

1 **Unscheduled Procedural Sedation:**
2 **A Multidisciplinary Consensus Practice Guideline**
3 **Approved by the ACEP Board, September 28, 2018**
4

5 This guideline has been organized by the American College of Emergency Physicians and has
6 been endorsed by ... [List here]
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45 **ABSTRACT**

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47 The American College of Emergency Physicians organized a multidisciplinary effort to
48 create a clinical practice guideline specific to unscheduled, time-sensitive procedural sedation,
49 which differs in important ways from scheduled, elective procedural sedation. The purpose of this
50 guideline is to serve as a resource for practitioners who perform unscheduled procedural sedation
51 regardless of location or patient age. This document outlines the underlying background and
52 rationale, and issues relating to staffing, practice, and quality improvement.

53

54 **INTRODUCTION**

55

56 The provision of sedation and analgesia to facilitate the humane performance of painful
57 and/or anxiety-provoking procedures is now a widespread and integral practice for a variety of
58 specialists. The safety of procedural sedation is supported by a large and robust body of literature,
59 with serious adverse events being extremely rare. The multidisciplinary field of procedural
60 sedation has fostered a strong safety culture following many decades of close attention to
61 provider training, patient evaluation, physiologic monitoring, and other critical safeguards.¹⁻⁴¹

62 Various specialty societies, including the American College of Emergency Physicians
63 (ACEP), have crafted practice guidelines to outline core procedural sedation principles and to
64 address specialty-specific needs, challenges, and patient populations. However, a limitation of
65 existing guidelines has been their primary emphasis on issues and practices germane to
66 scheduled, elective sedation encounters. Many patients in various clinical settings regularly
67 require unscheduled procedural sedation on short notice to facilitate urgent or emergent
68 procedures, for which many aspects of patient management must differ from elective procedural
69 sedation.¹⁻³⁰ To better address the needs of time-sensitive, unscheduled procedural sedation,
70 ACEP has organized a multidisciplinary effort to create a clinical practice guideline specific to
71 unscheduled procedural sedation regardless of location or patient age.

72

73 **WHY DOES UNSCHEDULED SEDATION REQUIRE A SEPARATE GUIDELINE?**

74

75 To provide patient care that is safe, effective and patient-centered, some procedures require
76 urgent or emergent sedation and cannot be scheduled or delayed. Unique aspects of unscheduled
77 sedation include:

- 78 • For urgent and emergent procedures, the sedation provider must manage not just the sedation
79 encounter, but also the acute pain, anxiety, and associated circumstances of the precipitating
80 injury or illness.
- 81 • Fasting may not be an option for time-sensitive procedures.
- 82 • Unscheduled procedures must often be performed while a patient is in a dynamic
83 physiological state or prior to a definitive diagnosis.
- 84 • The goals and requirements for unscheduled procedural sedation can differ from elective
85 procedural sedation, and some practices specific to the latter may unnecessarily complicate or
86 delay preparations for the former to the detriment of patient comfort and care.
- 87 • Existing regulatory and accreditation standards focus primarily on elective procedural
88 sedation, and extrapolation to unscheduled, time-sensitive procedures can confuse and
89 impede patient care.

90
91 **METHODS**

92
93 Given the identified need, ACEP organized the effort to produce this consensus guideline.

94 **Literature search:** This guideline is based on critical analysis of the existing literature. Our
95 medical librarian performed searches of the MEDLINE and Scopus databases. We limited all
96 searches to human studies from English-language sources published between January 1, 2000 and
97 August 10, 2018. Key words/phrases for literature searches: sedation, unscheduled sedation,
98 procedural sedation, conscious sedation, dissociative sedation, dissociative anesthetics,
99 presedation, urgent, emergent, emergency medicine, pediatric emergency medicine, ketamine,
100 skill set, professional skills, privileging, credentialing, support personnel, equipment, supplies,
101 patient evaluation, oral intake, adjunctive, regimen, supplemental oxygen, recovery, and

102 variations and combinations of the key words/phrases. We screened titles and abstracts of all
103 articles identified by the search, with full text review of reports pertinent to the guideline. We
104 reviewed the reference lists of identified publications and consulted with content experts to
105 identify additional reports.

106 **Writing committee:** ACEP commissioned a writing committee of three general emergency
107 physicians and two pediatric emergency physicians—each of whom had extensive experience
108 with procedural sedation practice, research and/or policy management, extensive familiarity in
109 the related literature, and no financial conflicts of interest.

110 **Multidisciplinary review:** We identified specialties other than emergency medicine that
111 also regularly administer unscheduled procedural sedation (FIGURE 1), and invited them to
112 appoint a representative to critically review and provide input on serial iterations of the
113 document. To ensure optimal perspective, we asked that these representatives be practicing
114 members of their primary specialty with regular clinical exposure to unscheduled procedural
115 sedation, and to be free from relevant conflicts of interest (disclosures shown in the APPENDIX).

116 The writing group and organizational representatives met in Dallas, TX on June 21, 2018 to
117 debate and edit the draft. Further refinement occurred during subsequent review cycles.

118 119 **DEFINITIONS**

120 We adopted this previously published⁴ and cited⁸⁻¹⁰ definition of **procedural sedation**: “the
121 use of anxiolytic, sedative, hypnotic, analgesic, and/or dissociative medication(s) to attenuate
122 anxiety, pain, and/or motion. These agents are administered in order to facilitate amnesia or
123 decreased awareness and/or patient comfort and safety during a diagnostic or therapeutic
124 procedure.”⁴

126 We adopted definitions for **levels of procedural sedation** as shown in FIGURE 2, listed in
127 increasing order of complexity and potential risk. Any administration of sedative drugs for which

128 apnea is the desired endpoint is general anesthesia and not sedation, and is beyond the scope of
129 this guideline.

130 Procedural sedation can be unscheduled or elective. We define **unscheduled** procedures as
131 medical, surgical, or dental interventions that are emergent or urgent and, to optimize patient
132 outcomes, must be performed within a short time frame unsuitable for that used to schedule
133 elective procedures.

134 Examples of unscheduled procedures that can be time-sensitive (whether urgent and
135 emergent) include, but are not limited to: cardioversion, tube thoracostomy, central venous line
136 placement, imaging, fracture and dislocation reduction, cardiac catheterization, upper endoscopy,
137 arthrocentesis, abscess incision and drainage, lumbar puncture, laceration repair, care of
138 contaminated wounds, and foreign body removal.

