

Disclosure

Chair, Steering Committee (compensated)

PRODIGY Clinical Trial

Sponsor: Medtronic

2006



October 2006 Conference Recommendations

- *No patient shall be harmed by respiratory depression in the postoperative period (zero tolerance)*
- **Continuous monitoring** could prevent a significant number of cases of patient harm

2011 APSF Recommendations

❖ **Conclusions and Recommendations***

- ❖ 5. All patients should have oxygenation monitored by continuous pulse oximetry
 - ❖ 6. Capnography or other monitoring modalities that measure the adequacy of ventilation and airflow is indicated when supplemental oxygen is used.
 - ❖ 7. Applying electronic monitoring selectively based upon perceived increased risk is likely to miss respiratory depression in patients without risk factors
-

Safe Use of Opioids in Hospitals

Urges hospitals to adopt effective processes, safer technology, and education and training that will:

- ★ Increase monitoring of patients receiving opioids
 - ★ Identify patients at risk of OIRD
 - ★ Educate prescribers & front line providers on rational prescribing strategies & signs and symptoms of OIRD.
-

BRIAN: Dilaudid Overdose- anoxic injury

2013



DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland 21244-1850



Center for Clinical Standards and Quality/Survey & Certification Group

Ref: S&C: 14-15-Hospital

DATE: March 14, 2014
TO: State Survey Agency Directors
FROM: Director
Survey and Certification Group



Memorandum Summary : We are updating our guidance for the hospital medication administration requirements to:

Reflect the need for patient risk assessment and appropriate monitoring during and after medication administration, particularly for post-operative patients receiving IV opioid medications.

Immediate Post-operative Care:.... emphasize the need for post-operative monitoring of patients receiving IV opioid medications, regardless of where they are in the hospital.

Jadeen:

Found DEAD IN BED in 2014 from Dilaudid overdose



With family permission: DO NOT REPRODUCE

Postoperative Hypoxemia Is Common and Persistent: A Prospective Blinded Observational Study

Zhuo Sun, MD,* I. Sessler, MD, et.al.

Anesth Analg 2015;121:709–15

2015

Method: Blinded, continuous SpO₂

Results:

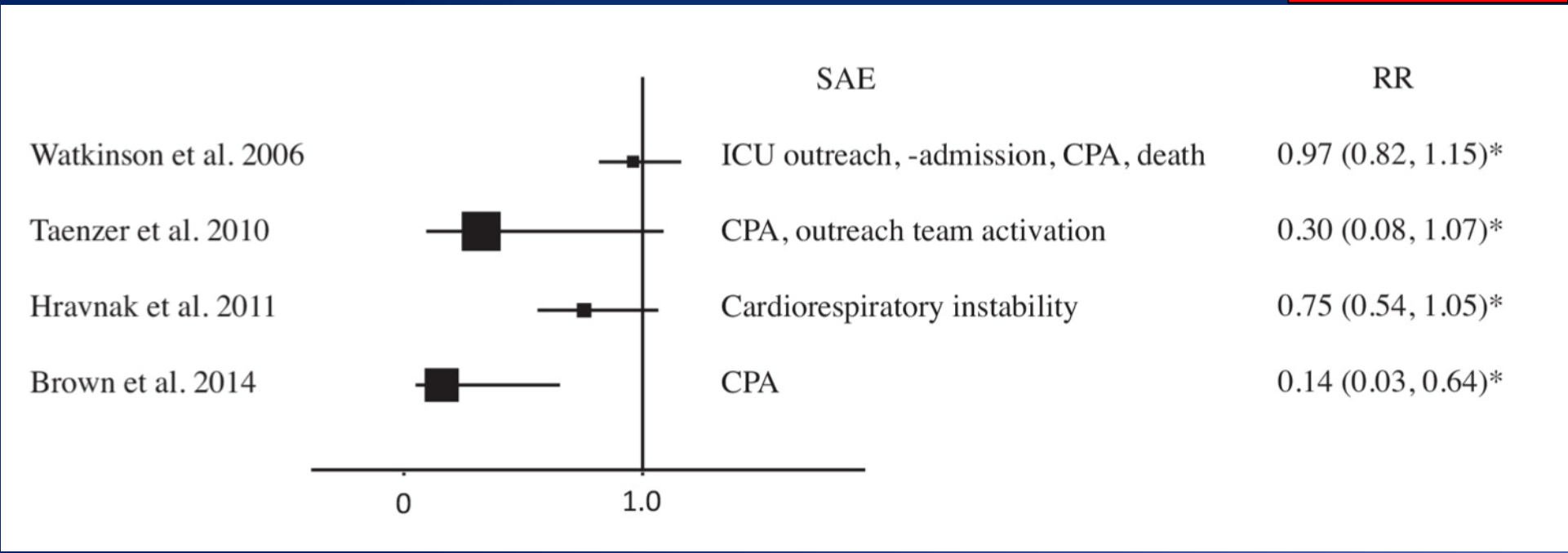
- 37% of patients had SpO₂ <90% for an hour or more.
- Nurses unaware of 90% of hypoxemic episodes (SpO₂ <90% for at least one hour).



