



Nov 2016

## **ICPS statement on pulse oximetry and cardiac apnea monitoring (CAM) for hospitalized pediatric patients outside critical care areas or the emergency department.**

The overuse of continuous pulse oximetry and CAM in pediatric patients is well established and has been associated with increased admission rates and increased length of stay.

Overuse of pulse oximetry and /or (CAM) can add to the cacophony of alarms in the hospital setting causing clinicians to become desensitized or immune to the sounds, and overwhelmed by information – known as “alarm fatigue.” In response to this constant barrage of noise, clinicians may turn down the volume of the alarm, turn it off, or adjust alarm settings outside the limits that are safe and appropriate for the patient – all of which can have serious, potentially fatal, consequences. Overuse of pulse oximetry and /or CAM can also lead to unnecessary:

- transfer to higher level of care
- testing
- admissions / hospital days
- supplemental oxygen

After review of the literature as well as local policy and procedures, the ICPS Pediatric workgroup has reached a consensus opinion on the judicious use of pulse oximetry and / or CAM to combat alarm fatigue and facilitate the delivery of appropriate care.

## **ICPS recommendations for appropriate use of pulse oximetry and CAM for hospitalized pediatric patients outside critical care areas or the emergency department \***

To ensure continued appropriate use, the need for monitoring should be reviewed by the healthcare team on at least a **daily basis**.

### **AUTOMATIC PULSE OXIMETRY AND CAM USE**

- IV opioids or IV benzodiazepine use while patients are sedated, experiencing altered mental status, or hemodynamically unstable
- After general anesthesia or procedural sedation for at least 4 hours or while patients are sedated, experiencing altered mental status, or unstable
- Infants younger than 60 weeks post-conceptual age for 12 hours post general anesthesia
- Epidural catheter in place
- Continuous nebulizer treatment
- Admission for BRUE (Brief Resolved Unexplained Event – formerly ALTE ) or apnea including OSA
- Admitted for seizures with on-going seizure risk
- Patients with newly initiated or changing settings on CPAP or BiPAP

Indianapolis Coalition for Patient Safety, Inc  
Pediatrics Workgroup

Pulse oximetry and cardiac apnea monitoring (CAM) version 11.16.16

- Patients with a tracheostomy
  - Placed less than 1 month ago
  - Admitted with respiratory illness
- Admitted for or new onset cardiac conditions
- Post ingestion following recommendation from Poison Center
- Medication infusions and blood products with high risk for anaphylaxis (e.g.: IVIG, infliximab, IV iron, chemotherapy drugs as indicated)
- Patients with neuromuscular disease admitted for any reason
- Enteral Withdrawal medication initiation (ex: opioids, benzodiazepines, phenobarbital, clonidine) in a child less than 4 weeks of age. Monitor until vital signs stable and on a non-increasing dose x 48 hours

#### **AUTOMATIC CAM USE**

- On a home apnea monitor Patients admitted for syncope
- During bolus electrolyte infusions (non-maintenance)

#### **AUTOMATIC PULSE OXIMETRY USE**

- Acute hypoxia or cyanosis \*\*
- New oxygen requirement \*\*
- Less than 6 weeks of age admitted for acute respiratory illness
- Patients on pulse oximetry at home
- High-flow nasal cannula (HFNC)
- IV opioids or benzodiazepines within the last 4 hours
- Patients with a tracheostomy

\*\*Note- consider discontinuing continuous pulse oximetry when stable on room air for 4 hours

#### **ROUTINE CONTINUOUS MONITOR USE IS DISCOURAGED IN:**

- Acute respiratory illness unless on supplemental oxygen or <6 weeks of age (e.g.: Bronchiolitis, Asthma, Pneumonia, Croup)
- Routine IV fluid administration
- Parenteral nutrition
- Fever without source or of unknown origin
- Enteral opioid or benzodiazepine use in patients who are not sedated or unstable
- Routine Post-op patients (>60 weeks PCA)
- Patients receiving intermittent inhaled therapies (e.g. albuterol, racemic epi, saline)
- Patients based solely on age

\*This consensus statement was developed by an independent panel of interdisciplinary experts including physicians, nurses, quality professionals, and pharmacists. The group reviewed current literature, best practices, and, combined with professional experience, provided these monitoring recommendations for hospitalized pediatric patients outside critical care areas or the emergency department. These recommendations do not replace sound clinical judgement or other published guidelines.

