



Waveform Capnography

Essential Information
You Can Trust

Count on Nonin.

When You Can't Wait for Patient Data

In the emergency department, time is everything. To make critical decisions for actions such as CPR and intubation, you need immediate data on perfusion, respiration, and ventilation. The quality of information you get can affect the speed and confidence of your response.

The need for reliable measurements doesn't stop there. From the operating room to the intensive care unit to postoperative recovery, patient monitoring helps inform important treatment choices. That includes both professional care and unsupervised events like patient-controlled analgesia.



Readings from the First Breath

Waveform capnography measures the partial pressure of carbon dioxide (CO_2) during exhalation. End-tidal CO_2 (EtCO_2) detected at the end of exhalation provides important information about the health of patients—especially those in respiratory distress, cardiac arrest, or shock. This measurement is displayed as a waveform that shows the respiratory rate and how much CO_2 is present during each stage of respiration. Normal EtCO_2 levels are 35 to 45 mm Hg, and the waveform generally has a rectangular shape. As the respiratory rate and tidal volume change, the waveform changes as well.

“Waveform capnography is the standard of care for confirming advanced airway placement. EtCO_2 level and ventilation rate can be continuously monitored through all phases of patient contact, and trends can be archived for documentation and quality assurance afterward.”

— Bob Sullivan, MS, NRP

Clinical Challenges

Acute Respiratory Events During Procedural Sedation and Analgesia

In a prospective study of emergency department patients, researchers compared three patient monitoring methods to detect acute respiratory events during procedural sedation and analgesia (PSA): oxygen saturation (SpO_2), clinical ventilation assessment, and capnography (EtCO_2).

A study investigator recorded EtCO_2 levels and respiratory events during each PSA procedure, with clinical providers blinded to EtCO_2 levels. In 70% of patients with acute respiratory events, abnormal EtCO_2 findings were documented before changes in SpO_2 or clinically observed hypoventilation.¹

CAPNOGRAPHY
detected changes
faster than
PULSE OXIMETRY or
CLINICAL OBSERVATION



Read more at: <https://pdfs.semanticscholar.org/b8f0/272a40f13c4fe95afdeda60d2c2dcde8e9e5.pdf>

EtCO_2 MEASUREMENT
can help
users monitor
QUALITY OF CPR



Organ Perfusion During Cardiopulmonary Resuscitation

Successful resuscitation from cardiac arrest depends on provision of adequate blood flow to vital organs generated by cardiopulmonary resuscitation (CPR). Measurement of end-tidal expiratory pressure of carbon dioxide (EtCO_2) using capnography provides a noninvasive estimate of cardiac output and organ perfusion during cardiac arrest.

During experimental CPR, EtCO_2 has shown a significant positive correlation with cardiac index and with coronary and cerebral perfusion pressures. It can be used to monitor the quality of CPR and predict return of spontaneous circulation (ROSC).²

Read more at: https://www.cercp.org/images/stories/recursos/articulos_mes/noviembre_2018_articulo.pdf

1. Does End-tidal Carbon Dioxide Monitoring Detect Respiratory Events Prior to Current Sedation Monitoring Practices? John H. Burton, MD, John D. Harrah, MD, Carl A. Germann, MD, Douglas C. Dillon, MD
2. Capnography During Cardiac Arrest: Claudio Sandroni, Paolo De Santis, Sonia D'Arrigo, Istituto Anestesiologia e Rianimazione Università Cattolica del Sacro Cuore, Fondazione Policlinico Universitario "Agostino Gemelli" IRCCS, Largo Francesco Vito, 1-00168 Rome, Italy



Use Cases for Capnography

Capnography provides valuable patient information in a wide range of care environments, from emergency medicine to procedural or conscious sedation to sleep laboratories. Professional groups recommend the use of capnography as a standard practice in settings like these:



Emergency Department

The American Heart Association (AHA) 2010 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Recommend continuous waveform capnography during CPR on intubated patients



Intensive Care Unit

The Royal College of Anaesthetists and Difficult Airway Society studies, 2011³ recommend capnography for all intubated patients



General Medical and Surgical Hospital Ward

The Anesthesia Patient Safety Foundation (APSF)⁴ recommends continuous ventilation monitoring for all postoperative patients, and patients receiving supplemental oxygen, to mitigate the effects of opioid-induced respiratory depression



Procedural or Conscious Sedation

The American Society of Anesthesiologists (ASA) Standard of Basic Anesthetic Monitoring (updated 2011) requires capnography during procedural sedation