139 We adopted the previously published⁹ and cited¹⁰ definition of a procedural sedation-related
140 **adverse event**, as an “unexpected and undesirable response(s) to medication(s) and medical
141 intervention used to facilitate procedural sedation and analgesia that threaten or cause patient
142 injury or discomfort.”⁹

143 We defined procedural sedation **rescue** as one or more interventions to correct adverse
144 physiologic consequences from procedural sedation. Although the word “rescue” suggests an
145 alarming situation, its interventions may occur in response to adverse events presenting either low
146 or high risk.

147
148 **SCOPE OF GUIDELINE**
149

150 This document provides guidance for practitioners of unscheduled, time-sensitive procedural
151 sedation, as defined above. We did not seek to address scheduled elective procedural sedation, the
152 administration of analgesics to achieve analgesia or sedatives to achieve anxiolysis or sedation in
153 the absence of a concurrent procedure, and minimal sedation (FIGURE 2) given its negligible
154 patient risk.

155 We intend this guideline to be applicable to the practice of all emergency providers, and
156 have incorporated multidisciplinary input in the belief that it will be useful to other practitioners
157 of unscheduled procedural sedation.

158
159 **GUIDING PRINCIPLES**

160
161 The principal difference between this guideline and its predecessors is the focus on the
162 special needs and issues relating to unscheduled procedural sedation. Other guiding principles
163 are:

164 **Evidence-based guideline components:** We sought to be parsimonious—emphasizing what
165 is known to be important, and omitting or deemphasizing that which is not.

166 **Patient- and family-centered care:** Given their importance, we have prioritized patient-
167 centered and family-centered care more strongly than prior guidelines. The ethical imperative to
168 diminish pain, alleviate anxiety, and optimize patient comfort during unscheduled procedures
169 may be even greater given the added stress of the precipitating acute condition.

170 Time is of the essence for urgent and emergent procedures—not just to minimize physical
171 harm from the active condition, but to minimize distress for the patient and their family. Delaying
172 procedural sedation for reasons not supported by evidence²³⁻³¹ may result in extended periods of
173 unremitting pain and anxiety with a negligible decrease in risk and must be avoided.

174 **All sedation states:** To accommodate the wide range of unscheduled procedures for which
175 sedation is required and to maximize the applicability and usefulness of this guide, we discuss all
176 states of sedation beyond minimal sedation. (Some guidelines omit deep⁴² or dissociative^{32,42}
177 sedation.) With the exception of dissociative sedation with ketamine, sedation exists as a
178 continuum, and patients will move up and down the sedation continuum and can transition
179 between defined sedation states during any given procedure.^{3,4,15,22} Dissociative sedation has
180 particular utility for urgent or emergent procedures, especially in children, non-fasting patients,
181 and those with co-morbid conditions.⁵

182 **Multidisciplinary field:** Procedural sedation (whether elective or unscheduled) has always
183 been administered by providers of different backgrounds working in diverse settings. This
184 multispecialty experience fosters productive debate and innovation.

185 Accordingly, it is appropriate that institutional oversight of procedural sedation practice be
186 collaborative and multidisciplinary, usually in the form of a local procedural sedation committee.
187 A single individual may chair such a committee; however, all procedural sedation providers
188 should have sufficient and diverse representation in this process such that sound, evidence-based
189 procedural sedation advances receive full and appropriate consideration. When unmet procedural
190 sedation needs are identified, the collaborative multidisciplinary leadership should assist with
191 forming strategies for their solution.⁴³⁻⁴⁵ Procedural sedation leadership crosses multiple
192 specialties with the demonstrated skills and commitment to safety.^{14,43-46}

193 **Ventilatory adequacy versus responsiveness:** When the first procedural sedation
194 guidelines appeared in 1985,^{47,48} pulse oximetry and capnography were unavailable in the
195 outpatient setting, and physiologic monitoring was limited to cardiac rhythm and vital signs.
196 Sedation levels were defined by the patient’s response to verbal or tactile stimulation, with
197 ventilatory quality descriptors secondary (FIGURE 2).

198 This responsiveness-based taxonomy is valuable for targeting procedural sedation depth to
199 ensure patient comfort but should not be promoted as the principal metric of sedation safety.
200 Responsiveness is itself not a clinically useful safety measure, but rather represents a crude and
201 indirect surrogate for ventilatory adequacy.^{49,50} Furthermore, responsiveness is an imprecise
202 measure of procedural stress and subsequent procedural recall.^{51,52} A consequence of this focus is
203 that procedural sedation providers and monitors feel compelled to repeatedly stimulate their
204 patients to re-verify their targeted sedation level—with such disturbances fundamentally
205 counterproductive to the intended state of tranquility. An additional adverse consequence of this
206 taxonomy is that, given the inherent subjectivity of these definitions, their incorporation into
207 guidelines and policy has fomented semantic disputes regarding procedural sedation boundaries,

208 eg, what is the dividing line between moderate and deep sedation, and between deep sedation and
209 general anesthesia?^{44-46,49,50,53}

210 Modern procedural sedation practice is best served by focusing on patient responsiveness
211 when the intent is to ensure effectiveness,⁵⁴ while focusing on ventilatory adequacy when the
212 intent is to ensure safety^{49,50}—with both assessments occurring concurrently throughout the
213 procedural sedation encounter. Cardiovascular stability is of similarly vital concern; however
214 clinically important hemodynamic alterations are rare in patients without serious systemic disease
215 or acute cardiovascular compromise. If a sedated patient has a stable and effective ventilatory
216 pattern, from a safety perspective it is functionally irrelevant whether at that moment they are
217 responsive to voice or to pain. Such ventilatory adequacy is verified through close, continual
218 observation of the airway and chest wall motion, supplemented with physiologic monitoring of
219 oxygenation (pulse oximetry) and ventilation (capnography). This safety focus is compared to the
220 traditional effectiveness focus in FIGURE 2.

