## EXEMPLARY PROFESSIONAL PRACTICE SIGNIFICANTLY REDUCES POST-OPERATIVE RESPIRATORY FAILURE RATES



Kimberly Latham BSN, RN, CCRN Tamera Bird BSN, RN, CCRN Victoria Roelker, RRT Brenda Johnson, RN, CPAN

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## PACU CNS RT IT SDS Pulmonology Anesthesia Surgery PI

## July 2012

- Two respiratory events occurred that lead to ICU admissions within a one month period.
- Chart reviews led to the conclusion that it was not an oversedation issue but was related to OSA

#### **August 2012**

LEAN OSA team formed to develop an action plan



## GOALS



#### **Goals of the LEAN OSA team:**

- > Perform a literature search
- Conduct a PACU pilot study to assess the scope of the problem at TCH
- Develop a workflow for evaluating patients pre-operative for OSA history or risk for OSA.
- Identify equipment needs capnography and non-invasive positive pressure ventilation (NPPV)
- Develop monitoring and treatment guidelines



#### What the literature says:

 OSA Patients are at a higher risk for peri-operative respiratory complications (24% for OSA vs. 9% for control Group) (Chung, 2008)

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- Numerous OSA Patients remain undiagnosed (82% in men and 93% in women) (Gammon, 2012)
- In the surgical population, a STOP-BANG score of 5 8 identified patients with high probability of moderate/severe OSA. (Chung, 2012).



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## PILOT STUDY RESULTS



The majority (67%) of surgical patients were at high risk for OSA

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 Most of the surgical patients identified as high risk (76%), did not have a diagnosis of OSA prior to admission.



**OSA ASSESSMENT TOOL** 



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STOP BANG

Chung, 2008

- <u>SNORE</u> Have you been told you snore?
- <u>TIRED</u> Are you often tired during the day?
- <u>OBSTRUCTION</u> Do you know if you stop breathing or has anyone witnessed you stop breathing while you are asleep?
- <u>PRESSURE</u> Do you have high blood pressure or on medication to control high blood pressure?
- $\underline{B}MI Is$  your BMI > 28?
- <u>A</u>GE Are you > 50 years old?
- <u>N</u>ECK CIRCUMFERENCE Is your neck circumference >17 (male) or >16 (female)?
- <u>G</u>ENDER Are you Male?

THE MORE QUESTIONS YES - THE GREATER THE RISK



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#### June 2013

- Nursing implemented placing all patients with PCAs on capnography and oximetry
- Continued work on OSA process
  - Post-op algorithm developed
  - Securing funds for APAP Auto-titrating Positive Airway Pressure

#### June 2014

- Initial Go Live with OSA algorithm
- > 15 APAPs were purchased



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## **SDS – Screening**

- Screen all pre-operative patients on admission using the STOP-BANG tool
- Score appears on the Banner in the Patient's Chart

## **PACU – Initiate Monitoring**

- ▶ If STOP-BANG score of  $\geq 5 \rightarrow$ 
  - RN in PACU will place the patient on Capnography monitoring

## Floor Staff Continue Monitoring

- Post Op if patient is to be admitted:
  - > RN will obtain order to continue OSA interventions



## **OSA ORDER PANEL**

#### **Original Orders:**

- > RN could automatically place patient on APAP if criteria met
- Consult to Pulmonary Diseases was not automatic

