading, sitting in, or driving a car) despite adequate "sleep"
- Pediatric patients: parent or teacher comments that child appears sleepy during the day, is easily distracted, is overly aggressive, inattentive, or has difficulty concentrating
- Pediatric patients: child often difficult to arouse at usual awakening time

B. If a sleep study has been done, the results should be used to determine the perioperative anesthetic management of a patient.

However, because sleep laboratories offer so many criteria for defining episodes of apnea and hypoxemia, the Task Force believes that the sleep laboratory's assessment (none, mild, moderate, or severe) should take precedence over the actual AHI. If the overall severity is not indicated, it may be determined by using the table below.

Severity of OSA	Adult AHI	Pediatric AHI
None	0-5	0
Mild OSA	5-20	1-5
Moderate OSA	21-40	6-10
Severe OSA	>40	>10

AHI = apnea-hypopnea index; the number of apneas or hypopneas of sleep (duration >10 sec) per hour. BMI = body mass index; OSA = obstructive sleep apnea.

Obesity and OSA

Obesity Statistics

- BMI of
 - 30 kg/m² and above: obese
 - 40 kg/m² and above: morbidly obese
 - 50 kg/m² and above: super-obese
- Incidence has been increasing around the world
- USA
 - more than one-third of adults
 - nearly 17% of youth

Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009-2010. NCHS Data Brief 2012; 82: 1-6.

Obesity: Adverse Events?

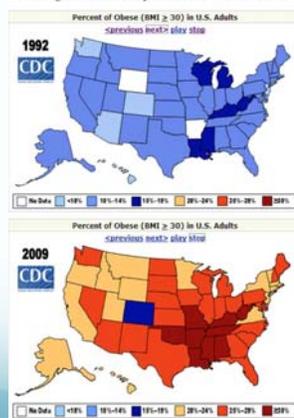
- Estimated the incidence of anesthesia-related major adverse intraoperative events at 0.9%
 - Bariatric patients undergoing bariatric surgeries in the USA
- Systematic review of ambulatory surgeries in the obese by Joshi, et al.
 - 20 studies (11 prospective and nine retrospective)
 - Obesity is not a predictor of unplanned admission
- Retrospective study of 235 obese patients scheduled for ambulatory surgery in a tertiary medical center.
 - Comorbidity was more frequent in the obese cohort.
 - Obesity is not a significant independent risk factor for unplanned admission after ambulatory surgery

Greenstein AJ, Wainel AD, Alesky A, et al. Prevalence of adverse intraoperative events during obesity surgery and their sequelae. J Am Coll Surg 2012; 215:271-277

Joshi GP, Arora S, Rhee W, et al. Selection of obese patients undergoing ambulatory surgery: a systematic review of the literature. Anesth Analg 2013; 117:1082-1091

Hahn PG, Van T, Doctor PK, et al. Obesity is a risk factor for unplanned admission after ambulatory surgery. Mayo Clin Proc 2008; 83:959-965

Changes in US obesity levels from 1992-2009



Obesity: Adverse Events

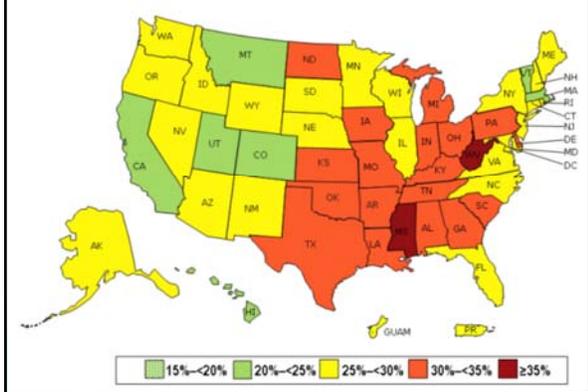
- Cohort study of 17,638 patients:
 - 2,779 had a BMI of greater than or equal to 30 kg/m²
 - did not experience increased cardiovascular risk
 - significantly increased risk of intraoperative events, including desaturation and bronchospasm
- Four times more likely to develop postoperative respiratory complications
- Super obesity (BMI >50 kg/m²)
 - higher complication rate in ambulatory surgery (particularly with coexisting medical conditions)
 - death
 - venous thromboembolism
 - increased length of hospital stay

Warner DO, Warner MA, Barnes RD, et al. Perioperative respiratory complications in patients with asthma. Anesthesiology 1996 Sep;85(3):460-7.

