Continuous Monitoring of Patients on Opioids: Capnography Initiative at BJC Healthcare

Friday

October 14, 2016

AAMI FOUNDATION

AAMI Foundation

Vision: To drive the safe adoption and safe use of healthcare technology

- ***National Coalition for Infusion Therapy Safety***
- ***National Coalition to Promote Continuous Monitoring of Patients on Opioids***
  - ***Compendium: Opioid Safety & Patient Monitoring***
- ***National Coalition for Alarm Management Safety***
  - ***Compendium: AAMI Foundation Management of Clinical Alarm***

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Type a question into the question box on the webinar dashboard.

Polling Questions

Speaker Introduction

Paul E Milligan, Pharm. D.
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Continuous Monitoring of Patients on Opioids: Initiatives at BJC Healthcare

Paul E Milligan, Pharm. D.
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AAMI Foundation & The National Association of Clinical Nurse Specialists.

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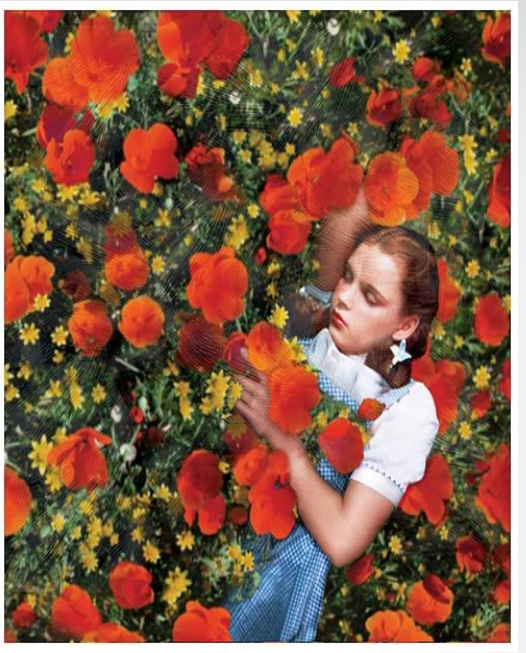
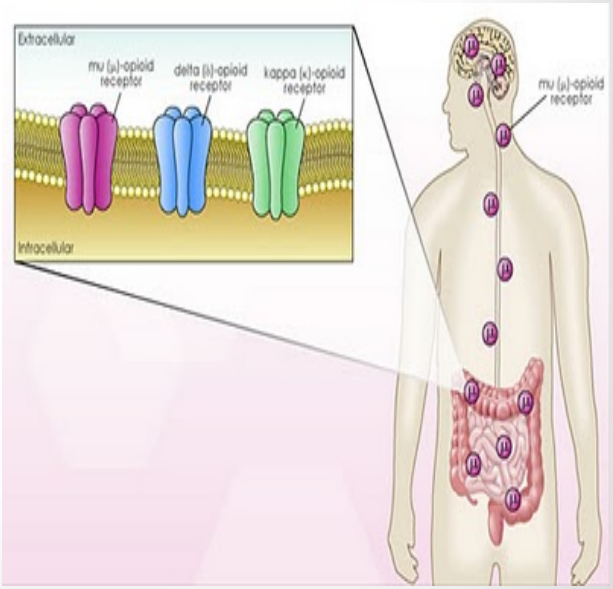
Why Do We Give Opioids?



- Medications used to treat moderate to severe pain
  - Derived from the poppy plant
- Actions:
  - Pain relief– raise pain threshold
    - Considered the gold standard
    - Euphoria which can lead to abuse
- How?
  - Bind to Mu (μ) receptors in brain
  - Mu (μ) receptors are <u>not only in the brain</u>
  - Also in smooth muscle
    - **Respiratory depression**
      - overdose can lead to death
    - Sedation (CNS) / Hypotension
    - Nausea/Vomiting
    - Constipation (treatment for diarrhea)
  - 2016 warning to avoid prescribing with other sedatives[1]



1.http://www.fda.gov/Drugs/DrugSafety/ucm518473.htm

More Opioids = More Risk

- National Perspective
  - Opioids involved in almost One-Half of all deaths from Medication Errors[1]
  - One-Third hospital codes due to respiratory depression[2]
  - 20,000 post-op patients receive naloxone annually[3]
  - US Healthcare costs associated with post-op respiratory failure total $2 Billion[4]

