



# CLINICAL SOCIETY GUIDELINES FOR **CAPNOGRAPHY** **MONITORING**

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## GROWING WAVE OF CAPNOGRAPHY »



Improving outcomes. It's your goal with every patient you care for. But one of the greatest threats can also be one of the most difficult to detect. Respiratory compromise — incidents of respiratory insufficiency, failure, and arrest — can strike subtly and suddenly.

There is a growing wave of clinical societies recommending continuous capnography monitoring, along with pulse oximetry, to alert you to changes in oxygenation and ventilation — two key factors in identifying respiratory compromise in its early stages.

## KEY RECOMMENDATIONS

While society guidelines and recommendations vary by application and area of care, most support using waveform capnography under specific situations, such as:

- During administration of opioids for pain management<sup>1,2</sup>
- With patients receiving supplemental oxygen<sup>1,2</sup>
- With patients under moderate to deep sedation<sup>3-7</sup>
- When transporting mechanically ventilated patients<sup>8</sup>
- During CPR<sup>7,8</sup>
- To ensure the proper placement of endotracheal tubes<sup>8,9</sup>

## TOUR THIS EBOOK TO:

- Read about some of the clinical societies publishing guidelines and standards for capnography monitoring
- View guideline and recommendation summaries
- Gain insight on specific recommendations

**Hear what clinicians are saying about respiratory compromise**

**Access a clinical evidence bibliography on capnography monitoring**

**Visit the Medtronic Capnography Policy and Procedures web pages** and review examples of actual capnography policies and protocols, provided with permission from healthcare facilities

**Click here to see a list of societies worldwide recommending capnography monitoring**

1. <http://www.apsf.org/about.php>
2. [https://www.jointcommission.org/about\\_us/fact\\_sheets.aspx](https://www.jointcommission.org/about_us/fact_sheets.aspx)
3. <http://www.asahq.org/about-asa>
4. <http://www.arinursing.org/about-arin/>
5. <http://www.sгна.org/About-Us/Mission-Statement>
6. <http://www.sirweb.org/about-us/>
7. <http://www.esahq.org>
8. <http://www.aarc.org/aarc/us/>
9. [http://www.heart.org/HEARTORG/General/About-Us---American-Heart-Association\\_UCM\\_305422\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/General/About-Us---American-Heart-Association_UCM_305422_SubHomePage.jsp)

# 1

## CLINICAL SOCIETY PROFILES

These profiles represent only some of the clinical societies recommending the use of capnography monitoring to help improve patient care and safety.

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## AARC

The American Association for Respiratory Care (AARC) works to advance the science and practice of respiratory care by fostering and promoting professional excellence for respiratory care professionals and advocating for patients and their families.<sup>1</sup>

## AHA

The American Heart Association (AHA) is a voluntary organization dedicated to building healthier lives by fighting heart disease and stroke. The AHA funds research, advocates for public health policies, and offers resources to help save and improve lives.<sup>2</sup>

## ASA

The American Society of Anesthesiologists (ASA) is a professional organization of anesthesiologists dedicated to raising and maintaining the standards of the medical practice of anesthesiology and improving patient care. The society provides continuing education to its members and advocates for state and federal guidelines to improve patient safety and outcomes.<sup>3</sup>

## APSF

The Anesthesia Patient Safety Foundation (APSF) strives to improve patient safety during anesthesia care by encouraging national and international collaboration safety research and education, and patient safety initiatives.<sup>4</sup>

## ARIN

The Association for Radiologic and Imaging Nursing (ARIN) provides radiology nurses with the knowledge and resources to advance the standards of care for patients undergoing radiology procedures. Procedures include diagnostic, neuro, cardiovascular, interventional, ultrasonography, computerized tomography, nuclear medicine, magnetic resonance, or radiation oncology.<sup>5</sup>

## ESA

The European Society of Anaesthesiology (ESA) works to improve the safety standards for the administration of anesthesia. The Society promotes education, research, and the exchange of information about anesthesia and pain management to improve patient outcomes, particularly the reduction of morbidity.<sup>6</sup>

## JC

The mission of the Joint Commission (JC) is to evaluate health care organizations and inspire them to continuously improve healthcare with safe, effective, high-quality care. The Joint Commission accredits and certifies nearly 21,000 healthcare organizations in the United States, reflecting their commitment to quality and performance standards.<sup>7</sup>

