

# Organizational prerequisites for anesthesia outside the operating room

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## Purpose of review

The purpose of this review is to define the responsibility and designation of anesthesia personnel to nonoperating room location anesthesia and their education in this regard. The review will also define the safety standards, guidelines, physical environment, equipment, accreditation, the quality of care and patient and procedural selection.

## Recent findings

Anesthesia outside operating room continues to be a challenging field. With the advances in surgical and anesthetic technology, there is an increasing need for research in the area of office-based anesthetic techniques and for improvement in terms of adherence to safety standards in aiming to decrease morbidity and mortality and increase patient satisfaction.

## Summary

Complications of anesthesia outside operating room still persist even in American Society of Anesthesiologist status I patients and in accredited facilities with board-certified physicians. Department of anesthesiology taking care of in-hospital office-based facility has the responsibility to define safe practice standards according to the ASA guidelines regarding education, documentation, guidelines preparation, equipment, standard monitoring, collaboration with other facilities, backup for the personnel in case of emergencies and prolongation of observation of a complicated patient in the postanesthesia care unit. Office-based facilities outside the hospital should comply with all federal, state, local laws and regulations. Such precautions will enhance safety, efficiency and reliability of office-based anesthesia inside and outside the hospital.

## Keywords

nonoperating room anesthesia, office-based anesthesia, organization, prerequisites

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## Introduction

Office-based anesthesia (OBA) and office-based surgery (OBS) are booming. It is estimated that 25% of all surgeries in the United States during the year 2005 were performed as office-based procedures (twice the number in 1995) [1]. OBA was first reported in 1919, and since the 1930s, OBA/OBS was practiced for oral and maxillofacial surgery [2,3].

The advances in less invasive medical technology, development of faster acting, potentially safer anesthetics and the increasing demand to cut down health costs and improve efficiency are creating the condition to continually push anesthesiologists outside the operating room [4]. As OBA is a subset of ambulatory anesthesia, the American Society of Anesthesiologist (ASA) 'Guidelines for Ambulatory Anesthesia and Surgery' should be followed in the OBA setting as well

[5,6]. The establishment of the OBA facility, its construction, accreditation, equipment and operation should be in accordance with the local, state and federal law regulations. Staff should be qualified and adequate to meet patient and facility needs for the special procedures performed in this setting. Minimal patient care should include preoperative evaluation and preparation. Anesthesia should be administered by qualified anesthesiologists or nonanesthesiologist physicians who are educated and supervised by anesthesiologists. Patients are discharged by a physician, following written accurate medical instructions in the medical records for follow-up care [5]. This review will address the challenges faced by an OBA facility: its organization, construction, equipment and staffing in relation to patient selection and safety.

A successful organization of anesthesia services outside the operating room depends on facility accreditation,

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guidelines, physical environment and equipment, quality of care and patient/procedural selection.

### Accreditation

Before providing anesthesia in OBA setting, it is imperative to vigilantly investigate the facility for equipment, policy, safety, emergency set-up, preparedness for unanticipated patient transfer and competency of staff including credentialing and licensure [5,7]. Additionally, the facility should comply with all federal, state and local laws and regulations. At present, 22 U.S. states had issued guidelines or regulations to meet with patient safety in OBA, whereas the other states demand reporting of complications ([www.asahq.org/Washington/rulersgs.htm](http://www.asahq.org/Washington/rulersgs.htm), [www.fsmb.org/pdf/GRPOL](http://www.fsmb.org/pdf/GRPOL)). The need for accreditation is a means to increase patient safety in OBA. Although this procedure is not mandatory in most of the states, third party payers require it to reimburse facility fee for surgical procedure.

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According to Coldiron *et al.* [8\*\*], only 38.5% of the OBA/OBS facilities were accredited, whereas 92.5% of the physicians were board certified and 96.6% had hospital privileges, which obviate the correlation of these prerequisites to patients' outcomes.

