

# Maintaining Safety During Office Based Anesthesia Procedures

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## Objectives

Upon completion of this C.E.U. offering, the CRNA will be able to:

1. Discuss the trends in Office Based Anesthesia (OBA) procedures.
2. Explain the advantages of Office Based Anesthesia and Office Based Surgical (OBS) procedures.
3. Evaluate the Standards for OBS as set forth by the American Association of Nurse Anesthetists (AANA)
4. Assess factors that contribute to patient safety throughout OBA procedures.
5. Discuss the efficacy of the Quick Reference Guide (QRG) in contributing to optimal OBA patient safety outcomes

## Introduction

Office-based surgery (OBS) has grown exponentially in the past thirty years due to advancements in diagnostic procedures and non-invasive surgical techniques.<sup>1</sup> It was estimated that 10 million office-based procedures were performed in 2005, which was double the amount estimated 10 years prior. It is now estimated that 17-24% of all elective ambulatory surgeries are performed in an office-based setting.<sup>2</sup> Convenience, efficiency, patient privacy, and financial benefits have also played a part in its growth.<sup>3</sup> Along with the exponential growth of OBS has been the associated need for equal growth of office-based anesthesia (OBA) care. Better technology for monitoring and shorter acting medications have facilitated anesthesia professionals in meeting the increased demand for OBS. Because of the growing prominence in OBA, there is a need for utilizing guidelines and standards ensure the quality and safety of OBA care.<sup>4</sup>

## State of Current Office Based Surgery and Office Based Anesthesia

Plastic surgeons, dentists, podiatrists, gastroenterologists and oral surgeons have been providing OBS, including OBA, for decades. The frequency and types of procedures performed have increased in almost all

areas including OBA.<sup>5</sup> Other specialists also are currently exploring and expanding their surgical practices to provide OBS and OBA.<sup>6</sup>

During this expansion, one of the major issues that has emerged is assuring patient safety during OBS and OBA. This rapid expansion in OBS and OBA has not coincided with oversight by healthcare regulatory and accrediting organizations, federal and state governmental agencies, or peer review. In order to assure safety and make sure quality of OBS and OBA is equitable to procedures done in tertiary settings and ambulatory care settings, oversight by regulatory and accrediting agencies as it relates to these procedures is warranted.<sup>5</sup>

## Advantages of OBS and OBA

There are advantages to performing OBS and OBA, including cost containment, patient privacy, patient and surgeon convenience, and decreased exposure to nosocomial infections.<sup>2</sup> Recently, however, the conveniences of OBS and OBA have been challenged by an increasing number of research studies and media reports addressing concern on the safety.<sup>7</sup> For example, a study by Vila et al. in 2003, concluded that OBS and OBA were not safe when compared to outcomes found in accredited ambulatory surgery centers.<sup>8</sup> The results of this study initially prompted the state of Florida to issue a moratorium on certain types of OBS and OBA.<sup>8</sup> These actions prompted much interest in providing evidence to further examine OBS and OBA practices. In 2011, a retrospective study done by Starling, challenged earlier findings and indicated that Villa's study was flawed and the conclusions were erroneous.<sup>9</sup>

Safety associated with OBS and OBA procedures not only has global implications, but the efficacy and outcomes of these procedures are linked to identifiable factors. Factors that are potentially associated with OBS and OBA safety include patient selection, procedure or surgery performed, surgeon qualifications, anesthesia provider qualifications and training, medications used, equipment for anesthesia administration and resuscitation, and office accreditation.<sup>1-3,5-7</sup>

### Thought Box 1.

1. What trends have you observed in OBS and OBA?
2. From your experience, what factors make a significant difference in outcomes associated with OBS and OBA as compared to procedures done in tertiary and ambulatory care settings?

### Safety Advantages associated with OBS or OBA procedures.

Hospital-based anesthesia has a current morbidity and mortality rate of approximately 1/400,000.<sup>3</sup> There is some discussion about the lack of rigorous empirical evidence related to OBS and OBA procedure. However, recent findings, including those featuring analyses of the American Association for Accreditation of Ambulatory Surgical Facilities (AAAASF) data bank, suggest that mortality rates are similar across the spectrum of accredited surgical facilities.<sup>2,3</sup> As one empirical indicator, this is strongly significant.