Chung F, Mazzi G, Tong D. Preexisting medical conditions as predictors of adverse events in day-case surgery. Br J Anaesth 1999; 83:262-270.

Kalishnik VN, Narendran K, Latta M, et al. Are laparoscopic bariatric procedures safe in superobese (BMI >50 kg/m²) patients? An NSQIP data analysis. Surg Obes Relat Dis 2011; 7:452-458

Prevalence* of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2013



Obesity: Cardiac Evaluation

- Dyspnea with exertion and lower-extremity edema occur commonly in the obese and are often nonspecific
 - Pedal edema may signal the presence of elevated right ventricular filling pressure
- Electrocardiographic signs
 - Right-axis deviation and right bundle-branch block suggest pulmonary hypertension
 - Left bundle-branch block configuration is unusual in uncomplicated obesity and raises the possibility of occult coronary heart disease
- The threshold for further testing is not altered just because the patient is obese as there are not enough data as yet to suggest otherwise.
- Patients at elevated surgical risk, as defined in the Revised Cardiac Risk Index, or diagnosed coronary heart disease may only require additional noninvasive testing if the results will change management
- Functional capacity, cardiac risk factor analysis and the presence or absence of potential cardiovascular symptoms will determine whether formal testing beyond electrocardiography is required

Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). Circulation 2007; 116:e598-659

Piehl P, Albert MA, Frazier LA, et al. Cardiovascular evaluation and management of severely obese patients undergoing surgery: a science advisory from the American Heart Association. Circulation 2009; 120:38-50

Obesity: Pulmonary Evaluation

- Higher demand for ventilation and breathing workload
- Higher closing capacity as well as reduced functional reserve capacity and expiratory reserve volume
 - results in increased atelectasis, especially in supine position
- The prevalence of OSA in the obese population is higher than in the general population, ranging between 70 and 95%

Parameswaran K, Todd DC, Both M. Altered respiratory physiology in obesity. Can Respir J 2006; 13:203-210.

Lopez PP, Bolton B, Schulman CL, Byers PM. Prevalence of sleep apnea in morbidly obese patients who presented for weight loss surgery evaluation: more evidence for routine screening for obstructive sleep apnea before weight loss surgery. Am Surg 2008; 74:834-838.

Obesity Hypoventilation Syndrome

- Characterized by:
 - Obesity
 - Daytime awake hypercapnia (partial pressure of arterial carbon dioxide ≥ 45 mmHg at sea level)
 - Hypoxemia (partial pressure of arterial oxygen ≤ 70 mmHg at sea level)
 - ***In the presence of sleep-disordered breathing without other known causes of hypoventilation**
 - In 90% of cases of OHS, the sleep-disordered breathing present is OSA
- Prevalence of OHS is 11% in patients with known OSA and 8% in bariatric surgical patients
- Compared with the eucapnic obese patient:
 - Severe upper airway obstruction
 - Impaired respiratory mechanics
 - Blunted central respiratory drive
 - Increased incidence of pulmonary hypertension

Olson A, Zwilich C. The obesity hypoventilation syndrome. Am J Med 2005; 118:948-956.

Mokhlesi B. Obesity hypoventilation syndrome: a state-of-the-art review. Respir Care 2010; 55:1347-1362.

Chen B, Liang D, Wang J, et al. Obesity hypoventilation syndrome: a review of epidemiology, pathophysiology, and perioperative considerations. Anesthesiology 2012; 117:188-205.

