

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

REFERENCE #	CITATION	CONCLUSION(S)	CONSENSUS SCORE	EVIDENCE TYPE	POPULATION	INTERVENTIONS	COMPARISON	SAMPLE SIZE	OUTCOME MEASURE
1	American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by nonanesthesiologists. <i>Anesthesiology</i> . 2002;96(4):1004-1017.	The purpose of the guidelines is to allow clinicians to provide their patients with the benefits of sedation/analgesia while minimizing the associated risks.	IVA	Clinical practice guideline	NA	NA	NA	NA	NA
2	Russell KA. Nurse practice acts guide and govern nursing practice. <i>J Nurs Regul</i> . 2012;3(3):36-42.	The practice of nursing is a right granted by a state to protect those needing nursing care. The guidelines of the nurse practice act and its rules provide safe parameters within which to work and protect patients from unprofessional and unsafe nursing practice.	VA	Literature review	NA	NA	NA	NA	NA
3	About nursing licensure. National Council of State Boards of Nursing. <a href="https://www.ncsbn.org/licensure.htm">https://www.ncsbn.org/licensure.htm</a> . Accessed October 22, 2015.	The purpose of a professional license is to protect the public from harm by setting minimal qualifications and competencies for safe entry-level practitioners. Nursing is regulated because it is one of the health professions that poses a risk of harm to the public if practiced by someone who is unprepared and/or incompetent.	VA	Expert opinion	NA	NA	Na	NA	NA
4	American Nurses Association. <i>Nursing: Scope and Standards of Practice</i> . Silver Spring, MD: American Nurses Association; 2015.	Outlines the expectations of the professional role of the registered nurse. It states the scope of practice and presents the standards of professional nursing practice and their accompanying competencies.	IVB	Standards of practice	NA	NA	NA	NA	NA
5	Standards of perioperative nursing. In: <i>Guidelines for Perioperative Practice</i> . Denver, CO: AORN, Inc; 2015:693-710.	The standards of perioperative nursing focus on the process of providing nursing care and performing professional role activities. These standards apply to all nurses in the perioperative setting and were developed by AORN using the American Nurses Association's (ANA) scope and standards of practice for nursing and nursing administration as the foundation.	IVB	Clinical practice guideline	Perioperative patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

6	Nurse practice act, rules & regulations. National Council of State Boards of Nursing. <a href="https://www.ncsbn.org/nurse-practice-act.htm">https://www.ncsbn.org/nurse-practice-act.htm</a> . Accessed October 22, 2015.	Each state or territory has a law called the Nurse Practice Act, which is enforced by each nursing board. Nurses must comply with the law and related rules in order to maintain their licenses. The law describes qualifications for licensure, nursing titles that are allowed to be used, scope of practice (what the nurse is allowed to do), and actions that can or will happen if the nurse does not follow the nursing law.	Reg		NA	NA	NA	NA	NA
7	Perioperative explications for the ANA Code of Ethics for Nurses. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2015:711-732.	The perioperative nurse, by virtue of the nurse patient relationship, has an obligation to provide safe, professional, and ethical patient care. It is important that nurses know how to manage ethical decisions appropriately so that patients' beliefs can be honored without compromising the nurse's own moralconscience. Ethical practice is thus a critical aspect of nursing care, and the development of ethical competency is paramount for present and future nursing practice.	IVB	Clinical Practice Guideline	NA	NA	NA	NA	NA
8	AANA-ASA Joint Position Statement Regarding Propofol Administration. 2004. American Association of Nurse Anesthetists. <a href="https://www.aana.com/resources2/professional-practice/Documents/PPM%20PS%20Joint%20AANA-ASA%20Propofol.pdf">https://www.aana.com/resources2/professional-practice/Documents/PPM%20PS%20Joint%20AANA-ASA%20Propofol.pdf</a> . Accessed October 22, 2015.	Whenever propofol is used for sedation/anesthesia, it should be administered only by persons trained in the administration of general anesthesia, who are not simultaneously involved in these surgical or diagnostic procedures.	IVB	Position statement	NA	NA	NA	NA	NA
9	Statement on Safe Use of Propofol. 2014. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resourses/standards-guidelines/statement-on-safe-use-of-propofol.pdf">http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resourses/standards-guidelines/statement-on-safe-use-of-propofol.pdf</a> . Accessed October 22, 2015.	When an anesthesiologist is not involved in the care, non-anesthesia personnel who administer propofol should be qualified to rescue patients whose level of sedation becomes deeper than intended.	IVB	Clinical practice guideline	NA	NA	NA	NA	NA
10	Singh H, Poluha W, Cheung M, Choptain N, Baron KI, Taback SP. Propofol for sedation during colonoscopy. Cochrane Database Syst Rev. 2008;(4):CD006268.	Propofol for sedation during colonoscopy for generally healthy patients can lead to faster recovery & discharge times, increased patient satisfaction without an increase in side effects.	IA	Systematic review with meta-analysis	Colonoscopy patients	Sedation with propofol	Propofol versus traditional agents	22 studies	Recovery time, patient satisfaction, pain control, cardiopulmonary events
11	Vargo JJ, Cohen LB, Rex DK, et al. Position statement: nonanesthesiologist administration of propofol for GI endoscopy. Gastroenterology. 2009;137(6):2161-2167.	The administration of propofol and standard sedation by nonanesthesiologists is comparable in regards to safety and efficacy.	IVA	Consensus position statement	Endoscopy patients	NA	NA	NA	NA
12	Sethi S, Wadhwa V, Thaker A, et al. Propofol versus traditional sedative agents for advanced endoscopic procedures: a meta-analysis. Dig Endosc. 2014;26(4):515-524.	Propofol for advance endoscopic procedures is associated with shorter recovery time, better sedation and amnesia level without an increased risk of cardiopulmonary complications & overall patient satisfaction.	IA	Systematic review with meta-analysis	Patients undergoing advanced endoscopy procedures	Propofol	Traditional sedative agents	969	Recovery time, efficacy and safety of propofol sedation for advance endoscopic procedures
13	Lee CK, Lee S, Chung I, et al. Balanced propofol sedation for therapeutic GI endoscopic procedures: a prospective, randomized study. Gastrointest Endosc. 2011;73(2):206-214.	Compared with conventional sedation balanced propofol sedation (BPS) provides higher health care provider satisfaction, better patient cooperation, and similar adverse event profiles for patients undergoing therapeutic endoscopy.	IB	Prospective, randomized, single-blinded study	Patients undergoing therapeutic endoscopy procedures	Balanced propofol sedation	BPS versus conventional sedation	222	Cardiopulmonary complications, patient cooperation, and health car provider satisfaction

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

14	Yamamoto H, Gotoda T, Nakamura T, et al. Clinical impact of gastroenterologist-administered propofol during esophagogastroduodenoscopy: a randomized comparison at a single medical clinic. <i>Gastric Cancer</i> . 2015;18(2):382-389.	Patients receiving propofol had shorter time to discharge with less management for monitoring and recovery after completion of the EGD procedure. The authors concluded that short time of propofol recovery may save recovery room space, reduce the number of recliners, the number of nurses, and staff effort and improve patient compliance in even small clinics.	IB	Prospective randomized controlled clinical trial	EGD patients	Sedation	Propofol or midazolam	106	Patient management after screening EGD procedure
15	Molina-Infante J, Duenas-Sadornil C, Mateos-Rodriguez JM, et al. Nonanesthesiologist-administered propofol versus midazolam and propofol, titrated to moderate sedation, for colonoscopy: a randomized controlled trial. <i>Dig Dis Sci</i> . 2012;57(9):2385-2393.	The drug synergy of midazolam and propofol promotes a deeper and longer moderate sedation improving patient satisfaction rates but prolonging early recovery time.	IB	Double-blinded, randomized, placebo controlled trial	Outpatient colonoscopy patients	Midazolam plus propofol	Midazolam plus propofol compared to saline plus propofol	135	Propofol dose, depth of sedation, length of recovery time, pain perception, patient satisfaction
16	Schilling D, Rosenbaum A, Schweizer S, Richter H, Rumstadt B. Sedation with propofol for interventional endoscopy by trained nurses in high-risk octogenarians: a prospective, randomized, controlled study. <i>Endoscopy</i> . 2009;41(4):295-298.	Nurse administered propofol sedation during interventional endoscopy is as safe as midazolam/meperidine sedation in high-risk patients older than 80.	IC	Prospective, randomized controlled trial	Endoscopy patient older than 80 years	Sedation	Midazolam and meperidine versus propofol	150	Cardiopulmonary complications, adverse events, patient cooperation
17	Dewitt J, McGreevy K, Sherman S, Imperiale TF. Nurse-administered propofol sedation compared with midazolam and meperidine for EUS: a prospective, randomized trial. <i>Gastrointest Endosc</i> . 2008;68(3):499-509.	NAPS provided faster induction and recovery time; higher post-op patient satisfaction, and quicker return to baseline than midazolam & meperidine.	IIB	Prospective, randomized, single-blinded trial	Outpatients referred for EUS	Sedation with nurse administered propofol sedation and meperidine and midazolam	Midazolam and meperidine versus propofol	80	Comparison of recovery times, costs, safety, health personnel, and patient satisfaction of nurse administered propofol sedation and meperidine and midazolam for EUS
18	Manjrekar AU, Kane D, Dewoolkar L, Shroff P. Conscious sedation in interventional radiology. <i>Internet J Anesthesiol</i> . 2008;18(1):9p-9p.	Both techniques of conscious sedation with midazolam and propofol were satisfactory for interventional radiology procedures with respect for stability of vital signs; level of sedation, amnesia, recovery, satisfaction of the patient and the physician.	IC	Quasi-experimental study	Interventional radiology patients	Propofol	Propofol versus midazolam	60	Stability of vital signs; level of sedation, amnesia, recovery, satisfaction of the patient and the physician
19	Sieg A, Beck S, Scholl SG, et al. Safety analysis of endoscopist-directed propofol sedation: a prospective, national multicenter study of 24,441 patients in German outpatient practices. <i>J Gastroenterol Hepatol</i> . 2014;29(3):517-523.	Following the German S-3 Guideline for endoscopic sedation, endoscopist-directed propofol sedation is safe.	IIIA	Retrospective review	German endoscopy patients	Propofol sedation	NA	24,441	Adverse events during endoscopist-directed propofol sedation
20	Lucendo AJ, Oliveira A, Frigal-Ruiz AB, et al. Nonanesthesiologist-administered propofol sedation for colonoscopy is safe and effective: a prospective Spanish study over 1000 consecutive exams. <i>Eur J Gastroenterol Hepatol</i> . 012;24(7):787-792.	Colonoscopy under endoscopist controlled propofol sedation in low risk patients is safe and effective but patients at least 65 years old and classified as ASAII are more likely to have a decrease in blood pressure and a prolonged recovery time.	IIIB	Prospective, non-experimental study	Adult colonoscopy patients	Propofol sedation	NA	1000	Complete examination, propofol dose, recovery time, hypoxemia, hypotension
21	Mao W, Wei XQ, Tao J, Zhen FP, Wen ZF, Wu B. The safety of combined sedation with propofol plus fentanyl for endoscopy screening and endoscopic variceal ligation in cirrhotic patients. <i>J Dig Dis</i> . 2014;15(3):124-130.	Sedation with fentanyl and propofol is safe for cirrhotic patients having EVL or SEGD.	IIIB	Retrospective review	Patients with liver cirrhosis	Sedation	Sedated SEGD group versus sedated EVL group; conscious EVL group; sedated control group	309	The incidence of minimal hepatic encephalopathy or complications of sedation. Secondary-patient satisfaction & cooperation.

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

22	Bosslet GT, Devito ML, Lahm T, Sheski FD, Mathur PN. Nurse-administered propofol sedation: feasibility and safety in bronchoscopy. <i>Respiration</i> . 2010;79(4):315-321.	Nurse-administered propofol sedation is a feasible and safe sedation method for bronchoscopies.	III B	Retrospective review	Bronchoscopy procedure patients	Nurse administered propofol sedation	NA	498	Adverse events (eg, hypoxia, endotracheal intubation, hypotension)
23	Sayfo S, Vakil KP, Alqaqa'a A, et al. A retrospective analysis of proceduralist-directed, nurse-administered propofol sedation for implantable cardioverter-defibrillator procedures. <i>Heart Rhythm</i> . 2012;9(3):342-346.	Nurse administered propofol sedation for shorter implantable cardioverter/defibrillator procedures have acceptable rates of serious adverse events and manageable non-serious events and should be considered for further study. Complex procedures should be done with an anesthesiologist.	IIIB	Retrospective analysis	Patients undergoing implantable cardioverter/defibrillator procedures	Nurse administered propofol sedation	NA	582	Adverse events (serious and non-serious)
24	Slagelse C, Vilmann P, Hornslet P, Jorgensen HL, Horsted TI. The role of capnography in endoscopy patients undergoing nurse-administered propofol sedation: a randomized study. <i>Scand J Gastroenterol</i> . 2013;48(10):1222-1230.	Capnography seems to reduce the number and duration of hypoxia in NAPS patients. Capnography is able to detect insufficient respiration that leads to hypoxia prior to changes in pulse oximetry. The researchers concluded that capnography was not necessary during NAPS due to the additional expense and limited clinical benefit.	IA	RCT	Patients receiving NAPS	Monitoring with capnography	Capnography versus no capnography	540	Hypoxia, changes in SpO2
25	Tohda G, Higashi S, Wakahara S, Morikawa M, Sakumoto H, Kane T. Propofol sedation during endoscopic procedures: safe and effective administration by registered nurses supervised by endoscopists. <i>Endoscopy</i> . 2006;38(4):360-367.	Administration of propofol by RNs under the supervision of endoscopists was safe and resulted in high rates of patient satisfaction.	IIIB	Prospective, observational study	Patients undergoing endoscopy procedures	Nurse administered propofol	NA	27,500	Cardiorespiratory events, patient satisfaction, and recovery time.
26	Morse JW, Fowler SA, Morse AL. Endoscopist-administered propofol: a retrospective safety study. <i>Can J Gastroenterol</i> . 2008;22(7):617-620.	Propofol can be safely administered to patients in a community hospital under the supervision of the endoscopist with no additional support or monitoring.	IIIC	Retrospective chart	Patients undergoing endoscopic procedures	Sedation with propofol	NA	680	Blood pressure readings, SpO2 readings
27	Sipe BW, Scheidler M, Baluyut A, Wright B. A prospective safety study of a low-dose propofol sedation protocol for colonoscopy. <i>Clin Gastroenterol Hepatol</i> . 2007;5(5):563-566.	The propofol protocol administration regimen used by the researchers was safe and effective for elective colonoscopy patients. The level of sedation titrated to a moderate level of sedation and a high level of patient satisfaction.	IIIB	Prospective study	Outpatient colonoscopy patients	Multidrug propofol regimen	NA	100	Level of sedation, length of the procedure, sedation/recovery time, patient satisfaction, and adverse events
28	Fatima H, DeWitt J, LeBlanc J, Sherman S, McGreevy K, Imperiale TF. Nurse-administered propofol sedation for upper endoscopic ultrasonography. <i>Am J Gastroenterol</i> . 2008;103(7):1649-1656.	Nurse administered propofol sedation is safe for upper endoscopic ultrasonography and may be performed without major complications.	IIIB	Retrospective review	Upper endoscopic ultrasonography patients	NAPS	NA	806	Sedation related complications and clinical data
29	Frieling T, Heise J, Kreysel C, Kuhlen R, Schepke M. Sedation-associated complications in endoscopy—prospective multicentre survey of 191142 patients. <i>Z Gastroenterol</i> . 2013;51(6):568-572.	Propofol sedation in gastrointestinal endoscopy is a safe procedure with a low potential of risk in daily routine. However, high risk patients (ASA $\geq$ 3) should be identified, especially before emergency endoscopies and managed by additional persons for NAAP and under intensive care surveillance.	IIIB	Prospective multicentre survey	Endoscopy patients	NA	NA	191,142	Complications associated with sedation
30	Garcia-Suarez C, Lopez-Roses L, Olivencia P, et al. Sedation with propofol controlled by endoscopists during percutaneous endoscopic gastrostomy. <i>Rev Esp Enferm Dig</i> . 2010;102(4):249-256.	Propofol sedation can be administered by non-anesthesiologists and appears to be safe & effective while doing PEG procedures.	IIIC	Prospective descriptive study	Patients for placement of percutaneous endoscopic gastrostomy	Propofol	NA	47	Complications

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

31	Garewal D, Powell S, Milan SJ, Nordmeyer J, Waikar P. Sedative techniques for endoscopic retrograde cholangiopancreatography. Cochrane Database Syst Rev. 2012;(6):CD007274.	Patients have a better recovery after propofol sedation for endoscopic retrograde cholangiopancreatography (ERCP) than after midazolam and meperidine sedation. There were no differences between the two techniques as far as safety.	IIA	Systematic review	Patients undergoing ERCP	Moderate sedation	Propofol versus midazolam and meperidine.	510	Adverse events (eg, death, hypoxemia, hypotension) and recovery time
32	Kulling D, Orlandi M, Inauen W. Propofol sedation during endoscopic procedures: how much staff and monitoring are necessary? Gastrointest Endosc. 2007;66(3):443-449.	A team of an endoscopy physician and an endoscopy nurse can safely administer propofol sedation for GI endoscopy in a practice setting without additional staff or specialized monitoring.	IIIA	Prospective , non-experimental study	Endoscopy patients	Propofol administration by the endoscopy nurse supervised by the endoscopist	NA	27,061	Propofol dose and respiratory events (eg, hypoxia, mask ventilation)
33	Adler DG, Kawa C, Hilden K, Fang J. Nurse-administered propofol sedation is safe for patients with obstructive sleep apnea undergoing routine endoscopy: a pilot study. Dig Dis Sci. 2011;56(9):2666-2671.	NAPS is safe for patients with documented OSA during routine endoscopy procedures. Complication rates were comparable to conscious sedation with benzodiazepines & narcotics.	IIIA	Retrospective cohort study	Endoscopy patients	Sedation	1. OSA patients with NAPS.2. OSA patients with standard conscious sedation. 3. Non-OSA patients with NAPS. 4. Non-OSA patients with standard conscious sedation.	215	Complication rate
34	Van Beek EJAH, Leroy PLJM. Safe and effective procedural sedation for gastrointestinal endoscopy in children. J Pediatr Gastroenterol Nutr. 2012;54(2):171-185.	Propofol based procedural sedation is the best practice for sedation in children undergoing GI endoscopy procedures. Propofol can be safely administered by specifically trained non-anesthesiologists.	IIB	Systematic review	Pediatric patients receiving sedation	NA	NA	26 trials	Safety outcomes
35	McQuaid KR, Laine L. A systematic review and meta-analysis of randomized, controlled trials of moderate sedation for routine endoscopic procedures. Gastrointest Endosc. 2008;67(6):910-923.	Moderate sedation provides a high level of physician and patient satisfaction and a low risk of serious adverse events. Midazolam-based regimens have longer sedation and recovery times compared to propofol.	IA	Systematic review and meta-analysis	Adult patients undergoing endoscopy procedures	Sedation	Midazolam, diazepam, narcotics, propofol	3918 patients from 36 studies.	Risk of adverse events, patient satisfaction, provider satisfaction.