- **Inpatient**: A 2013 national study found that opioids were used in more than half of hospital admissions of *non-surgical* patients, ranging from 33% to 64%.[5]

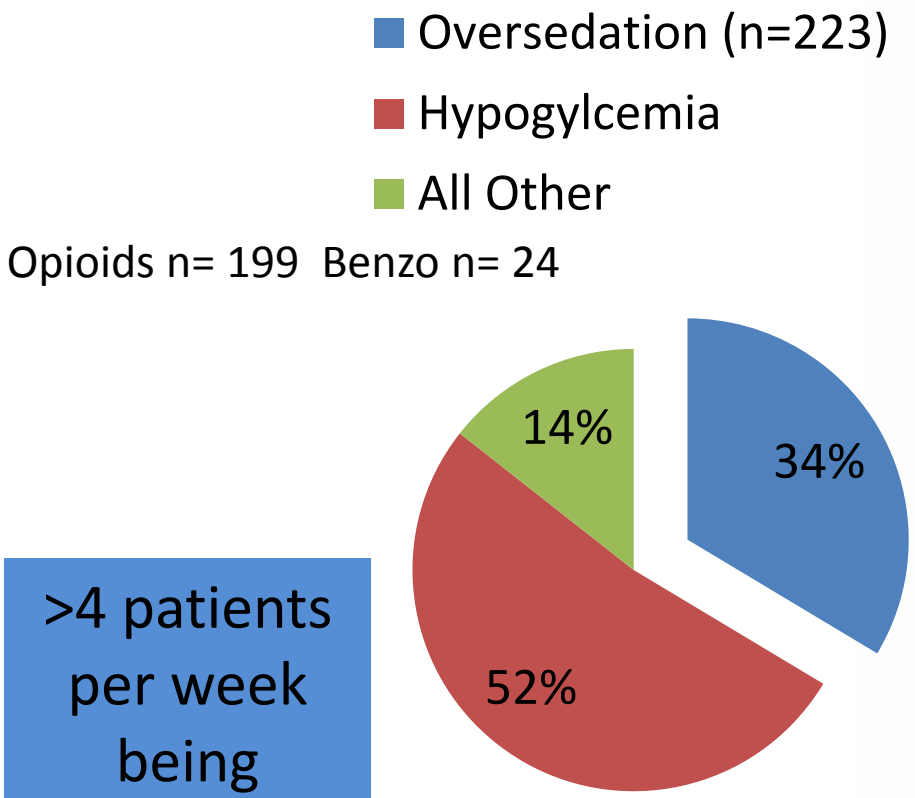
1. Colquhoun M, Koczmara C. Canadian Journal of Hospital Pharmacy. 2005;58:162-4.
2. Fecho K, Freeman J, Smith FR, et al. Therapeutics and Clinical Risk Management. 2009; 5:961-8.
3. Rothman, Brian AAMI Foundation. American Dental Association, Chicago, IL. 14 November 2014
4. .https:// www.cpmhealthgrades.com/CPM/assets/File/ HealthGradesPatientSafetyInAmericanHospitalsStudy2011.pdf. Accessed Dec. 2, 2014
5. 2. HERZIG SJ, ROTHBERG MB, eT. (2014), OPIOID UTILIZATION AND OPIOID-RELATED ADVERSE EVENTS IN NONSURGICAL PATIENTS IN US HOSPITALS. *J HOSP MED.* 9: 73-81.

Case Study: Inpatient Oversedation Risk

- Do you know the oversedation rate at your hospital?

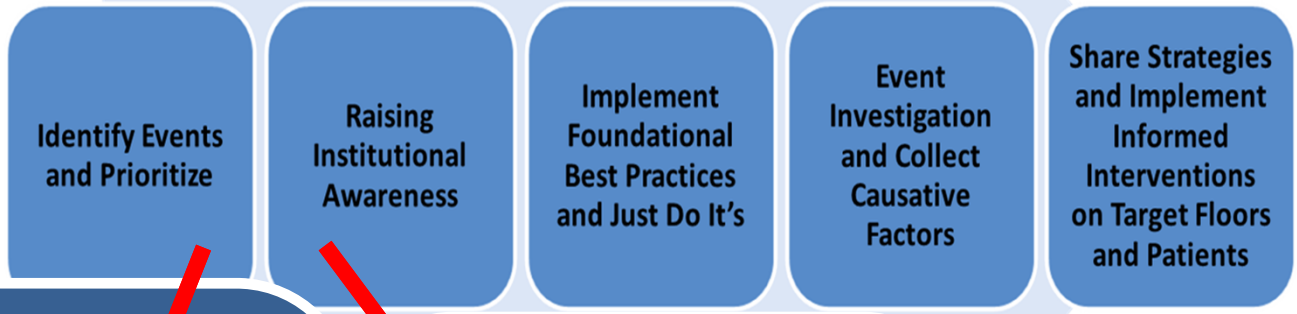
- We developed a robust method of identifying:
  - Valid
  - Comprehensive
  - Reproducible

2015 Percent of ADEs at BJC



>4 patients per week being emergently reversed!