221 Given continued advances in ventilatory monitoring technology and real-time computational
222 data analysis and algorithm development, it seems highly likely that responsiveness-defined
223 sedation levels will be replaced in many procedures with objective physiological monitoring that
224 continually predicts the ongoing risk of serious ventilatory impairment.^{49,50,55}

225 **Procedural sedation depth, not drug:** A longstanding hallmark of procedural sedation
226 guidelines is the concept of a sedation continuum, ie, that all sedatives and opioids, excluding
227 ketamine—depending upon dose and patient response—are capable of producing any sedation
228 depth along this scale from minimal sedation to general anesthesia. Accordingly, it is more
229 meaningful and useful to focus clinical decisions and management upon sedation depth and
230 ventilatory adequacy rather than the specific drug itself, recognizing that different drugs have
231 different pharmacological properties and windows of effect and side effect. There is no
232 evidentiary or pharmacological basis^{1-6,12-15,32,36-40,44-46} for the designation of specific procedural

233 sedation agents as intended or not intended for general anesthesia, or for restricting them on this
234 basis.⁴²

235 **Skill sets, not specialty:** A vital role for a procedural sedation guideline is to specifically
236 outline the skill sets that render practitioners competent and suitable for procedural sedation
237 privileges.⁵⁶

238 Given ample evidence that modern procedural sedation is widely and safely practiced by a
239 variety of specialists, competencies and privileges for procedural sedation should not be defined
240 solely by specialty training. Instead, they should focus on whether the provider possesses specific
241 procedural sedation knowledge in addition to assessment, management, and rescue skills targeted
242 to sedation needs, the procedure, and the individual patient (FIGURE 3).⁵⁶ Providers may acquire
243 and demonstrate procedural sedation competency as part of the curricula of their specialty
244 training programs. Alternatively, providers may acquire and demonstrate procedural sedation
245 competency through additional focused training and education.⁵⁶ All sedation practitioners must
246 maintain their skills over time.

247 **Intervention-oriented definitions for adverse events:** An important advance in the
248 evaluation of procedural sedation adverse events for quality improvement and for research is the
249 shift away from event and threshold-based definitions (eg, apnea for >30 s) to the more clinically
250 relevant intervention-based orientation (eg, assisted ventilation for apnea).^{8,10} The act of
251 performing an intervention is typically unambiguous, and thus more likely to be reported in a
252 standardized, reproducible fashion. Intervention-based definitions better predict clinical
253 importance, as any event would be trivial if no intervention was performed in response to its
254 occurrence.^{8,10} Periodic interventions are an expected part of procedural sedation practice, and
255 their performance does not necessarily signify a clinical error.

256 **Modern procedural sedation is off-label:** Current product labeling from the United States
257 Food and Drug Administration (FDA) is incomplete and inconsistent with the extensive
258 procedural sedation literature.⁴⁶ As a result, essentially all medications used in modern procedural

259 sedation practice are off-label, while simultaneously being highly safe and effective when used by
260 those with proper training and support.¹⁻⁴¹ Unless and until there is a comprehensive update of
261 FDA product labeling to comply with recent decades of procedural sedation advances, such
262 product labeling should not supersede the wealth of evidence from the procedural sedation-
263 specific medical literature.^{1-7,12,13,15,31-33,35-41,45,46,51-53}

264

265 **SEDATION STAFFING**

266

267 **Two-person sedation team:** Safe procedural sedation requires a minimum of two trained
268 health care practitioners at the bedside: the sedation provider who takes responsibility for
269 oversight of the procedural sedation encounter and a sedation monitor (commonly a registered
270 nurse or respiratory therapist) whose primary duty is continuous patient monitoring and
271 documentation. Requisite skill sets for each role are shown in FIGURE 3.

272

At least one individual present must be skilled in vascular access.

273

274 **Procedural sedation provider skill set:** The sedation provider is a licensed health care
275 professional with the sedation provider skill set (FIGURE 3). The procedural sedation provider
276 must possess these core skills regardless of targeted sedation depth. Rescue skills are essential,
277 given that it is not always possible to predict how an individual patient will respond. Procedural
278 sedation providers must also possess the skills to identify a patient who is beyond the intended
279 target depth, and to be prepared to correct any adverse physiologic consequences and return the
280 patient to the originally intended level of sedation. Likewise, procedural sedation providers must
281 recognize inadequate sedation and address the insufficient condition through administration of
282 either more sedative or an alternative agent to achieve the optimal state while maintaining patient
283 safety.

283

284 Emergency physicians have long-standing, proven procedural sedation skills and a track
285 record as research leaders in this multidisciplinary field. The Centers for Medicare & Medicaid
Services (CMS) acknowledged the special situation and training of emergency medicine: “The

286 ED is a unique environment where patients present on an unscheduled basis with often very
287 complex problems that may require several emergent or urgent interventions to proceed
288 simultaneously to prevent further morbidity or mortality.⁵⁷ They continue: "... emergency
289 medicine-trained physicians have very specific skill sets to manage airways and ventilation that
290 is necessary to provide patient rescue. Therefore, these practitioners are uniquely qualified to
291 provide all levels of analgesia/sedation."⁵⁷

292 Although short courses such as Advanced Cardiac Life Support and Pediatric Advanced Life
293 Support have educational merit, their completion does not assure appropriate sedation provider
294 skills (FIGURE 3), and for some specialists—including emergency medicine and critical care—
295 their residency or fellowship training offers a higher level of knowledge and skill acquisition than
296 these courses and supersedes them.⁵⁸ ACEP is a member of the Coalition to Oppose Medical
297 Merit Badges,⁵⁹ comprised of all major emergency medicine organizations. These organizations
298 oppose credentialing or privileging based on brief, episodic courses for physicians who are
299 already maintaining certification by the American Board of Emergency Medicine and the
300 American Osteopathic Board of Emergency Medicine, as such maintenance of certification goes
301 well beyond short courses designed to be taken by paramedics, nurses, and other providers.^{58,59}
302 For other specialties, periodic short courses may be a helpful component of training and skills
303 maintenance.

304 Airway repositioning and bag mask ventilation are the most common airway rescue
305 interventions,^{11-13,36,40} even for emergency physicians and critical care physicians whose core
306 training and practice includes intubation. For procedural sedation providers who do not intubate
307 or place laryngeal mask airways regularly, it is preferable to focus their rescue skills on airway
308 repositioning, bag mask ventilation, and the placement of oral and nasal airways rather than to
309 stipulate intubation or laryngeal mask airway skills.³²

310 **Procedural sedation monitor skill set:** The sedation monitor is a licensed health care
311 professional (commonly a registered nurse or respiratory therapist) with the sedation monitoring

312 skills shown in FIGURE 3, and whose principal role is continuous monitoring and
313 documentation. The sedation monitor can assist with minor, interruptible tasks as long as they do
314 not materially interfere with effective procedural sedation monitoring. If suitably trained, such
315 tasks may include sedative drug administration under the direct supervision of the sedation
316 provider.