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

36	Mollica G, Mirabella L, Spadaro S, et al. Prospective, randomized comparative study of respiratory and hemodynamic monitoring during colonoscopy using remifentanyl versus propofol/fentanyl. <i>J Anesth Clinical Res.</i> 2014;5(1). <a href="http://www.omicsonline.org/open-access/a-prospective-randomized-comparativestudy-of-respiratory-and-hemodynamic-monitoring-during-colonoscopy-using-remifentanyl-versus-propofolfentanyl-2155-148.1000381.php?aid=23270">http://www.omicsonline.org/open-access/a-prospective-randomized-comparativestudy-of-respiratory-and-hemodynamic-monitoring-during-colonoscopy-using-remifentanyl-versus-propofolfentanyl-2155-148.1000381.php?aid=23270</a> . Accessed October 21, 2015.	Remifentanyl sedation afforded a good quality colonoscopy without respiratory & hemodynamic impairment and faster recovery than propofol/fentanyl.	IB	RCT	Colonoscopy patients		Remifentanyl vs Propofol/ fentanyl for sedation during colonoscopy	180	Sedation levels measured by the OAAA/S and BIS. Cardiovascular and respiratory variables.
37	Terui T, Inomata M. Administration of additional analgesics can decrease the incidence of paradoxical reactions in patients under benzodiazepine-induced sedation during endoscopic transpapillary procedures: prospective randomized controlled trial. <i>Dig Endosc.</i> 2013;25(1):53-59.	The administration of pentazocine significantly reduced the incidence of paradoxical reactions in patients undergoing midazolam induced sedation during endoscopic transpapillary procedures.	IB	Randomized controlled trial	Patients undergoing diagnostic or therapeutic endoscopic transpapillary procedures	Sedation	Sedation with midazolam only compared to sedation with both midazolam and the analgesic pentazocine	180	Paradoxical reactions
38	Khajavi M, Emami A, Etezadi F, Safari S, Sharifi A, Shariat Moharari R. Conscious sedation and analgesia in colonoscopy: ketamine/propofol combination has superior patient satisfaction versus fentanyl/propofol. <i>Anesth Pain Med.</i> 2013;3(1):208-213.	Patient satisfaction was higher with propofol/ ketamine than fentanyl/propofol during colonoscopy.	IA	Randomized controlled trial	Colonoscopy patients	Sedation	Propofol/ketamine versus propofol/fentanyl	60	Patient satisfaction; level of sedation; hemodynamic parameters
39	Tu RH, Grewall P, Leung JW, et al. Diphenhydramine as an adjunct to sedation for colonoscopy: a double-blind randomized, placebo-controlled study. <i>Gastrointest Endosc.</i> 2006;63(1):87-94.	Intravenous diphenhydramine given before initiation of standard sedation offers a significant benefit to conscious sedation for patients undergoing colonoscopy.	IA	Prospective, randomized, double-blind, placebo-controlled study	Patients undergoing screening/diagnostic / therapeutic colonoscopy procedures	Diphenhydramine 50 mg or placebo IV 3 minutes before starting conscious sedation with intravenous midazolam and meperidine.	Diphenhydramine 50 mg versus a placebo	270	Anesthetic effect as assessed by the endoscopy team and by the patient; quantity of adjunctive sedatives to achieve adequate sedation
40	Welchman S, Cochrane S, Minto G, Lewis S. Systematic review: the use of nitrous oxide gas for lower gastrointestinal endoscopy. <i>Aliment Pharmacol Ther.</i> 2010;32(3):324-333.	Nitrous oxide provides comparable analgesia to IV sedation. The rapid psychomotor recovery from N2O enables quicker patient discharge and removes the need for a patient escort. Benefit was not seen from N2O in patients undergoing flexible sigmoidoscopy.	VB	Literature review	Endoscopy patients	Nitrous oxide	NA	NA	NA
41	Levitzky BE, Lopez R, Dumot JA, Vargo JJ. Moderate sedation for elective upper endoscopy with balanced propofol versus fentanyl and midazolam alone: a randomized clinical trial. <i>Endoscopy.</i> 2012;44(1):13-20.	There was superior patient satisfaction and shorter recovery times with the balanced propofol sedation targeted to moderate sedation.	IA	Randomized controlled trial	Patients undergoing elective esophagogastroduod endoscopy (EGD)	Balance propofol sedation	Standard sedation with opiates and benzodiazepines	110	Patient satisfaction with EGD following balanced propofol versus standard sedation

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

42	Sakurai S, Fukunaga A, Ichinohe T, Kaneko Y. IV ATP potentiates midazolam sedation as assessed by bispectral index. <i>Anesth Prog.</i> 2014;61(3):95-98.	The addition of ATP (adenosine 5-triphosphate) infusion to midazolam significantly enhances midazolam sedation without adverse effects on the cardiorespiratory functions.	IB	RCT	Male volunteers	Sedation	Midazolam with and without the addition of ATP	10 volunteers for 2 different sessions	Level of midazolam induced sedation
43	Sun GC, Hsu MC, Chia YY, Chen PY, Shaw FZ. Effects of age and gender on intravenous midazolam premedication: a randomized double-blind study. <i>Br J Anaesth.</i> 2008;101(5):632-639.	Age and gender differences in neuropsychological and physiological responses after midazolam premedication were evident. Midazolam is effective for producing sedation and anxiolysis at a dose of 0.02 mg/kg with minimal effects on cardiorespiration and oxygen saturation to patients. Dosage adjustments based on age and gender differences is necessary.	IIB	Double-blinded randomized clinical study	Elective surgery patients	Sedation with midazolam	Two dose groups of midazolam and 6 groups stratified by gender and age	360	Influence of age, gender, and dose on midazolam sedation,
44	Dal T, Sazak H, Tunc M, Sahin S, Yilmaz A. A comparison of ketamine-midazolam and ketamine-propofol combinations used for sedation in the endobronchial ultrasound-guided transbronchial needle aspiration: a prospective, single-blind, randomized study. <i>J Thorac Dis.</i> 2014;6(6):742-751.	Both Ketamine-midazolam & ketamine-propofol combinations for sedation were effective & safe without remarkable side effects for endobronchial ultrasound guided transbronchial needle aspiration.	IIB	Prospective study	Adult patients for endobronchial ultrasound guided procedures	Sedation	2 medication regimens- ketamine-midazolam & ketamine-propofol combinations	60	Patient and bronchoscopist satisfaction; side effects of medications
45	Bassett K, Smith SW, Cardiff K, Bergman K, Aghajanian J, Somogyi E. Nurse anaesthetic care during cataract surgery: a comparative quality assurance study. <i>Can J Ophthalmol.</i> 2007;42(5):689-694.	Conscious sedation of cataract surgery patients can be safely and effectively provided by trained nurses for selected patients. This nursing role is likely replicable in similar operating room settings.	II B	Prospective, non-randomized study	Outpatient cataract surgery patients	Conscious sedation provided by trained nurses	Sedation provided by nurse anesthetists versus nurses trained to administer conscious sedation	211	Anesthetic and surgical complications; Patient assessment of discomfort, well-being, and anxiety
46	Khalil MA, Ebade AA, Abdel Azeem MS. The role of intravenous paracetamol in conscious sedation during Internal Cardioverter Defibrillator (ICD) insertion in geriatric patients. <i>Egypt J Anaesth.</i> 2013;29(1):41-45.	IV paracetamol was effective in reducing pain and intraoperative respiratory events in high risk cardiac patients undergoing transvenous placement of internal cardioverter defibrillator.	IB	Prospective, randomized study	Elective trans venous placement of Internal Cardioverter Defibrillator	IV paracetamol	Patients receiving paracetamol versus fentanyl	100	Effect of paracetamol in reducing pain, apnea, and upper airway obstruction
47	Conway A, Page K, Rolley JX, Worrall-Carter L. Nurse-administered procedural sedation and analgesia in the cardiac catheter laboratory: an integrative review. <i>Int J Nurs Stud.</i> 2011;48(8):1012-1023.	Low rates of sedation-related complications among patients who receive procedural sedation & analgesia in the Cardiac Cath lab; practice is varied.	IIIA	Integrative review	Patients receiving procedural sedation in the cardiac catheter laboratory	Procedural sedation	NA	NA	Safety of procedural sedation, cost savings, education
48	Schaufele MK, Marín DR, Tate JL, Simmons AC. Adverse events of conscious sedation in ambulatory spine procedures. <i>Spine J.</i> 2011;11(12):1093-1100.	This study suggests that mild to moderate conscious sedation in interventional spine procedures is associated with low rates of adverse events when established protocols are followed.	IIIB	Retrospective cohort chart review	Patients undergoing interventional spine procedures	Conscious sedation	NA	2494	Adverse events documented immediately after the procedure up to 3 days post-procedure
49	Kezerashvili A, Fisher JD, Delaney J, et al. Intravenous sedation for cardiac procedures can be administered safely and cost-effectively by non-anesthesia personnel. <i>J Intervent Card Electrophysiol.</i> 2008;21(1):43-51.	Non-anesthesia personnel can administer moderate sedation for cardiac procedures in cardiac settings safely and cost-effectively. Anesthesia services are appropriate for selected cases.	IIIB	Retrospective review	Cardiac procedure patients	Nurse administered sedation	NA	9558	Patient complications (eg, death, hypotension, heart failure) and cost savings

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

50	Backman ES, Triant VA, Ehrenfeld JM, et al. Safety of midazolam for sedation of HIV-positive patients undergoing colonoscopy. <i>HIV Med.</i> 2013;14(6):379-384.	HIV positive out-patients undergoing colonoscopy had similar outcomes whether they received midazolam or diazepam. IV midazolam can be considered for use in HIV positive patients on ART with close clinical monitoring. Additional research is needed in prospective and RCT trials.	IIIB	Retrospective review	HIV positive patients on antiretroviral therapy (ART) for colonoscopy	IV sedation	IV midazolam vs IV diazepam	136	Sedation duration, nadir systolic BP, nadir oxygen saturation, abnormal cardiac rhythm, & change in level of consciousness
51	Cakmak H, Kocaturk T, Dundar SO, Kaan N, Ozbacivan M, Erkan E. The effects of diazepam on blood pressure levels in cataract surgery. <i>Saudi Med J.</i> 2014;35(7):669-673.	Elevated blood pressure can undermine surgical outcomes and lead to complications. To prevent an elevated BP during the intraoperative period, diazepam may be beneficial even in normotensive patients.	IIIB	Retrospective review	Cataract surgery patients	NA	Patients who received diazepam preoperatively with patients who did not receive any oral premedication.	147	Diastolic and systolic blood pressure readings
52	Nayar DS, Guthrie WG, Goodman A, et al. Comparison of propofol deep sedation versus moderate sedation during endosonography. <i>Dig Dis Sci.</i> 2010;55(9):2537-2544.	There does not seem to be a significant difference between complication rates for propofol deep sedation with monitored anesthesia care and meperidine/midazolam administered for moderate sedation.	IIB	Quasi-experimental study	Endosonography Patients	Propofol sedation	propofol sedation to meperidine/midazolam for moderate sedation	2000	Complication rates
53	Zaidi N, Scoccia B, Leach RE, Jain T. Moderate conscious sedation for in vitro fertilization oocyte retrieval procedures in an office setting. <i>Internet J Anesthesiol.</i> 2007;12(1):7p-7p.	Moderate conscious sedation provides adequate pain control during IVF oocyte retrieval procedures. No significant differences were found between fentanyl and meperidine.	IIIB	Post-procedure questionnaire	Female patients undergoing IVF	Moderate sedation	NA	312	Pain prevention, pain relief, recovery from sedation, and overall satisfaction
54	Wortman M, Daggett A, Ball C. Operative hysteroscopy in an office-based surgical setting: review of patient safety and satisfaction in 414 cases. <i>J Minim Invasive Gynecol.</i> 2013;20(1):56-63.	Major operative hysteroscopic surgery can be performed in an office based setting with a high degree of safety and patient satisfaction.	IIIB	Retrospective analysis	Female patients undergoing hysteroscopy	NA	NA	414	Patient satisfaction and safety
55	Steinfort DP, Irving LB. Patient satisfaction during endobronchial ultrasound-guided transbronchial needle aspiration performed under conscious sedation. <i>Respir Care.</i> 2010;55(6):702-706.	Endobronchial ultrasound-guided transbronchial needle aspiration maybe safely performed under conscious IV sedation and associated with a very high patient satisfaction.	IIIC	Non-experimental study	Patients undergoing endobronchial ultrasound-guided transbronchial needle aspiration procedures	IV conscious sedation	NA	41	Patient satisfaction, patient recall of the procedure, and adverse events
56	Sabbatani P, Mantovan R. Electrical cardioversion of atrial fibrillation: evaluation of sedation safety with midazolam by means of EtCO2 and IPI algorithm analysis. <i>Int J Cardiol.</i> 2013;169(6):430-432.	Use of midazolam for sedation during cardioversion procedures for atrial fibrillation is safe with trained staff & cardiologists and cautious patient selection.	IIIB	Non-experimental study	Atrial fibrillation patients for cardioversion	Midazolam for sedation		45	EtCO2 measurement with capnography & IPI index.
57	Cinar K, Yakut M, Ozden A. Sedation with midazolam versus midazolam plus meperidine for routine colonoscopy: a prospective, randomized, controlled study. <i>Turk J Gastroenterol.</i> 2009;20(4):271-275.	Patient safety, outcomes, & satisfaction were similar in both groups. Adding meperidine to midazolam does not seem to have additive benefit for the patient.	IB	Prospective, randomized, controlled study	Colonoscopy patients	Sedation	Efficacy and safety of midazolam versus midazolam plus meperidine for colonoscopy procedures	74	Safety and quality of sedation, pain measured with the VAS; recovery time in minutes, & total procedure time

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

58	Eberl S, Polderman JAW, Preckel B, Kalkman CJ, Fockens P, Hollmann MW. Is "really conscious" sedation with solely an opioid an alternative to every day used sedation regimes for colonoscopies in a teaching hospital? Midazolam/fentanyl, propofol/alfentanil, or alfentanil only for colonoscopy: a randomized trial. Tech Coloproctol. 2014;18(8):745-752.	Alfentanil could be an alternative for sedation during colonoscopies. Patients were satisfied and respiratory events were less frequent.	IB	RCT	Colonoscopy patients	Sedation	Midazolam/fentanyl; alfentanil; propofol/alfentanil	180	Patient & gastroenterologist satisfaction
59	Hutson P. Is the use of intravenous opioids essential to control pain during colonoscopy? Gastrointest Nurs. 2009;7(3):15-23.	Cardiopulmonary risks are significantly reduced without compromising patient satisfaction and tolerance of colonoscopy if opioid administration is rearticled to selected patients and not given as a routine regime.	IIA	Systematic review	Colonoscopy patients receiving moderate sedation	NA	Oxygen saturation, pain perception, and pain assessment	2921	Cardiopulmonary events
60	Judah JR, Collins D, Gaidos JK, Hou W, Forsmark CE, Draganov PV. Prospective evaluation of gastroenterologist-guided, nurse-administered standard sedation for spiral deep small bowel enteroscopy. Dig Dis Sci. 2010;55(9):2584-2591.	Deep enteroscopy using the spiral over-tube can be successfully and safely accomplished with gastroenterologist guided nurse administered standard sedation.	IIIC	Prospective case series	Patients undergoing spiral deep small bowel enteroscopy	Gastroenterologist guided nurse administered standard sedation	Anesthesiologist guided sedation	91	Successful completion of the procedure and complications
61	Kan P, Jahshan S, Yashar P, et al. Feasibility, safety, and periprocedural complications associated with endovascular treatment of selected ruptured aneurysms under conscious sedation and local anesthesia. Neurosurgery. 2013;72(2):216-220.	The authors concluded that conscious sedation with local anesthesia for endovascular treatment of ruptured intracranial aneurysms is safe in most patients with a low-grade subarachnoid hemorrhage. Conscious sedation may allow for direct evaluation of the patient's neurological status potentially leading to earlier detection & response to intraprocedural complications.	IIIB	Retrospective review	Patients with aneurysmal subarachnoid hemorrhage treated with coil embolization.	NA	General anesthesia versus conscious sedation with local anesthesia.	197	Intraprocedural complications
62	Kim YH, Kim JW, Lee KL, et al. Effect of midazolam on cardiopulmonary function during colonoscopy with conscious sedation. Dig Endosc. 2014;26(3):417-423.	Midazolam induced decreases in systolic blood pressure, heart rate, diastolic blood pressure, SpO2. The authors conclude that midazolam may be safely used during colonoscopy and has a tolerable effect on cardiopulmonary function.	IIA	Prospective study	Colonoscopy patients		Sedation with midazolam vs. no sedation	126	Effect of midazolam on cardiopulmonary function during colonoscopy with conscious sedation
63	Jirapinyo P, Abu Dayyeh BK, Thompson CC. Conscious sedation for upper endoscopy in the gastric bypass patient: prevalence of cardiopulmonary adverse events and predictors of sedation requirement. Dig Dis Sci. 2014;59(9):2173-2177.	Upper endoscopy can be safely performed on Roux-en Y gastric bypass patients under conscious sedation with a similar risk profile to that of the general population.	IIIA	Retrospective review	Roux-en Y patients having EGD under conscious sedation	NA	NA	1385 procedures	Adverse events
64	Mador MJ, Abo Khamis M, Nag N, Mreyoud A, Jallu S, Mehboob S. Does sleep apnea increase the risk of cardiorespiratory complications during endoscopy procedures? Sleep Breath. 2011;15(3):393-401.	Patients undergoing endoscopic procedures under conscious sedation are not at an increased risk of cardiopulmonary complication if they have obstructive sleep apnea (OSA).	IIIB	Retrospective study	Patients who had an endoscopic procedure under conscious sedation and a sleep study	NA	Patients identified as OSA negative, mild, moderate, severe	639	Major complications(eg, chest pain, respiratory distress, cardiorespiratory arrest) and minor complications ( eg, hypertension, hypotension, bradycardia, tachycardia, oxygen desaturation)

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

65	Gill J, Vidyarthi G, Kulkarni P, Anderson W, Boyd W. Safety of conscious sedation in patients with sleep apnea in a veteran population. South Med J. 2011;104(3):185-188.	Endoscopy can be safely done in patients with obstructive sleep apnea(OSA)under conscious sedation. The complication rate is not significantly different from patients without obstructive sleep apnea.	IIIB	Retrospective review	Endoscopy patients	NA	Endoscopy patients with and without OSA receiving moderate sedation/analgesia for endoscopy procedures	400	Complications 9 eg, oxygen desaturation)
66	Svrakic M, Pollack A, Huncke TK, Roland JT Jr. Conscious sedation and local anesthesia for patients undergoing neurotologic and complex otologic procedures. Otol Neurotol. 2014;35(10):e277-2285.	Select neurotologic & otologic procedures can be safely & effectively performed under conscious sedation with dexmedetomidine as the anesthetic for patients who are poor medical candidates for general anesthesia & endotracheal intubation.	IIIB	Retrospective case review	Neurotologic & otologic patients	Sedation with dexmedetomidine	Conscious sedation with dexmedetomidine compared to general anesthesia	17	Adverse events; cost of anesthetic agents; patient satisfaction and comfort
67	Mason KP, Robinson F, Fontaine P, Prescilla R. Dexmedetomidine offers an option for safe and effective sedation for nuclear medicine imaging in children. Radiology. 2013;267(3):911-917.	Dexmedetomidine offers advantages for pediatric sedation for nuclear medicine imaging. Dexmedetomidine produces a condition similar to natural sleep with no detrimental effect on respiration. The drug was well tolerated.	IIIA	Retrospective review	Pediatric patients undergoing nuclear medicine imaging	Dexmedetomidine	NA	669	Safety, efficacy, bradycardia, hypotension, hypertension
68	AB, AS, AS, AD, VG. Cardiorespiratory compromise under conscious sedation during upper gastrointestinal endoscopy. J Coll Physicians Surg Pak. 2006;16(9):585-589.	Upper GI endoscopy proved to be a reasonably safe procedure both with or without sedation.	IB	Comparative, randomized, single blind study	Upper GI endoscopy patients without a previous history of cardiorespiratory comorbidities.	Sedation with midazolam or diazepam	Administration of a placebo( ie, saline); midazolam; and diazepam	252	Fall in SpO2; heart rate; blood pressure; and EKG changes
69	Sethi P, Mohammed S, Bhatia PK, Gupta N. Dexmedetomidine versus midazolam for conscious sedation in endoscopic retrograde cholangiopancreatography: An open-label randomized controlled trial. Indian J Anaesth. 2014;58(1):18-24.	Dexmedetomidine can be superior to midazolam for conscious sedation in ERCP.	IA	Open-label RCT	Patients for ERCP	Sedation	Midazolam versus dexmedetomidine	60	Hemodynamic, respiratory, & recovery profiles. And patient comfort
70	Hurford WE, Staubach KC. A hospital policy for procedural sedation in the nonintubated patient. Int Anesthesiol Clin. 2013;51(2):1-22.	Sample policy and procedure from a large university hospital based on ASA, CMS, and Joint Commission statements.	VB	Expert opinion	NA	NA	NA	NA	NA
71	Statement on Granting Privileges for Administration of Moderate Sedation to Practitioners Who Are Not Anesthesia Professionals. 2011. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/statement-on-granting-privileges-for-administration-of-moderate-sedation-to-non-anesthesiologist.pdf">http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/statement-on-granting-privileges-for-administration-of-moderate-sedation-to-non-anesthesiologist.pdf</a> . Accessed October 22, 2015.	Statement to assist health care organization to develop a program for the delineation of clinical privileges for practitioners who are not anesthesia professionals to administer sedative and analgesia drugs to establish a level of moderate sedation.	IVB	Clinical practice guideline	NA	NA	NA	NA	NA
72	Statement on the Anesthesia Care Team. 2013. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/statement-on-the-anesthesia-care-team.pdf">http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/statement-on-the-anesthesia-care-team.pdf</a> . Accessed October 22, 2015.	Anesthesiologists supervising resident physicians in training and/or directing qualified nonphysician anesthesia providers in the the provision of anesthesia care. The physician may delegate monitoring and appropriate tasks while retaining overall responsibility for the patient.	IVB	Clinical practice guideline	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