## SGNA

The Society of Gastroenterology Nurses and Associates, Inc. (SGNA) is committed to the safety and effectiveness of gastroenterology and endoscopy nursing by supporting professional development, education, research, advocacy and collaboration.<sup>8</sup>

## SIR

The Society of Interventional Radiology is an organization of practicing interventional radiologists, scientists, and other health professionals dedicated to delivering patient care with minimally invasive, image-guided therapy.<sup>9</sup>

1. <http://www.aarc.org/aarc/us/>

2. [http://www.heart.org/HEARTORG/General/About-Us---American-Heart-Association\\_UCM\\_305422\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/General/About-Us---American-Heart-Association_UCM_305422_SubHomePage.jsp)

3. <http://www.asahq.org/about-asa>

4. <http://www.apsf.org/about.php>

5. <http://www.esahq.org>

6. <http://www.arinursing.org/about-arin/>

7. [https://www.jointcommission.org/about\\_us/fact\\_sheets.aspx](https://www.jointcommission.org/about_us/fact_sheets.aspx)

8. <http://www.sgna.org/About-Us/Mission-Statement>

9. <http://www.sirweb.org/about-us/>

# 2

## CAPNOGRAPHY GUIDELINES SUMMARIES BY SOCIETY

## AARC<sup>1</sup>

In 2011, the AARC issued clinical practice guidelines for the use of capnography by analyzing the results of more than 200 clinical trials, a review of 19 articles on capnography monitoring during mechanical ventilation, and the consideration of the 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.

The guidelines recommend capnography/capnometry to:

- Verify the correct placement of endotracheal tubes and artificial airways
- Assist in the assessment of pulmonary circulation and respiratory status
- Optimize mechanical ventilation

## AHA<sup>2,3</sup>

The AHA issued Guidelines for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiovascular Care in 2010 calling for capnography monitoring to help clinicians monitor quality of chest compressions, to confirm endotracheal tube placement and to utilize as an early indicator of the return of spontaneous circulation (ROSC).<sup>2</sup>

In 2015, the AHA updated its guidelines to include additional clinical utility for capnography that builds on the 2010 recommendations. One of the major updates includes using capnography monitoring as a potential indicator to help guide end-of-life resuscitative efforts in adults and to assess CPR quality in pediatric patients to help avoid risk of exposure to hypocapnia or hypercapnia.<sup>3</sup>

## ASA<sup>4</sup>

As a part of the Standards for Basic Anesthetic Monitoring, the ASA recommends that clinicians should monitor oxygenation, ventilation, circulation, and temperature continuously during administration of all anesthetics. For patients under moderate to deep sedation, the society advocates the use of both pulse oximetry and capnography along with visual monitoring.

The ASA Standards also state that end tidal CO<sub>2</sub> monitoring is required when an endotracheal tube or laryngeal mask is in place.

## APSF<sup>5</sup>

The APSF recognizes that drug-induced respiratory depression in the postoperative period is a patient safety risk in some patients and can result in significant morbidity and mortality. The APSF highlights that while structured assessments of the patient's level of consciousness and frequent spot checks are critical, they may not offer an indication of respiratory depression as quickly as continuous electronic monitoring of oxygenation and ventilation.

To help reduce the likelihood of unrecognized, clinically significant opioid-induced respiratory depression, the APSF recommends continuous monitoring of oxygenation and ventilation.

## ARIN<sup>6</sup>

The ARIN Position Statement endorses the routine use of capnography for all patients who receive moderate sedation or analgesia during procedures in the imaging environment. Use of capnography monitoring will help clinicians detect respiratory depression, hypoventilation, and apnea, as capnography use is associated with improved patient outcomes. Capnography should be used at all times regardless of whether sedation is administered by an anesthesia provider or a registered nurse credentialed to administer moderate sedation.

1. Walsh B, Crotwell D, Restrepo R. AARC Clinical Practice Guidelines 2011: Capnography/Capnometry During Mechanical Ventilation Respiratory Care. April 2011, Volume 56, No.4.

2. Field JM, Hazinski MF, Sayre MR, Chameides L, Schexnayder SM, Hemphill R, Samson RA, Kattwinkel J, Berg RA, Bhanji F, Cave DM, Jauch EC, Kudenchuk PJ, Neumar RW, Peberdy MA, Perlman JM, Sinz E, Travers AH, Berg MD, Billi JE, Eigel B, Hickey RW, Kleinman ME, Link MS, Morrison LJ, O'Connor RE, Shuster M, Callaway CW, Cucchiara B, Ferguson JD, Rea TD, Vanden Hoek TL. Part 1: executive summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S640–S656.