317 **Procedural sedation provider privileging and credentialing:** Competencies for
318 procedural sedation should be defined by the specific sedation skill set a practitioner must be able
319 to perform, rather than by specialty training (FIGURE 3).⁵⁶ The granting of procedural sedation
320 credentials and privileges can be comprehensive or focused.

321 Comprehensive procedural sedation privileges include all levels of sedation, including
322 general anesthesia limited to emergency rapid sequence intubation and post-intubation
323 management. Some providers will already possess comprehensive procedural sedation skills by
324 virtue of their postgraduate training and ongoing clinical practice sufficient to support continued
325 competence. For example, the core curricula of emergency medicine, pediatric emergency
326 medicine, and critical care residency and fellowship programs accredited by the Accreditation
327 Council for Graduate Medical Education and American Osteopathic Association include
328 advanced airway management, resuscitation, critical care, vascular access, monitoring,
329 pharmacology, pain management, and training and supervised practice in all levels of procedural
330 sedation. Graduates of these programs are routinely credentialed for rapid sequence intubation
331 based upon this training and should, in essentially all cases, be simultaneously credentialed to
332 manage all levels of procedural sedation.

333 Focused procedural sedation privileges are appropriate when a sedation provider possesses
334 the skill set (FIGURE 3), but in accordance with his or her specific practice needs chooses to
335 implement them in a manner restricted by sedation level or drug. One physician, for example,
336 may be fully trained for moderate but not deep or dissociative sedation. In this case his or her
337 procedural sedation skill set may appropriately be limited to the knowledge and skills pertinent to

338 moderate sedation, ensuring that they possess rescue skills (FIGURE 3) and have no intent to
339 perform dissociative or deep sedation. Another physician, for example, may be fully trained in
340 moderate and deep sedation, but have never used ketamine nor feel any need to ever administer
341 this agent. In this case, his or her procedural sedation skill set may appropriately omit the
342 knowledge and skills unique to dissociative sedation.

343 Department medical directors and/or hospital procedural sedation committees can specify
344 focused procedural sedation privileges based upon an individualized evaluation of each
345 provider's skills, experience, and competency. In some circumstances departmental training
346 and/or proctoring can be used to confirm or expand privileges.

347 **Procedural sedation provider quality improvement:** As with every other aspect of
348 medical practice, departmental leadership and/or hospital procedural sedation committees
349 continually monitor ongoing competencies as part of a quality improvement process (discussed
350 later). Renewal without additional action should be expected for those who regularly provide
351 procedural sedation, have no deficiencies identified through this quality improvement, and
352 demonstrate no other reason to question their ongoing skills. In all other cases departmental
353 leadership and/or the hospital procedural sedation committee will evaluate the current status of
354 each provider's skills and competency on an individualized basis. If appropriate, privileges for
355 specific sedation levels may be withdrawn or withheld contingent upon focused training and/or
356 proctoring.

357 **Procedural sedation monitor privileging and credentialing:** The capability for a nurse,
358 respiratory therapist, or other health care professional to serve as a procedural sedation monitor is
359 a privilege based upon local oversight, training, and verification of skills.

360 **Procedural sedation roles:** When unscheduled moderate or dissociative sedation is
361 performed, the procedural sedation provider may also be the provider performing the procedure,
362 assuming that the procedure can be immediately halted should an adverse event occur that
363 requires urgent attention or resuscitation.¹⁻⁶

364 Some procedural sedation guidelines specify that the sedation provider during deep sedation
365 should be fully dedicated to sedation management and not involved in the
366 procedure.^{32,33,42} Although such a practice is optimal for both scheduled and unscheduled
367 procedures, there is a longstanding track record of sedation providers (with standard back-up
368 from their sedation monitors) simultaneously performing brief unscheduled procedures while
369 managing moderate, dissociative, or deep sedation. This practice has been shown to be safe,
370 without evidence of any increased frequency of clinically important adverse events or
371 outcomes.^{3,17-20,35-40}

372 There remain circumstances in which time-sensitive deep sedation is necessary, but
373 resources do not permit the timely availability of a third provider or the operating room without
374 risk of physical harm based on the underlying condition and/or undue exacerbation of pain or
375 anxiety for the patient and their family. Examples include a patient who promptly requires a tube
376 thoracostomy, central line placement, cardioversion, or hip relocation. In these circumstances, the
377 benefits outweigh the risks for the procedure and sedation to commence without delay, as
378 assessed by the sedation provider—particularly when the procedure at hand can be readily
379 interrupted. Should an adverse event require urgent attention or resuscitation, the sedation
380 provider must be able to immediately halt the procedure and attend to the patient as appropriate.
381 These circumstances also assume the rapid availability of additional licensed health care
382 practitioners (eg, nurses, respiratory therapists) beyond the sedation provider and sedation
383 monitor who can assist with rescue, as is typical in a hospital setting but may not be in a clinic or
384 office.

385 **Nurse administration of sedatives:** Just as qualified registered nurses routinely administer
386 sedatives and paralytics for intubation under direct supervision of an ordering provider, they are
387 similarly qualified and capable of administering medications for procedural sedation while under
388 the direct supervision of the ordering provider. Some state and nursing board regulations restrict
389 (or are locally interpreted to restrict) such administration—but without supporting evidence.

390 Nurses with the required skills to serve as sedation monitors (FIGURE 3) should be permitted to
391 administer any and all medications used for unscheduled procedural sedation while under the
392 direct supervision of the ordering provider, with the ordering provider specifying the dosing and
393 administration.

394
395 **PROCEDURAL SEDATION PRACTICE**
396

397 **Procedural sedation needs assessment:** When clinical circumstances dictate the need for
398 an unscheduled procedure, the sedation provider must first assess the specific circumstances of
399 the situation. How urgent or emergent is the procedure? What depth of sedation will be needed to
400 ensure patient comfort? What level of responsiveness on the sedation continuum (FIGURE 2)
401 will be compatible with procedural success? What is the likely duration of the procedure? Are the
402 key patient needs analgesia, anxiolysis, immobility, or some combination of the three? Is the
403 patient at higher risk of adverse events based upon the pre-sedation patient evaluation (see full
404 section below)? What level of ventilatory adequacy (FIGURE 2) is to be anticipated?