73	Heneghan S, Myers J, Fanelli R, Richardson W; Society of American Gastrointestinal Endoscopic Surgeons. Society of American Gastrointestinal Endoscopic Surgeons (SAGES) guidelines for office endoscopic services. Surg Endosc. 2009;23(5):1125-1129.	Standards (eg, safety, quality) for GI endoscopy procedures in an office based setting.	IVC	Clinical practice guideline	Endoscopy patient	NA	NA	NA	NA
74	Chapman W. Administration of sedation in endoscopy: guidance, risks and skill requirements. Gastrointest Nurs. 2010;8(2):14-17.	Nurses administering moderate sedation should have the necessary competencies , education, and skills.	VC	Literature review	NA	NA	NA	NA	NA
75	Gupta A. Preoperative screening and risk assessment in the ambulatory surgery patient. Curr Opin Anaesthesiol. 2009;22(6):705-711.	Pre-op identification of patients at high risk can improve patient outcomes.	VB	Literature review	NA	NA	NA	NA	NA
76	Odom-Forren J. Perioperative patient safety and procedural sedation. Perioper Nurs Clin. 2008;3(4):355-366.	Perioperative nurses should follow multidisciplinary guidelines that are available and to ensure proper education and competency to respond quickly to adverse events. The facility should support a sedation system that has rewritten scenarios of response with practiced personnel.	VA	Literature review	NA	NA	NA	NA	NA
77	Coté CJ, Wilson S. Guidelines for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures: an update. Clinical report. Pediatrics. 2006;118(6):2587-2602.	The safe sedation of children for procedures requires a systematic approach.	IVB	Clinical Practice Guidelines	Pediatric patients receiving sedation for diagnostic and therapeutic procedures	NA	NA	NA	NA
78	Sury M, Bullock I, Rabar S, Demott K; Guideline Development Group. Sedation for diagnostic and therapeutic procedures in children and young people: summary of NICE guidance. BMJ. 2010;341:c6819.	Summary of the most recent recommendations of the National Institute for Health and Clinical Excellence on effective and safe sedation of children undergoing common diagnostic and therapeutic procedures.	VA	Literature review	Pediatric patients	NA	NA	NA	NA
79	Makkad B. Procedural sedation for interventional cardiology procedures. Int Anesthesiol Clin. 2013;51(2):112-126.	Knowledge, skill, abilities, & experience of the sedation or anesthesia provider are important to ensure optimal procedure results & patient outcomes.	VB	Literature review	Interventional cardiology patients	NA	NA	NA	NA
80	Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy; Lichtenstein DR, Jagannath S, et al. Sedation and anesthesia in GI endoscopy. Gastrointest Endosc. 2008;68(5):815-826.	The guideline is intended to be an educational device to provide information that may assist endoscopists in providing care to patients.	IVA	Clinical practice guideline	Endoscopy patients	NA	NA	NA	NA
81	Voynarovska M, Cohen LB. The role of the endoscopy nurse or assistant in endoscopic sedation. Gastrointest Endosc Clin N Am. 2008;18(4):695-705.	Additional training and competency assessment is required where gastroenterologist directed propofol sedation is administered.	VB	Literature review	Endoscopy patients	NA	NA	NA	NA
82	Cohen LB, Delegge MH, Aisenberg J, et al. AGA Institute review of endoscopic sedation. Gastroenterology. 2007;133(2):675-701.	Review standardizes the practice of endoscopic sedation within the USA.	IVB	Clinical Practice Guideline	NA	NA	NA	NA	NA
83	Bui AH, Urman RD. Clinical and safety considerations for moderate and deep sedation. J Med Pract Manage. 2013;29(1):35-41.	Sedation providers should know the distinct levels of sedation, but clinically it may be difficult to differentiate them.	VA	Literature review	NA	NA	NA	NA	NA
84	Mitty RD, Wild DM. The pre- and postprocedure assessment of patients undergoing sedation for gastrointestinal endoscopy. Gastrointest Endosc Clin North Am. 2008;18(4):627-640.	Preprocedure assessment is necessary for patients undergoing sedation.	VB	Literature review	Endoscopy patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

85	Caperelli-White L, Urman RD. Developing a moderate sedation policy: essential elements and evidence based considerations. AORN J. 2014;99(3):416-430.	A P & P for moderate sedation should be developed by a multidisciplinary team including clinicians, administrators, and risk managers.	VA	Literature review/expert opinion	NA	NA	NA	NA	NA
86	Molina-Infante J, Arias A, Vara-Brenes D, et al. Propofol administration is safe in adult eosinophilic esophagitis patients sensitized to egg, soy, or peanut. Allergy. 2014;69(3):388-394.	Propofol was safely administered for procedural sedation to adult eosinophilic esophagitis patients with hypersensitivity to eggs, soy, or peanut showing 1/3 clinical allergy to these foods.	IIIB	Retrospective observational study	Eosinophilic esophagitis patients with hypersensitivity to eggs, soy, or peanut	NA	NA	60 patients having 404 procedures	Safety of propofol administration
87	Murphy A, Campbell DE, Baines D, Mehr S. Allergic reactions to propofol in egg-allergic children. Anesth Analg. 2011;113(1):140-144.	Propofol is likely to be safe in the majority of egg-allergic children who do not have a history of egg anaphylaxis.	IIIC	Retrospective case review	Pediatric patients with an egg allergy	Propofol administration	NA	28 patients with 43 propofol administrations	Allergic response to propofol
88	Tashkandi J. My patient is allergic to eggs, can I use propofol? A case report and review. Saudi J Anaesth. 2010;4(3):207-208.	Allergy to propofol is rarely reported. Providers should be alert when patients present with several drug allergies and a history of atopy.	R	Case report	NA	NA	NA	NA	NA
89	Audicana Berasategui MT, Barasona Villarejo MJ, Corominas Sánchez M, et al; Drug Allergy Committee of the Spanish Society of Allergology and Clinical Immunology (Sociedad Española de Alergología e Inmunología Clínica SEAIC). Potential hypersensitivity due to the food or food additive content of medicinal products in Spain. J Invest Allergol Clin Immunol. 2011;21(7):496-506.	Most hypersensitivity reactions to the different formulations of propofol have been attributed to propofol itself. There may be specific IgE to the active substance. There are reported hypersensitivity reactions in patients with allergies to legumes, soybean and eggs.	VA	Literature review	NA	NA	NA	NA	NA
90	Cochico SG. Propofol allergy: assessing for patient risks. AORN J. 2012;96(4):398-405.	Categorizing allergies into two subgroups of "no known drug allergy" and "no known food allergy" would be beneficial to the patients and health care providers.	VB	Literature review	NA	NA	NA	NA	NA
91	Dewachter P, Mouton-Faivre C, Castells MC, Hepner DL. Anesthesia in the patient with multiple drug allergies: are all allergies the same? Curr Opin Anaesthesiol. 2011;24(3):320-325.	Potential allergic cross-reactivity between drugs and foods is frequently considered a risk factor for perioperative hypersensitivity. A review of specific families of drugs and foods for management of patients with multiple drug allergies.	VB	Literature review	NA	NA	NA	NA	NA
92	Dumonceau J-M, Riphaus A, Beilenhoff U, et al. European curriculum for sedation training in gastrointestinal endoscopy: position statement of the European Society of Gastrointestinal Endoscopy (ESGE) and European Society of Gastroenterology and Endoscopy Nurses and Associates (ESGENA). Endoscopy. 2013;45(6):496-504.	Standards for non-anesthesiologists (i.e., doctors, nurses) administering sedation during GI endoscopy procedures.	IVB	Practice guideline	Endoscopy patients	NA	NA	NA	NA
93	Hausman LM, Reich DL. Providing safe sedation/analgesia: an anesthesiologist's perspective. Gastrointest Endosc Clin N Am. 2008;18(4):707-716.	Sedation in an office setting can be safely performed. The office should be a safe sedating location. All members of the team should be qualified to perform their assigned duties.	VB	Literature review	Patients receiving sedation in an office-based location	NA	NA	NA	NA
94	National Institute for Health and Care Excellence. Sedation in Children and Young People: Sedation for Diagnostic and Therapeutic Procedures in Children and Young People. [NICE Clinical Guidelines, No 112] London, United Kingdom: Royal College of Physicians; 2010.	The guideline offers the best practice advice on the care of children and young people under the age of 19 undergoing sedation for diagnostic or therapeutic procedures.	IVB	Clinical Practice Guideline	Pediatric patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

95	Guideline for medication safety. In: Guidelines for Perioperative Practice. Denver, CO: AORN; 2015:291-334.	Guidance to perioperative RNs to develop, implement, and evaluate safe medication management practices specific to the perioperative setting.	IVB	Clinical Practice Guideline	NA	NA	NA	NA	NA
96	Halliday AB. CE Shades of sedation: learning about moderate sedation and analgesia. Nursing. 2006;36(4):36-41.	By understanding the role of the RN in administering moderate sedation, patients will be safer, more comfortable, and complication free.	VC	Literature review	NA	NA	NA	NA	NA
97	Petersen C. Perioperative Nursing Data Set. 3rd ed. Denver, CO: AORN, Inc; 2011.	Perioperative nursing language.	IVB	Clinical Practice Guideline	NA	NA	NA	NA	NA
98	American Society of Anesthesiologists Committee. Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Committee on Standards and Practice Parameters. Anesthesiology. 2011;114(3):495-	Guideline for anesthesia care.	IVA	Clinical practice guideline	NA	NA	NA	NA	NA
99	Antonelli MT, Seaver D, Urman RD. Procedural sedation and implications for quality and risk management. J Healthc Risk Manag. 2013;33(2):3-10.	A successful sedation program is developed by a multidisciplinary team backed by educational standards & administrative structure.	VB	Literature review	NA	NA	NA	NA	NA
100	Campbell EJ, Krishnaraj A, Harris M, Saini S, Richter JM. Automated before-procedure electronic health record screening to assess appropriateness for GI endoscopy and sedation. Gastrointest Endosc. 2012;76(4):786-792.	Use of the EHR to pre-screen & identify patients needing additional evaluation before the day of the procedure.	IIIB	Retrospective non-experimental study	Adult outpatient endoscopy patients receiving moderate sedation	NA	NA	1682	Procedures needing pre-procedure patient management identified through EHR screening tool
101	Conway A, Page K, Rolley J, Fulbrook P. Risk factors for impaired respiratory function during nurse administered procedural sedation and analgesia in the cardiac catheterisation laboratory: a matched case-control study. Eur J Cardiovasc Nurs. 2013;12(4):393-399.	The researchers identified several risk factors that predict the likelihood of impaired respiratory function. Patients with acute illness were more likely to experience impaired respiratory function. Patients with acute illness probably had underlying conditions that impact their cardiopulmonary function. Results are consistent with previous research.	IIIA	Retrospective matched case-controlled design	Cardiac catheterization patients	NAPS/ staffing	21 cases of impaired respiratory function were identified and matched to 113 controls from a consecutive cohort of adult patients.	134	Impaired respiratory function
102	Continuum of Depth of Sedation: Definition of General Anesthesia and Levels of Sedation/Analgesia. 2014. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/continuum-of-depth-of-sedationdefinition-of-general-anesthesia-and-levels-of-sedationanalgesia.pdf">http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/continuum-of-depth-of-sedationdefinition-of-general-anesthesia-and-levels-of-sedationanalgesia.pdf</a> . Accessed October 22, 2015.	Description of the levels of sedation from minimal sedation to general anesthesia.	IVB	Clinical practice guideline	NA	NA	NA	NA	NA
103	ASA Physical Status Classification System. American Society of Anesthesiologists. <a href="https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system">https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system</a> . Accessed October 22, 2015.	The classification system assesses the patient's physical state prior to selecting the anesthetic or prior to performing surgery. The patients' preoperative physical status is used for documentation and for communication between health care professionals.	VB	Expert opinion	NA	NA	NA	NA	NA
104	Tantri A, Clark C, Huber P, et al. Anesthesia monitoring by registered nurses during cataract surgery: assessment of need for intraoperative anesthesia consultation. J Cataract Refract Surg. 2006;32(7):1115-1118.	Monitoring of routine cataract surgery by RN was associated with a low rate of intraoperative anesthesia consultation. ASA Class appears predictive of the need for intraoperative consultation.	IIIB	Retrospective, non-experimental study	ASA 1, 2, & 3 cataract patients	NA	NA	270	Need for anesthesia consultation

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

105	Knappe JT, Adriaenssen H, van Aken H, et al. Guidelines for sedation and/or analgesia by non-anesthesiology doctors. <i>Eur J Anaesthesiol.</i> 2007;24(7):563-567.	Guidance for sedation/analgesia by non-anesthesiology physicians.	VB	Literature review	NA	NA	NA	NA	NA
106	Langeron O, Masso E, Huraux C, et al. Prediction of difficult mask ventilation. <i>Anesthesiology.</i> 2000;92(5):1229-1236.	In the general population difficult mask ventilation (DMV) was reported in 5% of the patients. A simple DMV risk score was established. Prediction of a difficult airway may improve airway management.	IIIA	Prospective, non-experimental review	Adult surgical patients	Preoperative assessment for DMV	NA	1502	Difficult mask ventilation and DMV risk factors
107	Kheterpal S, Han R, Tremper KK, et al. Incidence and predictors of difficult and impossible mask ventilation. <i>Anesthesiology.</i> 2006;105(5):885-891.	The incidence of grade 3 difficulty in performing a mask ventilation is 1.4% similar to the incidence in other studies. The presence of a beard is the only easily modifiable risk factor for difficult mask ventilation. Mandibular protrusion test is useful in predicting difficult mask ventilation.	IIIA	Prospective observational study	Patients rated as a Grade 3 or Grade 4 difficult mask ventilation.	NA	NA	434	Ease or difficulty of mask ventilation
108	El-Orbany M, Woehlick HJ. Difficult mask ventilation. <i>Anesth Analg.</i> 2009;109(6):1870-1880.	An objective definition of difficult mask ventilation (DMV) is currently needed. The pathophysiology of DMV is operator technique or airway related.	VB	Literature review	NA	NA	NA	NA	NA
109	Phero JC, Rosenberg MB, Giovannitti JA. Adult airway evaluation in oral surgery. <i>Oral Maxillofac Surg Clin North Am.</i> 2013;25(3):386-399.	Adult airway evaluation and identification & preparedness for a difficult mask ventilation airway rescue are important aspects for patient safety.	VA	Literature review	NA	NA	NA	NA	NA
110	American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. <i>Anesthesiology.</i> 2003;98(5):1269-1277.	Guideline for the management of the difficult airway.	IVA	Clinical practice guideline	NA	NA	NA	NA	NA
111	Apfelbaum JL, Hagberg CA, Caplan RA, et al. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. <i>Anesthesiology.</i> 2013;118(2):251-270.	Guideline for the management of the difficult airway and to reduce the likelihood of adverse outcomes (eg, death, brain injury, cardiopulmonary arrest, unnecessary surgical airway, airway trauma, and damage to the trachea.)	IVA	Clinical Practice Guideline	NA	NA	NA	NA	NA
112	Leoni A, Arlati S, Ghisi D, et al. Difficult mask ventilation in obese patients: analysis of predictive factors. <i>Minerva Anesthesiol.</i> 2014;80(2):149-157.	Protruding mandible, Mallampati test & neck circumference are important predictors of difficult mask ventilation.	IIIB	Prospective non-experimental study	Obese preoperative patients	Modified Mallampati test, patient's Height/Thyromental distance ratio, Inter-Incisor Distance, Protruding Mandible, history of sleep apnea, and Neck circumference were recorded pre-operatively	NA	309	Accuracy of commonly used preoperative difficult airway indices as predictors of difficult mask ventilation in obese patients.

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

113	Magalhaes E, Marques FO, Goveia CS, Ladeira LC, Lagares J. Use of simple clinical predictors on preoperative diagnosis of difficult endotracheal intubation in obese patients. <i>Braz J Anesthesiol.</i> 2013;63(3):262-266.	Obese patients are more prone to difficult facemask ventilation & laryngoscopy. The clinical and polysomnographic diagnosis of obstructive sleep apnea (OSA) is useful in the preop diagnosis of difficult laryngoscopy.	IIIA	Observational, prospective, & comparative study	Adults undergoing general anesthesia	Facemask ventilation and laryngoscopy	Obese versus non-obese patients	88	Difficulty with facemask ventilation & laryngoscopy
114	Saghaei M, Shetabi H, Golparvar M. Predicting efficiency of post-induction mask ventilation based on demographic and anatomical factors. <i>Adv Biomed Res.</i> 2012;1:10.	Presence of a receding chin, beard, male gender, high Mallampati class, high neck circumference, low interincisors gap, and old age are the main factors for estimating the efficiency of mask ventilation.	IIIB	Prospective non-experimental study	Adult elective surgery patients	Mask ventilation	NA	1050	Efficiency of mask ventilation
115	Lee A, Fan LT, Gin T, Karmakar MK, Ngan Kee WD. A systematic review (meta-analysis) of the accuracy of the Mallampati tests to predict the difficult airway. <i>Anesth Analg.</i> 2006;102(6):1867-1878.	Mallampati tests used alone are insufficient to confidently predict the presence or absence of a difficult airway. Use as part of an overall airway assessment.	IIIA						
116	Gross JB, Apfelbaum JL, Caplan RA, et al. 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. <i>Anesthesiology.</i> 2014;120(2):1-19.	Purpose is to improve the perioperative care and reduce the risk of adverse outcomes in patients with OSA who receive sedation, analgesia, or anesthesia for diagnostic or therapeutic procedures under the care of an anesthesiologist.	IVA	Clinical Practice Guideline	NA	NA	NA	NA	NA
117	Joshi GP, Ankichetty SP, Gan TJ, Chung F. Society for Ambulatory Anesthesia consensus statement on preoperative selection of adult patients with obstructive sleep apnea scheduled for ambulatory surgery. <i>Anesth Analg.</i> 2012;115(5):1060-1068.	The statement recommends the use of STOP-Bang criteria for preoperative obstructive sleep apnea screening and considers patients' comorbid conditions in the selection process.	IVA	Consensus statement	Adult patients with obstructive sleep apnea scheduled for ambulatory surgery	NA	NA	NA	NA
118	Abrishami A, Khajehdehi A, Chung F. A systematic review of screening questionnaires for obstructive sleep apnea. <i>Can J Anaesth.</i> 2010;57(5):423-438.	The existing evidence regarding the accuracy of OSA questionnaires is associated with promising but inconsistent results. The researchers suggest using STOP and STOP-Bang questionnaires for their high methodological quality & ease of use.	IIIA	Systematic Review	Patients (eg, surgical, sleep study, epileptic)	OSA questionnaire	NA	1484	Accuracy of obstructive sleep apnea questionnaires.
119	Chung F, Yegneswaran B, Liao P, et al. STOP questionnaire: a tool to screen patients for obstructive sleep apnea. <i>Anesthesiology.</i> 2008;108(5):812-821.	The STOP questionnaire is a screening tool for obstructive sleep apnea (OSA). It has a high sensitivity especially for moderate to severe OSA.	IIIA	Non-experimental study	Preoperative patients	STOP questionnaire	NA	2467	Effectiveness of the STP questionnaire to identify patients with OSA.
120	Chung F, Subramanyam R, Liao P, Sasaki E, Shapiro C, Sun Y. High STOP-Bang score indicates a high probability of obstructive sleep apnoea. <i>Br J Anaesth.</i> 2012;108(5):768-775.	A STOP-Bang score of 5-8 identified patients with high probability of moderate/severe obstructive sleep apnea (OSA). The STOP-Bang score can help the perioperative team to stratify patients for unrecognized OSA, practice perioperative precautions, or triage patients for diagnosis and treatment.	IIIA	Non-experimental study	Preoperative patients that consented to having a preoperative polysomnography	Preoperative screening with the STOP-Bang questionnaire and polysomnography	NA	746	Predictive value of the STOP-Bang score to determine OSA.
121	Kulkarni GV, Horst A, Eberhardt JM, Kumar S, Sarker S. Obstructive sleep apnea in general surgery patients: is it more common than we think? <i>Am J Surg.</i> 2014;207(3):436-440.	Preoperative screening for OSA should be considered to diagnose patients at risk.	IIIB	Non-experimental study	General surgery patients	STOP-Bang questionnaire	NA	367	Classification for OSA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