BJC's Improvement Process



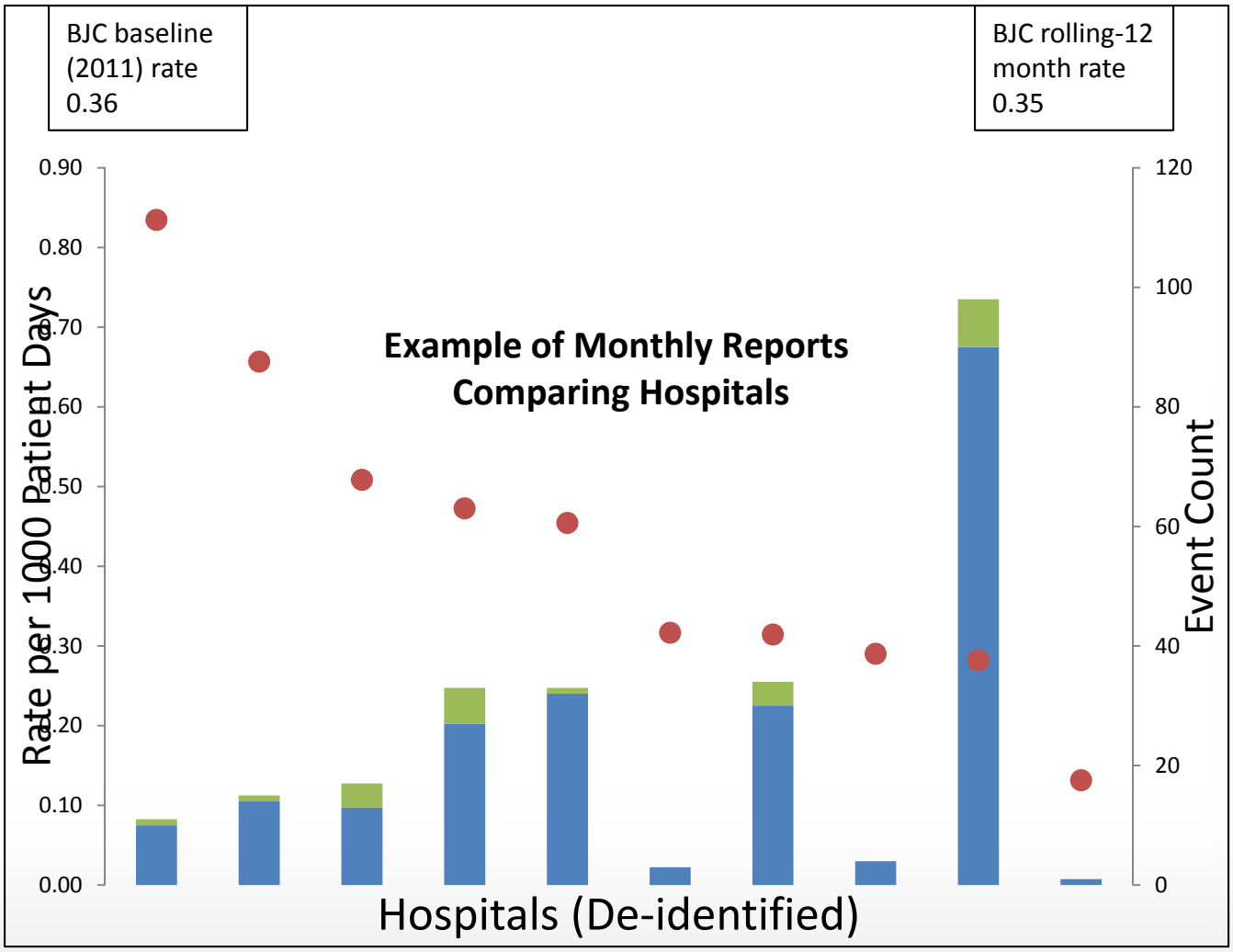
- We designed an ADE measurement process that was:
  - Semi-automated
  - Comprehensive
  - Reproducible