### Economic Advantages associated with OBS and OBA procedures

As healthcare costs continue to soar, patients, providers, and insurers are exploring new opportunities and venues to decrease the expense of medical care.<sup>2</sup> For example, the cost of an average inguinal hernia repair in a hospital setting is \$2,237 compared to \$895 in the office-based setting.<sup>9</sup> Prostate biopsies are almost 75% less expensive when performed in an office-based setting rather than a hospital.<sup>10</sup> The cost for pediatric dental rehabilitation has been demonstrated to be 13 times less in an office-based setting rather than a hospital, thus saving patients and families approximately \$6800 per surgery.<sup>2</sup> These large disparities in cost are largely due to office-based settings having lower overhead expenses and being less resource intensive than hospitals.<sup>9,10</sup> These economic benefits for individuals, insurers, and the health care industry are significant contributors in the rapid growth of OBS and OBA.

### Patient Privacy

In addition to cost-effectiveness, there are other significant factors in OBS and OBA for patients, such as improved patient privacy.<sup>2,3</sup> Patients

undergoing personal, and sometimes body image-sensitive procedures, or surgeries, take comfort in having their procedure done in an office setting that allows for minimal personal disclosure.<sup>2,3</sup> Increased convenience of scheduling and access also are significant to patients.<sup>1,2</sup> Patients prefer OBS and OBA to avoid the confusion of hospitals and easier experience in scheduling and length of stay.<sup>1</sup> Lower exposure to nosocomial infections for patients has also been suggested by Hausman et al.<sup>2,3</sup>

### Putting It Together

Certified Registered Nurse Anesthetists (CRNAs) have been leaders in providing anesthesia in office-based settings.<sup>11</sup> CRNAs are often consulted when a surgeon plans to develop an office-based practice that meets projected practice standards and safety requirements. For most nurse anesthetists and other anesthesia providers, these consults for office-based anesthesia service are met with a “learn in the trenches” mentality.<sup>12</sup> To that end, the American Association of Nurse Anesthetists (AANA) provides practice standards and guidelines for providing office-based anesthesia, yet, these practice standards and guidelines have not been fully integrated into the formal training or education for CRNAs or other anesthesia providers.<sup>5,11</sup>

There is current clinical literature that addresses the “education gaps” of healthcare providers, surgeons, and anesthesia providers who practice in the office-based setting.<sup>13</sup> For example, Dillon states that a survey of anesthesiology residents found that approximately 2% were exposed to any type of office-based practice during residency.<sup>12,15</sup> Though not fully informed by the evidence, many nurse anesthesia educators assume that the same problem exists in nurse anesthesia education. As initial evidence, a review of guidelines and requirements from the Council on Accreditation (COA) indicate that no requirement exists for the inclusion of office-based anesthesia in primary nurse anesthesia curricula.<sup>22</sup> There is increasing consensus, therefore, that a need exists to educate student nurse anesthetists in office-based safety factors (including the possible use of simulation), regulatory bodies requirements, state, and professional association standards.<sup>13</sup>

It is important to consider these standards and for CRNAs engaged in OBS and OBA to be familiar with the application of these standards. The following Table is an adaptation of these standards from The American Association of Nurse Anesthetists. Review these standards and consider their application to current practice.

**Table 1. Chart related to AANA's Standards of Anesthesia in the Office Setting**

Standard	Statement	Application to Office Practice
Standard 1	Perform and document a thorough preanesthesia assessment and evaluation.	Preanesthesia assessment of the patient undergoing office based surgery should include documentation of at least: a. assigned physical status b. assessment of airway c. previous anesthetic history d. allergies e. last meal eaten or oral intake f. history and physical
Standard 2	Obtain and document informed consent for the planned anesthetic intervention from the patient or legal guardian, or verify that an informed consent has been obtained and documented by a qualified professional.	The CRNA shall confirm that consent has been given for the planned surgical or diagnostic procedure. The CRNA validates and documents that the patient understands and accepts the plans and inherent risks for anesthesia in the office setting.