122	Chung F, Yegneswaran B, Liao P, et al. Validation of the Berlin questionnaire and American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients. <i>Anesthesiology</i> . 2008;108(5):822-830.	Similar to the STOP questionnaire the Berlin questionnaire and the ASA checklist demonstrate a moderately high level of sensitivity for obstructive sleep apnea (OSA) screening. The STOP questionnaire and the ASA checklist were able to identify patients who were likely to develop postoperative complications	IIIA	Non-experimental study	Preoperative patients	STOP questionnaire, ASA checklist & Berlin questionnaire	Scores from the STOP questionnaire, ASA checklist & Berlin questionnaire were evaluated against the apnea-hypopnea index from the in-laboratory polysomnography	177	All three screening tools demonstrated a moderately high level of sensitivity for OSA screening.
123	Chung F, Yang Y, Liao P. Predictive performance of the STOP-Bang score for identifying obstructive sleep apnea in obese patients. <i>Obes Surg</i> . 2013;23(12):2050-2057.	The STOP-Bang score was validated in the obese and morbidly obese surgical patients.	IIIA	Non-experimental study	Obese preoperative patients	STOP-Bang questionnaire	NA	310	The high sensitivity and high positive predictive value of the STOP-Bang score for identifying OSA in obese patients
124	Mador MJ, Nadler J, Mreyoud A, et al. Do patients at risk of sleep apnea have an increased risk of cardiorespiratory complications during endoscopy procedures? <i>Sleep Breath</i> . 2012;16(3):609-615.	Patients undergoing endoscopic procedures under conscious sedation are not at an increased risk of cardiopulmonary complication if they have obstructive sleep apnea (OSA).	IIIB	Prospective study	Endoscopy procedure patients	Berlin and STOP-Bang questionnaires	Patients are high risk for OSA compared to patients at low risk for OSA	904	Major complications (eg, chest pain, respiratory distress, cardiorespiratory arrest) and minor complications (eg, hypertension, hypotension, bradycardia, tachycardia, oxygen desaturation)
125	Corso RM, Petrini F, Buccioli M, et al. Clinical utility of preoperative screening with STOP-Bang questionnaire in elective surgery. <i>Minerva Anestesiologica</i> . 2014;80(8):877-884.	The study demonstrated that there is a high prevalence of high risk OSA patients in the surgical patient population. The increase in perioperative complications justifies the use of the STOP-Bang tool for triage.	IIIA	Multisite prospective observational study	Adult surgical patients	STOP-Bang questionnaire	NA	3452	Types of perioperative complication (eg, respiratory [difficult intubation, difficult mask ventilation], cardiac, and systemic)
126	Singh M, Liao P, Kobah S, Wijesundera DN, Shapiro C, Chung F. Proportion of surgical patients with undiagnosed obstructive sleep apnoea. <i>Br J Anaesth</i> . 2013;110(4):629-636.	Anesthesia providers and surgeons failed to identify a significant number of patients with pre-existing obstructive sleep apnea (OSA) and symptomatic undiagnosed OSA before surgery.	IIIB	Historical cohort study	Presurgical patients	NA	NA	819	Correct diagnosis of OSA by surgeons and anesthesia providers
127	Boese ML, Ransom RK, Roadfuss RJ, Todd A, McGuire JM. Utility of the Berlin Questionnaire to screen for obstructive sleep apnea among patients receiving intravenous sedation for colonoscopy. <i>AANA J</i> . 2014;82(1):38-45.	40% incidence of possible OSA in the patient sample. The results suggest that patients with suspected OSA based on the Berlin questionnaire who have mild to moderate sedation do not appear to have an increased risk of airway complications when compared to patients with a low risk for OSA.	IIIA	Descriptive, prospective study	Colonoscopy patients	Berlin questionnaire	NA	99	Incidence of OSA, airway complications, hemodynamic instability, decreases in oxygen saturation, and use of reversal agents.
128	Vasu TS, Doghramji K, Cavallazzi R, et al. Obstructive sleep apnea syndrome and postoperative complications: clinical use of the STOP-BANG questionnaire. <i>Arch Otolaryngol Head Neck Surg</i> . 2010;136(10):1020-1024.	The STOP-Bang questionnaire is useful for preop identification of patients at higher than normal risk for surgical complications.	IIIB	Historical cohort study	Elective surgery patients	STOP-Bang questionnaire	NA	135	Postoperative complications

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

129	Luo JM, Huang R, Zhong X, Xiao Y, Zhou J. STOPBang questionnaire is superior to Epworth sleepiness scales, Berlin questionnaire, and STOP questionnaire in screening obstructive sleep apnea hypopnea syndrome patients. <i>Chin Med J.</i> 2014;127(17):3065-3070.	The STOP-Bang questionnaire has greater predictive value than the Epworth scale, the Berlin questionnaire, and STOP questionnaire for screening for OSA in the general population.	IIIB	Prospective non-experimental study	Patient referred to the sleep-disordered breathing clinic	Use of OSA evaluation tools	STOP-Bang questionnaire versus the Epworth scale, the Berlin questionnaire, and STOP questionnaire	212	Value of the STOP-Bang questionnaire in predicting OSA compared to the Epworth scale, the Berlin questionnaire, and STOP questionnaire
130	Khiani VS, Salah W, Maimone S, Cummings L, Chak A. Sedation during endoscopy for patients at risk of obstructive sleep apnea. <i>Gastrointest Endosc.</i> 2009;70(6):1116-1120.	One third of the patients in the study who were undergoing routine endoscopy procedures scored as a high risk for obstructive sleep apnea (OSA). There was no significant difference in the rates of transient hypoxemia between the high and low risk groups.	IIIB	Prospective, case controlled study	Routine endoscopy patients	Berlin questionnaire	NA	233	Proportion of patients undergoing routine endoscopy procedures who are at risk of OSA and the risk of these patients for sedation-related hypoxia
131	Lockhart EM, Willingham MD, Abdallah AB, et al. Obstructive sleep apnea screening and postoperative mortality in a large surgical cohort. <i>Sleep Med.</i> 2013;14(5):407-415.	Neither a prior diagnosis of obstructive sleep apnea (OSA) nor a positive screen for OSA risk was associated with and increased 30-day or one year mortality.	IIIB	Prospective cohort study	Adult surgical patients	Preoperative OSA screening	NA	14,962	30 day and one year postoperative mortality
132	Mehta PP, Kochhar G, Kalra S, et al. Can a validated sleep apnea scoring system predict cardiopulmonary events using propofol sedation for routine EGD or colonoscopy? A prospective cohort study. <i>Gastrointest Endosc.</i> 2014;79(3):436-444.	A significant number of patients undergoing endoscopy procedures are at risk for obstructive sleep apnea (OSA). Patients with a positive STOP-Bang score are not at higher risk for airway intervention or sedation related adverse events.	IIIB	Prospective cohort study	Endoscopy patients	Airway interventions( chin lift, mask ventilation, bag mask ventilation, unplanned endotracheal intubation, nasopharyngeal airway	NA	243	Positive STOP-Bang score, hypotension, hypoxia
133	Ganesh BR, Kulkarni Maitreyi K, Noronha Melita G. Screening of sleep apnoea in middle-aged hypertensive subjects using Stop-Bang questionnaire—an observational study. <i>Indian J Physiother Occup Ther.</i> 2014;8(2):13-16.	Hypertensive patients are at risk for sleep apnea. The STOP-Bang questionnaire is a reliable screening tool for OSA in hypertensive patients.	IIIC	Observational study	Hypertensive patients	STOP-Bang questionnaire	NA	100	Risk of OSA
134	Chia P, Seet E, Macachor JD, Iyer US, Wu D. The association of pre-operative STOP-BANG scores with postoperative critical care admission. <i>Anaesthesia.</i> 2013;68(9):950-952.	STOP-BANG scores of 4, 5, or > or + 6; age, asthma, a history of sleep apnea, & ASA physical status were significant for critical care admission post operatively. STOP-BANG score of 6 or more was associated with a 5-fold increased rate of postoperative critical care admission.	IIIC	Retrospective review	Elective surgery patients	NA	NA	5432	Critical care admission
135	Ankichetty S, Chung F. Considerations for patients with obstructive sleep apnea undergoing ambulatory surgery. <i>Curr Opin Anaesthesiol.</i> 2011;24(6):605-611.	Recent publications indicated that the majority of OSA patients may be done as ambulatory surgery patients with few adverse events.	VC	Literature review	NA	NA	NA	NA	NA
136	Seet E, Chung F. Obstructive sleep apnea: preoperative assessment. <i>Anesthesiol Clin.</i> 2010;28(2):199-215.	The patient with obstructive sleep apnea poses challenges during the perioperative period. Preoperative screening and a management plan may decrease the perioperative morbidity associated with obstructive sleep apnea.	VB	Literature review	Surgical patients	NA	NA	NA	NA
137	Becker DE, Rosenberg MB, Phero JC. Essentials of airway management, oxygenation, and ventilation: part 1: basic equipment and devices. <i>Anesth Prog.</i> 2014;61(2):78-83.	Availability of basic equipment for oxygenation, ventilation, and airway management during patient sedation.	VB	Literature review	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

138	Porhomayon J, Nader ND, Leissner KB, El-Solh AA. Respiratory perioperative management of patients with obstructive sleep apnea. J Intensive Care Med. 2014;29(3):145-153.	Patients with obstructive sleep apnea are at increased risk for perioperative complications. The biggest challenge is identifying surgical patients with undiagnosed obstructive sleep apnea.	VA	Literature review	Patients with obstructive sleep apnea	NA	NA	NA	NA
139	Moos DD. Obstructive sleep apnea and sedation in the endoscopy suite. Gastroenterol Nurs. 2006;29(6):456-463.	Increased awareness of the potential interaction of sedatives/analgesics in the upper airway of patients with obstructive sleep apnea should lead to increased vigilance in monitoring the patient for complications.	VB	Literature review	Sedated patients with obstructive sleep apnea	NA	NA	NA	NA
140	Chung F, Elsaid H. Screening for obstructive sleep apnea before surgery: why is it important? Curr Opin Anesthesiol. 2009;22(3):405-411.	The STOP questionnaire is short and can easily be incorporated into routine screening of surgery patients.	VB	Literature review	NA	NA	NA	NA	NA
141	Moos DD, Cuddeford JD. Implications of obstructive sleep apnea syndrome for the perianesthesia nurse. J Perianesth Nurs. 2006;21(2):103-115.	Patients with obstructive sleep apnea can be adversely affected by sedation and analgesia.	VA	Literature review	Sedated patients with obstructive sleep apnea	NA	NA	NA	NA
142	Auckley D, Bolden N. Preoperative screening and perioperative care of the patient with sleep-disordered breathing. Curr Opin Pulm Med. 2012;18(6):588-595.	OSA is common in patients having elective surgery & has been linked to an increase in perioperative complications. Attempts to identify these patients is prudent. Protocols on how to manage these patients are available, although validation of their effectiveness is needed.	VB	Literature review	NA	NA	NA	NA	NA
143	Pace N. Sedating the patient with underlying sleep apnea. J Radiol Nurs. 2008;27(3):107-111.	Sedation of a patient with underlying obstructive sleep apnea (OSA) can be a challenge with greater potential for a respiratory event. With careful planning, screening and appropriate intervention OSA patients can receive adequate sedation safely and effectively.	VB	Literature review	NA	NA	NA	NA	NA
144	Sharara AI, El Zahabi L, Maasri K, et al. Persistent snoring under conscious sedation during colonoscopy is a predictor of obstructive sleep apnea. Gastrointest Endosc. 2010;71(7):1224-1230.	Snoring during conscious sedation is a strong predictor of obstructive sleep apnea. Patients with obstructive sleep apnea should be identified and referred for sleep evaluation studies.	IIIB	Non-experimental study	Outpatient colonoscopy patients	Completion of the Epworth Sleepiness Scale and the Stanford Sleepiness Scale	NA	131	Snoring during conscious sedation for 10 seconds or longer
145	Ead H. Meeting the challenge of obstructive sleep apnea: developing a protocol that guides perianesthesia patient care. J Perianesth Nurs. 2009;24(2):103-110.	Impact of obstructive sleep apnea (OSA) on the patient care in the perioperative area and the implications to care providers. Challenges of implementing and OSA screening tool and management protocol.	VA	Literature review	NA	NA	NA	NA	NA
146	Chung F, Yang Y, Brown R, Liao P. Alternative scoring models of STOP-bang questionnaire improve specificity to detect undiagnosed obstructive sleep apnea. J Clin Sleep Med. 2014;10(9):951-958.	Specific predictive factors improved the specificity of the STOP-Bang questionnaire. Patients with a STOP score of $\geq 2$ , male gender and BMI $\geq 35$ kg/m <sup>2</sup> were more predictive than age $\geq 50$ and neck circumference $\geq 40$ cm.	IIA	Comparative quasi-experimental study	Preoperative patients that consented to having a preoperative polysomnography	Preoperative screening with the STOP-Bang questionnaire & polysomnography	Results of the polysomnography compared to the completed STOP-Bang questionnaire	516	Predictive performance of the STOP-bang questionnaire

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

147	American Society of PeriAnesthesia Nurses Standards and Guidelines Committee. 2015-2017 Perianesthesia Nursing Standards, Practice Recommendations and Interpretive Statements. Cherry Hill, NJ: American Society of PeriAnesthesia Nurses; 2015.	Principles of safety and ethics in perianesthesia practice, perianesthesia practice standards, evidence-based clinical practice guidelines, practice recommendations, position statements, resources from partnering organizations and interpretive statements which provide clarity and definition to key elements of the standards.	IVB	Clinical practice guideline	NA	NA	NA	NA	NA
148	Blake DW, Yew CY, Donnan GB, Williams DL. Postoperative analgesia and respiratory events in patients with symptoms of obstructive sleep apnoea. <i>Anaesth Intensive Care</i> . 2009;37(5):720-725.	This study suggests that avoidance of sedation and large opioid doses is desirable, small reductions in morphine dose achieved by the use of 'atypical-opioid' tramadol and nonsteroidal anti-inflammatory drugs are not effective in avoiding postoperative respiratory obstruction.	IC	Randomized controlled trial	Elective surgery patients evaluated as a probable obstructive sleep apnea risk	Portable respiratory monitor	Opioid versus opioid sparing techniques	62	Number of respiratory events in the 12 hour post-operative monitored period.
149	Gorospe EC, Oxentenko AS. Preprocedural considerations in gastrointestinal endoscopy. <i>Mayo Clin Proc</i> . 2013;88(9):1010-1016.	Health conditions that should trigger the need for anesthesia assisted sedation include major cardiac or pulmonary conditions, medically complicated obesity, severe sleep apnea, history of difficult airway management, adverse reaction to sedatives, chronic substance abuse, seizure disorder, & neurological conditions resulting in altered consciousness.	VA	Literature review	NA	NA	NA	NA	NA
150	LÜ F, Lin J, Benditt DG. Conscious sedation and anesthesia in the cardiac electrophysiology laboratory. <i>J Cardiovasc Electrophysiol</i> . 2013;24(2):237-245.	It is important to know the patient's clinical status, and have an understanding of the clinical pharmacology of each anesthetic agent to select the appropriate medications, to monitor for adverse effects, and to ensure adequate sedation and anesthesia for a comfortable, safe, and successful procedure.	VB	Literature review	Electrophysiology patients	NA	NA	NA	NA
151	Braunstein ED, Rosenberg R, Gress F, Green PH, Lebowitz B. Development and validation of a clinical prediction score (the SCOPE score) to predict sedation outcomes in patients undergoing endoscopic procedures. <i>Aliment Pharmacol Ther</i> . 2014;40(1):72-82.	A clinical prediction score was developed & validated that may be used to risk-stratify patient undergoing EGD & colonoscopy procedures across 5 risk classes.	IIIA	Retrospective cross-sectional study	Colonoscopy & EGD patients	Sedation	NA	35,474	Difficult sedation, agitation, & discomfort
152	DeLegge MH. When to call the anesthesiologist for assistance with sedation. <i>Gastrointest Endosc</i> . 2011;74(6):1377-1379.	Anesthesiology & gastroenterology should work together to achieve safe sedation for all patients.	VB	Literature review	NA	NA	NA	NA	NA
153	Hassan AE, Akbar U, Chaudhry SA, et al. Rate and prognosis of patients under conscious sedation requiring emergent intubation during neuroendovascular procedures. <i>AJNR Am J Neuroradiol</i> . 2013;34(7):1375-1379.	Low rate of conscious sedation failure and adverse outcomes among neurovascular procedure patients. Patient selection is important.	IIIA	Retrospective review	Neuroendovascular procedure patients	Conscious sedation	NA	520	Conversion to general anesthesia
154	Chawla S, Katz A, Attar BM, Go B. Endoscopic retrograde cholangiopancreatography under moderate sedation and factors predicting need for anesthesiologist directed sedation: a county hospital experience. <i>World J Gastrointest Endosc</i> . 2013;5(4):160-164.	ERCP under gastroenterologist guided sedation is safe and effective for low grade procedures. Sedation by an anesthesia provider should be reserved for procedures with a higher risk of failure with moderate sedation.	IIIB	Retrospective review	ERCP patients	ERCP under moderate sedation	NA	486	Procedural success with deep cannulation and the objectives of the procedure accomplished.
155	Amornyotin S. Sedation-related complications in gastrointestinal endoscopy. <i>World J Gastrointest Endosc</i> . 2013;5(11):527-533.	Unwanted complications can be prevented by performing a pre-procedure assessment, appropriate monitoring and support, & post-procedure management.	VB	Literature review	GI endoscopy patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