Non-Invasive Continuous Respiratory Monitoring on General Hospital Wards: A Systematic Review." van van Loon, Kim, et. al. *PloS One* 10.12 (2015): e0144626.

2015

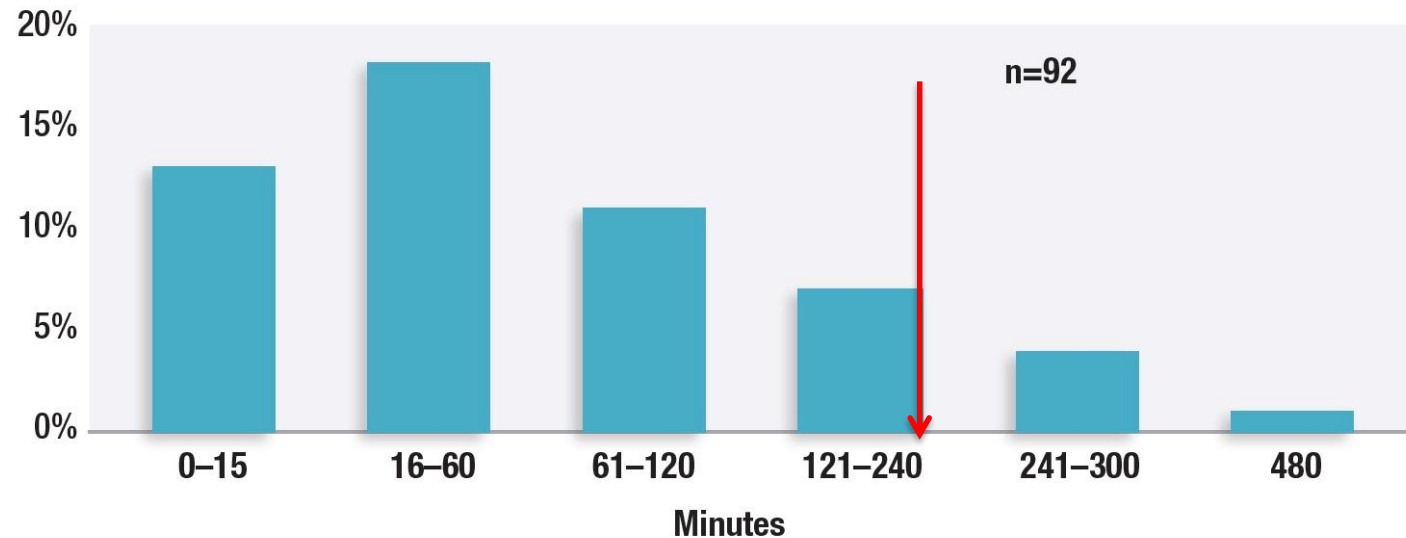
Forest plot: Hazard Ratios for Serious Adverse Events (SAE)
CM vs intermittent respiratory monitoring on general hospital awards.