STOP-bang questionnaire

STOP		
Do you SNORE loudly (louder than talking or loud enough to be heard through closed doors)?	Yes	No
Do you often feel TIRED , fatigued, or sleepy during daytime?	Yes	No
Has anyone OBSERVED you stop breathing during your sleep?	Yes	No
Do you have or are you being treated for high blood PRESSURE ?	Yes	No

BANG		
BMI more than 35kg/m ² ?	Yes	No
AGE over 50 years old?	Yes	No
NECK circumference > 16 inches (40cm)?	Yes	No
GENDER : Male?	Yes	No

TOTAL SCORE		

Obesity Hypoventilation Syndrome

- Definitive test for alveolar hypoventilation is an arterial blood gas performed on room air during
- Screening approach has been suggested on the basis of serum HCO₃⁻ (≥ 27 mmol/l)
 - increased serum HCO₃⁻ level caused by metabolic compensation of chronic respiratory acidosis is common in patients with OHS
 - highly sensitive (92%)
- Can be used together with the presence of hypoxemia (SpO₂ < 90%) during wakefulness
 - highly specific (95%)
- If these predictors are present, an arterial blood gas to confirm hypercapnia awake should be done to prompt referral to sleep medicine
- No data looking at the safety of operating on OHS patients as day surgical patients
 - surgical mortality rate in high-risk patients with OHS undergoing bariatric surgery is between 2 and 8%

Chau E, Mokhlesi B, Chung F. Obesity hypoventilation syndrome and anesthesia. Sleep Med Clin 2013; 8:135-147.

STOP-Bang

- Recently validated in the obese population
- Obese and morbidly obese patients:
 - 0–2 indicates a low risk of OSA
 - 3–4 indicates an intermediate risk of OSA
 - 5–8 indicates a high risk of OSA

Chung F, Yang Y, Liao P. Predictive performance of the STOP-Bang score for identifying obstructive sleep apnea in obese patients. Obes Surg 2013; 23:2050-2057.

Points

- Everyone should fill out a STOP-Bang questionnaire
- Consider evaluating a serum HCO₃⁻ and a resting room air SpO₂ measurement on every obese patient, but especially morbidly and supramorbidly obese patients
- Consider evaluating an ECG on every obese patient with reduced exercise tolerance and/or any cardiac risk factors (or those who are morbidly obese or supramorbidly obese).

The Obese Airway



Geriatric Population

- The global population is aging as a result of the parallel decline in mortality and fertility rates
- US population less than 65 years of age is increasing by 1% per year, the population aged 65–79 years is increasing by more than 2% per year and the population aged at least 80 years is increasing by 3% per year
- The number of elderly population (>65 years) has tripled over the last 50 years and will more than triple again over the next 50 years.

Adverse Events!

- Recent multicenter analysis of 490,000 patients found that BMI greater than 30 kg/m² is an independent risk factor for the combination of difficult mask ventilation with difficult laryngoscopy
- Obesity is a predictor of difficult mask ventilation, supraglottic airway device placement failure, and difficult emergency surgical airway
- The United Kingdom Fourth National Audit Project:
 - four-fold increase in the risk of serious complications in the morbidly obese patient when compared with nonobese patients
 - eight of the 23 cases of aspiration of gastric contents during anesthesia occurred in obese patients
- The American Society of Anesthesiologists Closed Claim Analysis reported 35% of airway problems during induction of anesthesia involving obese patients

Kheteresi S, Healy D, Aza M, et al. Incidence, predictors, and outcome of difficult mask ventilation combined with difficult laryngoscopy: a report from the multicenter perioperative outcomes group. *Anesthesiology* 2013; 119:1360-1369

Cook TM, Woodall N, Frank C. Fourth National Audit Project. Major complications of airway management in the UK: results of the fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: anaesthesia. *Br J Anaesth* 2011; 108:617-631

Peterson GN, Domino KB, Caplan RA, et al. Management of the difficult airway: a closed claims analysis. *Anesthesiology* 2005; 103:333-39

Geriatric Statistics

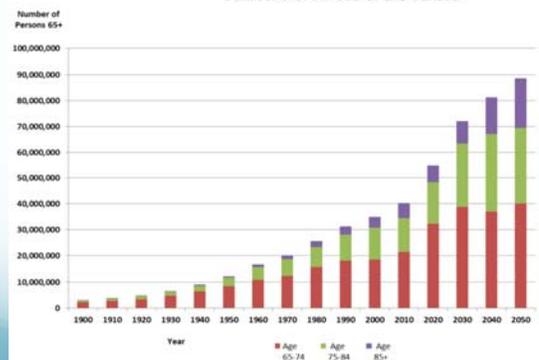
- According to the US Census Bureau, the elderly population numbered 39.6 million in 2009, or 12.9% of the population. By 2030, there is expected to be approximately 72.1 million elderly population (or 19% of the US population)
- According to Medicare statistics, the frequency of preoperative consultation for cataract surgery increased from 11.3% in 1998 to 18.4% in 2006 and was primarily related to the increasing age of the population (75–84 years old vs. 66–74 years old)