- Formed system task force and identified key stake holders.
- Reported event rates widely
- Compared hospitals and even nursing units

<u>What gets measured gets managed!</u>
Stakeholder Acceptance
Case Building
Project Prioritization

Oversedation Events- Rolling 12 Months:

April 2015-March 2016



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BJC's Improvement Process

- **Discovered system, regional, and national best practices**
- **Recommended a standard sedation scale and capnography**

Initial projects identified for action by OS Task Force

Start Now

- Develop prescribing limits and/or make sure order sets comply with ISMP guidelines
- Institute near real-time audit and feedback on events (all or F-I) using a standardized protocol
- Enter all events in Safety Event Monitoring System and send event forms to appropriate MD
- Complete TJC Sentinel Event Alert Survey and comply

Pilot Projects

- Capnography
  - 18% of our ADEs are on PCA
- Nurse Education
- All PCAs on Smart Pumps
- Develop Clinical Decision Support (CDS) for high-risk patients

BJC's Improvement Process

- **Developed a Narcotic Event Analysis Tool (NEAT)**
- **Collected Causative Factors**

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Narcotic Event Analysis Tool (NEAT) Causative Factor Choices

Select all causative factors associated with the event (when harm is found)

- ☐ Concurrent administration of more than one opioid
- ☐ Concurrent administration of opioid and benzodiazepine
- ☐ Concurrent administration of opioid and another sedative (Please add contributing drug below)
- ☐ Surgery/procedure
- ☐ Patient or visitor misuse (e.g. PCA by proxy, patient own med)
- ☐ Administration error
- ☐ Renal impairment
- ☐ Hepatic Impairment
- ☐ Opioid naive
- ☐ Dosing not appropriate (other)
- ☐ Lapse in monitoring of patient status
- ☐ History of respiratory disease (obstructive or central sleep apnea, severe COPD)
- ☐ Obesity (BMI >=30)
- ☐ Concurrent use of PCA plus another opioid
- ☐ No causative factor discovered during investigation

Slide 17

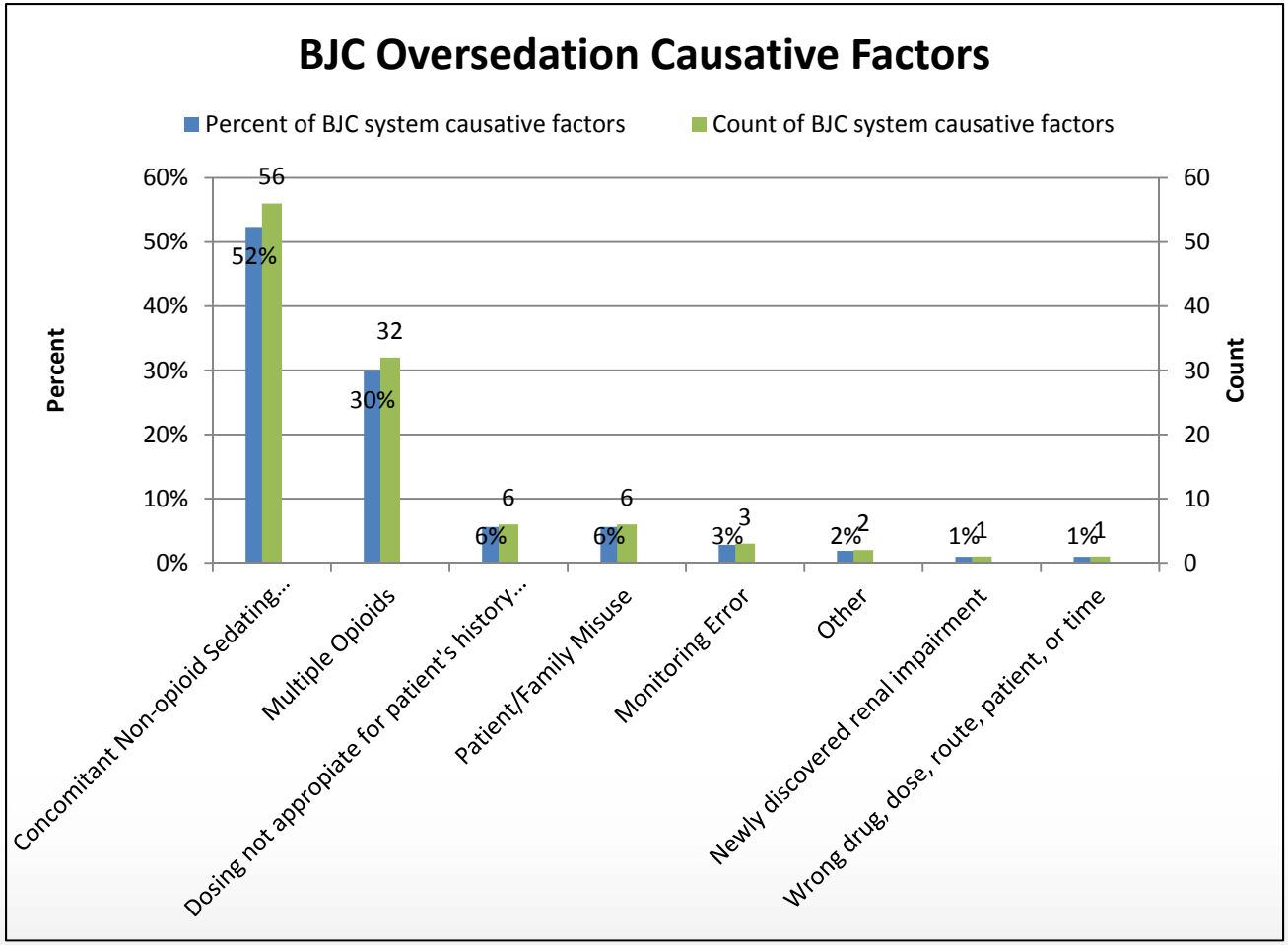
GD2 I don't understand the question
Giarracco, David, 5/31/2016