156	Guimaraes ES, Campbell EJ, Richter JM. The safety of nurse-administered procedural sedation compared to anesthesia care in a historical cohort of advanced endoscopy patients. <i>Anesth Analg</i> . 2014;119(2):349-356.	During advance endoscopy sedation complications were reduced when sedation was provided by anesthesia care providers versus nurse administered sedation in high risk populations. The sedation risk reduction did not reduce major morbidity, mortality, or total complications.	IIIB	Retrospective review	Adult patients for ERCP & endoscopic ultrasound examinations	Sedation	Anesthesia provider sedation versus NAPS	9598	Sedation related complications
157	Cabrini L, Nobile L, Cama E, et al. Non-invasive ventilation during upper endoscopies in adult patients. A systematic review. <i>Minerva Anestesiol</i> . 2013;79(6):683-694.	Use of non-invasive ventilation during upper endoscopy is feasible, appears safe and effective. High-risk patients would benefit the most from non-invasive ventilation during upper endoscopy.	IIIB	Systematic review	Adult patients	Non-invasive ventilation	NA	515	Successful use of non-invasive ventilation during upper endoscopies
158	Hession PM, Joshi GP. Sedation: not quite that simple. <i>Anesthesiol Clin</i> . 2010;28(2):281-294.	Protocols for training programs, patient selection and preparation, monitoring, sedation/analgesia techniques, and postprocedure recovery and discharge, and diagnosis and treatment of potential complications are needed. Anesthesiologists can play an important role in development of protocols, training programs, and quality assurance programs.	VB	Literature review	NA	NA	NA	NA	NA
159	Kauling AL, Locks Gde F, Brunharo GM, da Cunha VJ, de Almeida MC. Conscious sedation for upper digestive endoscopy performed by endoscopists. <i>Rev Bras Anestesiol</i> . 2010;60(6):577-583.	The occurrence of hypoxia & arterial hypotension is common during upper endoscopy procedures under conscious sedation using meperidine and midazolam.	IIIB	Prospective, cross-sectional, observational study	Upper endoscopy patients	Conscious sedation	NA	105	Blood pressure, heart rate, & peripheral oxygen saturation
160	Registered Nurses Engaged in the Administration of Sedation and Analgesia. 2005. American Association of Nurse Anesthetists. <a href="http://www.aana.com/resources2/professional_practice/Pages/Registered-Nurses-Engaged-in-the-Administration-of-Sedation-and-Analgesia.aspx">http://www.aana.com/resources2/professional_practice/Pages/Registered-Nurses-Engaged-in-the-Administration-of-Sedation-and-Analgesia.aspx</a> . Accessed October 22, 2015.	Position of AANA regarding qualifications, monitoring, and management of patients receiving moderate sedation by a RN.	IVB	Position statement	NA	NA	NA	NA	NA
161	Du Rand IA, Blaikley J, Booton R, et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: accredited by NICE. <i>Thorax</i> . 2013;68(Suppl 1):1-44.	Minimum of 2 qualified nurses are required during bronchoscopy procedures.	IVA	Clinical practice guideline	Adult flexible bronchoscopy patients	NA	NA	NA	NA
162	De Vito A, Carrasco Llatas M, Vanni A, et al. European position paper on drug-induced sedation endoscopy (DISE). <i>Sleep Breath</i> . 2014;18(3):453-465.	DISE ( drug induced sedation endoscopy) standardization for indication, staffing, setting, equipment, medications, positioning, etc.	IVB	Position statement	Patients who have sleep apnea or snore	Endoscopy	NA	NA	NA
163	Lee KK, Anderson MA, Baron TH, et al. Modifications in endoscopic practice for pediatric patients. <i>Gastrointest Endosc</i> . 2008;67(1):1-9.	Guidance regarding endoscopic practice issues that may differ for pediatric patients.	IVA	Clinical Practice Guideline	Pediatric patients	NA	NA	NA	NA
164	AORN Position Statement on One Perioperative Registered Nurse Circulator Dedicated to Every Patient Undergoing an Operative or Other Invasive Procedure. 2014. AORN, Inc. <a href="http://www.aorn.org/Clinical_Practice/Position_Statements/Position_Statements.aspx">http://www.aorn.org/Clinical_Practice/Position_Statements/Position_Statements.aspx</a> . Accessed October 22, 2015.	At a minimum, one perioperative RN circulator should be dedicated to each patient undergoing an operative or other invasive procedure and be present during that patient's entire intraoperative experience.	IVB	Consensus statement	NA	NA	NA	NA	NA
165	AORN Position Statement on Perioperative Safe Staffing and On-Call Practices. 2014. AORN, Inc. <a href="http://www.aorn.org/Clinical_Practice/Position_Statements/Position_Statements.aspx">http://www.aorn.org/Clinical_Practice/Position_Statements/Position_Statements.aspx</a> . Accessed October 22, 2015.	Staffing is dynamic in nature and depends on clinical judgment, critical thinking, and the administrative skills of the RN.	IVB	Consensus statement	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

166	Centers for Medicare & Medicaid Services. 42 CFR482.51. Condition of participation: surgical services. 2011. <a href="http://www.gpo.gov/fdsys/granule/CFR-2011-title42-vol5/CFR-2011-title42-vol5-sec482-51">http://www.gpo.gov/fdsys/granule/CFR-2011-title42-vol5/CFR-2011-title42-vol5-sec482-51</a> . Accessed October 22,2015.		I	Regulatory	NA	NA	NA	NA	NA
167	Kane RL, Shamliyan T, Mueller C, Duval S, Wilt TJ. Nurse staffing and quality of patient care. Evid Rep Technol Assess (Full Rep). 2007;(151):1-115.	Increased nursing staffing in hospitals was associated with lower hospital-related mortality, failure to rescue, and other patient outcomes, but the association is not necessarily causal. The effect size varied with the nurse staffing measure, the reduction in relative risk was greater and more consistent across the studies, corresponding to an increased registered nurse to patient ratio but not hours and skill mix. Estimates of the size of the nursing effect must be tempered by provider characteristics including hospital commitment to high quality care not considered in most of the studies. Greater nurse staffing was associated with better outcomes in intensive care units and in surgical patients.	IIIA	Systematic review	Hospital patients	NA	NA	94 studies	Nurse staffing ratios and patient outcomes (eg, mortality, length of stay)
168	Thungjaroenkul P, Cummings GG, Embleton A. The impact of nurse staffing on hospital costs and patient length of stay: a systematic review. Nurs Econ. 2007;25(5):255-265.	Significant reductions in cost and length of stay may be possible with higher ratios of nursing personnel in hospital settings.	IIIA	Systematic Review	Hospitalized patients	NA	NA	17 studies	Patient length of stay, hospital cost, nurse staffing measures
169	McGillis Hall L, Doran D, Pink GH. Nurse staffing models, nursing hours, and patient safety outcomes. J Nurs Adm. 2004;34(1):41-45.	Higher proportion of RNs on medical and surgical units were associated with lower medication errors and wound infections. Higher patient complexity was associated with greater patient use of nursing care resources.	IIIB	Descriptive correlational study	Patients on adult medical, surgical and obstetric care units	NA	Nurse staffing models	77	Effect of nurse staffing models on costs and patient outcomes of falls, medication errors, wound infections, and urinary tract infections.
170	Newhouse RP, Johantgen M, Pronovist PJ, Johnson E. Perioperative nurses and patient outcomes: mortality, complications, and length of stay. AORN J.2005;81(3):508-528.	Selected organizational factors in the ORs had a significant influence on patient outcomes	IIIA	Retrospective review	Patients who had abdominal aortic surgery	NA	NA	1894	Level of RN staffing in the OR related to postoperative complications, mortality, and length of stay
171	Kane RL, Shamliyan TA, Mueller C, Duval S, Wilt TJ. The association of registered nurse staffing levels and patient outcomes: systematic review and meta-analysis. Med Care. 2007;45(12):1195-1204.	Studies with different designs show associations between increased RN staffing and lower odds of hospital related mortality and adverse patient events.	IIIA	Systematic review with meta-analysis	Hospital patients	Na	NA	28 studies	Patient mortality and adverse patient events
172	Needleman J, Buerhaus P, Pankratz VS, Leibson CL, Stevens SR, Harris M. Nurse staffing and inpatient hospital mortality. N Engl J Med. 2011;364(11):1037-1045.	RN staffing below target levels was associated with increased mortality which reinforces the need to match staffing with patients' needs for nursing care	IIIA	Retrospective observational study	Patients in a large, tertiary academic medical center	NA	Target level of RN staffing to patient mortality	197,961 admissions	Patient mortality
173	McHugh MD, Berez J, Small DS. Hospitals with higher nurse staffing had lower odds of readmissions penalties than hospitals with lower staffing. Health Aff (Millwood). 2013;32(10):1740-1747.	A component of the hospital care delivery system that can be targeted to limit hospitals' exposure readmissions penalties while improving patient care. Focusing on nurse staffing, administrators may be able to address multiple quality issues and reduce the likelihood of penalties for r excess readmissions.	IIIB	Retrospective non-experimental study	Hospitals with fiscal year 2013 Hospital Readmission Reduction Program & covariate data	NA	High and low RN staffing	2826	Relationship between RN staffing levels and hospital performance in the Hospital Readmission Reduction Program

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

174	Aiken LH, Cimiotti JP, Sloane DM, Smith HL, Flynn L, Neff DF. Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments. <i>Med Care.</i> 2011;49(12):1047-1053.	The positive effect of increasing percentages of BSN nurses is consistent across all hospitals. Lowering the patient to nurse ration markedly improves patient outcomes in hospitals with good work environments, slightly improves them in hospitals with average work environments & has no effect in hospitals with poor environments.	IIIA	Non-experimental correlational study	Hospital patients & hospital staff nurses	NA	NA	1,262,120 patients; 39,038 hospital staff nurses	30-day inpatient mortality and failure to rescue
175	SGNA Practice Committee. Statement on the use of sedation and analgesia in the gastrointestinal endoscopy setting. <i>Gastroenterol Nurs.</i> 2008;31(3):249-251.	RNs trained and experienced in gastroenterology nursing and endoscopy can administer and maintain moderate sedation/analgesia by order of a physician.	IVB	Consensus statement	Endoscopy patients	NA	NA	NA	NA
176	Cohen LB. Patient monitoring during gastrointestinal endoscopy: why, when, and how? <i>Gastrointest Endosc Clin North Am.</i> 2008;18(4):651-663.	Review of the risks of sedation-related endoscopic complications.	VA	Literature review	NA	NA	NA	NA	NA
177	Eichhorn V, Henzler D, Murphy MF. Standardizing care and monitoring for anesthesia or procedural sedation delivered outside the operating room. <i>Curr Opin Anaesthesiol.</i> 2010;23(4):494-499.	Patient selection, procedure appropriateness and location are key elements defining the provision of safe care outside the OR.	VB	Literature review	NA	NA	NA	NA	NA
178	Standards for Basic Anesthetic Monitoring. 2011. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/sites/asahq/files/public/resources/standardsguidelines/standards-for-basic-anesthetic-monitoring.pdf">http://www.asahq.org/~media/sites/asahq/files/public/resources/standardsguidelines/standards-for-basic-anesthetic-monitoring.pdf</a> . Accessed October 22, 2015.	Standard for basic anesthesia monitoring to include patient oxygenation, ventilation, circulation and temperature.	IVB	Clinical practice standard	NA	NA	NA	NA	NA
179	Friedrich-Rust M, Welte M, Welte C, et al. Capnographic monitoring of propofol-based sedation during colonoscopy. <i>Endoscopy.</i> 2014;46(3):236-244.	Capnography reduced the incidence of hypoxemia during colonoscopy procedures with propofol sedation. Capnography is a simple and inexpensive device.	IA	Prospective randomized study	Colonoscopy patients	Capnography	Standard monitoring versus standard monitoring with capnography & sedation performed by anesthesiologist versus NAPS	533	Incidence of hypoxia
180	Beitz A, Riphaus A, Meining A, et al. Capnographic monitoring reduces the incidence of arterial oxygen desaturation and hypoxemia during propofol sedation for colonoscopy: a randomized, controlled study (ColoCap Study). <i>Am J Gastroenterol.</i> 2012;107(8):1205-1212.	Additional capnographic monitoring of ventilator activity reduces the incidence of oxygen desaturation and hypoxemia during propofol sedation.	IB	Randomized controlled trial	Endoscopy patients	Capnography	Propofol sedation using standard monitoring versus standard monitoring plus capnography	760	Oxygen desaturation; bradycardia; hypotension; and quality of sedation.
181	Qadeer MA, Lopez AR, Dumot JA, Vargo JJ. Hypoxemia during moderate sedation for gastrointestinal endoscopy: causes and associations. <i>Digestion.</i> 2011;84(1):37-45.	Hypoxemia occurs usually within 5 minutes of medication administration or endoscope intubation. Only 1/3 of all apnea/ventilation events eventually leads to hypoxemia.	IB	Randomized, double-blind and parallel assignment trial	Endoscopy patients	Early notification of abnormal ventilations	Standard respiratory monitoring and notification versus early notification after 5 seconds of abnormal ventilation	123	Hypoxemia, ventilation,
182	Waugh JB, Epps CA, Khodneva YA. Capnography enhances surveillance of respiratory events during procedural sedation: a meta-analysis. <i>J Clin Anesth.</i> 2011;23(3): 189-196.	End-tidal CO2 monitoring is an important addition in detecting respiratory depression during procedural sedation and analgesia.	IIA	Systematic review and meta-analysis	Adult patients	Capnography	NA	5 studies	Respiratory complications during procedural sedation and analgesia
183	Cacho G, Pérez-Calle JL, Barbado A, Lledó JL, Ojea R, Fernández-Rodríguez CM. Capnography is superior to pulse oximetry for the detection of respiratory depression during colonoscopy. <i>Rev Esp Enferm Dig.</i> 2010;102(2):86-89.	Capnography is more reliable than pulse oximetry in early detection of respiratory depression during colonoscopy.	IIA	Quasi-experimental study	Colonoscopy patients	Capnography	Pulse oximetry versus capnography for detection of disordered respiration	50	Disordered respiration( eg, apnea, hypoventilation)

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

184	Schlag C, Worner A, Wagenpfeil S, Kochs EF, Schmid RM, von Delius S. Capnography improves detection of apnea during procedural sedation for percutaneous transhepatic cholangiodrainage. <i>Can J Gastroenterol</i> . 2013;27(10):582-586.	Capnographic monitoring was better than clinical observation in detecting apnea and the prediction of oxygen desaturation during procedural sedation.	IIIB	Prospective study	Patients undergoing percutaneous transhepatic cholangiodrainage	Capnography	Capnography versus clinical observation	20	Detection of apnea & the prediction of oxygen desaturation & hypoxemia using capnography versus clinical observation during procedural sedation
185	Yarchi D, Cohen A, Umansky T, Sukhotnik I, Shaoul R. Assessment of end-tidal carbon dioxide during pediatric and adult sedation for endoscopic procedures. <i>Gastrointest Endosc</i> . 2009;69(4):877-882.	End tidal CO <sub>2</sub> contributes significantly to the prediction of events during endoscopy. A lower mean end tidal CO <sub>2</sub> , higher variability of end tidal CO <sub>2</sub> , younger age, and upper endoscopy increase the probability of an event.	IIIB	Non-experimental study	Adult and pediatric endoscopy patients	Capnography	NA	57	Adverse events
186	Restrepo RD, Nuccio P, Spratt G, Waugh J. Current applications of capnography in non-intubated patients. <i>Expert Rev Respir Med</i> . 2014;8(5):629-639.	Capnography should be used for non-intubated patients at risk for respiratory depression and on supplemental oxygen.	VA	Literature review	NA	NA	NA	NA	NA
187	Welliver M. Why capnography for procedural sedation? <i>Gastroenterol Nurs</i> . 2012;35(6):423-425.	Capnography has been shown to detect abnormalities early. Full assessment and interpretation of the capnography waveform shape, rate, rhythm, and comparison to baseline are necessary to maximize the benefits.	VB	Literature review	NA	NA	NA	NA	NA
188	Lightdale JR, Goldmann DA, Feldman HA, Newburg AR, DiNardo JA, Fox VL. Microstream capnography improves patient monitoring during moderate sedation: a randomized, controlled trial. <i>Pediatrics</i> . 2006;117(6):e1170-e1178.	The results of this trial support the use of microstream capnography to detect alveolar hypoventilation and reduce hypoxemia during procedural sedation in children.	IB	Prospective, double-blind, randomized trial with 2 study arms	Pediatric patients	Microstream capnography	Standard monitoring versus monitoring with capnography	163	Patient arterial oxygen desaturation and documented assessments of abnormal ventilation, termination of the procedure.
189	Langhan ML, Chen L, Marshall C, Santucci KA. Detection of hypoventilation by capnography and its association with hypoxia in children undergoing sedation with ketamine. <i>Pediatr Emerg Care</i> . 2011;27(5):394-397.	Hyponeic hypoventilation detected by capnography is common in children undergoing sedation with ketamine with or without midazolam. Hypoxia is frequently preceded by low ET-CO <sub>2</sub> levels. Additional studies are needed to determine if the addition of routine capnography can reduce the frequency of hypoxia in children undergoing sedation.	IIIB	Prospective observational study	Pediatric patients undergoing sedation with ketamine with or without midazolam.	NA	NA	58	Capnographic values, oxygen saturation, supplemental oxygen
190	Distinguishing Monitored Anesthesia Care ("MAC") from Sedation/Analgesia (Conscious Sedation). 2009. American Society of Anesthesiologists. <a href="http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/distinguishing-monitored-anesthesiacare-from-moderate-sedation-analgesia.pdf">http://www.asahq.org/~media/Sites/ASAHQ/Files/Public/Resources/standards-guidelines/distinguishing-monitored-anesthesiacare-from-moderate-sedation-analgesia.pdf</a> . Accessed October 22, 2015.	Monitored anesthesia care is a physician service that is distinct from moderate sedation/analgesia due to the expectations and qualifications of the provider who must be able to utilize all anesthesia resources to support life and provide patient comfort and safety during a diagnostic or therapeutic procedure.	VB	Expert opinion	NA	NA	NA	NA	Na
191	Sheahan CG, Mathews DM. Monitoring and delivery of sedation. <i>Br J Anaesth</i> . 2014;113(Suppl 2):ii37-ii47.	With continued improvements in monitoring, understanding of drug interactions, and development of new delivery technologies, moderate sedation should become safer and more effective.	VA	Literature review	Na	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

192	Munson GW, Van Norstrand MD, O'Donnell JJ, Hammes NL, Francis DL. Intraprocedural evaluation of comfort for sedated outpatient upper endoscopy and colonoscopy: the La Crosse (WI) intra-endoscopy sedation comfort score. <i>Gastroenterol Nurs.</i> 2011;34(4):296-301.	The La Crosse intraendoscopy sedation comfort score is the first validated sedation comfort scale appropriate for routine outpatient use. Further research in other practice settings and populations is needed.	IIIB	Prospective non-experimental study	Endoscopy patients	Sedation comfort scale	NA	300	Interrater reliability between comfort scores as rated by the patient, nurses, and endoscopists.
193	Frölich MA, Zhang K, Ness TJ. Effect of sedation on pain perception. <i>Anesthesiology.</i> 2013;118(3):611-621.	IV sedatives may increase pain perception and is agent and pain type specific. Knowledge of these effects provide a basis for analgesia and sedation to facilitate procedures.	IA	Randomized controlled trial	Healthy volunteers	Sedation	Midazolam versus propofol versus dexmedetomidine	86	Rating of pain in response to cold, heat, ischemic or electrical pain before and after moderate sedation
194	Heuss LT, Sughanda SP, Degen LP. Endoscopy teams' judgment of discomfort among patients undergoing colonoscopy: "How bad was it really?" <i>Swiss Med Wkly.</i> 2012;142:w13726.	The estimation of a patient's discomfort during a colonoscopy is difficult and the comfort level may not be accurately determined in a considerable number of patients, including sedated patients.	IIIB	Correlational study	Routine colonoscopy patients	Measurement of pain with the Visual Analog Scale	Patient's pain level using the Visual Analog Scale by the patient, the endoscopist, and the endoscopy nurses	222	Estimation of the patient's pain level using the Visual Analog Scale by the patient, the endoscopist, and the endoscopy nurses
195	Goodyear D, Velanovich V. Measuring pain in outpatient surgical patients: variation resulting from instrument choice. <i>Am Surg.</i> 2012;78(11):1292-1296.	Different instruments may measure different aspects of pain and the precision with which pain is measured in surgical patients.	IIIB	Comparative, non-experimental study	Consecutive preoperative and postoperative patients	NA	Preoperative and postoperative pain scores measured with the Visual Analog Scale and SF-36 instrument	269	The correlation between the Visual Analog Scale and SF-36 instrument in measuring preoperative and postoperative pain.
196	Froehlich F, Harris JK, Wietlisbach V, et al. Current sedation and monitoring practice for colonoscopy: an international observational study (EPAGE). <i>Endoscopy.</i> 2006;38(5):461-469.	Internationally, sedation and monitoring practices during colonoscopy vary widely. Electronic monitoring was used in 75% of patients	IIIB	Observational study	Patients receiving moderate sedation for colonoscopy procedures	Moderate sedation	NA	6004	Types of sedation, medications used for sedation, types of monitoring
197	Qadeer MA, Vargo JJ, Dumot JA, et al. Capnographic monitoring of respiratory activity improves safety of sedation for endoscopic cholangiopancreatography and ultrasonography. <i>Gastroenterology.</i> 2009;136(5):1568-1576.	Capnographic monitoring improves patient safety during procedural sedation for endoscopy by reducing the frequency of hypoxemia, severe hypoxemia, and apnea.	IIB	Randomized, double-blind and parallel assignment trial	Endoscopy patients	Capnographic monitoring	Blinding of the endoscopy team to the capnography monitor compared to the team awareness of the capnographic monitoring	263	Occurrence of hypoxemia; occurrence of severe hypoxemia, apnea, & oxygen supplementation
198	ASGE Technology Committee; Gottlieb KT, Banerjee S, et al. Monitoring equipment for endoscopy. <i>Gastrointest Endosc.</i> 2013;77(2):175-180.	All patients receiving sedation to facilitate endoscopic procedures should have monitoring of cardiorespiratory parameters before, during, and after administration of sedation/analgesia.	IVB	Clinical Practice Guideline	NA	NA	NA	NA	NA
199	Guideline for a safe environment of care, part 1. In: <i>Guidelines for Perioperative Practice.</i> Denver, CO: AORN, Inc; 2015:239-264.	Guidance for providing a safe environment of care related to patients and perioperative personnel and the equipment used in the perioperative environment.	IVB	Clinical Practice Guideline					