Postoperative Opioid-induced Respiratory Depression: A Closed Claims Analysis

Lee, Lorri A., et al. *Anesthesiology*: 122.3 (2015): 659-665.

2015



Reproduced and modified with permission. Lee LA, Caplan RA, Stephens LS, Posner KL, Terman GW, Voepel-Lewis T, Domino KB. Postoperative opioid-induced respiratory depression: a closed claims analysis. *Anesthesiology* 2015;122:659-65.

Figure 2: Time between last nursing check and discovery of opioid-induced ventilatory impairment in 92 claims. Claims with unknown timing ($n = 39$) and not applicable (at home, $n = 3$) not shown.

Tom: Dies from Dilaudid overdose

2016



With family permission: DO NOT REPRODUCE

Implementing Monitoring for Opioid-Induced Respiratory Depression in Medical-Surgical and Other General Care Units

Published 11/22/2016

- Monitors to detect OIRD need to **continually** assess **ventilation** for first 24 hrs
- Evaluated capnography and bioimpedance minute ventilation
- ECRI does not recommend purchasing pulse oximetry to monitor patients on opioids.

Continuous pulse oximetry and capnography monitoring for postoperative respiratory depression and adverse events: a systematic review and meta-analysis.”

Lam, Thach, et al.

Anesthesia & Analgesia 125.6 (2017): 2019-2029.

- 9 studies: 4 cont SpO₂; 5 cont capnography
- Cont SpO₂ is associated with:
 - significant improvement in the detection of desaturation
 - a trend toward less ICU transfers with CPOX. RR= 0.66
- The evidence whether cont SpO₂ leads to less rescue team activation and mortality is inconclusive.

2017

Continuous Pulse Oximetry Does Not Measure Blood Pressure

Overdyk, Frank, J., MSEE, MD; Broens, Suzanne J., L., MD
Anesthesia & Analgesia: 126(3) p1089-90 (2018)

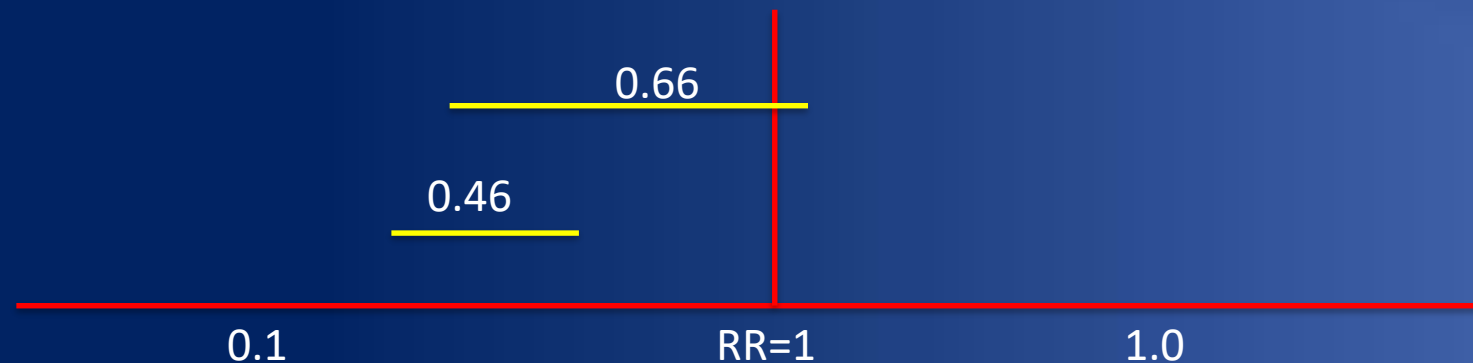
2017

Table 2. Reason for Transfer to the Intensive Care Unit

	Cardiac	Pulmonary	Other
Monitored	20	8	12
Unmonitored	13	27	13

$\chi^2, P = 0.0033.$

Ochroch, E. Andrew, et al. *A&A* 102.3 (2006): 868-875.