Obesity and LMAs

- In a study population of over 15,000 patients:
 - obesity was found to be an independent predictor of failed use of a laryngeal mask airway requiring device removal and endotracheal intubation
 - Inadequate ventilation due to leak (42.4%)
 - airway obstruction (30%)

Ramchandran SK, Mehta MR, Tremper KK, et al. Predictors and clinical outcomes from failed laryngeal mask airway Unique™: a study of 15,795 patients. *Anesthesiology* 2012; 116:1217-1226

Population 65+ by Age: 1900-2050
Source: U.S. Bureau of the Census



Geriatric Surgery

- Increasing evidence now suggests that the elderly benefit from ambulatory surgery
- Patients who are at least 80 years, are currently the most rapidly growing age group in ambulatory surgery
- Avoidance of hospitalization results in a reduction of both postoperative cognitive dysfunction and early postoperative complications
- Given the economic and social pressure to reduce healthcare expenditures, anesthesiologists will be required to treat an increasing number of elderly as outpatients

Benefits

- Elderly patients are less able to adapt to unfamiliar environments and recover faster in their familiar 'home' environment
- A study by Canet *et al.* suggested that the avoidance of hospitalization in elderly patients undergoing minor surgery resulted in less postoperative cognitive dysfunction (POCD) at 1 week
- **Possible** reduction in respiratory events, nosocomial infections, and early postoperative complications (thrombosis, etc.)
- Bed rest induces functional decline in elderly patients after only 2 days of hospitalization
 - Paradoxically, the worse the patient's functional status is preoperatively, the greater the expected benefit of avoiding hospitalization

Canet J, Rueda J, Rosowen LS, et al. Cognitive dysfunction after minor surgery in the elderly. *Acta Anaesthesiol Scand* 2003; 47:1204-1210.

Huik, Sakamoto S, Ding YV. Factors associated with functional decline of hospitalized older persons following discharge from an acute geriatric unit. *Ann Acad Med Singapore* 2006; 35:17-23.

Table 1. Top 10 ambulatory surgery procedures in patients over the age of 65 years

	Number of surgical procedures in thousands (Medicare's percentage)
Inguinal and femoral hernia repair	38 [23]
Therapeutic procedures on muscles and tendons	44 [19]
Therapeutic procedures on joints	19 [13]
Cholecystectomy and common duct exploration	21 [16]
Excision of semilunar cartilage of knee	23 [15]
Lumpectomy, quadrantectomy of breast	33 [23]
Lens and cataract procedures	342 [75]
Decompression of the peripheral nerve (carpal tunnel release)	27 [24]
Partial excision of the bone (e.g., bunionectomy)	15 [17]
Transurethral excision, drainage, or removal of a urinary obstruction	33 [40]

Points

- Optimize all comorbid conditions and give clear explanations of medication regimens
- Evaluate the elderly for "frailty" or functional capacity
 - Future studies are needed to determine whether it is better to treat the frail elderly as outpatients (vs. inpatient care) with the attendant risk of loss of autonomy, POCD, nosocomial infections, and thrombotic complications, as well as the functional decline because of bed rest in the hospital setting
- Determine that elderly patients have sufficient supportive networks to administer postoperative care

Adverse Events?

- A recent study could not find any age-related effect on recovery time after knee arthroscopy under general anesthesia in a population aged more than 65 years
- Even elderly patients with significant comorbidities, with the exception of acute heart failure, can successfully undergo ambulatory surgery
- Data from the Veterans Affairs Surgical Quality Improvement Program showed that functional capacity for ASA-III patients aged more than 80 years was a significant independent predictor of mortality

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