The three major organizations for accreditation of office-based surgical facility are the Joint Commission on Accreditation of Healthcare Organization (JCAHO), the Accreditation Association for Ambulatory Healthcare (AAAHC) and the American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF). They differ in the adverse effects and complications to be reported and peer review procedures. Additionally, the American Medical Association (AMA) has published 10 mandatory prerequisite standards and rules to meet with patient safety in office-based practices. These standards have been endorsed and adopted by the state medical boards [9]. Recently, the Society for Ambulatory Anesthesia (SAMBA) decided to include OBA in their application to the Residency Review Committee (RRC) for a formal approval of fellowship program in ambulatory anesthesia.

### Guidelines

Many professional organizations have published comprehensive guidelines intended to assist practitioners performing OBA/OBS in providing high quality and safe care and uniform professional standards for procedures that require anesthesia and sedation in office-based setting [5,10–13]. The guidelines address patient admission and discharge, office administration, including plans for emergency care and transfer to hospital if needed, handling of medical records, documentation and administration of anesthesia, reporting of adverse incidents, credentialing of prac-

tioners, training of other healthcare personnel, facility accreditation and minimum standards for equipment and supplies ([www.asahq.org/Washington/rulersgs.htm](http://www.asahq.org/Washington/rulersgs.htm), [www.fsmb.org/pdf/GRPOL](http://www.fsmb.org/pdf/GRPOL)) [9]. In addition, before providing anesthesia in such setting, the anesthesiologist should communicate with the surgeon and the other staff and spend sufficient time to examine the OBA area and assess the adequacy of equipment and compliance with federal, state and local guidelines and regulations [14\*\*].

### Physical environment and equipment

Physical environment for OBA/OBS should accommodate the needs to perform anesthesia and surgical procedure. It should include, therefore, at a minimum, several items that are not standards in a primary physician office such as electrical outlets, overhead lighting, anesthesia work station, monitoring, emergency cart with emergency drugs, self-inflating bag (Ambu bag), communication system, central oxygen source, gas evacuation and wall suction [5,15]. The use of basic anesthetic monitoring is intended to encourage quality of care. It should be consistent with ASA 'Standards for Basic Anesthesia Monitoring' [3,8\*\*,10,14\*\*,16–18]. These standards apply to all anesthesia care, although in emergency circumstances, appropriate life support measures take precedence. Standard I requires that a qualified anesthesia personnel should be present in the room to monitor the patient and provide anesthesia care throughout the conduct of all general anesthesia, regional anesthesia and monitored anesthesia care (MAC). Standard II requires that during all anesthetic administration, the patient's oxygenation, ventilation, circulation and temperature shall be continually evaluated [18]. The use of bispectral index (BIS) monitor is debatable [17]. A recent Cochrane review [19] reveals that BIS-monitored anesthesia reduces propofol requirement, recovery time and the time to extubation but not the duration of postanesthesia care. The authors concluded that maintaining a BIS value within the recommended limits (40–60) could improve anesthetic administration and post-operative recovery in patients with prolonged anesthesia and reduce the incidence of patient recall.

The potential for delay in identification of apnea in procedures under sedation, especially in aged and obese patients, justifies the use of capnography [20,21]. Soto *et al.* [20] have found that anesthesiologists who were 'blinded' to capnography during MAC did not identify any of the 26% of anesthetized patients who developed apnea for 20 s. Respiratory depression secondary to sedative drugs was responsible for 21% of claims of which 24% occurred during endoscopic procedures [20].

The anesthesiologist should always be prepared for a change in procedure. The question whether to prefer

MAC, which requires heavy sedation, or general anesthesia is debatable. Bhananker *et al.* [22] using the ASA closed claims with entries from 1990 to 2002 database found the same mortality and morbidity rates during MAC or general anesthesia, for MAC mostly (21%) related to respiratory depression following overdose of sedatives or opioid drugs. Complications were associated with age over 70 years, ASA physical status III–IV and obesity. Propofol and benzodiazepines used as single agents were responsible for oversedation in 9% of the patients. Propofol with addition of another drug increased the incidence of oversedation to 50%. It is likely that greater skills in airway control and monitoring are required during heavy sedation and analgesia with spontaneous ventilation. In the offices in which anesthetic services are provided to infants or children, the equipment should be appropriately sized for them. The OBA/OBS should have backup power to ensure patient protection in case of emergency. There should be enough space in the office to accommodate all necessary equipments and staff, especially in emergency situations, to allow expeditious access and function [5]. All equipments should be maintained and inspected periodically, according to the manufacturer's requirements.