Characteristics of Desaturation and Respiratory Rate in Postoperative Patients Breathing Room Air Versus Supplemental Oxygen: Are They Different?.

Taenzer, Andreas H., et al. *Anesthesia & Analgesia* 126.3 (2018): 826-832

- The time to transition from a 'normal' SpO₂ (92%) to 88% or below was not longer for supplemental oxygen patients.
- Respiratory rates did not differ between the mean and desaturation phases, or between the oxygen and room air group.

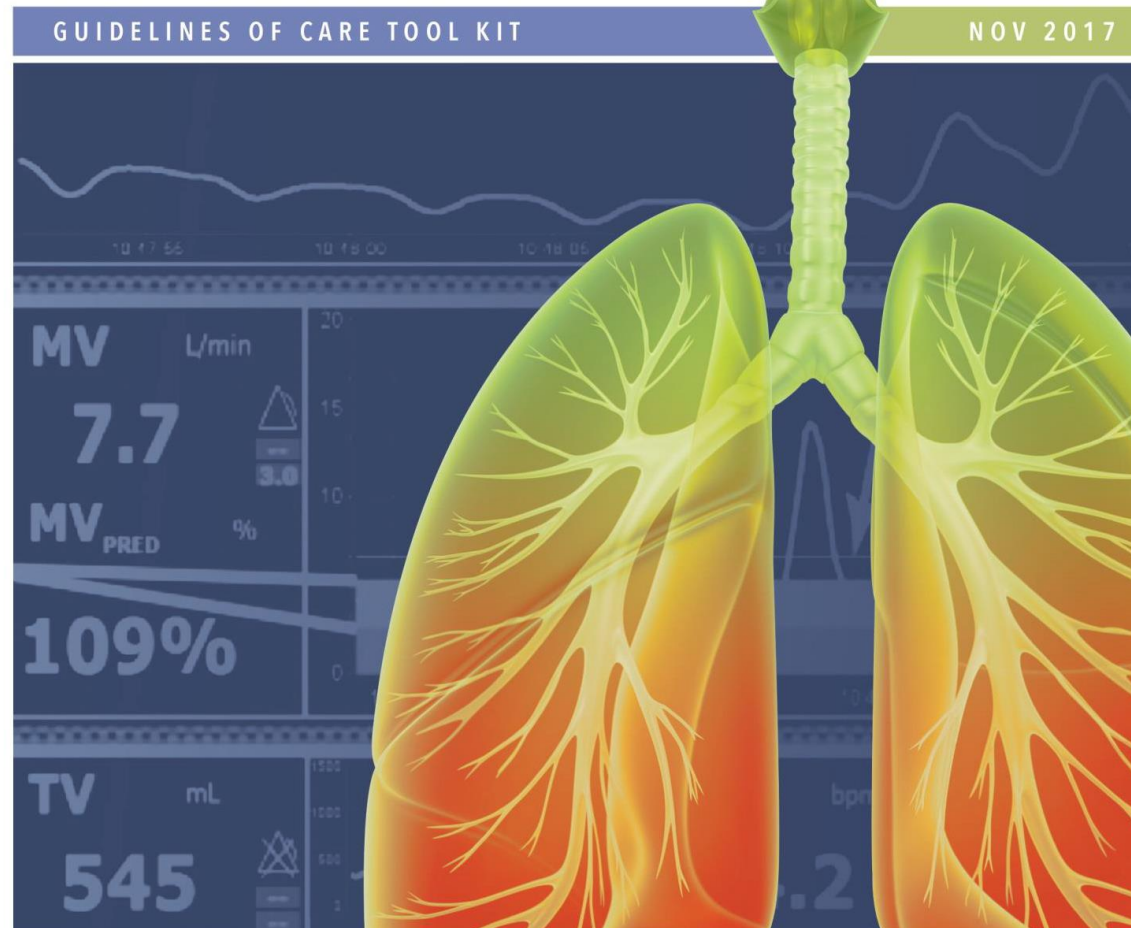
2017

Reducing Harm from Respiratory Depression in Non-ICU Patients

Through Risk Mitigation
and Respiratory Monitoring




2017

Hospital
Quality
Institute



COAST score: California Opioid Assessment and Action Safety Tool

TABLE 3: RESPIRATORY MONITORING PRIORITIZATION RECOMMENDATIONS BASED ON COAST RISK ADULTS

<u>RISK</u> ^a			
Risk Level	Very Low Risk	Low to Moderate Risk	Moderate to High Risk
Monitor ^b	Recommend periodic oxygenation monitoring ^c	Recommend continuous oxygenation monitoring ^c	Strongly recommend continuous ventilation monitoring and oxygenation monitoring ^c
Location	Portable monitoring at bedside	Portable monitoring at bedside	Remote/centralized and/or close proximity/high visibility

^a Considering not all hospitals are fully equipped to offer ventilation monitoring on patients that may benefit, triaging monitors for the most critical patients may be necessary (until the appropriate numbers of monitors are acquired).

^b Monitoring recommendations are inclusive of existing best practices and standardized protocol for pulse oximetry monitoring.