Standard 3	Formulate a patient-specific plan for anesthesia care.	A patient specific plan of care is based on patient assessment with the anticipation of potential problems in the office setting. The operating practitioner clears the patient for the planned anesthetic.
Standard 4	Implement and adjust the anesthesia care plan based on the patient's physiologic status. Continuously assess the patient's response to the anesthetic, surgical intervention, and/or procedure. Intervene as to maintain the patient in optimal physiologic condition.	The CRNA shall continuously assess and monitor the patient's response to the anesthetic. Prior to administration of anesthesia the CRNA shall verify a means to deliver positive pressure ventilation and treat emergency situations including availability of necessary emergency equipment and drugs.
Standard 5	Monitor, evaluate, and document the patient's physiologic condition as appropriate for the type of anesthesia and specific patient needs. When any physiological monitoring device is used, variable pitch 2 and threshold alarms shall be turned on and audible. The CRNA should attend to the patient continuously until the responsibility of care has been accepted by another anesthesia professional.	Minimum monitors in the office based setting include: pulse oximetry; electrocardiogram; blood pressure; O2 analyzer when O2 is delivered through the breathing system of the anesthesia machine; end-tidal CO2 when administering general anesthesia; a monitor for the presence of expired carbon dioxide when administering moderate or deep sedation; a body temperature monitor when clinically significant changes are intended, anticipated, or suspected; and peripheral nerve stimulator as indicated when administering neuromuscular blocking agents.
Standard 6	Document pertinent anesthesia-related information on the patient's medical record in an accurate, complete, legible, and timely manner.	The CRNA affirms a plan for accurate record keeping and documentation of the following: a. informed consent b. preanesthesia and postanesthesia evaluations c. course of the anesthesia, including monitoring modalities and drug administration, dosages and wastages d. discharge follow-up
Standard 7	Evaluate the patient's status and determine when it is safe to transfer the responsibility of care. Report the patient's condition, including all essential information, and transfer the responsibility of care to another qualified healthcare provider that assures continuity of care and patient safety.	Quality postanesthesia care is consistent with other practice settings in that there is a designated area operated by appropriately trained personnel. At least one qualified provider - a surgeon, anesthesia professional, or ACLS-certified registered nurse - should remain in the facility until all patients are discharged. An accurate postanesthesia record is documented.
Standard 8	Adhere to appropriate safety precautions as established within the practice setting to minimize the risks of fire, explosion, electrical shock and equipment malfunction. Based on the patient, surgical intervention or procedure, ensure that the equipment reasonably expected to be necessary for the administration of anesthesia has been checked for proper functionality and document compliance. When the patient is ventilated by an automatic mechanical ventilator, monitor the integrity of the breathing system with a device capable of detecting a disconnection by emitting an audible alarm. When the breathing system of an anesthesia machine is being used to deliver oxygen, the CRNA should monitor inspired oxygen concentration continuously with an oxygen analyzer with a low concentration audible alarm turned on and in use. Application to Office	The CRNA confirms equipment is routinely maintained by appropriately trained professionals. Prior to use, equipment is inspected for risk of malfunction and electrical/fire hazards.
Standard 9	Verify that infection control policies and procedures for personnel and equipment exist within the practice setting. Adhere to infection control policies and procedures as established within the practice setting to minimize the risk of infection to the patient, the CRNA, and other healthcare providers.	The CRNA shall confirm that policies are in place and a process exists to document compliance with Occupational Safety and Healthcare Administration (OSHA) standards relating to blood borne pathogens; medical waste and hazardous materials; personal protection devices; and disposal of needles, syringes and contaminated supplies.
Standard 10	Participate in the ongoing review and evaluation of anesthesia care to assess quality and appropriateness.	Prior to administration of any anesthetic in an office facility, the CRNA shall review the AANA minimal elements (Section II) and evaluate for compliance and applicability to the setting. The CRNA shall participate in assessment and review of appropriateness of anesthesia care provided in the office setting. There should be a process to document patient satisfaction and outcomes.
Standard 11	Respect and maintain the basic rights of patients.	The CRNA shall act as the patient's advocate. The patient has the right to dignity, respect and consideration of legitimate concerns in the office setting. Patients should be involved with all aspects of their care.