405 It may be possible that procedural sedation can be avoided, and that a high level of patient
406 comfort can be attained through some combination of analgesics, local anesthesia, regional
407 anesthesia, and non-pharmacological techniques (see section below). Conversely, if the patient is
408 at high risk based upon their pre-sedation evaluation, consider the feasibility of referral for
409 general anesthesia, while recognizing the delays required arranging an operating room, anesthesia
410 services, and an operating surgeon or proceduralist.

411 The procedural sedation provider will discuss the sedation plan with the patient (and/or his
412 or her parents or caregivers, as appropriate), including risks and benefits, using shared decision-
413 making. Appropriate consent will be obtained in accordance with local policies. This process will
414 of necessity be abbreviated for some urgent and emergent procedures.

415 **Pre-sedation patient evaluation:** Sedation providers should perform the following pre-
416 sedation evaluation, which will at times require abbreviation based upon the urgent or emergent
417 nature of the required procedure.

418 The procedural sedation provider should perform a focused history and physical
419 examination, including a review of current medications. Does the patient have substantial
420 underlying illness? Patients who are healthy or have mild systemic disease (commonly classified
421 as American Society of Anesthesiologists (ASA) physical status I and II respectively) are
422 generally excellent procedural sedation candidates. Those with severe systemic disease (ASA III
423 or greater) are at greater risk of adverse events.^{21,22,31}

424 What have been the patient’s prior experiences with procedural sedation or anesthesia? Have
425 they experienced prior adverse events? Do they have any pertinent allergies? Do they have any
426 absolute or relative contraindications to the specific sedatives being considered?

427 Does the patient have any anatomic or physiologic variants that put them at greater risk of
428 airway or ventilatory compromise, or that might complicate assisted ventilation? Examples
429 include: airway abnormalities (eg, micrognathia, macroglossia, laryngomalacia, tonsillar
430 hypertrophy), short neck, severe obesity, a history of obstructive sleep apnea, very young age
431 (such as infants under 3 months), and premature birth in an infant. There is no evidence that
432 adding the Mallampati score to this general airway evaluation has any impact on clinical
433 outcomes, and thus it cannot be recommended.⁶⁰⁻⁶³ This score—a graded visual assessment of the
434 pharynx and tonsils—poorly predicts both difficult bag mask ventilation⁶⁰ and endotracheal
435 intubation,^{60,61,64} is unreliably assessed,^{62,65} and is frequently not obtainable in younger children
436 who are unable to comply with the exam.⁶³

437 Females of childbearing age should be questioned regarding the potential for pregnancy,
438 although in urgent or emergent situations procedural sedation will likely need to proceed
439 regardless. There is inadequate evidence to guide specific sedative agent selection in pregnancy.

440 **Pre-sedation oral intake:** The combination of vomiting and loss of airway protective
441 reflexes is rare during procedural sedation, and resulting aspiration is extremely rare.³¹ To date,
442 only nine reports of aspiration-associated deaths have been reported in the post-1984 procedural
443 sedation literature, of which eight were during upper gastrointestinal endoscopy. None of these
444 occurred in children or in healthy adults.⁶⁶ Currently, there is no evidence that non-compliance
445 with elective fasting guidelines increases the risk of aspiration or other adverse events.²³⁻³¹ Any
446 concerns regarding aspiration vastly exceed the actual risk.^{31,66-69}

447 Providers of unscheduled procedural sedation should assess the timing and nature of recent
448 oral intake. The urgency of the procedure will dictate the necessity of providing sedation without
449 delay, regardless of fasting status. For patients with established risk factors for aspiration (eg,
450 serious underlying illness,^{31,66} obstructive sleep apnea,³¹ obesity,⁷⁰⁻⁷³ age less than 12 months,³¹
451 upper endoscopy as the procedure,^{37,38,66,74,75} or bowel obstruction),³¹ consider the risks versus
452 benefits of delaying procedural sedation after recent ingestion of a substantial meal. When such a
453 delay is not feasible, consider the use of dissociative sedation, as unlike other sedatives ketamine
454 helps preserve protective airway reflexes,^{5,32} and there have been no reported occurrences of
455 aspiration (despite its association with vomiting and laryngospasm) in patients receiving this
456 agent alone except in compromised neonates.^{5,66}

457 **Sedative regimens:** Assuming that procedural sedation remains appropriate, the sedation
458 provider will plan the sedative regimen based on the needs and considerations identified above.
459 This must be customized to each patient, as no single sedative agent or combination of agents is
460 ideal for every patient or procedure. A full discussion of drugs and administration strategies is
461 beyond the scope of this guideline (examples can be found elsewhere).^{4-7,12,15} Agents used for
462 unscheduled procedural sedation include but are not limited to opioids, benzodiazepines,
463 barbiturates, ketamine, propofol, dexmedetomidine, etomidate, and nitrous oxide. Strategies
464 include single versus combined agents. Drug doses and drug concentrations should be confirmed
465 right before administration and calculated on a mg/kg basis for children.

466 **Room and supplies:** Procedural sedation must be performed in an area with oxygen,
467 suction, physiological monitoring equipment, resuscitation medications, and age- and size-
468 appropriate equipment for airway and ventilatory rescue (eg, bag-valve mask, oral airway, nasal
469 airway) and for intravenous access. When opioids or benzodiazepines are principal sedatives,
470 their reversal agents should be readily available. Drugs to treat allergic reactions and recovery
471 nausea and vomiting should be readily available.

472 The need for intravenous access is dependent on the medications, the dose, the route used,
473 and risk factors for adverse events. Ketamine, for example, can be safely administered
474 intramuscularly without need for intravenous access.⁵ Inhaled nitrous oxide and intranasal
475 medications can be safely administered without intravenous access.

476 **Non-pharmacological and other adjunctive techniques:** Age-specific interventions for
477 managing fear and pain can often reduce anxiety and distress in children and their families, and
478 augment the procedural sedation experience.^{76,77} The sedation provider should utilize
479 developmentally appropriate interventions to reduce fear, anxiety and pain and, when available,
480 enlist child life specialists specifically trained to provide this service. Immobilization devices in
481 children should generally be avoided and should certainly not be used in lieu of non-
482 pharmacological interventions as described above and, when appropriate, effective
483 pharmacologic sedation.