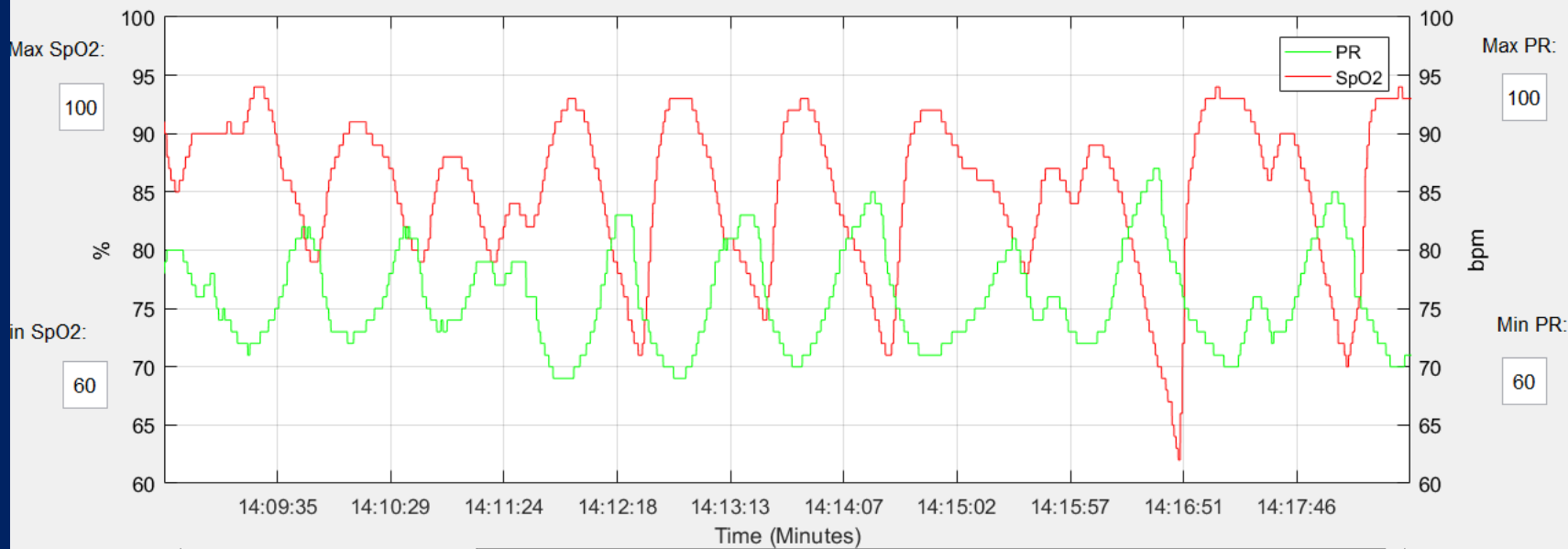
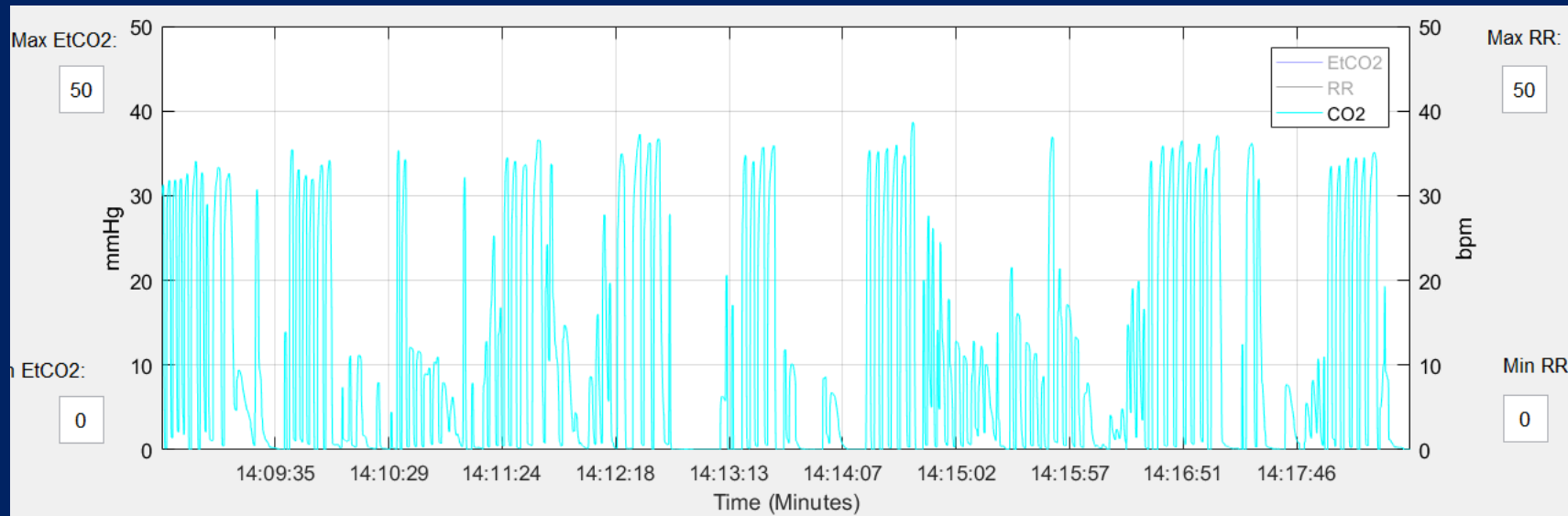
^c When using supplemental oxygen, evaluate the patient for adequate ventilation independent of SpO₂ values.

The PRediction of Opioid-induced respiratory Depression In patients monitored by capnoGraphY

- PRIMARY OBJECTIVE: Develop a risk stratification score for OIVI (opioid induced ventilatory impairment)
- 16 sites (US, France, Spain, Netherlands, Germany, Singapore, Japan)
- Continuous SpO₂ + ETCO₂ for patients receiving parenteral opioids. Providers blinded to monitors
- OIVI event defined as any 1 or more:
 - RR < 8 bpm for > 3 min
 - SpO₂ < 85% for > 3 min
 - ETCO₂ > 60 mmHg for > 3 min
 - Apnea > 30 sec
 - Clinical event: naloxone, PPV, code blue, etc.