Chart Adapted from: American Association of Nurse Anesthetists. *Standards for Office-Based Anesthesia Practice*.  
<http://www.aana.com/resources2/professionalpractice/Documents/Standards%20for%20Office%20Based%20Anesthesia%20Practice.pdf>  
Accessed August 30, 2017. Created by Stephen D. Krau, Ph.D, RN, CNE

## Thought Box 2.

1. When reviewing these standards, how comparable are they to standards of anesthesia suggested for tertiary and ambulatory care settings?
2. How should these standards be incorporated into CRNA education?
3. Should standards of OBA and OBS be incorporated into certification exams?
4. To what extent did you learn OBA and OBS in your basic CRNA program?

### Major focus on OBA

A major objective for our considerations is to identify factors that impact safety during OBA procedures. The focus here will be on OBA in different contexts, as opposed to OBS, and will provide a practical framework for OBA procedures. The synthesized findings and resulting conceptual model will be used to inform and develop a quick reference guide for providers and administrators that categorizes, highlights, and briefly describes the associated OBA safety factors. The overall goal is to inform providers about safety factors associated OBA procedures in the hope of assuring optimal outcomes for patients undergoing OBA procedures.

### What Does the Evidence Indicate?

In terms of the nature of the evidence, no randomized controlled trials were found that comparatively evaluated OBA safety (e.g., anesthesia-related morbidity and mortality) across the spectrum of accredited surgical facilities. A potential reason for this may be attributed to the rapid expansion of office-based anesthesia – an expansion that has outpaced the process of discovery. There are, however, explorative analyses, retrospective studies, and expert opinions related to office-based anesthesia safety that are presented in Table 2.

Shapiro et al. published a recent systematic review that used data from the National Anesthesia Clinical Outcomes Registry (NACOR) established by the Anesthesia Quality Institute (AQI) founded by the American Society of Anesthesiologists (ASA).<sup>2</sup> There were approximately 30 AQI member practices from which OBA data were obtained.<sup>2</sup> Although, this study provided a sound literature review, the limited evidence resulted in potentially misleading conclusions. For example, the authors stated “The paucity of CRNAs functioning as the sole anesthesia provider was another surprising finding. This lack may be caused by an unwillingness on the part of the proceduralist/surgeon to take on a supervising role or the unwillingness of a CRNA to work in such a remote setting with no backup.”<sup>2</sup> The study results also report that independently working CRNAs in an office-based setting makes up 1% of all office-based practices reported to NACOR.<sup>2</sup> A likely cause for this lack of reported data used to frame this claim is that CRNAs find it a conflict of interest to report to NACOR - a registry developed by the ASA.

Shapiro et. al’s. combined program of inquiry has produced the most extensive review of the OBA evidence to date.<sup>14</sup> These studies report findings derived from a comprehensive exploration of the current literature, and, in the process, identified possible associated factors that contribute to OBA safety. These factors include: 1) procedure and/or surgery selection; 2) patient selection; 3) facility preparedness; 4) use of checklists; 5) provider education; and 6) accreditation.

### Major factors that contribute to OBA safety include those related to:

1. Procedure and/or surgery selection
2. Patient Selection
3. Facility Preparedness
4. Use of Checklists
5. Provider Education
6. Accreditation

## Procedure and/or Surgery Selection

Procedure and/or surgery selection and duration should be evaluated to ensure it is appropriate for an office-based location.<sup>2,14,15,16</sup> Although the American Society of Plastic Surgeons suggests surgical/procedure duration should be no longer than six hours, Shapiro et al. suggest that there is an increase in unplanned hospital admissions for procedures/surgeries greater than one hour in length.<sup>2,15,16</sup> The anticipated amount of postoperative pain and/or risk of postoperative nausea and vomiting related to the procedure or duration of the surgery should be considered when evaluating whether or not to provide office-based anesthesia.<sup>14</sup> Offices should have the appropriate personnel, proper equipment, and medications to care for patients peri-operatively with a reasonable discharge time goal.<sup>14</sup> Surgeries with increased fluid shifts and large anticipated blood losses are not appropriate for office-based anesthesia.<sup>2,14</sup> Additionally, certain procedures such as liposuction and some dental procedures have been shown to have an increased risk when performed in the office setting. Due to this, some states have developed guidelines for performing these specific types of procedures in offices.<sup>17,18</sup>