484 **Interactive monitoring:** The sedation monitor must continually observe the quality of
485 airway patency and ventilation, as noted in their specific skill set (FIGURE 3). The sedation
486 provider must similarly observe the patient in an intermittent or continual fashion as per their
487 specific skill set (FIGURE 3), and continually monitor sedation status to ensure patient comfort
488 and to avoid oversedation.

489 The procedural sedation team should actively verify the procedure to be performed, the
490 patient identity, and, when appropriate and when the proceduralist has not been in constant

491 attendance with the patient, mark the correct anatomic site for the procedure. This “time-out” (as
492 per The Joint Commission)³⁴ should not delay care in a life-threatening situation.

493 **Physiologic monitoring:** The sedation monitor will observe and periodically document the
494 output of physiologic monitors. The use of these devices has become routine during procedural
495 sedation, although it must be acknowledged there is little or no convincing evidence that they
496 specifically enhance clinically important outcomes beyond interactive monitoring.^{1-4,16} But given
497 their simplicity, theoretical basis of utility, the reassurance they provide to caregivers, and their
498 low added expense, cardiac monitoring, blood pressure assessment, and pulse oximetry should be
499 used routinely during procedural sedation.

500 Cardiac monitoring permits the immediate continuous assessment of heart rate and rhythm.
501 Clinically important bradycardia and other arrhythmias are extremely rare during procedural
502 sedation but can be promptly identified with cardiac monitoring.

503 Blood pressure should be assessed at appropriate intervals including—if possible and not
504 unduly disturbing to the patient—before, during, and after procedural sedation, and at the earliest
505 evidence of potential cardiovascular compromise. Clinically important hypotension is rare during
506 procedural sedation in patients without serious systemic disease or acute cardiovascular
507 compromise. Greater attention and more frequent blood pressure measurements should occur in
508 patients with serious underlying illness, and in those otherwise judged at higher risk. Patients with
509 known or possible volume depletion should be rehydrated at the earliest time that is safe and
510 feasible—prior to sedative drug administration whenever possible—and their blood pressure
511 frequently monitored.

512 Pulse oximetry permits immediate identification of downward trends in oxygen saturation,
513 and must be continuously monitored.

514 Capnography is now routine in most settings for deep sedation but is optional for moderate
515 or dissociative sedation. Capnography provides continuous, immediate, objective verification of
516 the quality of ventilation, and is more reliable for this purpose than pulse oximetry or interactive

517 monitoring alone.¹⁶ Capnography is simple, noninvasive, easy to interpret, provides the earliest
518 warning of hypoventilation and apnea, and its use can reduce the risk of developing
519 hypoxia.^{2,3,16,55} Normal capnography can quickly and unambiguously confirm ventilatory activity.
520 Abnormal capnography can signal clinicians to reevaluate their patients, to be prepared to provide
521 ventilatory support and/or to administer a reversal agent, and to avoid administering additional
522 doses of sedatives until the concern is resolved.⁵⁵ Capnography also permits clinicians to safely
523 administer supplemental oxygen (discussed below).

524 A limitation of physiologic monitoring is that anxious or frightened children and
525 uncooperative adults may be unable to tolerate the blood pressure cuff, pulse oximetry sensor
526 probe, or capnography cannula prior to procedural sedation. In these circumstances procedural
527 sedation may need to be initiated without one or more of these monitoring modalities. Once the
528 patient is sufficiently sedated the devices may then be fitted.³² At lower levels of sedation
529 uncooperative patients may not be able to tolerate a capnography cannula, and continual
530 capnography may not be feasible.

531 Given the absence of supporting evidence, the use of a precordial stethoscope³² during
532 procedural sedation is optional.

533 **Supplemental oxygen:** In the event of apnea, high-flow pre-oxygenation delays oxygen
534 desaturation by up to 6 minutes in a healthy adult and 2 to 4 minutes in a healthy child with a
535 patent airway.⁷⁸ Such hyperoxygenation can permit patients to safely tolerate short periods of
536 respiratory depression or apnea without need for positive-pressure-assisted ventilation and its
537 potential for gastric insufflation. Clinicians can instead closely monitor the patient and avoid
538 further drug administration.⁷⁹ Supplemental oxygen is commonly avoided when capnography is
539 not used, thus permitting pulse oximetry to provide warning should interactive monitoring fail to
540 detect ventilatory compromise. When using capnography to directly measure ventilatory status,
541 high-flow supplemental oxygen can be administered throughout procedural sedation. In these

542 situations, capnography can provide immediate evidence of apnea or hypopnea, and when
543 respiratory effort has returned or is strengthening.

544 **Rescue:** The procedural sedation provider must be prepared to perform rescue interventions,
545 according to their skill set (FIGURE 3), should the situation warrant, with efforts made to avoid
546 positive pressure ventilation (and potential gastric insufflation) unless necessary. The procedural
547 sedation team should recognize that ventilatory depression may occur shortly after a stimulating
548 procedure has ceased, and the patient then becomes relaxed as the pain abates.

549 **Recovery:** Patients should be monitored post-sedation until they are no longer at risk for
550 respiratory depression, their vital signs return to pre-sedation states, and they are alert and at age-
551 appropriate baseline level of consciousness.^{3,4,15} There is no need to establish a willingness or
552 ability to take oral liquids. If the patient is being discharged post-recovery, appropriate written
553 care instructions should be given to the patient and their family or caregivers.

554 **Documentation:** The urgency of the procedure may not permit pre-sedation charting, but
555 post-procedure the sedation provider must document the original procedural sedation plan; patient
556 evaluation; procedural sedation course; drugs, drug doses, and when given; and any adverse
557 events and their interventions. The sedation monitor will separately document sedation events and
558 serial assessments of interactive and physiologic monitoring. This documentation must be
559 sufficient to permit quality assurance reviews (discussed next).

560 561 **QUALITY IMPROVEMENT**

562 Each procedural sedation provider should be accountable to an organized quality assurance
563 and improvement program (eg, departmental, institution-wide) that monitors procedural sedation
564 practice, tracks adverse events, ensures satisfactory documentation and compliance with this
565 guideline or local protocols, and identifies opportunities for improvement.
566

567 An example of a standardized tool for this purpose is TROOPS (Tracking and Reporting
568 Outcomes Of Procedural Sedation, <http://proceduralsedation.org/troops-overview>),¹⁰ which was
569 developed through a rigorous multidisciplinary consensus process.