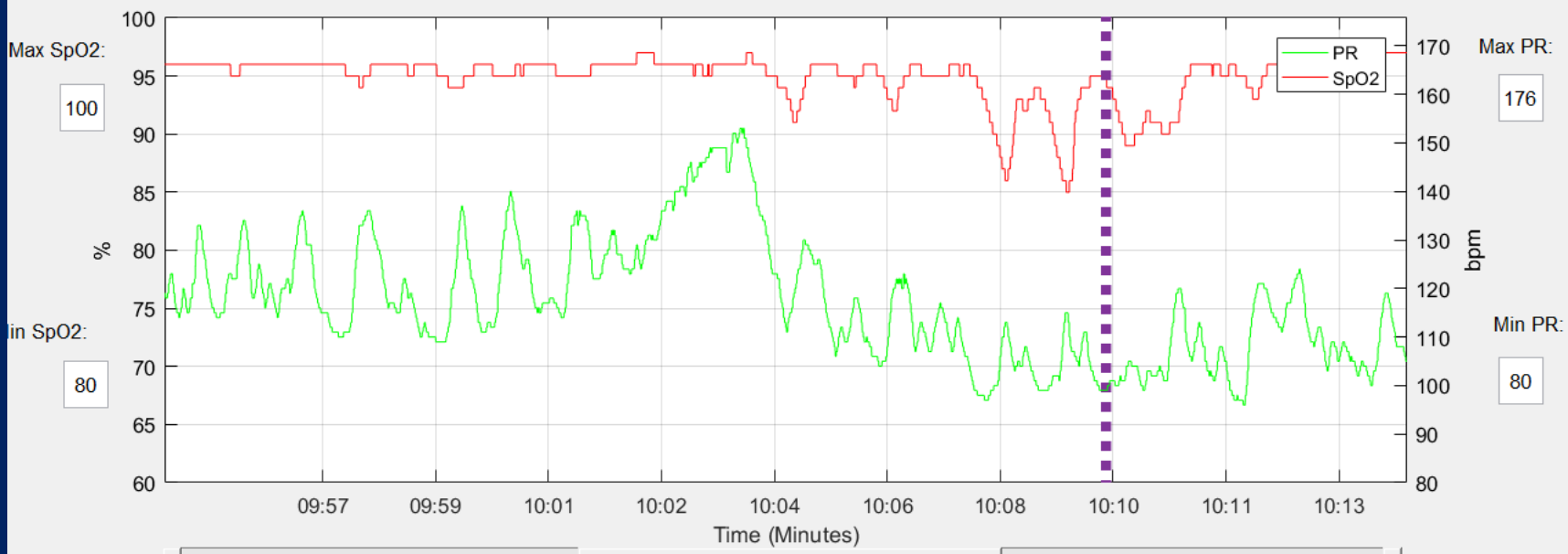
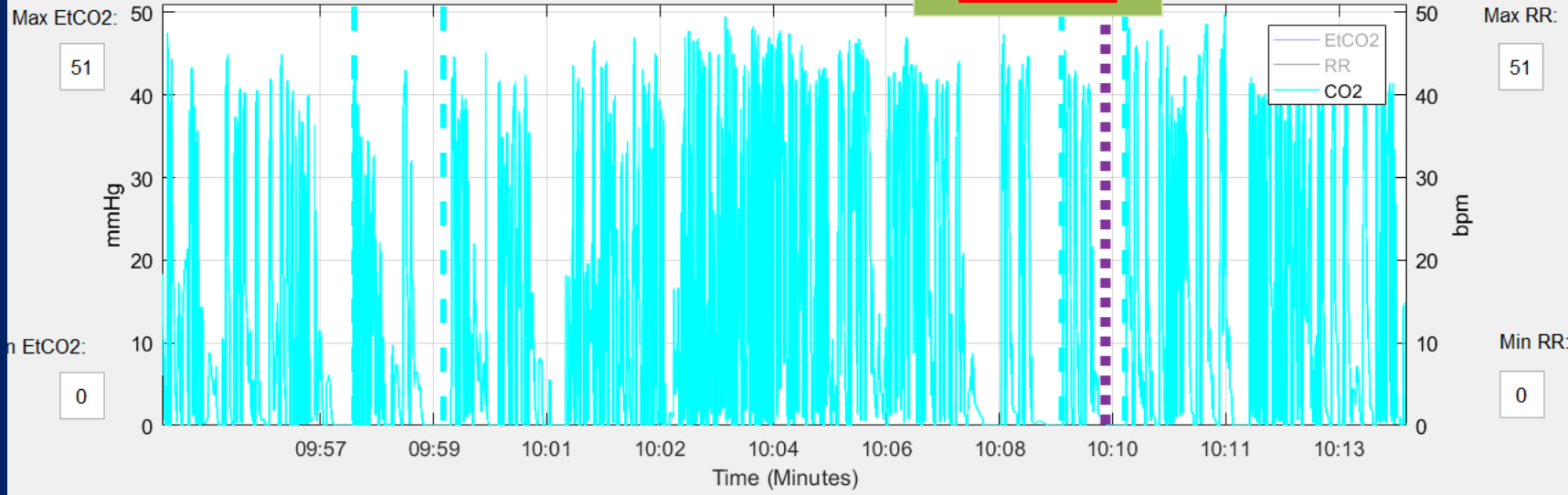
PRELIMINARY RESULTS