### Quality of care

Facilities located outside the hospital should be led by a medical director who has to ensure the adequacy of personnel, and that all local, state or federal regulations are obeyed. All healthcare practitioners and nurses should hold a valid license to perform their duties in providing clinical care with appropriate level of education, training and experience [5]. The majority of anesthesia residency training programs lack a formal training in OBA [23]. It may be advisable to rotate anesthesia residents in OBA locations to improve their competency in patient safety and prepare them to the increasing demand of private practice. The anesthesiologist should participate in ongoing continuous quality improvement and risk management activities.

The medical director of OBA/OBS should acknowledge the basic human rights of the patients and prepare written documents that present this policy. When OBA is located inside the hospital, the head of the department of anesthesiology should have the responsibility to define the safe practice standards guidelines, education and training [24\*\*]. The facility should comply with all federal, state and local laws and applicable regulations correlating with patient safety, accommodation for disabled and disposal of medical waste.

All facility personnel should be appropriately trained and review the facility written protocols for emergency medical situations and internal and external catastrophes,

including fires [5], and be ready to transfer the patient to another predetermined facility in case of emergency.

The anesthesiologists will collaborate with the surgeons to improve patient safety by referring patients to a licensed and organized facility with proper equipment and monitoring. The relatively low incidence of adverse effects and complications associated with anesthesia or sedation in the recent years in the OBS setting could be related to several factors such as better preoperative evaluation and patient selection, training of the medical care providers, appropriate intraoperative and postoperative monitoring and care and embracing new standards and modalities pertaining fasting and sedation [3,8\*\*,13,24\*\*,25\*\*].

Improving patient experience and satisfaction with anesthesia becomes one of the healthcare provider's goals, especially when standards of anesthesia are improved and patient expectations are exceeded [26].

### Perioperative care and patient/procedural selection

Anesthesiologists working in OBA locations should adhere to the 'Basic Standards for Preanesthesia Care', 'Standards for Postanesthesia Care' and Guidelines for Ambulatory Anesthesia and Surgery [5].

Patients belonging to ASA status I, II and occasionally III are acceptable for OBA/OBS setting [27]. The anesthesiologist should discuss the anesthetic plan and answer patients' or parents' questions. In case of pediatric anesthesia, the question whether to accompany the child to the operating room depends on the anesthesiologist's decision and the grade of the child's development and cooperation [28].

The anesthetic technique chosen should be appropriate to the surgical procedure and patient medical condition. It should allow sufficient anesthesia with rapid recovery and minimal postoperative pain and postoperative nausea and vomiting (PONV). To achieve these goals, the doses of opioids are minimized, and opioids are substituted by local anesthetics and NSAIDs [7,29]. The anesthesiologist should be physically present during the intraoperative period and immediately available until the patient is discharged from the facility. The anesthesia care should be documented in the medical records [5]. Discharge of the patient should be a physician's responsibility. Patients are ready to discharge when they fulfill the criteria of returning to the preanesthetic baseline of the respiratory and circulatory systems, color, oxyhemoglobin saturation and consciousness. Pain is controlled with absence of PONV. Almost all preventable OBA complications result from respiratory depression in the postoperative period. Therefore, there should be strict

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surveillance of the patient until full recovery and before discharge. The recovery area should be located near the operating room, in which all the necessary equipment is at hand. Personnel with training in advanced life support and pediatric life support should be immediately available until all patients are discharged.