PM3 Will clarify. These are the causative factors that we select
Paul Milligan, 6/3/2016

PM4

BJC System Causative Factors Percentages

October 2015-March 2016



Slide 18

PM4 Review monitoring errors. They may have been low, but we were making little progress on prescribing.....

Paul Milligan, 6/26/2016

BJC's Improvement Process

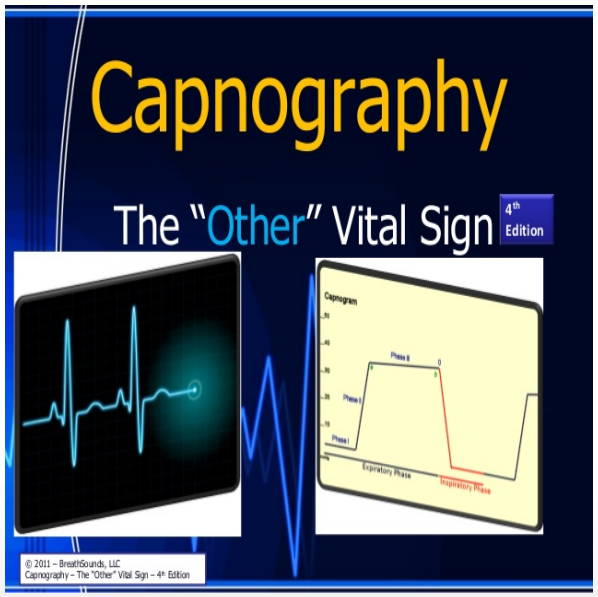
Our Taskforce investigated and piloted 3 different vendors, choosing Medtronic Capnostream 20 ™ for implementation.

- **Targeted Hospitals**
- **Began implementation of capnography on Highest Risk patients**

Capnography Growing at an Accelerated Rate

1999 - 2007	2008 - 2010	2011 - 2015
8 statements in 8 years	**8 statements in 3 years**	**51 statements from Mar 2011– Mar 2016** **(10 per year)**

16 statements in 12 years
(~1 per year)