- OIVI incidence: 41 % subjects \geq 1 event (1398 subjects)
 - RR < 8 bpm for > 3 min 822 (588)
 - SpO2 < 85% for > 3 min 128 (101)
 - ETCO2 > 60 mmHg for > 3 min 848 (588)
 - Apnea > 3 min 542 (400)
 - Clinical event: resp failure, naloxone: 22 (1.5%)



Duration : 10 (in minutes)

NARCAN



Duration : 20 (in minutes)



New and Revised Standards Related to Pain Assessment and Management

APPLICABLE TO HOSPITALS

Effective January 1, 2018**2017**

Standard LD.04.03.13

- Pain assessment and pain management, including safe opioid prescribing, is identified as an organizational priority for the hospital.
- The hospital provides staff and licensed independent practitioners with educational resources and programs to improve pain assessment, pain management and the safe use of opioid medications.



New and Revised Standards Related to Pain Assessment and Management

APPLICABLE TO HOSPITALS

Effective January 1, 2018

2017

Standard LD.04.03.13

- The hospital provides nonpharmacologic pain treatment
- Hospital leadership works with its clinical staff to identify and acquire the equipment needed to monitor patients who are at high risk for adverse outcomes from opioid

Solution=Educate-MMA-monitor

Kim:

2014



- Obese
- OSA
- CPAP compliant!
- Brought her CPAP!!

w/i 36 hrs postop:

- 8 doses IV Dilaudid
- 9 doses Oxycodone po
- 3 doses Oxycodone ER

Found DIB at 5AM POD#2



NEWSLETTER

The Official Journal of the Anesthesia Patient Safety Foundation

Volume 32, No. 3, 57-88

Circulation 122,210

February 2018

2017 Marks 30 Years of APSF Research Grants

by Richard D. Urman, MD; Karen L. Posner, PhD; Steven K. Howard, MD; and Mark A. Warner, MD



APSF.ORG

NEWSLETTER

THE OFFICIAL JOURNAL OF THE ANESTHESIA PATIENT SAFETY FOUNDATION

Volume 33, No. 1, 1-32

Circulation 122,210

June 2018

Using the 2018 Guidelines from the Joint Commission to Kickstart Your Hospital's Program to Reduce Opioid-Induced Ventilatory Impairment

by Thomas W. Frederickson, MD, MBA, FACP, SFHM, and JE Lambrecht, MD, PharmD

Lost in Translation

The 2016 John W. Severinghaus Lecture on Translational Research

Daniel I. Sessler, M.D.

“Similarly, it seems likely that continuous ward monitoring will **soon** be the standard-of-care since vital signs at 4- to 6-h intervals clearly miss many (and probably most) rescue opportunities.”

Lets make 'soon' happen

THANK YOU.