**Contributors:**

David Zipes, MD FAAP, SFHM  
Director, St. Vincent Pediatric Hospitalists  
Peyton Manning Children's Hospital at St. Vincent  
[dgzipes@stvincent.org](mailto:dgzipes@stvincent.org)

Michele Saysana, MD, FAAP  
Medical Director, Riley Quality and Safety  
Associate Professor of Clinical Pediatrics  
Riley Hospital for Children at Indiana University Health  
Department of Pediatrics; IU School of Medicine  
[msaysana@IUHealth.org](mailto:msaysana@IUHealth.org)

Gina Ellis, Pharm.D.  
Neonatal and Pediatric Clinical Pharmacy Specialist  
Franciscan St. Francis Hospital  
[Gina.Ellis@franciscanalliance.org](mailto:Gina.Ellis@franciscanalliance.org)

Dennis Gardner, Pharm.D.  
Clinical Pharmacy Specialist  
Pediatrics/Neonatal Intensive Care  
Community Health Network  
[DGardner@ecomunity.com](mailto:DGardner@ecomunity.com)

Suzanne M. Grannan, MD  
Children's Product Line Physician Lead  
Community Health Network  
[SGrannan@ecomunity.com](mailto:SGrannan@ecomunity.com)

Larry W. Lynn, M.D.  
Medical Director, Pediatric Hospitalists  
Community Hospital North  
[llynn@ecomunity.com](mailto:llynn@ecomunity.com)

Margie McCaskey, RN, DNP, CPHQ  
Formerly Chief Quality Coordinator  
Riley Hospital for Children at IU Health

Lorie J. Miller, CPHQ  
Quality Management Consultant  
Peyton Manning Children's Hospital at St. Vincent  
[ljmiller@stvincent.org](mailto:ljmiller@stvincent.org)

Colleen Scherer, PharmD, MPA, BCPS  
Pediatric Clinical Pharmacist  
Peyton Manning Children's Hospital at St. Vincent  
[cnschere@stvincent.org](mailto:cnschere@stvincent.org)

Indianapolis Coalition for Patient Safety, Inc  
Pediatrics Workgroup  
Pulse oximetry and cardiac apnea monitoring (CAM) version 11.16.16

Elizabeth Weinstein, MD, FAAEM, FACEP, FAAP  
Associate Professor of Clinical Pediatrics and Emergency Medicine  
Indiana University School of Medicine  
Riley Hospital for Children and Sidney & Lois Eskenazi Hospital  
Director, Indiana Emergency Medical Services for Children Program  
Deputy Medical Director, Pediatrics, Indianapolis EMS  
[elweinst@iupui.edu](mailto:elweinst@iupui.edu)

## References:

- Choosing Wisely, Society of Hospital Medicine – Pediatric Hospital Medicine, Released February 21, 2013  
<http://www.choosingwisely.org/wp-content/uploads/2015/02/SHM-Pediatric-Choosing-Wisely-List.pdf> accessed 4/18/16
- Ralston SL, Lieberthal AS, Meissner HC, et al. Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis. *Pediatrics*. 2014;134(5):e1474–e1502  
[http://www.jointcommission.org/assets/1/18/SEA\\_50\\_alarms\\_4\\_5\\_13\\_FINAL1.PDF](http://www.jointcommission.org/assets/1/18/SEA_50_alarms_4_5_13_FINAL1.PDF) accessed 7/14/15
- Drew BJ, Califf RM, et al. Practice Standards for Electrocardiographic Monitoring in Hospital Settings: An American Heart Association Scientific Statement From the Councils on Cardiovascular Nursing, Clinical Cardiology, and Cardiovascular Disease in the Young. *Circulation*. 2004;110:2721-2746  
[https://www.openanesthesia.org/postoperative\\_apnea\\_post\\_conceptual\\_age/](https://www.openanesthesia.org/postoperative_apnea_post_conceptual_age/) (accessed 5/18/16)
- Tieder j, Bonkowsky J, Etzel R, Brief Resolved Unexplained Events (Formerly Apparent Life-Threatening Events) and Evaluation of Lower-Risk Infants. *Pediatrics*. 2016; 137(5):e2-e32 0160590