3. Link MS, Berkow LC, Kudenchuk PJ, Halperin HR, Hess EP, Moitra VK, Neumar RW, O'Neil BJ, Paxton JH, Silvers SM, White RD, Yannopoulos D, Donnino MW. Part 7: adult advanced cardiovascular life support: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2015;132(suppl 2):S444–S464.

4. Committee of Origin: Standards and Practice Parameters. Standards for Basic Anesthetic Monitoring. American Society of Anesthesiologists. Last affirmed on October 28, 2015.

5. Stoelting, R.K., Overdyke, F.J. Essential Monitoring Strategies to Detect Clinically Significant Drug Induced Respiratory Depression in the Postoperative Period Conclusions and Recommendations. Last update 9/26/2015. <http://www.apsf.org/announcements.php?id=7>.

6. Green K, Brast S, Bland E, Long M, Robson P, Boone B, Wempe E, Duncan K, Hooker C. Association for Radiologic & Imaging Nursing Position Statement: Capnography. *J Radiol Nurs* 2016;35:63–64.

## ESA<sup>7</sup>

The ESA recommends that capnography be used with all patients undergoing procedural sedation so that ventilation problems can be detected quickly. Continuous evaluation of ventilation and levels of carbon dioxide during sedation can be achieved through capnography.

Pulse oximetry measures oxygenation but does not provide measurements for ventilation if supplemental oxygen is given to the patient, and therefore, additional monitoring should also be used to monitor appropriate respiratory function.

The use of capnography has been shown to help reduce incidents of apnea and hypoxia in patients undergoing sedation and intubation. Capnography results in earlier detection of hypoxia in patients experiencing sedation with propofol. Additional methods of measuring carbon dioxide levels improve the effectivity of capnography.

## Joint Commission<sup>8</sup>

The Joint Commission Sentinel Event Alert #49 outlines a number of steps that can be implemented to help hospitals better manage unintended consequences of opioid-induced respiratory depression. One of the recommendations includes developing and implementing protocols and policies for continuous patient monitoring for patients receiving opioid analgesia during the administration of opioids.

Specifically, The Joint Commission advises the use of both pulse oximetry and waveform capnography because pulse oximetry alone may indicate adequate oxygenation when the patient's ventilation is compromised. The recommendations emphasize the use of ventilation monitoring when a patient has higher risk of respiratory depression and supplemental oxygen is in use.

In 2018, The Joint Commission identified safe opioid prescribing for pain management as an organizational priority for hospitals. Additionally, The Joint Commission specifies that hospital leadership and clinicians identify and acquire patient monitoring technology for use with patients at high risk for adverse events as a result of treatment with prescribed opioids.<sup>9</sup>

## SGNA<sup>10</sup>

The SGNA cites drug-induced respiratory depression as the primary cause of morbidity during procedural sedation. To help reduce these incidents, the SGNA recommends standard monitoring (inclusive of oxygenation saturation, heart rate, respiratory frequency and ventilation, blood pressure), along with physiological, hemodynamic, pulmonary ventilation, oxygenation and capnography monitoring.

## SIR<sup>11</sup>

SIR recognizes that ASA standards are the basis for anesthesia administration credentials in most medical facilities. As a result, the SIR position statement concludes that interventional radiology professionals should become familiar with the changes to the standards set by the ASA, as any significant change in the ASA standards for moderate and deep sedation will have a downstream impact on most interventional radiology practices.<sup>9</sup>

In addition, SIR also notes the American Heart Association (AHA) guidelines for the use of capnography for endotracheal tube assessment, cardiac and respiratory arrest care and cardiopulmonary resuscitation.<sup>10,11</sup>

7. Hinkelbein J, Lamperti M, Akeson J, Santos J, Costa J, De Robertis E, et al. European Society of Anaesthesiology and European Board of Anaesthesiology guidelines for procedural sedation and analgesia in adults. *Eur J Anaesthesiol.* 2017; 34:1–19.
8. The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals Issue 49, August 8, 2012.
9. The Joint Commission. New and Revised Standards Related to Pain Assessment and Management. *The Joint Commission Perspectives.* July 2017, Vol. 37, No. 7.
10. <http://www.sgna.org/GI-Nurse-Sedation/Patient-Care-Safety>
11. Baerlocher M, Nikolic B, Silberzweig J, Kinney T, Kuo M, Rose S. Society of Interventional Radiology Position Statement on Recent Change to the ASA's Moderate Sedation Standards: Capnography. *J VascIntervRadiol* 2013;24:939–940. <http://dx.doi.org/10.1016/j.jvir.2013.04.002>.