## Patient Selection

Patient selection is another factor that is identified in current literature as being associated with safety in office-based anesthesia. While there are no universally accepted criteria for patient selection, the American Association of Nurse Anesthetists (AANA) and American Society of Anesthesiologists (ASA) provide guidelines to aid in those decisions.<sup>11,18,19</sup> Criteria for identifying poor candidates for OBA could include patients with an ASA score greater than 3, obstructive sleep apnea (OSA), severe psychiatric disorders, uncontrolled hypertension or diabetes. A patient with a history of adverse events with anesthesia such as malignant hyperthermia would also be an example of a poor candidate for OBA.<sup>14</sup> Required laboratory studies should be completed before the day of surgery to prevent cancellations.<sup>14</sup> Certain home medications such as insulin, anti-hypertensives, and anticoagulants if not taken by the patient appropriately could also be problematic.<sup>14</sup> It is a good practice for each office to develop policies defining appropriate candidates using an interdisciplinary approach including the surgeons, anesthesia, nursing and surgical/procedural assistants.<sup>2</sup>

## Facility Preparedness

Facility preparedness and infrastructure, including proper equipment and medications, also are identified possible associated factors for the administration of safe OBA.<sup>2,14</sup> Office-based procedure/surgical rooms should have ample room to allow for the necessary equipment, personnel, and provide adequate space for patients to safely enter and exit.<sup>2</sup> The type of OBA – whether general anesthesia, monitored anesthesia care, or regional anesthesia - has not demonstrated a difference in safety-related outcomes. Of more importance are the availability of the proper medications, equipment, and monitoring devices used for the type of anesthetic performed.<sup>2,14</sup> The availability of difficult airway and emergency equipment, reversals and ACLS medications, and applicable policies and procedures (e.g., hospital transfer protocols) are necessary to provide a safe environment for the delivery of OBA.<sup>2,14</sup>

## Surgical Checklists

The results of studies by the World Health Organization and evidence trended from the application of surgical checklists in hospitals and some ambulatory settings have demonstrated a decrease in adverse perioperative outcomes.<sup>17</sup> As a result, checklists are now required by Centers for Medicare and Medicaid Services (CMS) for hospitals and accredited ambulatory surgery centers.<sup>17</sup> These results have led some experts to speculate that surgical checklists may also improve OBA outcomes. The results of early studies further suggest that the use of surgical checklists could potentially improve office-based surgical outcomes.<sup>1,17</sup> In these early studies, it was also identified that the limited use of checklists is probably due to the lack of financial incentive and governmental mandate.<sup>1</sup> Recently, the Institute for Safety in Office-Based Surgery has developed a customizable surgical checklist for offices based on the World Health Organization Surgical Safety Checklist.<sup>1</sup> Early evidence on the use of this checklist suggests an improvement in safety measures and decrease in complications.<sup>1</sup>

## Provider Education

It has been suggested that only two percent of anesthesia residents are exposed to OBA.<sup>14</sup> Furthermore, nurse anesthesia programs do not provide OBA training in the COA-approved core curriculum. This lack of formalized OBA training has resulted in a large variance in provider competency.<sup>13</sup> Professional societies, such as the AANA and ASA, and many office-based practicing anesthesia providers are aware of this lack of formal education. As a result, these professional societies have issued practice standards, in addition to provider-generated literature that increases levels of awareness, care, and safety for patients.<sup>13,14</sup> The lack of office-based education is not unique to anesthesia professionals, however, as surgeons and proceduralists also lack specific training. This lack of formal training has led many states to develop regulations for surgeons, proceduralists, and anesthesia providers when performing OBS and OBA.<sup>13</sup>