Written instructions and verbal explanation (with interpreter, if needed) are given to the patient and family, and in case of pediatric anesthesia, the parents are instructed to follow the child for vital signs, pain, operation site, fluid/food intake and activity. They are also instructed to call their physicians or in case of emergency to go to the nearest emergency room [28].

The importance of postoperative anesthesia visit has been studied in 144 patients by Zvara *et al.* [30] to evaluate patient satisfaction. An increased number of such visits did not increase patient satisfaction of the anesthetic service. However, having perioperative nurses dedicated to anesthesia increased patient satisfaction [25\*\*].

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#### Patient selection

Not all patients or procedures may be suited for OBA setting. Appropriate patient selection is vital [5]. Although currently there is continuing shift of larger procedures to the OBS setting, the surgeon should evaluate the patient's medical condition to confirm patient's suitability for the specific procedure and refer the patient to the anesthesiologist for a further consideration, preferably the day before the surgical procedure. The anesthesiologist should review the patient's medical condition, preexisting diseases and request further consultation, if indicated. Patients with preexisting diseases at risk for complications should be referred to a hospital [5]. The followings are generally accepted patient exclusion criteria: unstable ASA III class, recent myocardial infarction (MI) in the past 6 months, uncontrolled hypertension or diabetes, acute substance abuse, a history of malignant hyperthermia, morbid obesity, severe chronic obstructive pulmonary disease (COPD), end-stage renal disease, sickle cell disease, unstable psychological disease or dementia, lack of adult escort, recent stroke (within the last 3 months) and myasthenia gravis [3,5,7,10,12,14\*\*,17,29,31–33]. The ASA guidelines regarding obstructive sleep apnea (OSA) [34] state that OSA patients can be safely managed as OBA except for patients undergoing airway surgeries and children less than 3 years old. Additionally, OSA patients should be monitored for at least 3 h longer than non-OSA patients and until oxygen saturation returns to the preanesthetic baseline. In case of airway obstruction or hypoxemia, the patient should be monitored for at least 7 h more. The Pennsylvania Patient Safety Reporting System promulgates safety guidelines regarding OSA patients, allowing OSA patients to undergo minimally invasive

procedures under local anesthesia in OBA facilities with the condition that these patients do not require opioids or continuous positive airway pressure (CPAP) support [35].

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#### Procedure selection

Until recently, most OBSs were limited to minimally invasive procedures such as dental extractions, excision of skin lesions and endoscopy, which were performed under sedation and local anesthesia. However, with the advancing surgical and anesthetic techniques and improved patient monitoring, it is likely that OBA/OBS procedures will continue to expand. According to the ASA Guidelines for OBA, surgical procedures should be of a duration and complexity that will permit patient recovery and discharge from the facility [5]. Prolonged procedures extending for more than 6 h may be associated with hypothermia and increased risk of deep vein thrombosis, mainly in patients undergoing extensive liposuction [33]. However, Gordon and Koch [36] have shown that prolonged facial plastic surgery extending more than 4 h, with general anesthesia, was not associated with increased morbidity or mortality. It is preferable that longer procedure be scheduled early in the morning to prevent delay of patient discharge. Recently, Koufman [37], Zeitels and Burns [38] and Hanson *et al.* [39] reported on the expanding of laryngeal and prostate laser surgery in office-based setting. Cooter *et al.* [40] emphasized the advantages of the paravertebral block technique in 87% of patients undergoing breast augmentation and its efficacy for postoperative analgesia in 94% of cases. In spite of the growing needs for OBA/OBS and the improved patient safety and efficiency, surgical procedures involving major blood loss, such as thoracic, abdominal and intracranial procedures, would remain inappropriate for office-based setting [7,29].

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#### Conclusion

The spectrum of surgical procedures performed outside the operating rooms has expanded dramatically in the last decade. However, no anesthesia, sedation or surgical procedure should be considered minor. In the hands of well trained and professional staff, by applying strict patient evaluation, preparation and selection and proper intraoperative and postoperative care, the quality of care, patient's safety and satisfaction can be assured by utilizing the same standards of care as those employed in a hospital-based facility.

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Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 000–000).

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