# 3

## COMPLIANCE WITH SOCIETY RECOMMENDATIONS FOR CAPNOGRAPHY MONITORING

PAIN MANAGEMENT »

PROCEDURAL SEDATION »

CPR »

PATIENT TRANSPORT »

INTUBATION »

SUPPLEMENTAL OXYGEN »

# PAIN MANAGEMENT

The APSF and The Joint Commission recommend capnography monitoring for patients receiving opioid analgesics for pain management.<sup>1,2</sup>

## MONITORING COMPLIANCE WITH APSF RECOMMENDATIONS<sup>1</sup>

- Use capnography monitoring with all patients receiving opioids for post-operative pain management, including patients without risk factors for respiratory complications.
- To help reduce the likelihood of unrecognized, clinically significant opioid-induced respiratory depression, the APSF recommends continuous monitoring of oxygenation and ventilation.

## MONITORING COMPLIANCE WITH JOINT COMMISSION RECOMMENDATION FOR SAFE USE OF OPIOIDS<sup>2,3</sup>

- Use capnography monitoring with all patients receiving opioids for post-operative pain management, including patients without risk factors for respiratory complications.
- Develop and implement protocols for continuous monitoring of patients receiving opioid therapy with individualized assessments to measure the quality and adequacy of respiration and depth of sedation.
- Identified safe opioid prescribing for pain management as an organizational priority.
- Hospital leadership and clinicians should work together to identify and acquire patient monitoring technology for use with patients at high risk for adverse events as a result of treatment with prescribed opioids.

1. Stoelting, R.K., Overdyke, F.J. Essential Monitoring Strategies to Detect Clinically Significant Drug Induced Respiratory Depression in the Postoperative Period. Conclusions and Recommendations. Last update 9/26/2015. <http://www.apsf.org/announcements.php?id=7>.
2. The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals Issue 49, August 8, 2012.
3. The Joint Commission. New and Revised Standards Related to Pain Assessment and Management. The Joint Commission Perspectives. July 2017, Vol. 37, No. 7.

# PROCEDURAL SEDATION

ASA, ARIN, ESA, SGNA and SIR all advocate for capnography during moderate to deep procedural sedation for improved patient outcomes<sup>1-5</sup>

## MONITORING COMPLIANCE WITH ASA STANDARDS<sup>1</sup>

- For patients under moderate to deep sedation, the society advocates the continuous use of both pulse oximetry and capnography along with visual monitoring.

## MONITORING COMPLIANCE WITH ARIN POSITION STATEMENT<sup>2</sup>

- All radiologic and imaging nursing professionals should be familiar with the use of capnography and the information it provides as an objective evaluation of a patient's ventilatory status.
- Capnography should be used for all patients who receive sedation while undergoing imaging procedures.

## MONITORING COMPLIANCE WITH SGNA GUIDELINES FOR PATIENT MONITORING<sup>3</sup>

- Personnel should be familiar with levels of sedation and have the skills to intervene if the sedation becomes deeper than planned or the patient suffers an adverse reaction.
- Equipment should be on hand to monitor vital signs, including oxygen saturation (pulse oximetry) and respiratory ventilation (waveform capnography).

## MONITORING COMPLIANCE WITH SIR POSITION STATEMENT<sup>4</sup>

- Interventional radiologists using moderate sedation should understand the potential benefits of using capnography in addition to pulse oximetry monitoring, and become familiar with ASA and AHA guidelines.
- Obtain capnography monitoring equipment and incorporate it into clinical practice.

## MONITORING COMPLIANCE WITH ESA POSITION STATEMENTS<sup>5</sup>

- Pulse oximetry is essential for bedside monitoring.
- Capnography is required for all patients receiving procedural sedation.