570
571 **THE FUTURE**

572 We pose key steps for future procedural sedation research and practice. First, as with this
573 document, we believe that there should be greater collaboration between specialties in the
574 development and oversight of optimal practice recommendations for this longstanding
575 multidisciplinary field.^{9,10,14,43-46}

577 Although the safety of procedural sedation practice by a variety of specialists is now well
578 established, research should focus on patient-centered outcomes. How can we improve the quality
579 of the experience for patients and their families? Can we increase satisfaction? Can we decrease
580 the frequency and magnitude of procedural awareness? Without compromising safety or efficacy,
581 are there ways in which the procedural sedation encounter can be accomplished more quickly or
582 more cost-effectively?

583 Target-controlled infusion technology has yet to be rigorously studied in procedural
584 sedation. Such computer-driven drug administration based upon pharmacokinetic modeling
585 smooths out the peaks and troughs of sedative drug concentrations, and thus should diminish
586 hypoventilation, help ensure more consistent patient comfort, and permit the sedation provider to
587 more closely focus on the patient without the distraction of repeat bolus sedative drug
588 administration.⁸⁰

589 Future research should better define optimal procedural sedation strategies for patients who
590 require time-sensitive procedural sedation despite substantial underlying illness, and for those
591 who are pregnant.

592 Given the exceptionally low risk of pulmonary aspiration with procedural sedation and
593 absent evidence of an impact from fasting, reform is appropriate for recommendations regarding
594 pre-procedural oral intake.²³⁻³¹

595 Regarding clinical practice, there should be a continued refocusing of sedation provider
596 credentialing and privileging on specific pertinent skill sets as outlined in this guideline, and
597 away from specialty training alone. Future research should better clarify the role of simulation in
598 procedural sedation training. State-based nursing regulations should, where barriers exist, be
599 amended to permit qualified nurses to administer any and all medications used for unscheduled
600 procedural sedation while under the direct supervision of the ordering provider.

601 As noted earlier, the next few years will hopefully permit movement beyond our current
602 responsiveness-based cognitive framework for the sedation continuum, and shift our focus from
603 sedation depth to sedation risk.^{49,50,55} The application of computational tools for analysis of
604 continuous, high-resolution monitoring data may permit ongoing, real-time estimates of risk,
605 allowing clinicians to titrate drug administration and focus interactive monitoring based upon
606 such risk assessments rather than upon repeated patient stimulation.^{49,50,55}

607

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914 **FIGURE 1: Organizations involved in the development of this guideline**

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[Note: Listings will be updated as organizations respond]

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920 Organizations who participated and endorsed the guideline

- 921 • American College of Emergency Physicians

922

923 Organizations who participated and provided input

- 924 • American Academy of Emergency Medicine
- 925 • American Academy of Pediatrics
- 926 • American Academy of Pediatrics Section on Critical Care
- 927 • American Academy of Pediatrics Section on Pediatric Emergency Medicine
- 928 • American Association of Oral and Maxillofacial Surgeons
- 929 • American Board of Emergency Medicine
- 930 • American College of Cardiology
- 931 • American College of Medical Toxicology
- 932 • American College of Osteopathic Emergency Physicians
- 933 • American Heart Association
- 934 • American Society for Gastrointestinal Endoscopy
- 935 • Association of Academic Chairs of Emergency Medicine
- 936 • Council of Emergency Medicine Residency Directors
- 937 • Emergency Medicine Residents' Association
- 938 • Emergency Nurses Association
- 939 • Society for Academic Emergency Medicine
- 940 • Society for Pediatric Sedation
- 941 • Society of Critical Care Medicine
- 942 • Society of Interventional Radiology

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944 Organizations who provided review comments

- 945 • American Association of Nurse Anesthetists

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948 Eight other organizations representing general medicine, anesthesiology, dentistry, and
949 gastroenterology were invited to participate, but either declined or did not respond.

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FIGURE 2: Common sedation state definitions listed in increasing order of complexity and potential risk, together with their corresponding airway and ventilatory focus.

Responsiveness-Based Sedation State Definitions
(best to guide sedation effectiveness)

Airway & Ventilatory Focus
(best to assess safety)

Minimal sedation (anxiolysis)

“A drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination might be impaired, ventilatory and cardiovascular functions are unaffected.”³⁴

The airway and effective spontaneous ventilation are consistently maintained.

Moderate sedation

“A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.”³⁴

The airway and effective spontaneous ventilation are essentially always maintained.

Dissociative sedation

“A trance-like cataleptic state induced by the dissociative drug ketamine characterized by profound analgesia and amnesia, with retention of protective airway reflexes, spontaneous respirations, and cardiopulmonary stability.”²⁻⁶

The airway may require repositioning. Effective spontaneous ventilation is essentially always maintained.*

Deep sedation

“A drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.”³⁴

The airway may require repositioning. The ventilatory pattern may be at times slowed or irregular, but effective spontaneous ventilation is usually maintained such that assisted ventilation or other interventions are typically not required.

General anesthesia

“A drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.”³⁴

The airway and ventilatory pattern are often impaired, and patients often require assisted ventilation or other interventions.

*Transient respiratory depression and apnea have been reported 1 to 2 minutes after rapid IV administration, and for this reason IV ketamine is typically administered over at least 30 seconds.⁵

FIGURE 3: Requisite Skill Sets for Procedural Sedation

Safe procedural sedation requires a minimum of two licensed health care practitioners in attendance: the procedural sedation provider who takes responsibility for oversight of the procedural sedation encounter, and a procedural sedation monitor whose primary duty is continuous patient monitoring and documentation. Requisite skill sets for each role are shown below.

