

Apnea-Sat Alert

Identification of Apnea and Oxygen Desaturation During Capnography/Oximetry Monitoring

Apnea and oxygen desaturation are common occurrences for many hospitalized patients. Studies have shown that as many as 88 percent of hospitalized patients may be at risk of recurrent apneas.^{1,2} It is generally agreed that only a small minority of these patients are identified and treated.³ Apnea syndromes may be caused or exacerbated by acute conditions, comorbidities, sleep disruption or medications (e.g., postoperative opioids).⁴

In addition, a significant percentage of COPD,⁵ heart failure,⁶ and neuromuscular patients,⁷ as well as patients with other conditions⁴ may experience profound and repetitive oxygen desaturation events as a result of apnea, nocturnal hypoventilation, periodic breathing and worsening of ventilation-perfusion mismatching.

A study of patients experiencing cardiac arrest on the general care floor found that 84 percent had documented observations of clinical deterioration or new complaints within eight hours of arrest.⁸ Respiratory alterations preceding arrest was the most common antecedent (38 percent) and respiratory alterations were a component of 39 percent of multiple

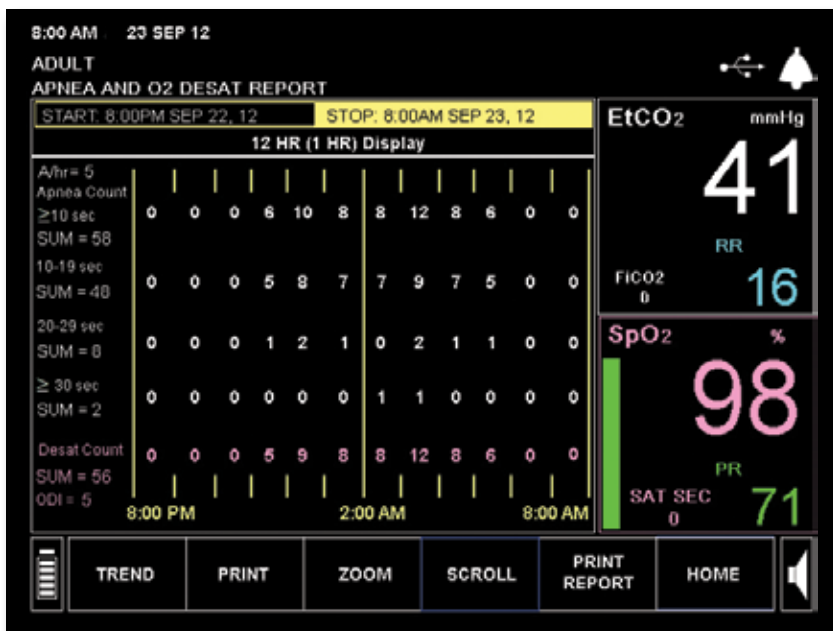
disturbances, which led to 27 percent of arrests. A retrospective multi-center study of 14,720 cardiopulmonary arrests showed that 44 percent were respiratory related and more than 35 percent occurred on the general care floor.⁹

Many clinical organizations, such as APSE, IHI, Joint Commission and ISMP, now recommend continuous electronic respiratory monitoring.¹⁰⁻¹³ Capnography and pulse oximetry are specifically cited as recommended methods of continuously monitoring adequacy of ventilation and oxygenation, respectively.

Apnea-Sat Alert

Apnea-Sat Alert was developed to improve patient safety by simplifying identification of ventilation and oxygenation disorders without the need for additional equipment or changes to clinical workflow. The Apnea-Sat Alert is a software algorithm that tracks and reports apneas per hour (A/hr). The algorithm also tracks and reports the oxygen desaturation index (ODI), which is based on pulse oximetry data. The Apnea-Sat Alert adds A/hr and ODI calculations to the Capnostream® 20p patient monitor in real time on the monitor home screen. Additionally, A/hr

Apnea and Oxygen Desaturation Report



Apnea and Oxygen Desaturation Display



Asterisk indicates apnea count has exceeded set threshold during the last 12 hours and clinician should view trend data.

and ODI trends are available on screen, in printouts and through data export. Apnea-Sat Alert software can also be integrated into the microMediCO₂™ module offered through monitoring partners. Apnea-Sat Alert is 510K cleared (K112368) for adult patients.