1. Committee of Origin: Standards and Practice Parameters. Standards for Basic Anesthetic Monitoring. American Society of Anesthesiologists. Last affirmed on October 28, 2015.
2. Green K, Brast S, Bland E, Long M, Robson P, Boone B, Wempe E, Duncan K, Hooker C. Association for Radiologic & Imaging Nursing Position Statement: Capnography. *J Radiol Nurs* 2016;35:63-64.
3. <http://www.sgna.org/GI-Nurse-Sedation/Patient-Care-Safety>
4. Baerlocher M, Nikolic B, Silberzweig J, Kinney T, Kuo M, Rose S. Society of Interventional Radiology Position Statement on Recent Change to the ASA's Moderate Sedation Standards: Capnography. *J VascIntervRadiol* 2013;24:939-940. <http://dx.doi.org/10.1016/j.jvir.2013.04.002>.
5. Hinkelbein J, Lamperti M, Akeson J, Santos J, Costa J, De Robertis E, et al. European Society of Anaesthesiology and European Board of Anaesthesiology guidelines for procedural sedation and analgesia in adults. *Eur J Anaesthesiol*. 2017; 34:1-19.

## MONITORING COMPLIANCE WITH 2011 AARC CLINICAL PRACTICE GUIDELINES<sup>1</sup>

- Optimize chest compressions and detect ROSC during chest compressions or when rhythm check reveals organized rhythm.

## MONITORING COMPLIANCE WITH AHA GUIDELINES<sup>2</sup>

- Improve chest compression performance if etCO<sub>2</sub> is < 10 mm Hg.
- Perform CPR at a rate of 10 breaths per minute with minimal chest rise.
- As an indication of return of spontaneous circulation.

1. Walsh B, Crotwell D, Restrepo R. AARC Clinical Practice Guidelines 2011: Capnography/Capnometry During Mechanical Ventilation Respiratory Care. April 2011, Volume 56, No.4.
2. Field JM, Hazinski MF, Sayre MR, Chameides L, Schexnayder SM, Hemphill R, Samson RA, Kattwinkel J, Berg RA, Bhanji F, Cave DM, Jauch EC, Kudenchuk PJ, Neumar RW, Peberdy MA, Perlman JM, Sinz E, Travers AH, Berg MD, Billi JE, Eigel B, Hickey RW, Kleinman ME, Link MS, Morrison LJ, O'Connor RE, Shuster M, Callaway CW, Cucchiara B, Ferguson JD, Rea TD, Vanden Hoek TL. Part 1: executive summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S640–S656.

# PATIENT TRANSPORT

AARC and The Joint Commission recommend the use of capnography monitoring when a patient is being transported by ambulance and within a healthcare facility.<sup>1,2</sup>

## MONITORING COMPLIANCE WITH 2011 AARC CLINICAL PRACTICE GUIDELINES<sup>1</sup>

- For patients under moderate to deep sedation, the society advocates the continuous use of both pulse oximetry and capnography along with visual monitoring.

## MONITORING COMPLIANCE WITH JOINT COMMISSION RECOMMENDATION—SENTINEL EVENT ALERT #49<sup>2</sup>

- Because drug levels may reach peak concentrations during discharge and transport, take extra precautions during these activities.

1. Walsh B, Crotwell D, Restrepo R. AARC Clinical Practice Guidelines 2011: Capnography/Capnometry During Mechanical Ventilation Respiratory Care. April 2011, Volume 56, No.4.
2. The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals Issue 49, August 8, 2012.

# INTUBATION

AARC, AHA, and ASA recommend the use of capnography monitoring for intubated patients.<sup>1-3</sup>

## MONITORING COMPLIANCE WITH 2011 AARC CLINICAL PRACTICE GUIDELINES<sup>1</sup>

- Confirm correct placement of endotracheal tubes.
- Guide ventilator management.
- Monitor mechanically ventilated patients during transport.
- Monitor intubated patients for cardiopulmonary quality.

## MONITORING COMPLIANCE WITH AHA GUIDELINES<sup>2</sup>

- Use capnography monitoring to confirm placement of endotracheal tubes.

## MONITORING COMPLIANCE WITH ASA STANDARDS<sup>3</sup>

- End tidal CO<sub>2</sub> monitoring is required when an endotracheal tube or laryngeal mask is in place.