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

200	Impact of clinical alarms on patient safety: a report from the American College of Clinical Engineering Healthcare Technology Foundation. <i>J Clin Eng.</i> 2007;32(1):22-33.	Alarms must be accurate, intuitive, and provide alerts that are readily interpreted and acted on by clinicians in an appropriate fashion. Clinical alarms and their shortcomings have been the topic of numerous studies and analysis in the literature. The American College of Clinical Engineering Healthcare Technology Foundation started an initiative to improve clinical alarms. The results of that initiative through reviews of the literature related to clinical alarm factors and analyzes adverse event databases. Observations and recommendations have been developed to improve the impact of clinical alarms on patient safety.	VB	Literature review	NA	NA	NA	NA	NA
201	Schmid F, Goepfert MS, Kuhnt D, et al. The wolf is crying in the operating room: patient monitor and anesthesia workstation alarming patterns during cardiac surgery. <i>Anesth Analg.</i> 2011;112(1):78-83.	Approximately 80% of the total 8975 alarms had no therapeutic consequences. Implementation of procedure-specific settings and optimization in artifact and technical alarm detection could improve patient surveillance and safety.	IIIB	Prospective observational study	Cardiac surgery patients	Fixed alarm settings	NA	25 patients with 8975 alarms	Therapeutic consequence of alarms
202	Clinical Alarms: 2011 Summit Report. Fairfax, VA: Association for the Advancement of Medical Instrumentation; 2011.	Medical device alarms provide essential warnings to alert caregivers of changes in a patient's condition. When alarms work well, the environment of care is enhanced. When alarms don't work well, they pull caregivers away from other duties and other patients — or worse, train caregivers to ignore the alarm sounds altogether. Alarms that are ignored can and have resulted in patient deaths. Resolving problems with medical device alarms requires an interdisciplinary effort and buy-in from a wide array of players at the highest levels.	VC	Expert opinion	NA	NA	NA	NA	NA
203	Dawson R, von Fintel N, Nairn S. Sedation assessment using the Ramsay scale. <i>Emerg Nurse.</i> 2010;18(3):18-20.	The validity and reliability of sedation scoring tools to monitor the depth of sedation and how to integrate the tools into patient care.	VB	Literature review	NA	NA	NA	NA	NA
204	Moline B, Roberts M, Houser J. Validity and interrater reliability of the Moline-Roberts Pharmacologic Sedation Scale. <i>Clin Nurse Spec.</i> 2012;26(3):140-148.	The Moline-Roberts Pharmacological Sedation Scale demonstrated content validity and strong reliability.	IIIB	Prospective, randomized, psychometric evaluation	Sedated patients	Moline-Roberts Pharmacological Sedation Scale	Pharmacological sedation versus sedation scale score	86	Pharmacological sedation and sedation scale score
205	Greenhalgh DL, Kumar CM. Sedation during ophthalmic surgery. <i>Eur J Anaesthesiol.</i> 2008;25(9):701-707.	A review of the role of sedation, the pharmacology of the medications, and the safety of sedation in patients undergoing ophthalmic surgery.	VB	Literature review	NA	NA	NA	NA	NA
206	Nisbet AT, Mooney-Cotter F. Comparison of selected sedation scales for reporting opioid-induced sedation assessment. <i>Pain Manag Nurs.</i> 2009;10(3):154-164.	The Pasero Opioid-Induced Sedation Scale can be recommended as a superior sedation scale for the measurement of sedation during opioid administration.	IIIB	Descriptive survey based study	Medical-surgical nurses	NA	Sedation scales	96	Validity and reliability of 3 sedation scales
207	Newton T, Pop I, Duvall E. Sedation scales and measures—a literature review. <i>SAAD Dig.</i> 2013;29:88-99.	A number of scales exist to measure depth of sedation. Choice of type of scale should be based on the patient (i.e., adult, child) and purpose (i.e., clinical assessment, research). The Ramsay scale worked well for adults. The Dartmouth Sedation Scale and the University of Michigan scale worked well with children.	VB	Literature review	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

208	Lo Y-L, Lin T-Y, Fang Y-F, et al. Feasibility of bispectral index-guided propofol infusion for flexible bronchoscopy sedation: a randomized controlled trial. PLoS One. 2011;6(11):e27769.	Bispectral Index (BIS) guided propofol infusion with alfentanil for flexible bronchoscopy provides excellent patient tolerance with fast recovery and less procedure interference.	IB	Prospective, randomized controlled trial	Elective patients undergoing flexible bronchoscopy	Propofol infusion titrated to a BIS level of 65-75.	Propofol infusion with BIS monitoring versus midazolam dose based on clinical judgment	493	Hypoxemia, hypotension, procedural interference ( eg, movement, coughing), time to orientation and ambulation.
209	Sasaki T, Tanabe S, Azuma M, et al. Propofol sedation with bispectral index monitoring is useful for endoscopic submucosal dissection: a randomized prospective phase II clinical trial.. Endoscopy. 2012;44(6): 584-589.	Propofol with bispectral index (BIS) monitoring improved recovery of patients after endoscopic submucosal dissection (ESD). The study was underpowered to prove the effectiveness and safety of propofol.	IC	Randomized controlled trial	Patients undergoing ESD	Sedation	Propofol versus midazolam	178	Safety parameters (hypotension, hypoxia, bradycardia)
210	Baysal A, Polat TB, Yalcin Y, Celebi A. Can analysis of the bispectral index prove helpful when monitoring titration of doses of midazolam and ketamine for sedation during paediatric cardiac catheterization. Cardiol Young. 2008;18(1):51-57.	When BIS is used for monitoring sedation of children during catheterization, there was a decreased need for midazolam and ketamine; lower need for respiratory support and less adverse events.	IB	Prospective randomized clinical trial	Children undergoing cardiac catheterization	BIS monitoring	Sedation with and without the use of the BIS monitors	126	Dosage of midazolam, ketamine; respiratory support, and adverse events
211	Imagawa A, Fujiki S, Kawahara Y, et al. Satisfaction with bispectral index monitoring of propofol-mediated sedation during endoscopic submucosal dissection: a prospective, randomized study. Endoscopy. 2008;40(11):905-909.	Monitoring with Bispectral Index (BIS) during endoscopic submucosal dissection (ESD) did not lead to a reduced dose of propofol but did lead to higher patient and endoscopist's satisfaction scores. Using BIS to monitor propofol sedation during complicated and prolonged endoscopic treatments contributes to safety, control and comfort.	IC	Prospective randomized controlled trial	Patients being treated for a gastric neoplasm with ESD	BIS monitoring	Standard monitoring with and without BIS	156	Dose of propofol and satisfaction scores of the patients and endoscopists
212	von Delius S, Salletmaier H, Meining A, et al. Bispectral index monitoring of midazolam and propofol sedation during endoscopic retrograde cholangiopancreatography: a randomized clinical trial (the EndoBIS study). Endoscopy. 2012;44(3):258-264.	The use of BIS monitoring did not lead to improved oxygen saturation or a reduced rate of complications. Recovery times were shorter than with standard monitoring alone. The clinical benefit for daily practice may be limited.	IA	Randomized clinical trial	Patients undergoing endoscopic retrograde cholangiopancreatography under procedural sedation	BIS monitoring	Standard monitoring of sedation (BIS-blinded arm) compared to open arm with BIS monitoring available	144	Mean oxygen saturation, cardiopulmonary complications, mean propofol doses, and quality of sedation
213	Malviya S, Voepel-Lewis T, Ludomirsky A, Marshall J, Tait AR. Can we improve the assessment of discharge readiness?: a comparative study of observational and objective measures of depth of sedation in children. Anesthesiology. 2004;100(2):218-224.	Incorporating a specific, objective discharge criteria may ensure a status closer to baseline compared with clinical judgment using standard criteria.	IIB	Quasi-experimental study	Children undergoing echocardiographic examination	Bispectral index(BIS) monitoring	BIS scores compared to the University of Michigan Sedation Scale scores	29	Discharge readiness
214	Yang KS, Habib AS, Lu M, et al. A prospective evaluation of the incidence of adverse events in nurse-administered moderate sedation guided by sedation scores or bispectral index. Anesth Analg. 2014;119(1):43-48.	Sedation provided by trained nurses was largely associated with appropriate levels of sedation measured by the Ramsey sedation scale and BIS. Use of BIS did not significantly change the sedation level. BIS is a reliable monitor for measuring the depth of sedation with midazolam, fentanyl, & hydromorphone.	IIIB	Prospective observational study	Endoscopy patients	BIS monitoring	NA	1766	Level of sedation
215	Hata K, Andoh A, Hayafuji K, et al. Usefulness of bispectral monitoring of conscious sedation during endoscopic mucosal dissection. World J Gastroenterol. 2009;15(5):595-598.	Bispectral Index(BIS) monitoring is useful to safely perform endoscopic mucosal dissection ESD). A BIS value of 70-75 is suitable for ESD.	IIB	Quasi-experimental study	Patients undergoing endoscopic mucosal dissection for an early-stage neoplasm of the digestive tract	BIS monitor set at 55-75 during the endoscopic procedure	NA	366	Adverse events( eg, hypotension, respiratory distress, bradycardia)

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

216	Yamamoto S, Igarashi T, Tetsuka K, Endo S. Bispectral index monitoring of midazolam sedation during flexible bronchoscopy. <i>J Bronchology Interv Pulmonol.</i> 2009;16(4):241-244.	The study suggests that BIS value during flexible bronchoscopy is associated with the satisfaction of patients and they may be able to predict patients' satisfaction.	IIIC	Retrospective chart review	Diagnostic flexible bronchoscopy patients	NA	NA	52	Patient satisfaction, BIS value & adverse events
217	Haberland CM, Baker S, Liu H. Bispectral index monitoring of sedation depth in pediatric dental patients. <i>Anesth Prog.</i> 2011;58(2):66-72.	There is a significant correlation between the Bispectral index (BIS) values and the University of Michigan Sedation Scale score in pediatric patients undergoing mild to moderate sedation. The BIS monitor may be useful during mild or moderate sedation to establish the level of sedation objectively without the need to stimulate the patient.	IIIC	Comparative, non-experimental study	Pediatric dental patients	NA	Evaluation of the depth of sedation with the BIS monitor readings compared to the University of Michigan Sedation Scale.	35	Correlation of BIS monitor readings compared to the University of Michigan Sedation Scale
218	Wehrmann T. Extended monitoring of the sedated patient: bispectral index, Narcotrend and automated responsiveness monitor. <i>Digestion.</i> 2010;82(2):90-93.	Review of three different neuromonitoring devices for use during sedated endoscopic procedures.	VB	Literature review	Endoscopy patients	NA	NA	NA	NA
219	Malviya S, Voepel-Lewis T, Tait AR, Watcha MF, Sadhasivam S, Friesen RH. Effect of age and sedative agent on the accuracy of bispectral index in detecting depth of sedation in children. <i>Pediatrics.</i> 2007;120(3):e461-e470.	Bispectral index (BIS) may differentiate light from deep sedation in most children, BIS must be interpreted cautiously in sedated children with attention to patient age and use of sedative agents.	IIIC	Observational study	Children receiving sedation	BIS monitoring	NA	3373	Correlation between the BIS and the University of Michigan Sedation Scale scores
220	Yu YH, Han DS, Kim HS, et al. Efficacy of bispectral index monitoring during balanced propofol sedation for colonoscopy: a prospective, randomized controlled trial. <i>Dig Dis Sci.</i> 2013;58(12):3576-3583.	There is no significant efficacy in using BIS. The use of BIS may increase cost. BIS is not superior to MOAA/S score in colonoscopy with moderate sedation. A large scale randomized study is needed in the future.	IB	Prospective randomized controlled trial	Outpatient colonoscopy patients	Monitoring	BIS versus a non-BIS	115	Efficacy of BIS monitoring during colonoscopy with moderate sedation with balance propofol
221	Drake LM, Chen SC, Rex DK. Efficacy of bispectral monitoring as an adjunct to nurse-administered propofol sedation for colonoscopy: a randomized controlled trial. <i>Am J Gastroenterol.</i> 2006;101(9):2003-2007.	BIS did not lead to reductions in mean propofol dose or recovery time when used in conjunction with nurse administered propofol sedation (NAPS) or when used as the primary target of sedation. There is no clinically role for BIS important role for BIS monitoring with NAPS.	IC	Randomized controlled trial	Outpatient colonoscopy patients	BIS monitoring	NAPS with BIS visible to the nurse and endoscopist compared to the BIS values being invisible	102	Recovery time in Phase 1 and Phase 2; and propofol dose
222	DeWitt JM. Bispectral index monitoring for nurseadministered propofol sedation during upper endoscopic ultrasound: a prospective, randomized controlled trial. <i>Dig Dis Sci.</i> 2008;53(10):2739-2745.	Compared to standard propofol sedation for endoscopic ultrasound, BIS guided propofol sedation offers no significant decrease in postprocedure recovery time or propofol doses,	IC	Prospective randomized controlled trial	Patients undergoing endoscopic ultrasound	BIS monitoring	BIS guided versus standard propofol sedation for endoscopic ultrasound	44	Mean procedure time, total propofol dose, recovery time, mean sedation level score and mean BIS score.
223	Kang KJ, Min BH, Lee MJ, et al. Efficacy of bispectral index monitoring for midazolam and meperidine induced sedation during endoscopic submucosal dissection: a prospective, randomized controlled study. <i>Gut Liver.</i> 2011;5(2):160-164.	Bispectral Index (BIS) monitoring during endoscopic submucosal dissection (ESD) did not increase patient or endoscopist satisfaction and did not lead to a reduction in the dose of midazolam and meperidine. Bis monitoring provides no additional benefit to sedation using midazolam and meperidine for ESD procedures.	IA	Prospective randomized controlled trial	Patients undergoing ESD procedures	BIS monitoring	Monitoring with and without BIS	56	Patient and endoscopist satisfaction scores and dose of midazolam and meperidine
224	Qadeer MA, Vargo JJ, Patel S, et al. Bispectral index monitoring of conscious sedation with the combination of meperidine and midazolam during endoscopy. <i>Clin Gastroenterol Hepatol.</i> 2008;6(1):102-108.	Bispectral index monitoring (BIS) has a low accuracy for detecting deep sedation as a result of overlap of scores across sedation levels. Refinements in BIS is needed to differentiate deep from moderate sedation.	IIIB	Non-experimental study	Endoscopy patients	Paired observation of BIS and the Modified Observer's Assessment of Alertness and Sedation	NA	76 patients and 775 observations	Deep sedation

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

225	Chisholm CJ, Zurica J, Mironov D, Sciacca RR, Ornstein E, Heyer EJ. Comparison of electrophysiologic monitors with clinical assessment of level of sedation. <i>Mayo Clin Proc.</i> 2006;81(1):46-52.	EEG-based monitors cannot reliably distinguish between light and deep sedation.	IIA	Comparative quasi-experimental study	Patients receiving sedation	EEG-based monitoring of sedation level	BIS monitoring versus the Patient State Analyzer and clinical assessment with the Ramsay Scale and the Observer's Assessment of Alertness/ Sedation Scale	50	Correlation of the level of sedation with EEG-based to the Ramsay and the Observer's Assessment of Alertness/ Sedation Scale
226	Yeganeh N, Roshani B, Almasi A, Jamshidi N. Correlation between Bispectral Index and predicted effect-site concentration of propofol in different levels of target-controlled, propofol induced sedation in healthy volunteers. <i>Arch Iranian Med.</i> 2010;13(2):126-134.	Both bispectral index and effect site concentration of propofol indicate a good estimate of sedation levels. Their correlations are significant and negative only at the moderate and deep sedation levels and during the induction of sedation,	IIB	Prospective observational study	Healthy volunteers	Target controlled infusion of propofol	NA	30	Bispectral index an defect site concentration
227	ACR-SIR Practice Parameter for Sedation/Analgesia. 2014. American College of Radiology/Society of Interventional Radiology. <a href="http://www.acr.org/~media/F194CBB800AB43048B997A75938AB482.pdf">http://www.acr.org/~media/F194CBB800AB43048B997A75938AB482.pdf</a> . Accessed October 22, 2015.	Practice parameter to assist physicians in the safe administration of sedation/analgesia & monitoring patients receiving sedation/analgesia outside the OR.	IVB	Practice guideline	Patients receiving sedation/analgesia	NA	NA	NA	NA
228	American Academy of Pediatrics; American Academy of Pediatric Dentistry; Cote CJ, Wilson S; Work Group on Sedation. Guidelines for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures: an update. <i>Paediatr Anaesth.</i> 2008;18(1):9-10.	The safe sedation of children requires a systematic approach that is multi-faceted.	IVB	Clinical practice guideline	Pediatric patients	NA	NA	NA	NA
229	Qureshi WA, Zuckerman MJ, Adler DG, et al. ASGE guideline: modifications in endoscopic practice for the elderly. <i>Gastrointest Endosc.</i> 2006;63(4):566-569.	Moderate sedation requires increased attention to dosing and the effects of sedatives in the elderly. Initial doses of sedatives should be lower than standard adult dosing & titration should be more gradual to allow for assessment of the dose.	IVC	Clinical practice guideline	Elderly patients	NA	NA	NA	NA
230	Akhtar Abbasi J, Padda Manmeet S. Safety and efficacy of colonoscopy in the elderly: experience in an innercity community hospital serving African American and Hispanic patients. <i>Ethnicity Dis.</i> 2011;21(4):412-414.	Colonoscopy in elderly patients is safe and effective & resulted in a high diagnostic yield.	IIIB	Retrospective review	Colonoscopy patients		Patients over 65 to patients under 65	1530	Medication dosage, completion rate, & diagnostic yield
231	Parlak M, Parlak I, Erdur B, Ergin A, Sagiroglu E. Age effect on efficacy and side effects of two sedation and analgesia protocols on patients going through cardioversion: a randomized clinical trial. <i>Acad Emerg Med.</i> 2006;13(5):493-499.	Propofol seems to be a better choice for cardioversion sedation in elderly patients because of the shorter recovery time, fewer side effects and its more comfortable sedative effect compared to midazolam.	IB	Randomized controlled trial	Patients undergoing cardioversion procedures	Sedation	Patients older and younger than 65 and midazolam and propofol sedation	70	Mean induction time, mean recovery time, medication dose, patient reaction
232	Martinez JF, Aparicio JR, Company L, et al. Safety of continuous propofol sedation for endoscopic procedures in elderly patients. <i>Rev Esp Enferm Dig.</i> 2011;103(2):76-82.	Continuous propofol sedation during endoscopy procedures in patients over 80 is as safe as in younger patients.	IIIB	Prospective observational cohort study	Endoscopy patients	Propofol sedation	Patients under 80 to patients over 80	1295	Sedaion related complications
233	Travis AC, Pievsky D, Saltzman JR. Endoscopy in the elderly. <i>Am J Gastroenterol.</i> 2012;107(10):1495-1501.	Overall, endoscopy procedures are safe and effective in appropriate elderly patients. Care must be taken and adjustments made to ensure successful and safe endoscopic procedures in the elderly.	VA	Literature review	Elderly endoscopy patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