	Procedural Sedation Provider	Procedural Sedation Monitor
Cognitive skills	<p>Must understand:</p> <ul style="list-style-type: none"> • airway, respiratory, and cardiovascular physiology and pathophysiology • the function and interpretation of continuous monitoring of cardiac rhythm, pulse oximetry, and capnography • sedative and antagonist drug pharmacology, e.g., pharmacokinetics, pharmacodynamics, dosing, administration, contraindications, adverse event profiles • sedation adverse events and when intervention is appropriate • the principles of patient pre-sedation evaluation and factors which increase sedation risk • the procedure to be performed and how it might impact the sedation course or sedation risk 	<p>Must be familiar with:</p> <ul style="list-style-type: none"> • airway, respiratory, and cardiovascular physiology and pathophysiology • the function and interpretation of continuous monitoring of cardiac rhythm, pulse oximetry, capnography, and blood pressure • the sedative drugs being used, including their dosing, administration, duration, and adverse event profiles • sedation adverse events and when intervention is appropriate • the equipment used during rescue, and where it is stored
Interactive monitoring skills	<p>Must be able to:</p> <ul style="list-style-type: none"> • monitor airway patency, identify airway obstruction, and identify and distinguish obstructive and central apnea • monitor ventilatory adequacy using continual observation of chest wall motion supplemented with pulse oximetry and capnography • monitor cardiovascular stability using physical assessment supplemented with cardiac rhythm and blood pressure monitoring • recognize when a patient is excessively or inadequately sedated 	<p>Must be able to:</p> <ul style="list-style-type: none"> • monitor airway patency and identify partial or complete airway obstruction • monitor ventilatory adequacy using continual observation of the airway and chest wall motion supplemented with pulse oximetry and capnography • monitor cardiovascular stability using physical assessment supplemented with cardiac rhythm and blood pressure monitoring • recognize when a patient is excessively or inadequately sedated
Rescue skills	<p>Must be able to:</p> <ul style="list-style-type: none"> • relieve airway obstruction through appropriate application of head tilt, chin lift, or placement of nasal or oral airway • perform bag mask ventilation • manage a patient who is excessively sedated, with or without active intervention as appropriate • rapidly initiate resuscitative measures for hypoxia, apnea, laryngospasm, hypotension, bradycardia, anaphylaxis, seizure, or cardiac arrest • rapidly summon additional resuscitation assistance, if required 	<p>Must be able to:</p> <ul style="list-style-type: none"> • assist the sedation provider in resuscitation • rapidly summon additional resuscitation assistance, if required

966 **APPENDIX: Conflict of interest disclosures for guideline participants**

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968 Questions asked of participants:

969 • Employment: Please indicate the name of your employer and describe your position of
970 employment, including the nature of the business of your employer, the position you hold
971 and a description of your daily employment responsibilities.

972 • Leadership: Do you hold any positions of leadership in other organizations, chapters,
973 commissions, groups, coalitions, agencies, and/or entities (e.g. board of director
974 positions, committees and/or spokesperson roles)? If yes, please describe the position you
975 hold, including a brief description of the nature and purposes of the organization or
976 entity.

977 • Relationships: To the best of your knowledge, do you have any outside relationships with
978 any person or entity from which ACEP obtains goods and services, or which provides
979 services that compete with ACEP where such relationship involves: a) holding a position
980 of responsibility; b) an equity interest (other than a less than 1% interest in a publicly
981 traded company); c) any gift, gratuities, lodging, dining, or entertainment valued at more
982 than \$100? If yes, please explain:

983 • Financial interests: Do you have any financial interests or positions of responsibility in
984 entities providing goods or services in support of the practice of emergency medicine
985 (e.g. physician practice management company, billing company, physician placement
986 company, book publisher, medical supply company, and/or a malpractice insurance
987 company), other than owning less than a 1% interest in a publicly traded company? If
988 yes, please explain.

989 • Other potential conflict: Do you have any other interest that may create a conflict with
990 your fiduciary duty to ACEP or that may create the appearance of a conflict of interest?

991 • Health administration: Do you have any outside relationships with any healthplan, health
992 insurance company, delegated payer, health insurance company administrative service
993 organization, or health insurance company related philanthropic organization or entity
994 where such relationship involves: a) holding any position of responsibility; b) an equity
995 interest (other than a less than 1% interest in a publicly traded company); c) any stipend,
996 contribution, gift, gratuities, lodging, dining, or entertainment valued at more than \$100?
997 If yes, please explain.

998

999 Corrie Chumpitazi, MD, MS

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1001 Medicine, Baylor College of Medicine; Co-Chair, Sedation Oversight Committee, Texas
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1007 • Other potential conflict: None.

1008 • Health administration: None.

- 1009
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 - 1018 • Health administration: None.
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 - 1049 • Health administration: None.
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 - 1056 • Financial interests: None.
 - 1057 • Other potential conflict: None.
 - 1058 • Health administration: None.
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 - 1067 • Other potential conflict: None.
 - 1068 • Health administration: None.
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 - 1076 • Other potential conflict: None.
 - 1077 • Health administration: None.
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 - 1082 • Leadership: Board Member, American College of Osteopathic Emergency Physicians
 - 1083 (ACOEP); Vice President, Texas Osteopathic Medical Association (TOMA).
 - 1084 • Relationships: US Acute Care Solutions advertises in ACEP newsletters and at ACEP
 - 1085 annual meeting.
 - 1086 • Financial interests: Physician owner of US Acute Care Solutions holding substantially
 - 1087 less than 1% interest in company.
 - 1088 • Other potential conflict: None.
 - 1089 • Health administration: None.
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 - 1101 • Health administration: None.
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 - 1151 • Other potential conflict: None.
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 - 1157 • Leadership: Editorial Board Member, TheNNT.com; Content Contributor, MDCalc.com.
 - 1158 • Relationships: None.
 - 1159 • Financial interests: Receive approximately \$300 annually to edit chapter on lightning and
 - 1160 electricity related issues for Merck Manual.
 - 1161 • Other potential conflict: None.
 - 1162 • Health administration: None.
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 - 1169 • Financial interests: None.
 - 1170 • Other potential conflict: None.
 - 1171 • Health administration: None.
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 - 1176 • Relationships: None.

- 1177 • Financial interests: None.
- 1178 • Other potential conflict: None.
- 1179 • Health administration: None.
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 - 1183 Gastroenterology and Hepatology Digestive Disease and Surgery Institute, Cleveland
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 - 1187 • Financial interests: None.
 - 1188 • Other potential conflict: None.
 - 1189 • Health administration: None.
 - 1190
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 - 1196 • Financial interests: None.
 - 1197 • Other potential conflict: None.
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 - 1204 • Relationships: None.
 - 1205 • Financial interests: None.
 - 1206 • Other potential conflict: None.
 - 1207 • Health administration: None.
 - 1208