1. Walsh B, Crotwell D, Restrepo R. AARC Clinical Practice Guidelines 2011: Capnography/Capnometry During Mechanical Ventilation Respiratory Care. April 2011, Volume 56, No.4.
2. Field JM, Hazinski MF, Sayre MR, Chameides L, Schexnayder SM, Hemphill R, Samson RA, Kattwinkel J, Berg RA, Bhanji F, Cave DM, Jauch EC, Kudenchuk PJ, Neumar RW, Peberdy MA, Perlman JM, Sinz E, Travers AH, Berg MD, Billi JE, Eigel B, Hickey RW, Kleinman ME, Link MS, Morrison LJ, O'Connor RE, Shuster M, Callaway CW, Cucchiara B, Ferguson JD, Rea TD, Vanden Hoek TL. Part 1: executive summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S640–S656.
3. Committee of Origin: Standards and Practice Parameters. Standards for Basic Anesthetic Monitoring. American Society of Anesthesiologists. Last affirmed on October 28, 2015.

# SUPPLEMENTAL OXYGEN

APSF and The Joint Commission recommend the use of capnography monitoring with patients receiving supplemental oxygen.<sup>1,2</sup>

## MONITORING COMPLIANCE WITH APSF RECOMMENDATIONS<sup>1</sup>

- When supplemental oxygen is prescribed, capnography or other monitoring modalities is indicated to measure adequacy of ventilation.

## MONITORING COMPLIANCE WITH JOINT COMMISSION—SENTINEL EVENT #49<sup>2</sup>

- Use ventilation monitoring when a patient has higher risk of respiratory depression and supplemental oxygen is in use.

1. Stoelting, R.K., Overdyke, F.J. Essential Monitoring Strategies to Detect Clinically Significant Drug Induced Respiratory Depression in the Postoperative Period Conclusions and Recommendations. Last update 9/26/2015. <http://www.apsf.org/announcements.php?id=7>.
2. The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals Issue 49, August 8, 2012.