234	Guidance for Directors of Anesthesia Service for Computer-Assisted Personalized Sedation (CAPS) Devices. 2014. American Society of Anesthesiologists. <a href="https://www.asahq.org/~media/sites/asahq/files/public/resources/asa%20committees/2014-1-21-final-sedasysguidance.pdf?la=en">https://www.asahq.org/~media/sites/asahq/files/public/resources/asa%20committees/2014-1-21-final-sedasysguidance.pdf?la=en</a> . Accessed October 22, 2015.	Recommendations on specific clinical and administrative issues that the Director of Anesthesia Services and practicing anesthesiologists should discuss with the Directors of Gastroenterology Services in order to integrate computer assisted personalized sedation devices into practice in the safest and most efficient fashion.	IVB	Clinical guidance document	NA	NA	NA	NA	NA
235	Pambianco DJ, Vargo JJ, Pruitt RE, Hardi R, Martin JF. Computer-assisted personalized sedation for upper endoscopy and colonoscopy: a comparative, multicenter randomized study. <i>Gastrointest Endosc.</i> 2011;73(4):765-772.	The SEDASYS System could provide the endoscopist/nurse teams a safe and effective on-label means to administer propofol to effect minimal to moderate sedation during routine colonoscopy & EGD.	IB	Nonblinded multicenter randomized comparative study	ASA class I to III adults undergoing routine colonoscopy or EGD.	Sedation with the SEDASYS System	sedation with each site's current standard of care ( eg, benzodiazepine/opioid combination)	1000	Area under the curve of oxygen desaturation & patient satisfaction, clinician satisfaction, level of sedation, & patient recovery time
236	Pambianco DJ, Whitten CJ, Moerman A, Struys MM, Martin JF. An assessment of computer-assisted personalized sedation: a sedation delivery system to administer propofol for gastrointestinal endoscopy. <i>Gastrointest Endosc.</i> 2008;68(3):542-547.	Computer-assisted personalized sedation(CAPS) the endoscopy team can control the administration of propofol to achieve minimal to moderate sedation with rapid recovery time.	IIIC	Non-experimental study	Adult colonoscopy patients	Sedation with CAPS	NA	48	Level of sedation, propofol dosage, recovery and procedure time
237	ASGE Technology Committee; Banerjee S, Desilets D, et al. Computer-assisted personalized sedation. <i>Gastrointest Endosc.</i> 2011;73(3):423-427.	Reviews of new or emerging endoscopic technologies that may impact the practice of GI endoscopy.	IVA	Clinical Practice Guideline	NA	NA	NA	NA	NA
238	Goudra BG, Singh PM, Chandrasekhara V. SEDASYS ® airway, oxygenation, and ventilation: anticipating and managing the challenges. <i>Dig Dis Sci.</i> 2014;59(5):920-927.	Selection of the patients for SEDASYS is a key component for success. Understanding the limitations of automated delivery systems and drug related complications can enhance the safety. Even among ASA I and II patients, those on sedative/narcotics, recreational drugs and those with undiagnosed sleep apnea pose particular challenges. Recent upper respiratory infection and smoking is a significant risk factor. Understanding the limitations of the existing monitors is important. As it might be too late to wait for a rapid response team, especially when airway difficulties arise, it is useful to be aware of the necessary airway skills and implement them in a timely manner. As the ultimate responsibility lies with the attending physician, administration of additional propofol might be necessary to break the laryngospasm and this might have to be done before expert help arrives.	VA	Literature review	NA	NA	NA	NA	NA
239	Pambianco DJ. Future directions in endoscopic sedation. <i>Gastrointest Endosc Clin North Am.</i> 2008;18(4):789-799.	There are unmet needs for improved methods for endoscopic sedation including the ideal medication.	VA	Expert opinion	NA	NA	NA	NA	NA
240	US Food and Drug Administration. P080009: Premarket approval letter for SEDASYS Computer-Assisted Personalized Sedation System. May 3, 2013. <a href="http://www.accessdata.fda.gov/cdrh_docs/pdf8/p080009a.pdf">http://www.accessdata.fda.gov/cdrh_docs/pdf8/p080009a.pdf</a> . Accessed October 22, 2015.	The device is indicated for the IV administration of 1% propofol injectable emulsion for the initiation and maintenance of minimal to moderate sedation as defined by the ASA Continuum of Depth of Sedation, in ASA I and II patients 18 years and older undergoing colonoscopy and esophagogastroduodenoscopy procedures.	Regulatory	Regulatory	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

241	Hosseini Jahromi SA, Hosseini Valami SM, Adeli N, Yazdi Z. Comparison of the effects of intranasal midazolam versus different doses of intranasal ketamine on reducing preoperative pediatric anxiety: a prospective randomized clinical trial. <i>J Anesth.</i> 2012;26(6):878-882.	Intranasal midazolam was more effective than low or high dose ketamine to reduce pediatric preoperative anxiety/	IA	RCT	Pediatric surgery patients	Sedation	Intranasal midazolam 0.2mg/kg; ketamine 0.5mg/kg; ketamine 3 mg/kg; & normal saline 1 drop/5 kg	120	Level of pediatric anxiety
242	Fallah R, Nakhaei MH, Behdad S, Moghaddam RN, Shamszadeh A. Oral chloral hydrate vs. intranasal midazolam for sedation during computerized tomography. <i>Indian Pediatr.</i> 2013;50(2):233-235.	Oral chloral hydrate can be considered as a safe & effective drug for sedation in children undergoing CT scan of the brain.	IB	Single blind randomized trial	Pediatric patients for CT scan of the brain	Sedation	Oral chloral hydrate & intranasal midazolam	60	Successful completion of the CT scan
243	Li BL, Yuen VM, Song XR, et al. Intranasal dexmedetomidine following failed chloral hydrate sedation in children. <i>Anaesthesia.</i> 2014;69(3):240-244.	Intranasal dexmedetomidine is effective for sedation in children who do not respond to chloral hydrate.	IB	Prospective randomized study	Children who had failed chloral hydrate sedation	Sedation	Dexmedetomidine either at 1, 1.5, or 2 micrograms/kg.	194	Adequate seda
244	Zhang X, Bai X, Zhang Q, Wang X, Lu L. The safety and efficacy of intranasal dexmedetomidine during electrochemotherapy for facial vascular malformation: a double-blind, randomized clinical trial. <i>J Oral Maxillofac Surg.</i> 2013;71(11):1835-1842.	Intranasal demedetomidine has a sedative effect & offers an alternative to IV medication administration. It is better tolerated & non-invasive.	IB	RCT	Patients with a facial vascular malformation for electrochemotherapy under local anesthesia	Sedation	Group IN-dexmedetomidine intranasally; Group IV-dexmedetomidine IV; & C-0.9% saline intranasally & IV	60	Level of sedation & number of adverse clinical events
245	Almenrader N, Passariello M, Coccetti B, Haiberger R, Pietropaoli P. Premedication in children: a comparison of oral midazolam and oral clonidine. <i>Paediatr Anaesth.</i> 2007;17(12):1143-1149.	Oral clonidine was a superior premedication to oral midazolam. The oral clonidine was better accepted by the child, produced more effective preoperative sedation, showed a trend towards better recovery from anaesthesia and had a higher degree of parental satisfaction.	IB	Prospective, randomized, open trial	Pediatric surgery patients	Oral clonidine or oral midazolam	Characteristics of oral clonidine & oral midazolam as premedication for pediatric patients	64	Drug acceptance, quality of mask induction, emergence, parent satisfaction.
246	West SK, Griffiths B, Shariff Y, Stephens D, Mireskandari K. Utilisation of an outpatient sedation unit in paediatric ophthalmology: safety and effectiveness of chloral hydrate in 1509 sedation episodes. <i>Br J Ophthalmol.</i> 2013;97(11):1437-1442.	Chloral hydrate sedation allows for a detailed examination & investigation in most children with few side effects. Children over 15 kg and a need for top up dose are risk factors for failure and adverse events.	IIIA	Retrospective short study	Pediatric ophthalmology patients	NA	NA	1509	Successful sedation for the child to have the procedures performed; any adverse event during or after sedation; safety and effectiveness of chloral hydrate sedation
247	Finnemore A, Toulmin H, Merchant N, et al. Chloral hydrate sedation for magnetic resonance imaging in newborn infants. <i>Paediatr Anaesth.</i> 2014;24(2):190-195.	MRI scanning in newborn infants was performed using chloral hydrate desation with a relatively low risk of significant adverse events.	IIIB	Retrospective review	Newborn infants for MRI scans	Chloral hydrate sedation	NA	411	adverse events
248	ASGE Ensuring Safety in the Gastrointestinal Endoscopy Unit Task Force; Calderwood AH, Chapman FJ, et al. Guidelines for safety in the gastrointestinal endoscopy unit. <i>Gastrointest Endosc.</i> 2014;79(3):363-372.	Purpose is to present recommendations for endoscopy units in implementing and prioritizing safety efforts.	IVB	Clinical Practice Guideline	Endoscopy patients	NA	NA	NA	NA
249	Rozario L, Sloper D, Sheridan MJ. Supplemental oxygen during moderate sedation and the occurrence of clinically significant desaturation during endoscopic procedures. <i>Gastroenterol Nurs.</i> 2008;31(4):281-285.	Patients receiving supplemental oxygen were 98% less likely to experience desaturation than the controls. The results support the routine use of supplemental oxygen during endoscopy procedures.	IB	Rndomized controlled trial	Endoscopy patients	Supplemental oxygen	Supplemental oxygen versus no supplemental oxygen	389	Desaturation episodes

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

250	Tae CH, Kang KJ, Min BH, et al. Paradoxical reaction to midazolam in patients undergoing endoscopy under sedation: incidence, risk factors and the effect of flumazenil. <i>Dig Liver Dis.</i> 2014;46(8):710-715.	The incidence of a paradoxical reaction was 1.4%. Risk factors include male gender, previous unsuccessful sedation, upper endoscope, higher dose of midazolam & lower dose of penthidine. Using a lower dose of midazolam and a higher dose of penthidine might be helpful in preventing the occurrence of paradoxical reactions. Consider the use of flumazenil in cases of a paradoxical reaction.	IIIB	Prospective study	Endoscopy patients	NA	Paradoxical reaction to midazolam	4140	Paradoxical reaction to midazolam
251	Moon YE. Paradoxical reaction to midazolam in children. <i>Korean J Anesthesiol.</i> 2013;65(1):2-3.	Paradoxical reactions have a low prevalence and are not life threatening.	VB	Expert opinion	Pediatric sedation patients	NA	NA	NA	NA
252	McKenzie WS, Rosenberg M. Paradoxical reaction following administration of a benzodiazepine. <i>J Oral Maxillofac Surg.</i> 2010;68(12):3034-3036.	Early recognition and pharmacologic management are key for the effective treatment of paradoxical reactions after benzodiazepine administration. Flumazenil at the proper dosage appears to reverse the paradoxical reaction while still retaining sedation and amnesia.	VB	Case report	Dental patient	NA	NA	NA	NA
253	Ip HY, Chung F. Escort accompanying discharge after ambulatory surgery: a necessity or a luxury? <i>Curr Opin Anaesthesiol.</i> 2009;22(6):748-754.	Both clinicians and patients have underestimated the risk associated with discharging patients without an escort after ambulatory anesthesia. This can be potentially dangerous and is not recommended.	VA	Literature review	Ambulatory patients	NA	NA	NA	NA
254	Chung F, Assmann N. Car accidents after ambulatory surgery in patients without an escort. <i>Anesth Analg.</i> 2008;106(3):817-820, table of contents	Based on the reported malpractice cases of serious injury when discharged following surgery without an escort, the author's recommend that an escort is required for all patients after receiving a general, regional, LMAC, or sedation. Caregivers should verify a safe ride home.	VA	Literature review	NA	NA	NA	NA	NA
255	Horiuchi A, Nakayama Y, Fujii H, Katsuyama Y, Ohmori S, Tanaka N. Psychomotor recovery and blood propofol level in colonoscopy when using propofol sedation. <i>Gastrointest Endosc.</i> 2012;75(3):506-512.	Consistent findings on the number connection test and driving simulation (psychomotor recovery) test are present as early as 1 hour after propofol sedation. For universal recommendation of these results more studies with different patient populations are needed.	IIIB	Prospective, consecutive study	Colonoscopy patients receiving propofol	NA	NA	48	Psychomotor recovery and blood propofol concentrations after colonoscopy with propofol sedation to determine if driving might be safe.
256	Cote CJ, Notterman DA, Karl HW, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: a critical incident analysis of contributing factors. <i>Pediatrics.</i> 2000;105(4 Pt 1):805-814.	In non-hospital settings there were more adverse outcomes (eg, permanent neurological injury, death) and inadequate resuscitation. In all settings there was inadequate and inconsistent physiological monitoring, inadequate pre-sedation medical evaluation, lack of an independent observer, medication errors, and inadequate recovery procedures.	IIIB	Retrospective review	Pediatric patients receiving sedation who experienced an adverse event	NA	NA	95	Contributing factors to an adverse event during pediatric sedation.
257	Newman DH, Azer MM, Pitetti RD, Singh S. When is a patient safe for discharge after procedural sedation? The timing of adverse effect events in 1367 pediatric procedural sedations. <i>Ann Emerg Med.</i> 2003;42(5):627-635.	Adverse events were common but serious adverse events rarely occurred after 25 minutes from the final medication administration	IIIB	Prospective non-experimental study	Pediatric patients who received procedural sedation	NA	NA	1367	Timing of adverse events
258	Trevisani L, Cifala V, Gilli G, Matarese V, Zelante A, Sartori S. Post-Anaesthetic Discharge Scoring System to assess patient recovery and discharge after colonoscopy. <i>World J Gastrointest Endosc.</i> 2013;5(10):502-507.	The Post-Anesthetic Discharge Scoring System is as safe as the clinical assessment and allows for earlier patient discharge after colonoscopy under sedation.	IIA	Randomized controlled trial	Patients undergoing colonoscopy under sedation	Objective scoring system to determine patient discharge readiness	Discharge decision based on clinical assessment versus the Post-Anesthetic Discharge Scoring System	207	Recovery time, hospital re-admission, and post-discharge symptoms

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

259	Wong J, Tong D, De Silva Y, Abrishami A, Chung F. Development of the functional recovery index for ambulatory surgery and anesthesia. <i>Anesthesiology</i> . 2009;110(3):596-602.	The functional recovery index had excellent reliability, good validity, responsiveness, and acceptability. This indicates that the questionnaire will be a good instrument for reassessing functional recovery of ambulatory surgery patients.	IIIB	Non-experimental study	Ambulatory surgery patients older than 16.	Functional recovery index questionnaire	NA	688	Patient responsiveness, acceptability, and interrater reliability
260	Flumazenil injection solution [package insert]. Rockford, IL: Mylan Institutional LLC; November 2013.	Flumazenil is a benzodiazepine antagonist	VA	Expert opinion/literature review	NA	NA	NA	NA	NA
261	Mathus-Vliegen EM, de Jong L, Kos-Foekema HA. Significant and safe shortening of the recovery time after flumazenil-reversed midazolam sedation. <i>Dig Dis Sci</i> . 2014;59(8):1717-1725.	Administration of flumazenil in the recovery room resulted in a safe shortened recovery period of one hour versus 2 hours. Resulting in savings in time, space, & nurse resources.	IIA	Quasi-experimental	Endoscopy patients	Reversal agent	Flumazenil in recovery area versus no reversal agent	1506	Length of stay in the recovery room
262	Basu NN, Kald B, Heath D. Morphine delays discharge following ambulatory surgery: a prospective institutional study. <i>J Perioper Pract</i> . 2009;19(8):254-256.	When morphine is used in day surgery, there is an increased operating and recovery times and higher rates of delayed discharge.	III B	Prospective, observational study	Outpatient surgery patients	Non-morphine analgesia	Patients receiving morphine versus patients receiving non-morphine analgesia	100	Operative and recovery times; discharge readiness
263	Makary L, Vornik V, Finn R, et al. Prolonged recovery associated with dexmedetomidine when used as a sole sedative agent in office-based oral and maxillofacial surgery procedures. <i>J Oral Maxillofac Surg</i> . 2010;68(2):386-391.	Dexmedetomidine demonstrated hemodynamic and respiratory stability when used as a sole sedating agent. Patient and surgeon satisfaction were high, but there was a prolonged recovery period.	IIIC	Prospective pilot study	Office based oral and maxillofacial surgery patients	Dexmedetomidine as sole sedation agent	NA	15	Hemodynamic and respiratory stability; patient and surgeon satisfaction
264	Cruthirds D, Sims PJ, Louis PJ. Review and recommendations for the prevention, management, and treatment of postoperative and postdischarge nausea and vomiting. <i>Oral Surg Oral Med Oral Pathol Oral Radiol</i> . 2013;115(5):601-611.	Postoperative nausea and vomiting is reported in 25-30% of patients and can lead to delayed discharge & unanticipated hospital admission.	VA	Literature review	NA	NA	NA	NA	NA
265	Neville A, Coe K, Thompson J. How long is too long? Recovery time of outpatients with sleep apnea after procedural sedation. <i>Gastroenterol Nurs</i> . 2013;36(4):260-264.	A 3 hour recovery time may be too long for outpatients with obstructive sleep apnea requiring machine assistance who received moderate sedation.	IIIB	Retrospective review	CPAP dependent patients receiving moderate sedation	CPAP	NA	118	Length of stay related to discharge oxygenation levels.
266	Centers for Medicare & Medicaid Services. 42 CFR 416: Ambulatory surgical services. 2011. <a href="https://www.cms.gov/Regulations-and-Guidance/Legislation/CFCsAnd-CoPs/ASC.html">https://www.cms.gov/Regulations-and-Guidance/Legislation/CFCsAnd-CoPs/ASC.html</a> . Accessed October 22, 2015.		I	Regulatory	NA	NA	NA	NA	NA
267	Centers for Medicare & Medicaid Services. 42 CFR 482. Conditions of participation for hospitals. 2015. <a href="http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title42/42cfr482_main_02.tpl">http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title42/42cfr482_main_02.tpl</a> . Accessed October 22, 2015.		I	Regulatory	NA	NA	NA	NA	NA
268	Veselis RA, Pryor KO, Reinsel RA, Li Y, Mehta M, Johnson RJ. Propofol and midazolam inhibit conscious memory processes very soon after encoding: an event-related potential study of familiarity and recollection in volunteers. <i>Anesthesiology</i> . 2009;110(2):295-312.	Propofol and midazolam impaired recognition event related potentials form long-term memory but not working memory. Event related potentials measures of memory showed different pathways to end-of-day memory loss as early as 27 seconds after encoding.	IA	Randomized controlled trial	Healthy volunteers	Continuous recognition tasks. Delayed recognition tests, EEG recording	Placebo, thiopental, propofol, midazolam, or dexmedetomidine	67	Event related potentials from long term memory