## Accreditation (Regulatory Agencies)

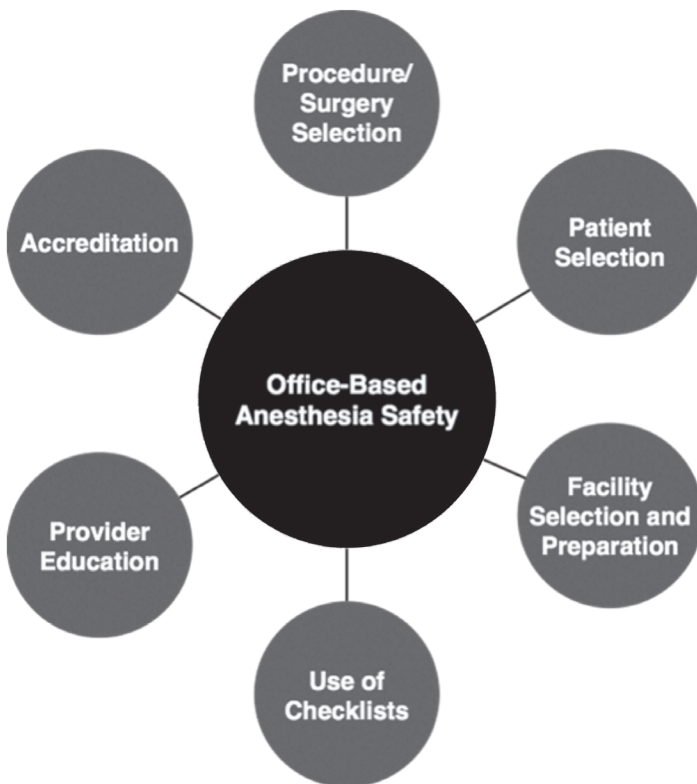
Accreditation in some form, either from an independent agency, individual states, or federal agency would increase the safety level of OBS and OBA.<sup>14,2</sup> It is estimated that 30 states now require accreditation of office-based practices in some form – such as that provided from the American Association of Ambulatory Surgery Centers (AAASC), American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF), Joint Commission on Accrediting Healthcare Organizations (JCAHO), to individual state mandated regulations.<sup>13</sup> Credentialing and privileging providers is, therefore, a strong argument for using accrediting agencies. This ensures proper training, education, and board certification of the providers performing procedures and providing anesthesia for patients.<sup>14</sup> According to some studies, however, board certification is not a contributing factor to office-based safety.<sup>14</sup> While accreditation provides basic standards, these agencies and states often vary on requirements to achieve a fully accredited status.<sup>2</sup> Furthermore, some agencies and states require adverse event reporting, and others do not.<sup>2</sup> Adverse event reporting and the resulting evidence would be beneficial in further evaluating factors that influence office-based safety.

**Table 2: Studies Related to OBS Safety**

Studies on Office-Based Anesthesia Safety		
Study	Key Findings	Strength of Evidence <sup>21</sup>
<b>Failey et al.<sup>16</sup></b>	A plastic surgery office utilizing TIVA (conscious and deep sedation) for their patients retrospectively studied the outcomes of 2006 consecutive patients. Chart reviews were completed for surgeries from 2003-2011. There were no deaths, cardiac events or transfers to the hospital reported.	4
<b>Vila et al.<sup>8</sup></b>	A comparative analysis using required adverse reporting data from ASCs and offices in Florida during 2000-2002. The authors concluded that complication rates were 10x higher in office-based settings versus ASCs.	3b
<b>Starling et al.<sup>6</sup></b>	This comparative analysis expands on an earlier study by Vila et al. The authors used same data as Vila et al. and additional data from Florida (10 years) and Alabama (6 years) adverse events reporting system. The authors determined that the inferences from the previous article were inaccurate and that office-based surgery is safe.	3b
<b>Rosenberg et al.<sup>17</sup></b>	This is a prospective comparative analysis regarding the use of a safety checklist perioperatively on outcomes in office-based surgery. The authors suggest a statistically significant difference in outcomes when a safety checklist is used but suggest it is not clinically significant	3b
<b>Pollock et al.<sup>4</sup></b>	A retrospective review of 1400 plastics cases safely performed in an office-based setting utilizing anesthesia. Patient selection, types of cases, monitoring and types of anesthesia are discussed.	4
<b>Blake<sup>15</sup></b>	A retrospective analysis of 4800 office-based anesthesia cases performed safely with only 3 complications noted. This study speaks to the lack of overall anesthesia training for the office-based location.	4
<b>Hoefflin et al.<sup>18</sup></b>	A retrospective view of over 23,000 consecutive office-based anesthetics for plastic surgery with no significant anesthetic complications.	4
<b>Fleisher et al.<sup>19</sup></b>	A comparative analysis of 564,267 Medicare outpatient surgeries performed in office-based, ASC and hospital locations. One-week mortality and inpatient admission within 7 days rates were lowest in the office-based place of service.	3
<b>Keyes et al.<sup>20</sup></b>	A retrospective review of 1,141,418 cases performed in AAAASF accredited outpatient facilities. 23 deaths were observed and 13 being due to pulmonary embolism. 1 death was caused by an intraoperative event.	4
<b>Shapiro et al.<sup>14</sup></b>	A systematic review of scientific literature for office-based anesthesia. The authors explored and analyzed the literature for characteristics contributing to the safe delivery of office-based anesthesia.	3b
<b>Shapiro et al.<sup>2</sup></b>	A systematic review of literature about office-based anesthesia reveals no randomized controlled trials. Data was collected from the National Anesthesia Outcomes Registry (NACOR) and analyzed using the Pearson chi-square test to compare office-based locations to NACOR extract data. The results are informative and give deeper insight into office-based anesthesia and its characteristics as compared to other outpatient locations.	3a