- A/hr is defined as the number of periods of breathing cessation (as monitored by capnography) of 10 seconds or more per hour. With Apnea Sat-Alert, clinicians can view A/hr and the total number of apnea events > 10 seconds, as well as a breakdown of apneas 10-19 seconds, 20-30 seconds and longer than 30 seconds.
- The oxygen desaturation index (ODI) is the number of dips per hour in SpO₂, 4 percent or lower from baseline with a return to baseline in 240 seconds or less.

A/hr Visual Alert

The A/hr Visual Alert, which appears as an asterisk next to the A/hr value, is used to indicate that the apnea count has exceeded a set threshold during any one-hour period during the last 12 hours. The default value will trigger an A/hr Visual Alert at 10 apneas per hour, but can be adjusted by the clinician. The asterisk will appear only when an A/hr Visual Alert is triggered; it is updated once every 10 minutes. The Visual Alert indicates that the clinician should view the A/hr and ODI trend screen to learn more about the patient's breathing patterns. The alert is designed to help caregivers identify the need for increased patient surveillance, intervention, or to confirm or change treatment.

References

1. Kumar S, McElligott D, Goyal A, Baugh M, Ionita RN. Risk of obstructive sleep apnea (OSA) in hospitalized patients. *Chest*. 2010;138(4):779A.
2. Frey WC, Pilcher J: Obstructive sleep-related breathing disorders in patients evaluated for bariatric surgery. *Obes Surg*. 2003; 13:676-683.
3. Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med*. 1993;29:328(17):1230-1235.
4. Gay PC. Sleep and sleep-disordered breathing in the hospitalized patient. *Respir Care*. 2010;55(9):1240-1254.
5. Lacasse Y, Sériès F, Vujovic-Zotovic N, et al. Evaluating nocturnal oxygen desaturation in COPD—revised. *Respir Med*. 2011;105(9):1331-1337.
6. Javaheri S, Ahmed M, Parker TJ, Brown CR. Effects of nasal O₂ on sleep-related disordered breathing in ambulatory patients with stable heart failure. *Sleep*. 1999; 22(8):1101-1106.
7. Bauman KA, Kurili A, Schmidt SL, Rodriguez GM, Chiodo AE, Sitrin RG. Home-based overnight transcutaneous capnography/pulse oximetry for diagnosing nocturnal hypoventilation associated with neuromuscular disorders. *Arch Phys Med Rehabil*. 2013;94(1):46-52.
8. Schein RM, Hazday N, Pena M, Ruben BH, Sprung CL. Clinical antecedents to in-hospital cardiopulmonary arrest. *Chest*. 1990;98(6):1388-1392.
9. Peberdy MA, Kaye W, Ornato JP, et al. Cardiopulmonary resuscitation of adults in the hospital: a report of 14720 cardiac arrests from the National Registry of Cardiopulmonary Resuscitation. *Resuscitation*. 2003;58(3):297-308.
10. Stoelting R, Overdyk F. Conclusions and recommendations—conference on electronic monitoring strategies. Essential monitoring strategies to detect clinically significant drug-induced respiration. Depression in the postoperative period. Conclusions and recommendations. Anesthesia Patient Safety Foundation website. Available at: <http://www.apsf.org/announcements.php?id=7>.
11. *How-to Guide: Prevent Harm from High-Alert Medications*. Cambridge, MA: Institute for Healthcare Improvement; 2012. Available at: www.ihf.org.
12. Joint Commission for the Accreditation of Healthcare Organizations. Sentinel Event Alert (Issue 49, August 8, 2012): Safe use of opioids in hospitals. http://www.jointcommission.org/assets/1/18/SEA_49_opioids_8_2_12_final.pdf
13. ISMP. Medication Safety Alert! *Acute Care*. 2007;12(3):2-4.



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