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

269	Watkins TJ, Bonds RL, Hodges K, Goettle BB, Dobson DA, Maye JP. Evaluation of postprocedure cognitive function using 3 distinct standard sedation regimens for endoscopic procedures. <i>AANA J.</i> 2014;82(2):133-139.	The investigators found that propofol alone resulted in the least impact on postoperative cognitive dysfunction at 24 & 48 hours post-op and limits the number of provider interventions.	IB	Prospective, randomized, single-blind study	Colonoscopy patients	Sedation	Propofol plus fentanyl; midazolam plus fentanyl; and propofol	96	Postprocedure cognitive function after 3 different sedation regimens and identification of complications requiring provider interventions
270	Padmanabhan U, Leslie K, Eer AS, Maruff P, Silbert BS. Early cognitive impairment after sedation for colonoscopy: the effect of adding midazolam and/or fentanyl to propofol. <i>Anesth Analg.</i> 2009;109(5):1448-1455.	There was significant cognitive impairment at discharge, but the addition of midazolam and or fentanyl did not result in more impairment. The use of the adjuvants improved the ease of colonoscopy without increasing the complication rate or prolonging early recovery time.	IC	Randomized controlled trial	Elective outpatient colonoscopy patients	Sedation	Propofol alone compared to propofol plus midazolam and or fentanyl	200	Cognitive function at discharge, operating conditions, procedure time, recovery time, recall, and patient satisfaction.
271	Multisociety sedation curriculum for gastrointestinal endoscopy. <i>Hepatology.</i> 2012;56(1):E1-E25.	Procedure sedation for endoscopy including pharmacology, assessment, airway management, & the use of anesthesia services to ensure a standardized basis for instruction through the use of competency-based training.	IVA	Clinical practice guideline	Endoscopy patients	Sedation	NA	NA	NA
272	Ehrhardt BS, Staubach KC. A program for education, competency, and quality in procedural sedation. <i>Int Anesthesiol Clin.</i> 2013;51(2):33-42.	Performance improvement project to standardize procedural sedation across practice settings in a large university hospital setting. Program for safe patient care during invasive and manipulative procedures by non-anesthesiologists on nonintubated patients.	VA	Organizational experience: Quality improvement	NA	NA	NA	NA	NA
273	Doig AK. Improving moderate sedation practice with interactive online nursing education. <i>Commun Nurs Res.</i> 2009;42:212-212.	Interactive web-based training can play an important role in promoting patient safety during procedures requiring moderate sedation.	IC	Randomized controlled trial	Nurses who provide moderate sedation	Web-based training	Web-based didactic training versus a booklet with the same didactic content	38	Post-test scores, time spent completing the training, and mental workload
274	DeMaria SJ, Levine A, Cohen LB. Human patient simulation and its role in endoscopic sedation training. <i>Gastrointest Endosc Clin North Am.</i> 2008;18(4):801-813.	Additional work for human simulation training include an assessment of the educational content, the number of training sessions to achieve competency, and the frequency of re-training.	VB	Literature review	NA	NA	NA	NA	NA
275	Tobin CD, Clark CA, McEvoy MD, et al. An approach to moderate sedation simulation training. <i>Simul Healthc.</i> 2013;8(2):114-123.	The initial data demonstrated a significant increase in knowledge, skills, and clinical judgment with a didactic/simulation course to teach moderate sedation. Future research should focus on examining the validity and reliability of scenario scoring and the impact of clinical training on clinical practice.	IIC	Quasi-experimental study	Non-anesthesiologists who use sedation in their specialty practice	Didactic and simulation training	NA	19	Difference in pretest and post-test cognitive examination scores; simulation scores, and post course survey results
276	Keidan I, Gravenstein D, Berkenstadt H, Ziv A, Shavit I, Sidi A. Supplemental oxygen compromises the use of pulse oximetry for detection of apnea and hypoventilation during sedation in simulated pediatric patients. <i>Pediatrics.</i> 2008;122(2):293-298.	Hypoventilation and apnea are detected quicker when patients receiving sedation breath room air. Supplemental oxygen does not prevent oxygen desaturation and delays the recognition of apnea.	IB		Pediatricians participating in a credentialing course using a pediatric human patient simulator	Supplemental oxygen	Pediatricians doing the simulation with supplemental oxygen; pediatricians doing the simulation without supplemental oxygen; Anesthesia residents doing the simulation with supplemental oxygen	40	Time to recognize apnea; time interval for bag-mask ventilation; PaCO2 levels; O2 saturation levels

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

277	Hollman GA, Banks DM, Berkenbosch JW, et al. Development, implementation, and initial participant feedback of a pediatric sedation provider course. Teach Learn Med. 2013;25(3):249-257.	A standardized pediatric sedation course was developed & consisted of a series of lectures, simulation exercises. There was overall satisfaction with the course	IIIC	Non-experimental	Pediatric sedation providers	Standardized course ( eg, lectures, simulation)	NA		44	Satisfaction with the course
278	Black SA, Nestel DF, Horrocks EJ, et al. Evaluation of a framework for case development and simulated patient training for complex procedures. Simul Healthc. 2006;1(2):66-71.	Simulation training utilizing actors to portray patients was an effective training framework.	IIIC	Non-experimental study	Carotid endarterectomy simulated patients	Simulation	NA	46 simulations with 23 surgeons		Successful training
279	Jensen JT, Konge L, Moller A, Hornslet P, Vilmann P. Endoscopy nurse-administered propofol sedation performance. Development of an assessment tool and a reliability testing model. Scand J Gastroenterol. 2014;49(8):1014-1019.	Assessing sedation skills in a simulator is possible. The NAPSAT showed fair inter-rater reliability & good construct validity.	IIIB	Psychometric multiphase study; case controlled study	Nurses administering sedation	NA	Experienced nurses versus nurses with ) experience	12 nurses ; 3 raters		Pass/ fail on the assessment
280	Lightdale JR, Weinstock P. Simulation and training of procedural sedation. Tech Gastrointest Endosc. 2011;13(3):167-173.	Simulation based training should balance both clinical and behavioral objectives. The use of simulation to teach sedation for endoscopy will yield a positive impact on the practice of gastroenterology and patient outcomes.	VB	Literature review	Pediatric patients	NA	NA	NA	NA	NA
281	Collins AS, Strother D. Synergy and competence: tools of the trade. J Nurses Staff Dev. 2008;24(4):E1-E8	Process to improve communication and standardize the validation of competence.	VB	Literature review	NA	NA	NA	NA	NA	NA
282	Jest AD, Tonge A. Using a learning needs assessment to identify knowledge deficits regarding procedural sedation for pediatric patients. AORN J. 2011;94(6):567-577.	A learning needs assessment has been shown to be an effective method for the development of continuing education offerings and is a valuable tool for the nurse educator.	VB	Literature review	NA	NA	NA	NA	NA	NA
283	Shavit I, Keidan I, Hoffmann Y, et al. Enhancing patient safety during pediatric sedation: the impact of simulation-based training of nonanesthesiologists. Arch Pediatr Adolesc Med. 2007;161(8):740-743.	Pediatric procedural sedations conducted by a simulator-trained nonanesthesiologist were safer. The simulation based sedation course enhanced physician performance during pediatric procedural sedation.	IIIB	Prospective, observational study	Non-anesthesiologists who routinely perform procedural sedation outside the OR.	NA	Simulation trained sedationists versus non-simulation trained sedationists		32	Sedation Safety tool with 9 criteria
284	Jordan C, Thomas MB, Evans ML, Green A. Public policy on competency: how will nursing address this complex issue? J Contin Educ Nurs. 2008;39(2):86-91.	An overview of international, national, and state perspectives and approaches in addressing the issue of assuring nursing competency from a public policy perspective is provided.	VA	Literature review	NA	NA	NA	NA	NA	NA
285	Brady M, Kinn S, Stuart P. Preoperative fasting for adults to prevent perioperative complications. Cochrane Database Syst Rev. 2003;(4):CD004423.	There is no evidence to suggest that a shortened preoperative fluid fast results in an increased risk of aspiration, regurgitation or related morbidity compared to the standard of nothing by mouth after midnight.	IA	Systematic review	Adult surgical patients		Fasting regimens	22 trails		Increased risk of aspiration, regurgitation, morbidity
286	Bernard PA, Makin CE, Hongying D, Ballard HO. Variability of ASA physical status class assignment among pediatric sedation practitioners. Anesthesiologists Physical Status. Int J Adolesc Med Health. 2009;21(2):213-220.	The type of training and experience affect a practitioner's view of the severity of a patient's condition.	IIIB	Non-experimental using a questionnaire	Pediatric sedation practitioners	NA	Subspecialty practitioners of pediatric sedation; years of experience; and program volume		100	Consistency of the ASA-PS scores between pediatric sedation practitioners of differing subspecialty training. And to determine if ASA-PS scores changed with experience and program volume.

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

287	Patient Safety: Rights of Registered Nurses When Considering a Patient Assignment [Position Statement]. 2009. American Nurses Association. <a href="http://www.nursingworld.org/MainMenuCategories/Policy-Advocacy/Positions-and-Resolutions/ANAPositionStatements/Position-Statements-Alphabetically/Patient-Safety-Rights-of-Registered-Nurses-When-Considering-a-Patient-Assignment.html">http://www.nursingworld.org/MainMenuCategories/Policy-Advocacy/Positions-and-Resolutions/ANAPositionStatements/Position-Statements-Alphabetically/Patient-Safety-Rights-of-Registered-Nurses-When-Considering-a-Patient-Assignment.html</a> . Accessed October 22, 2015.	The rights of the RN when considering an unsafe patient assignment-the RN based on their professional and ethical responsibilities has the right to accept, reject, or object in writing to any patient assignment that puts the patient or themselves at serious harm or risk.	IVB	Position statement	NA	NA	NA	NA	NA
288	Wiebe ER, Byczko B, Kaczorowski J, McLane AL. Can we safely avoid fasting before abortions with lowdose procedural sedation? A retrospective cohort chart review of anesthesia-related complications in 47,748 abortions. <i>Contraception</i> . 2013;87(1):51-54.	Eliminate the requirement to fast before procedure would decrease unnecessary stress and unpleasant symptoms without an increase in anesthesia related complications for women having abortions through the 18th week.	IIIA	Retrospective cohort chart review	Patients undergoing abortions with sedation	NA	NA	47,748	Anesthesia related adverse events
289	Manchikanti L, Malla Y, Wargo BW, Fellows B. Preoperative fasting before interventional techniques: is it necessary or evidence-based? <i>Pain Physician</i> . 2011;14(5):459-467.	IV sedation without pre-operative fasting is safe for patients receiving interventional pain procedures.	IIIB	Prospective, non-randomized study	Interventional radiology patients	No pre-op fasting	NA	18,472	Nausea and vomiting; aspiration
290	Wehrmann T, Riphahs A. Sedation with propofol for interventional endoscopic procedures: a risk factor analysis. <i>Scand J Gastroenterol</i> . 2008;43(3):368-374.	Interventional endoscopic procedures under propofol sedation is not risk free. There should be increased attention on the monitoring of vital signs, particularly during longer lasting and emergency procedures.	IIIB	Retrospective review	Endoscopy patients	NA	NA	9547	Adverse events (eg, endotracheal intubation, assisted ventilations, additional monitoring in ICU, and death)
291	Mason KP, Green SM, Piacevoli Q. Adverse event reporting tool to standardize the reporting and tracking of adverse events during procedural sedation: a consensus document from the World SIVA International Sedation Task Force. <i>Br J Anaesth</i> . 2012;108(1):13-20.	Established terminology for sedation-related adverse events to more accurately identify, track, and provide benchmarks.	IVB	Consensus document	NA	NA	NA	NA	NA
292	Lightdale JR, Mahoney LB, Fredette ME, Valim C, Wong S, DiNardo JA. Nurse reports of adverse events during sedation procedures at a pediatric hospital. <i>J Perianesth Nurs</i> . 2009;24(5):300-306.	Minor adverse events associated with procedural sedation are under-reported despite the documentation in the medical record. Improved education on reporting both major and minor adverse events will help identify opportunities for improvement.	IIIB	Descriptive, correlational study	Pediatric patients receiving procedural sedation.	NA	Adverse event reporting and review of the medical record.	5045	Inter-rater agreement between prospective adverse event reporting and that identified on independent review of the medical record.
293	Hoerl KH. Accuracy of nurse reported adverse sedation events. <i>J Radiol Nurs</i> . 2010;29(3):85-86.	Underreported adverse sedation events can create a false sense of security for nurses which may lead to nurses being unprepared when there is an adverse event.	VB	Literature review	Pediatric patients receiving sedation for diagnostic and therapeutic procedures	NA	NA	NA	NA
294	Shin JG, Hwang JH, Lee BS, et al. A case of midazolam anaphylaxis. <i>Clin Endosc</i> . 2014;47(3):262-265.	Occurrence of midazolam associated anaphylaxis is rare. There is a lack of research regarding risk factors. If anaphylaxis occurs a serum tryptase assay is recommended.	VA	Case report	NA	NA	NA	NA	NA
295	Coruh B, Tonelli MR, Park DR. Fentanyl-induced chest wall rigidity. <i>Chest</i> . 2013;143(4):1145-1146.	Chest wall rigidity can occur with an analgesic dose of fentanyl. Management includes ventilatory support and reversal with naloxone or a short acting neuromuscular blocking agent.	VA	Case Report	NA	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

296	Patel VJ, Ahmed SS, Nitu ME, Rigby MR. Vasovagal syncope and severe bradycardia following intranasal dexmedetomidine for pediatric procedural sedation. Paediatr Anaesth. 2014;24(4):446-448.	Unanticipated & previously unreported complications may occur as the use of certain sedatives and alternative routes of administration increase	VB	Case report	NA	NA	NA	NA	NA
297	Cabrera LS, Santana AS, Robaina PE, Palacios MS. Paradoxical reaction to midazolam reversed with flumazenil. J Emerg Trauma Shock. 2010;3(3):307.	Paradoxical reactions to midazolam can be treated with a small dose of flumazenil.	VB	Case report	NA	NA	NA	NA	NA
298	Holdcroft A. UK drug analysis prints and anaesthetic adverse drug reactions. Pharmacoepidemiol Drug Saf. 2007;16(3):316-328.	Reporting of allergic reactions is low. There is mortality associated with drugs such as remifentanyl.	IIIB	Retrospective review	Patients with adverse drug reactions	NA	NA	6603 patients; 11,199 reactions	Types of adverse reactions
299	Rueb GR, Brady WJ, Gilliland CA, et al. Characterizing cardiopulmonary arrest during interventional radiology procedures. J Vasc Interv Radiol. 2013;24(12):1774-1778.	The most common comorbidity of patients experiencing a cardiopulmonary arrest was kidney disease and most underwent dialysis access related procedures.	IIIB	Retrospective review	Interventional radiology patients	NA	NA	36,489	Code team activations
300	Sharma VK, Nguyen CC, Crowell MD, Lieberman DA, de Garmo P, Fleischer DE. A national study of cardiopulmonary unplanned events after GI endoscopy. Gastrointest Endosc. 2007;66(1):27-34.	During endoscopy procedures with conscious sedation, the patient's age, higher ASA class, inpatient status, trainee participation and routine use of oxygen are associated with a higher incidence of cardiopulmonary unplanned events.	IIIA	Retrospective database review	GI endoscopy patients	NA	NA	324,737	Cardiopulmonary unplanned events
301	Cravero JP, Blike GT, Beach M, et al. Incidence and nature of adverse events during pediatric sedation/anesthesia for procedures outside the operating room: report from the Pediatric Sedation Research Consortium. Pediatrics. 2006;118(3):1087-1096.	Pediatric sedation/analgesia for procedures outside the OR is unlikely to yield serious adverse outcomes.	IIIA	Prospective study	Pediatric sedation patients	NA	NA	30,037	Serious adverse events
302	Khalid-de Bakker CA, Jonkers DM, Hameeteman W, de Ridder RJ, Masclee AA, Stockbrugger RW. Cardiopulmonary events during primary colonoscopy screening in an average risk population. Neth J Med. 2011;69(4):186-191.	Mainly procedure-related and subject-related factors were associated with the occurrence of cardiopulmonary events in primary colonoscopy screening in a healthy population.	IIIB	Non-experimental study	Healthy colonoscopy patients	NA	NA	214	Cardiopulmonary events (eg, hypoxemia, bradycardia, hypotension)
303	Karamnov S, Sarkisian N, Grammer R, Gross WL, Urman RD. Analysis of adverse events associated with adult moderate procedural sedation outside the operating room. J Patient Saf. September 8, 2014. Epub ahead of print.	The risk assessment of harmful sedation related complications should include patient characteristics and procedure types. Patient harm was associated with age, BMI, comorbidities, female sex, & procedures in the gastroenterology area.	IIIA	Retrospective review	Patients receiving moderate sedation outside the OR			52	Adverse events associated with moderate sedation
304	Jensen JT, Vilmann P, Horsted T, et al. Nurse-administered propofol sedation for endoscopy: a risk analysis during an implementation phase. Endoscopy. 2011;43(8):716-722.	Nurse-administered propofol sedation for endoscopic procedures is safe when performed by personnel properly trained in airway management and sedation with propofol and had advantages over conventional sedation for endoscopy.	IIIB	Non-experimental study	Endoscopy patients	Structured training program for the endoscopists and nurses	NA	1822	Adverse events (eg, hypoxemia, assisted ventilation, endotracheal intubation, blood pressure changes); type of intervention; and level of experience of the staff performing the sedation.
305	Vargo JJ. Minimizing complications: sedation and monitoring. Gastrointest Endosc Clin North Am. 2007;17(1):11-28.	Serious adverse events are rare for procedural sedation.	VA	Literature review	Endoscopy patients	NA	NA	NA	NA

Guideline for Care of the Patient Receiving Moderate Sedation/Analgesia  
Evidence Table

306	Becker DE, Haas DA. Recognition and management of complications during moderate and deep sedation. Part 2: cardiovascular considerations. Anesth Prog. 2011;58(3):126-138.	Respiratory compromise, excessive drug dosages, or inadequate anesthesia may trigger CV events. The provider should be able to recognize and manage these events.	VA	Literature review	NA	NA	NA	NA	NA
307	Ko CW, Dominitz JA. Complications of colonoscopy: magnitude and management. Gastrointest Endosc Clin North Am. 2010;20(4):659-671.	Sedation complications from moderate sedation during colonoscopy are uncommon. Complications include respiratory depression, hypoxia, chest pain, cardiac arrhythmias, hypotension, hypertension, and vasovagal reactions.	VA	Literature review	Colonoscopy patients	NA	NA	NA	NA
308	Ginzburg L, Greenwald D, Cohen J. Complications of endoscopy. Gastrointest Endosc Clin North Am. 2007;17(2):405-432.	Adverse events related to conscious sedation during endoscopy including allergic reactions, drug interactions, hypotension, respiratory depression, and hypoxemia.	VB	Literature review	NA	NA	NA	NA	NA
309	Becker DE, Haas DA. Recognition and management of complications during moderate and deep sedation part 1: respiratory considerations. Anesth Prog. 2011;58(2):82-92.	Preop & intraop assessment of CV and respiratory status is critical for patient care and management of complications.	V A	Literature review	NA	NA	NA	NA	NA
310	Lourenco-Matharu L, Raval P. An unusual response to intravenous sedation: a case report. SAAD Dig. 2014;30:12-15.	A 14 year old girl became unconscious after administration of midazolam and flumazenil. The diagnosis was an unusual reaction to midazolam.	VA	Case report	NA	NA	NA	NA	NA
311	Galway UA. An anesthesiologist's focus on sedation and complications of GI endoscopy cases—a case of bilateral pneumothoraces and pneumomediastinum after routine ERCP. Internet J Anesthesiol. 2010;23(2):14p-14p.	A patient experienced bilateral pneumothoraces and pneumomediastinum after endoscopic retrograde cholangiopancreatography demonstrating that not all GI endoscopy procedures are free from major complications	VB	Case Report	NA	NA	NA	NA	NA
312	Malhotra N, Singhal S, Malhotra P. Conscious sedation: a safe approach for management of nonagenarian cataract surgery. Internet J Anesthesiol. 2007;13(1):4p-4p.	Cataract surgery on patients over 90 can be safely performed under conscious sedation with propofol and midazolam.	VB	Case report	Nonagenarian cataract surgery patients	NA	NA	NA	NA
313	Garg R, Dehran M. Convulsions with propofol: a rare adverse event. J Postgrad Med. 2009;55(1):69-71.	Report of a patient experiencing generalized convulsions within a few seconds of propofol administration. The administration of propofol has been associated with abnormal movements collectively termed as seizure-like phenomenon.	VB	Case report	NA	NA	NA	NA	NA