patient includes neonate, infant, toddler, preschool, grade school, teen, and young adult.

Additional considerations regarding pediatric sedation include:[19]

- During the pre-sedation assessment and evaluation, which includes patient's age, weight, developmental stage, health history, and physical exam, consultation with the pediatrician and/or other clinical specialist, such as an anesthesia professional, may be necessary when treating high-risk pediatric patients (e.g., physical status 3 and 4).
- Doses of sedatives in children are calculated based on weight.
- During procedural sedation, at least one sedation provider present should have specialized training in pediatric procedural sedation and rescue techniques.
- Age and size-appropriate equipment and medications for resuscitation should be immediately available during and after sedation.
- Upon discharge, a responsible adult who has accompanied the child to the procedure receives specific oral and written discharge instructions that include:
    - Special instructions of observing child's head position to prevent airway occlusion if child will travel in a car seat.
    - Signs and symptoms of potential complications.
    - Steps to follow in case of complications including a 24-hour emergency telephone number.

Additional pediatric considerations are available from:

- The Society for Pediatric Anesthesia
- The American Academy of Pediatrics
- Society of Gastroenterology Nurses and Associates
- The American Heart Association's Pediatric Advanced Life Support (PALS) program
- The American Academy of Pediatrics and American College of Emergency Physicians' Advanced Pediatric Life Support (APLS) program

Older Adult

As life span has become longer with improved management of health, a single definition of how society defines "senior" citizens has become arbitrary. In general, the chronological age of 60 to 65 is still used by many healthcare providers as a gross guide.[26] As such, there are several considerations regarding senior patients that should be considered when developing the plan for sedation include:[20,27]

- Existing, procedure or sedation related physical and/or cognitive limitations to optimize safety after discharge.
- When indicated for any physical status 3 or 4 patients, consult the patient's primary care physician to optimize the patient prior to sedation and/or include an anesthesia provider in the plan of care.
- Carefully *titrate* each drug to evaluate effect. Weight based dosing may cause the patient to move to an unintended level of sedation.
- Risk for hypothermia during procedures due to impaired thermoregulation.

- During airway evaluation, identify degree of flexion and extension of the neck that is tolerated to properly position the head and neck to avoid injury.
- An accompanying spouse, friend, another family member or living situation may not be capable of providing the needed assistance after discharge. Develop a post discharge plan with patient and caregivers to optimize safety.

Additional geriatric considerations are available from:

- The Society for the Advancement of Geriatric Anesthesia
- Society of Gastroenterology Nurses and Associates

Emerging Technology: Computer-Assisted Personalized Sedation

The computer-assisted personalized sedation (CAPS) system integrates the physician and RN sedation team with physiologic monitoring and drug delivery through a computer interface to provide safeguards and facilitate drug titration personalized to the needs of each patient.[28] Anesthesia professionals, including CRNAs, should be involved in policy development, staff education, device implementation, ongoing quality improvement program, and available in the facility when the CAPS system is being used to participate as necessary in patient resuscitation.

The CAPS system facilitates the administration of minimal to moderate propofol sedation using drug delivery algorithms that calculate and deliver appropriate amounts of drug, based on the patient's physiological measurements and response to tactile and voice stimulation.[32] CAPS is not intended for administration of deep sedation, general anesthesia or for sedation of high-risk patients (e.g., physical status 3 or 4, morbidly obese, difficult airway, risk of aspiration, complex procedure).[29,30,31]

The CAPS system incorporates cardiovascular and respiratory monitors, such as the electrocardiogram, pulse oximeter, end-tidal carbon dioxide, respiratory rate, heart rate, blood pressure, and responsiveness.[28,31] The CAPS system processes hemodynamic parameters and patient responsiveness to titrate the amount of propofol administered intravenously.[28,31] The system will increase oxygen delivery based on the patient's peripheral oxygen saturation[28,31] The system detects signs associated with over sedation and will automatically modify or stop the propofol infusion.[32] As with any procedural sedation policy, emergency protocols are initiated as necessary.

CRNA participation in policy development and implementation phases include:

- Evaluation of the CAPS devices
- Development of protocols to maintain sedation standards
- Development of emergency and resuscitation procedures
- Education of the sedation team, comprised of healthcare providers being trained to use the CAPS devices
- Integration of CAPS with existing processes of care
- Development and measurement of outcomes metrics for continuous quality improvement
- Ongoing assessment of competencies

As of this document publication date, the SEDASYS® System is the only U.S. Food and Drug Administration (FDA)-approved CAPS device on the market used for the delivery of propofol for minimal-to-moderate sedation in patients undergoing elective colonoscopy or esophagogastroduodenoscopy (EGD). Information regarding the SEDASYS® System is available on the FDA website: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cftopic/pma/pma.cfm?num=p080009. Facilities and providers who implement a CAPS system should follow the manufacturer's guidelines and FDA's labeling requirements pertaining to the use of the device.

Conclusion

With increasing numbers of diagnostic, therapeutic, or invasive procedures taking place in and outside of the operating room, non-anesthesia professionals administering procedural sedation must be prepared, competent, and skilled to achieve optimal patient outcomes and satisfaction.

Detailed facility policies and ongoing quality improvement efforts support providers in the delivery of safe, high-quality patient care.

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