Patient-Controlled Analgesia (PCA)

The Joint Commission Sentinel Event Alert 2004 Recommends capnography monitoring for patients receiving opiates that can suppress respiration



Oral and Maxillofacial Surgery (OMS)

The American Association of Oral and Maxillofacial Surgeons recommends the use of capnography for patients under moderate sedation, deep sedation, and general anesthesia⁵



Sleep Laboratory

The American Association for Sleep Medicine (AASM)⁶ scoring manual requires monitoring of either transcutaneous PCO₂ or end-tidal CO₂ for pediatric sleep studies

3. Cook TM, Woodall N, Frerk C. British Journal of Anaesthesia 2011; 106(5):617-31

4. APSF Essential Monitoring Strategies to Detect Clinically Significant Drug-Induced Respiratory Depression in the Postoperative Period, June 2011

5. Anesthesia in Outpatient Facilities, AAOMS ParCare 2012

6. AASM Manual for the Scoring of Sleep and Associated Events; Rules, Terminology and Technical Specifications

Nonin Capnographs

Nonin Medical offers EtCO₂ monitoring solutions for emergency departments, operating rooms, intensive care units, postoperative care, sleep labs, sedation dentistry, and homecare.

RespSense® Capnograph*

RespSense® II Capnograph

LifeSense® Capnograph and Pulse Oximetry Monitor*

LifeSense® II WIDESCREEN™
Capnograph and Pulse Oximeter



**LifeSense® II WIDESCREEN™
Capnograph and Pulse Oximeter**

All models feature Nonin sidestream EtCO₂ technology, which delivers fast, first-breath detection of respiratory rate and EtCO₂. LifeSense models include pulse oximetry functions with exclusive Nonin PureSAT® technology.



Nonin also makes a capnograph for veterinarians—the LifeSense VET Capnograph and Pulse Oximeter. This multiparameter monitor measures and displays EtCO₂ and fractional inspired CO₂ values, respiration, SpO₂, and pulse rate of intubated animals.

* RespSense II and LifeSense II carry the CE mark; RespSense and LifeSense do not.

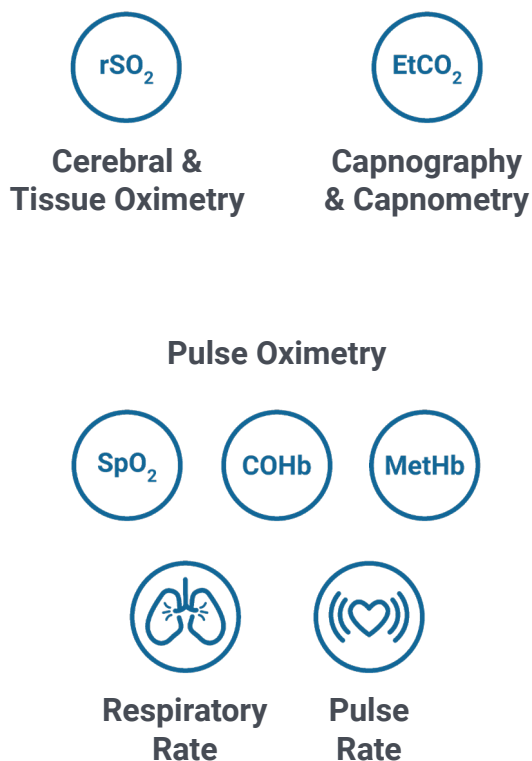
Comprehensive Monitoring Solutions

Reliable Measurements in Multiple Environments

Nonin designs and manufactures reliable capnography and oximetry solutions for use in a diverse range of settings.

Our sidestream capnography technology provides fast, first-breath detection of breathing irregularities.

Full Suite of Measurements[†]



Portfolio of Products



Fingertip

Rugged designs with clinically proven accuracy



Handheld

Proven durability for portable monitoring requirements



Patient Worn

Flexible design for stationary or ambulatory monitoring



Adult, Pediatric & Neonate Sensors

The most durable sensors on the market, with options for every patient



Tabletop

Simple and dependable monitoring across all care settings



Multi-Parameter Integration

Versatile technology available in a variety of monitoring products

[†] Not all parameters are approved in all countries. Respiratory rate, COHb, and MetHb are not available in the United States.

Count on Nonin.



Performance

Responsive, reliable measurements you can trust in any situation



Product

Durable devices built to withstand repeated use for long-lasting performance



People

Dedicated sales, engineering and service support for over 30 years

To learn more about our technologies and products, visit nonin.com/technologies/capnography

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