Procedures (3 Orders)			
	Se la companya de la comp	Remove Group	
Post-Op OSA Intervention			
Routine, ONE TIME First occurrence Today at 0925 Initiate non-invasive ventilation if recurrent respiratory events over 30 minutes per Respirations less than 8 per minute - 3 episodes, 3. Apnea - 3 episodes, baseline If suspected OSA Initiate APAP (Auto-Titration Positive Airway Pressure) patient on Home CPAP/BiPAP If known OSA and patient does not have home uni Positive Airway Pressure)	riod: 1.SpO2 less than 90% - 3 epis 4. Capnography trending of 10 mmH If known OSA and patient brought hom t with them, place them on APAP (Auto-	sodes, 2. g change from ne unit, place Titration	
Continuous Non Invasive Monitoring			
Routine, CONTINUOUS WITH Q4 CHECKS First occurrence Today at 1300 Until Specified Procedures to monitor: EtCO2 and Oximetry Notify physician that patient is using home unit for non invasive ventilation via nasal mask or prongs, and only SpO2 monitoring can be done.			
Patient Education for OSA			
Routine, ONE TIME First occurrence Today at 0925	If need for home unit or APAP us	e is known at	
Patient Home Unit for Non Invasive Ventilation Routine, NIGHTLY, Patient to use post surgery, nightly and PRN while sleeping	the time the order panel is place appropriate box. Same for Pulmo	d check the onary Consult.	
T APAP			
Routine, NIGHTLY, Patient to use post surgery If patient uses non invasive ventilation at home, continue APAP nightly and PRN while sleeping until discharge or home unit becomes available. Otherwise, morning of POD1, remove APAP and continue to monitor Capnography for the first 4 hours, nightly or when sleeping Use APAP after POD1 if sustained respiration are less than 8, SpO2 less than 90% or change of EtCO2 by 10 from baseline AND notify physician Patient may take off APAP to eat, drink or ambulate			
Inpatient consult to Pulmonary Diseases			
Routine, For OSA Evaluation and/or Management			

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### Challenges

- Confusion around the difference between OSA & PCA monitoring
- Reluctance from anesthesia to give OK for both the monitoring and potential treating OSA without further workup.
- Patients expressed discomfort with capnography monitor
- Staff reports a lot of false alarms



SIX MONTH EVALUATION PACU CNS RT IT SDS Pulmonology Anesthesia Surgery

## **Solutions**

- Group reconvened to review the process
  - Changes made to post anesthesia order set to empower nursing to implement monitoring based on an anesthesia order.
  - > OSA post-op order set created with two distinct sections, one for monitoring and the other for treatment.
  - Physician to evaluate the patient and if indicated will place orders for OSA intervention i.e. APAP, Pulmonary Consult
  - Evaluation and purchase of new monitors.





NESTHESIOLOGY POSTOPERATIVE ORDERS: FOR PACU AND SDS ONLY Manage My Version -
Anesthesiology Postoperative Orders: for PACU and SDS Only
🗢 General
May access Port a Cath for IV access and Deaccess Port a cath prior to Discharge Until Specified
✓ O2 per nasal cannula
Routine, PACU PRN ONCE starting Today at 1149 Until Specified Liters per minute; 2
If RA SaOx less than 90, notify anesthesiologist and maintain 2 L/min until AM
MONITORING
ONE TIME First occurrence Today at 1150
Call Surgeon for additional orders unless PCA requested
PACU CONTINUOUS starting Today at 1150 Until Specified
Hang additional bottle of IV fluids pending receipt of surgeon's orders PACU CONTINUOUS starting Today at 1150 Until Specified

Post-op Anesthesia orders give direction for the PACU nurse to place the Post-op OSA Monitoring order if the patient has a history of OSA or a score of <u>></u> 5





#### Post-op OSA Monitoring Order Panel:

🗢 Post-op OSA Monitorin	ng
- OSA MONITORING	
To be placed if patient has	an OSA score of greater than or equal to 5, or if patient has a history of
OSA	
Post-op OSA Monitor	ing Panel
Continuous Non I	Invasive Monitoring (OSA)
	Routine, CONTINUOUS WITH Q4 CHECKS First occurrence Today at 1300 Until
	Specified
	Procedures to monitor: EtCO2 and Oximetry
	May be off monitor for ambulation., PACU and Post-Op, Sign & Hold
🔽 Notify anesthesia	(if patient in PACU) or notify surgeon (if patient on the floor) if:
	Routine, PRN starting Today at 1207 Until Specified
	If any of the following 1. SpO2 less than 90, 3 episodes in 30 minutes 2.
	Respirations less than 8 per minute, 3 episodes in 30 minutes 3. Apnea, 3
	episodes in 30 minutes, 4. Capnography trending of 10 mmHg change from
	baseline, PACU and Post-Op, Sign & Hold
Patient Education	for OSA
	Routine, ONE TIME First occurrence Today at 1210
	PACI and Post-On, Sign & Hold



