The Challenge: Improving PCA Safety

Typical Patient-Controlled Analgesia (PCA) System:

Patient can call to request more analgesia, but, cannot call for help when over-medicated.
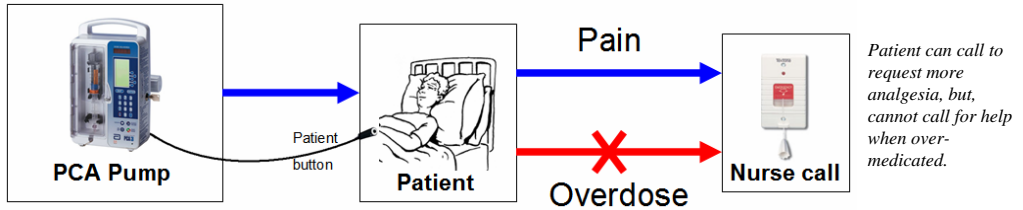
- PCA systems are unnecessarily unsafe. Once over-sedated, a patient cannot call for help.
- PCA system safety can be improved through new technology and medical device interoperability to effectively detect respiratory compromise, pause the infusion, and notify a clinician.
- Medical device interoperability can be leveraged in many different clinical scenarios, using diverse devices, to improve patient safety and efficiency.

APSF PCA Recommendations

The **APSF Newsletter of Winter 2006-2007** reported on the Board's workshop and white paper on the "Dangers of Postoperative Opioids" and included the following recommendations:

- "We advocate widespread acceptance of the goal that no patient shall be harmed by opioid-induced respiratory depression in the postoperative period.
- Thus, immediately, we urge health care professionals to consider the potential safety value of continuous monitoring of oxygenation (pulse oximetry) and ventilation in patients receiving PCA or neuraxial opioids in the postoperative period.
- A particularly attractive feature may be the <u>ability to automatically terminate</u> or reduce PCA (or PCEA) infusions when monitoring technology suggests the presence of opioid-induced respiratory depression. To facilitate such capabilities, we strongly endorse the efforts to develop international standards for <u>device interoperability</u> and device-device communication."

This exhibit demonstrates how interoperability could be used to integrate monitors and PCA pumps to implement the APSF recommendations.

PCA Adverse Events Data

Source: F. Overdyk et al. Continuous Oximetry/Capnometry Monitoring Reveals Frequent Desaturation and Bradypnea During Patient-Controlled Analgesia. *Anesthesia and Analgesia*. 105(2):412-8 (August 2007).

Variable level	# of patients	Pulse Oximetry: SpO2 < 90% 3 or more consecutives minutes			Respiratory Rate: RR < 10 3 or more consecutives minutes		
		# of RD	%	95% CI or P-Value	# of RD	%	95% CI or P-Value
All patients	178	21	11.80%	7.5-17.5%	73	41.00%	[33.7, 48.6]
Background infusion	103	8	7.80%	0.06	33	32.00%	<0.01
Supplemental O2	15	4	26.70%	0.08	11	73.30%	0.01

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