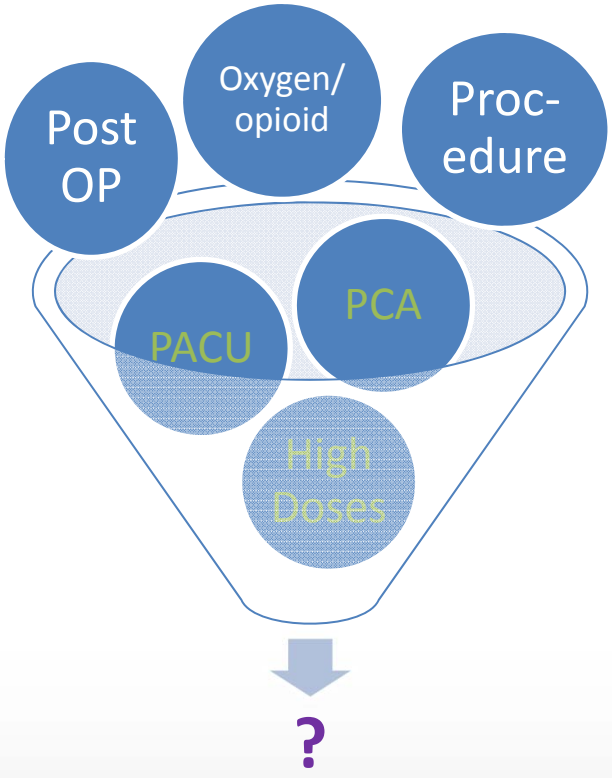
Identifying The Highest Risk Population

- Leadership was reluctant to start with all patients on opioids
- At least 7 other local hospitals are utilizing capnography at the bedside **only** on patients receiving a PCA.

Since less than 20% of our oversedation events at BJC occur to patients on a PCA, the group conducted a test of several hypothesis based on risks found in the literature to identify a patient group that would identify a larger percentage of our patients.

We Are Evidence Based!

- We tested several hypothesis to identify our patients at highest risk.



And The Winner Was……..

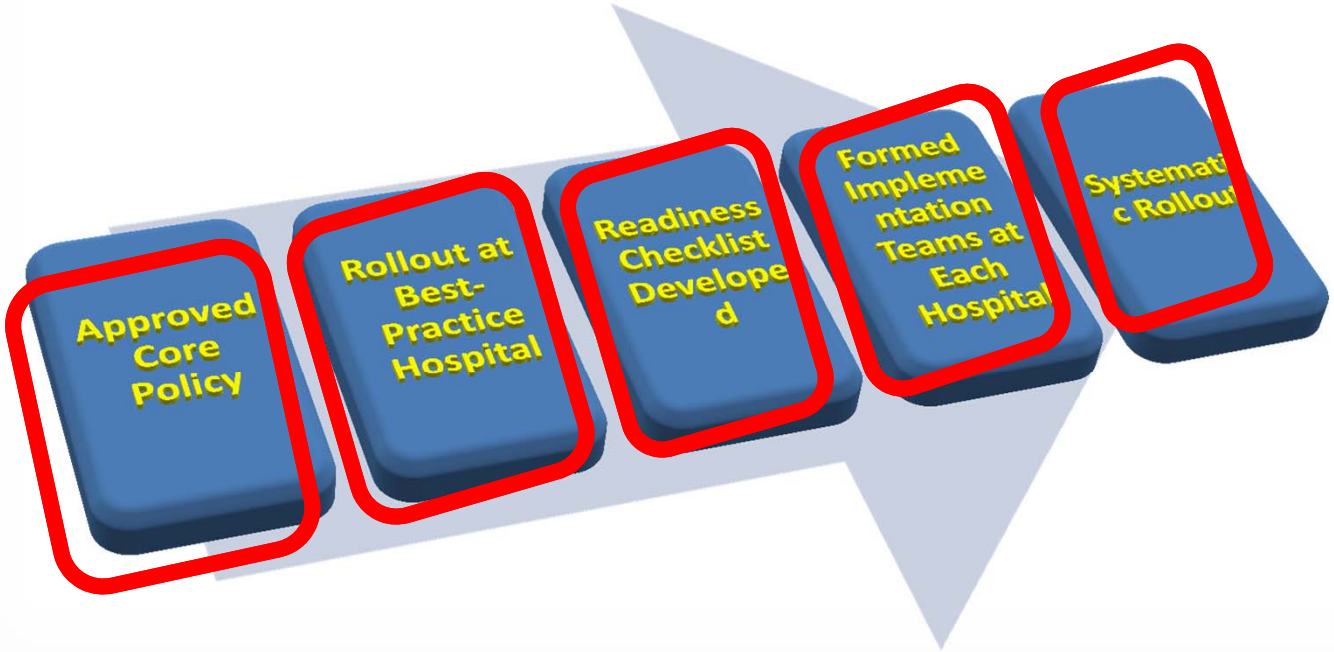
- **<u>Oxygen and Opioids!</u>**
  - 54% of patients had a concurrent **order** for parenteral narcotic and actively receiving supplemental oxygen prior to the oversedation event. (vs. 18% on PCA)

<u>From the Core Policy*</u>

Continuous End Tidal Carbon Dioxide (Capnography, EtCO2) monitoring is required (unless otherwise determined by provider) for early detection of over sedation in adult hospitalized patients actively receiving supplemental oxygen along with an active order for a parenteral (IV/PCA, Epidural and IM) opioid.