# 4

## SOCIETIES WORLDWIDE RECOMMENDING THE USE OF CAPNOGRAPHY



**AAAHCIQI** – Accreditation Association for Ambulatory Health Care Institute for Quality Improvement (US)

**AAGBI** – Association of Anaesthetists of Great Britain & Ireland

**AANA** – American Association of Nurse Anesthetists (US)

**AAOMS** – American Association of Oral and Maxillofacial Surgeons (US)

**AAP** – American Academy of Pediatrics

**AAPD** – American Academy of Pediatric Dentistry

**AARC** – American Association for Respiratory Care

**ACEM** – Australasian College for Emergency Medicine

**ACEP** – American College of Emergency Physicians

**ADA** – American Dental Association

**AHA** – American Heart Association

**AHRQ** – Agency for Healthcare Research and Quality (US)

**ANZCA** – Australian and New Zealand College of Anaesthetists

**ANZCOR** – Australia/New Zealand Council of Resuscitation

**AORN** – Association of Perioperative Registered Nurses (US)

**APS** – American Pain Society

**APSF** – Anesthesia Patient Safety Foundation (US)

**ARIN** – Association for Radiologic & Imaging Nursing (US)

**ARMC** – Academy of Royal Medical Colleges (UK)

**ASA** – American Society for Anesthesiologists

**BCS** – British Cardiovascular Society

**BHRS** – British Heart Rhythm Society

**BRCA** – British Royal College of Anesthetists

**BRCEM** – British Royal College of Emergency Medicine

**BSG** – British Society of Gastroenterology

**CAS** – Canadian Anesthesiologists' Society

**CCAS** – Congenital Cardiac Anesthesia Society

**CDC** – Centers for Disease Control (US)

**CEM** – College of Emergency Medicine (UK)

**CICM** – College of Intensive Care Medicine of Australia & New Zealand

**CMS** – Centers for Medicare and Medicaid Services (US)

**CMQ** – le Collège des médecins du Québec

**CRSCCRHA** – Cardiopulmonary Resuscitation Specialized Committee of Chinese Research Hospital Association

**CSANZ** – Cardiac Society of Australia and New Zealand

**CSA** – Chinese Society of Anesthesiology

**CSDE** – Chinese Society of Digestive Endoscopy

**CSGNA** – Canadian Society of Gastroenterology Nurses and Associates

**DAS** – Difficult Airway Society (UK)

**EBA** – European Board of Anesthesiology

**ECRI** – Emergency Care Research Institute (US)

**ENA** – Emergency Nurses Association (US)

**ERC** – European Resuscitation Council

**ESA** – European Society of Anaesthesiology

**ESGE** – European Society of Gastrointestinal Endoscopy

**ESGENA** – European Society of Gastroenterology and Endoscopy Nurses and Associates

**HSFC** – Heart and Stroke Foundation of Canada

**ICS** – Intensive Care Society (UK)

**IHI** – Institute for Healthcare Improvement (US)

**JC** – The Joint Commission

**JSA** – Japanese Society of Anesthesia

**NICE** – National Institute for Health and Care Excellence (UK)

**NHI** – Netherlands Healthcare Inspectorate

**NYSPPF** – New York State Partnership for Patients

**OIIQ** – l'Ordre des infirmières du Québec

**OPIQ** – l'Ordre Professionnel des inhalothérapeutes du Québec

**RCEM** – Royal College of Emergency Medicine (UK)

**RCI** – Respiratory Compromise Institute (US)

**SCAI** – Society for Cardiovascular Angiography and Interventions

**SFAI** – Swedish Society for Anesthesia and Intensive Care

**SGNA** – Society of Gastroenterology Nurses and Associates (US)

**SHM** – Society of Hospital Medicine (US)

**SIR** – Society of Interventional Radiology (US)

**SPA** – Society of Pediatric Anesthesia (US)

**SPS** – Society of Pediatric Sedation (US)

**TennCare** – Tennessee's Medicaid (US)

**USAF** – United States Air Force

**VHA** – Veteran's Health Administration (US)

# GROWING WAVE OF CAPNOGRAPHY

## CAPNOGRAPHY RECOMMENDATIONS

2010	2011	2012	2013	2014	2015	2016	2017	2018
VHA Opioids	BRCA/IRAS Airway	CAS Sedation	AANA Sedation	CDC Opioids	ASA X 2 Sedation	SPS Sedation	TennCare SNF Ventilation	ASA Task Force (ASA, AAOMS, ACE, ADA, ASDA, SIR) Sedation
AAU/ABC Resuscitation	AAU/ASD Sedation	ICU ICU	CMS Opioids	USAF Sedation	CMQ/OPIQ/OBQ Sedation	ANZCOR Resuscitation	ECRI Tech Hazards Opioids	ASA Sedation
NICE Sedation	AAAC Mechanical Ventilation	NHQ Sedation	ASA Airway	ACEP/ENA Sedation	CSGNA Sedation	AAOHNES Anesthesia/Sedation	ECRI Safety Concerns Opioids	ASGE Sedation
WFSA Anesthesia	'90 minute Man' Resuscitation	IRI Sedation/Paralytics	AAOBN 2 Airway/PACU	NICE Sedation	ACR/SIR Sedation	AORN Sedation	ASA/ADA Sedation	AAASF Sedation
	AAOR Sedation/ICU	BRCA/CEM Sedation	AMA Resuscitation	ESA Sedation/PACU/Transfer	BCS/SHS Sedation	ABR Sedation	PPANS Opioids	ECRI Opioids
	ASA Sedation/ICU	BRCEH Sedation	SIR Sedation	BRCA/CEM Sedation	BRCA Sedation/ICU/ED	APS Opioids	NYS DOH Sedation	CPS Respiratory Compromise/Sedation
	ASA Sedation	AAOMS Sedation	AAAC Sedation	TennCare SNF Ventilation	ESSE/ESSENA Sedation	ASA Opioids	AANA Opioids	
	APSF Opioids	TJC Opioids	ECRI Opioids	CMS Home Opioids	ICRANKI/NAZCA/ACER Transport	BCSP Sedation	Asst DA Sedation	
		AAAHIC HQI Sedation	CMS NYSPP Opioids	CSAMZ Sedation	RCJ Respiratory Compromise	AAP/AAFD Sedation	CSRT Sedation/Opioids	
			SHS Sedation	ECRI Opioids	SHM Opioids	SCAI/SPA/CCAS Sedation	HQI Opioids	
				SGNA Sedation	DAS Airway	CRJ/CRHA Resuscitation		
				ICU ICU	AAU/ABC Resuscitation	JSA Malignant Hyperthermia		
				CSDE/CSA Sedation	ICU Airway	ADA Sedation		
					JSA Sedation	NZDC Sedation		
						SASA Sedation		

Opioids    US/N American  
Sedation    Europe  
Other

# Medtronic

IMPORTANT: Please refer to the package insert for complete instructions, contraindications, warnings and precautions.

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