#### Post-op Non-Invasive Ventilation (NIV) – 2 Order Panels:

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Post-Op Non-Invasive Ventilation for OSA

v Non-Invasive Ventilation for OSA

O Patient has/uses Home Unit

O APAP (Initial Use)

#### 1. OSA diagnosed patients with previous NIV experience:

#### where the second se

• Patient has/uses Home Unit

C Home CPAP/BiPAP

Routine, NIGHTLY, Starting 2/6/15 Until Specified, Notify Surgeon if: patient is using home unit for non invasive ventilation via nasal mask or prongs, and only SpO2 monitoring can be done. Continue nightly and PRN until discharge., PACU and Post-Op

C APAP (in place of Home Unit)

Routine, NIGHTLY, Starting 2/6/15 Until Specified, Continue nightly and PRN until discharge., PACU and Post-Op

> Provider chooses if patient should use own unit or the hospital unit.



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#### 2. APAP Initial Use Order Panel

Post-Op Non-Invasive Ventilation for OSA		
	n for OSA	
O Patient has/uses Home	Unit	
APAP (Initial Use)		
APAP for Non-Invasiv	e Ventilation	
	Routine, NIGHTLY First occurrence Today at 2100 Until Specified Continue nightly and PRN, PACU and Post-Op, Sign & Hold	
🔽 Notify surgeon if APAI	P is needed upon transfer from PACU to the floor	
	PACU PRN ONCE starting Today at 1208 Until Specified PACU, Sign & Hold	
🔽 Inpatient consult to P	ulmonary Diseases	
<b>U</b>	Routine, ONE TIME First occurrence Today at 1210 Reason for consult: Initial APAP usage after surgery PACU and Post-Op, Sign & Hold	

Consult to Pulmonary Diseases is now automatic for patients who have not previously used home unit



## **JOURNEY TIMELINE**

#### February 2015

- SA Order Set live in production
- Revision to the PCA order set to include capnography monitoring until patient was off PCA.

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#### **April 2015**

- New ROOT Monitors for capnography and oximetry monitoring 100 units
  - > Utilizes different cannula no more uncomfortable scoop!
  - Has standby mode that can be utilized for ambulation, bathing, & therapy to reduce false alarms



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## **PROCESS MEASURES**



Compliance of OSA Screening of Patients Admitted through Same Day Surgery



The Christ Hospital<sup>™</sup> Health Network

#### Compliance with Monitoring Guidelines for patients with History of OSA or STOP-Bang score of 5 or greater

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-% Compliant --Goal



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## OUTCOME MEASURES



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- Postoperative Respiratory Failure rate decreased from 1.6% to 0.28% (p < 0.004)</p>
- Measure Definition: All inpatients who had surgery and a diagnosis of respiratory failure not present on admission



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**OUTCOME MEASURES** 



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- Emergency response call rates decreased from 0.088% to 0.00% (p< 0.01)</p>
- Upon implementation of new OSA protocol an increase in emergency calls was noted. However, the call rate decreased as nurses became more empowered through further education and experience to identify and implement interventions.



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## OUTCOME MEASURES



Transfers to ICU from non-tele surgical units decreased from 0.438% to 0.214% (p<0.01)</p>



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# WHAT NOW?

- Should women should receive monitoring if they are a score of 4 or more
- At what point post-operative is it appropriate to stop monitoring?
- Addition of screening and monitoring in Outpatient Surgery Centers
- Screening to become a part of Epic pre procedure navigator.



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# **THANK YOU!**