*Minimum Requirements: Can Be Broadened But Not Made More Restrictive

Bedside Capnography Implementation Process



Lessons Learned From Rollout: People

- Have leadership role on the implementation team
- Engage all stakeholders as early as possible
- Prescriber, nursing, and patient acceptance has been very high
- Vendor support has been strong, though repeat education needed is some areas
- Nurse manager introduction of vendor educators will help engagement of staff
- Hospital embraced leadership role and have been tracking issues which will be shared

Lessons Learned From Rollout: Policy

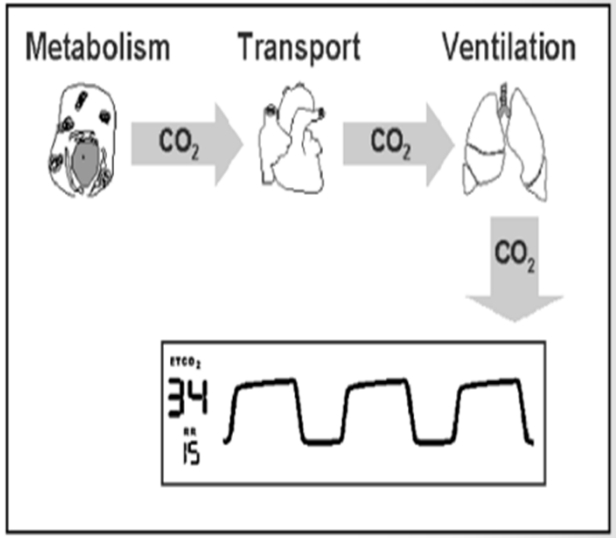
- Application of policy in ICU settings may not be of benefit
- Hospitals are modifying policy to allow nurses to begin capnography at their own discretion
- Capnography usage quickly spread to other areas of the hospitals- ER, PACU, etc.
- One large community hospital monitors all patients on a parenteral opioid (independent of oxygen) and several have added all patients on basal rate PCAs
- Modification of Alarm settings have big impact on nurse and patient satisfaction without compromising safety- policy modified

Progress, So Far….

- Rollout complete at 11 of 12 hospitals
  - Academic hospital testing alarm management technology to rollout simultaneously
- Nationwide recall of device interrupted rollout. (Battery issue discovered at one of our hospitals)
- Currently assessing adoption by all nursing units for all high-risk patients
- Piloting a wireless alarm management program
- Anticipating answers to key questions…….

Working On Answers To the Following Questions

- Is our high-risk population a good start?
  - If not, re-evaluate.
  - If yes, look for expansion.
- Have we implemented properly?
  - If not, retrain.
  - If yes, continue to work on alarm management.
- Does Capnography work?
  - If not, Hmmm.
  - If yes, Double Down!
- Currently: *"There is a statistically significant difference in the proportion of oversedation events between high-risk patients on and off capnography."*



Conclusion & Suggestions

Using a systematic approach to identifying patients at highest risk can provide a stepwise approach for implementation of capnography across a health-system. Once the technology is on-site, it has expanded to other patient care areas and patient populations.

How To Take Action:

- Get attention
  - Measure your events!
- Build your case
  - Literature and National Recommendations
- Identify highest risk patients
- Implement

Future/Ongoing Initiatives

Mark Your Calendars!

October 28, 2016; 12pm to 1pm EST

Are You Connected?
Get Ready to Reduce Alarms,
Avoid Alarm Fatigue and
Improve Patient Safety

Cathy Sullivan, MSN, RN, FNP, CCRN
Associate Director Sourcing
Mount Sinai Beth Israel, NYC

Learn how to:
Reduce pumps alerts & associated alert fatigue
Improve compliance with drug library use

https://attendee.gotowebinar.com/register/1102919389340451586

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