## Conceptual Model Development

Based on evidence discussed above, the recurrent themes (factors) that were associated with OBA safety were conceptualized into a model below. The evidence did not provide, however, a basis for determining the relative weight of each factor and their effects on safety-related outcomes. As a result, the model gives equal weight to each of the factors included.



## Quick Reference Guide Development

Besides organizing the key findings from the evidence, this model was used as the foundation for the development of the namely the Quick Reference Guide (QRG). The QRG was developed for distribution to specialists and CRNAs that are interested in providing OBA. The model is featured on the front of the QRG to highlight the six recurrent associated factors derived from the synthesis of evidence. The six factors are then briefly described and explained by using bullet points on the reverse side. At the end of the QRG, references are offered that will further assist providers in developing a safe OBA service.

### Thought box 3.

1. Which of these factors or concepts of the model could be omitted and patient safety still be assured?
2. Are there factors that are not present that you consider important in assuring optimal safety outcomes for patients undergoing OBA procedures?
3. What weigh of importance would assign to each factor?

## Key Findings

Perhaps the most impressive finding of this exploration is the lack of formal OBA training for CRNAs and other anesthesia providers. CRNAs are required from the Council on Accreditation (COA) to have formal didactic and clinical training in specialties such as cardiac, neurology, and obstetrical care. These specialties have unique bodies of knowledge and skill sets needed to ensure positive patient outcomes. In the same regard, OBA is a specialty that demands a unique knowledge and skill set to ensure the same outcomes. Despite this assertion, currently there are no published didactic or clinical requirements from the COA for OBA even though it is estimated that 12% of CRNAs provide OBA.<sup>23</sup>

## Implications for Anesthesia Education, Practice, and Research

While the specialty of OBA has grown rapidly, the study of associated factors that make OBA safe have not kept pace. Furthermore, many specialists and CRNAs lack formal education in the provision of office-based care, and, as a result, lack a general understanding of the factors that potentially contribute to OBA safety. It is recommended that the COA address the lack of both didactic and clinical requirements for OBA education and implement core requirements for CRNA education. Furthermore, evaluating the effects of formal OBA training on patient safety-related outcomes would be a suitable target for future research.

The AANA developed and published guidelines for CRNAs providing OBA, and, as a result, provided some organization for clinical decision-making despite the lack of formal OBA training for providers. The purpose of the QRG developed in this capstone project is to provide an easily understood reference that will support clinical decision-making by highlighting, organizing, and explaining the current knowledge about factors associated with the safe delivery of OBA.

## Conclusion

OBA is growing exponentially due to economic and social factors, surgical technologic advances, and improved anesthetic agents and monitoring.<sup>14</sup> Despite this rapid expansion in OBA care, providers remain largely uninformed about factors associated with improved safety. In response, this capstone project included a synthesized review of existing evidence that identified key factors associated with OBA-related safety. For the purposes of clarification and informed provider decision-making, these factors were organized into a conceptual model and a Quick Reference Guide. Other recommendations were offered that address the lack of formal provider education in OBA care, as well as for the creation of OBA-related didactic and clinical content in the nurse anesthesia core curriculum.

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