Opioid-induced ventilatory impairment in the post- op patient
or
Let sleeping dogs lie

NORTHLAND DISTRICT HEALTH BOARD
Te Poari Hauora Ā Rohe O Te Tai Tokerau

A Healthier Northland
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Is there a problem ???

- Initially a challenge to identify there was an issue
- Limited information available
  - GGT
  - Incidents
  - Stories
- Coding investigated
  - Y450 (Eureka !!)

Time to wake the sleeping dogs

TOP 10
Patient Safety
Concerns
for Healthcare Organizations
2016

Executive Brief

ECRI Institute
The Discipline of Science. The Integrity of Independence.

Anesthesia Patient Safety Foundation (APSF, 2006)

"We believe that unexpected and potentially harmful opioid-induced respiratory depression continues to occur. In most cases, there is inadequate monitoring…of oxygenation and/or especially ventilation, as well as a failure to consider unique characteristics of the patients' history and physical status that place them at higher risk for respiratory depression from opioid analgesics."

Weinger MB. *APSF Newsletter* Winter 2006-2007; 21:61-67.

Y450 Coding data captures opioid related issues

Categories of opioid related harms

Number of harms

250
200
150
100
50
0

100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%

Harm category	Number of harms	Cumulative %
Admit/ Read constip	57	22.4%
IP contsip	44	39.6%
Post op OIVI	36	53.7%
OIVI non post op	33	66.7%
Delirum	32	79.2%
Other	17	85.9%
N & V	15	91.8%
Hypoten	15	97.6%
Allergy	6	100.0%

Harm category

OIVI Opioid induced ventilatory impairment –all patients

All OIVI patients NDHB

Time between Events

100
90
80
70
60
50
40
30
20
10
0

86.93

Improvement work in surgical

Baseline established

7.09

1/28/14 3/28/14 4/8/14 4/16/14 5/13/14 6/5/14 6/15/14 6/24/14 7/15/14 8/18/14 10/4/14 10/8/14 10/20/14 11/6/14 12/28/14 2/7/15 3/8/15 6/17/15 6/28/15 8/9/15 8/12/15 8/19/15 9/11/15 9/29/15 11/5/15 12/26/15 1/12/16 1/20/16 3/1/16 4/3/16 5/21/16 5/26/16 6/18/16 7/22/16 29/09/16

Date/Time/Period/Number

Reducing harm from Opioids

- Aim: Reduce respiratory depression (OIVI) events in the Post-op surgical patients in Whangarei Hospital by 20% by June 30th 2016.

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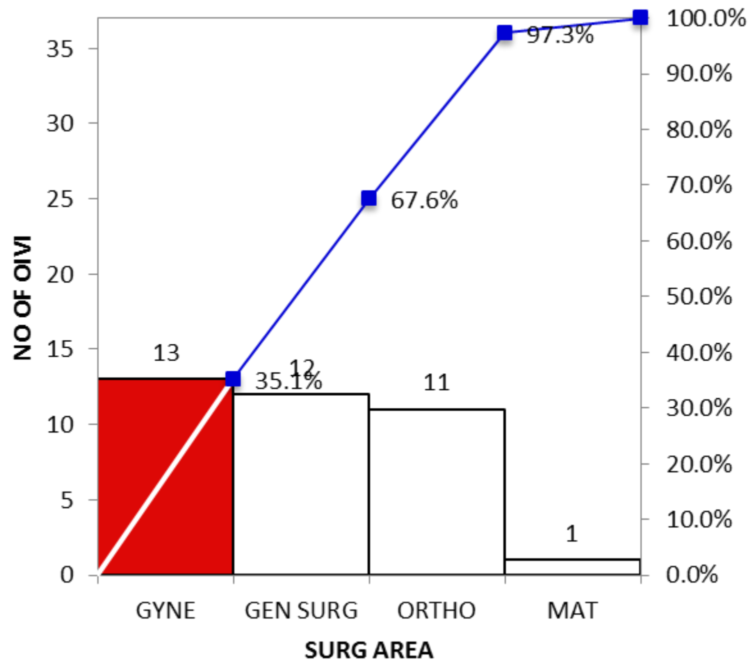
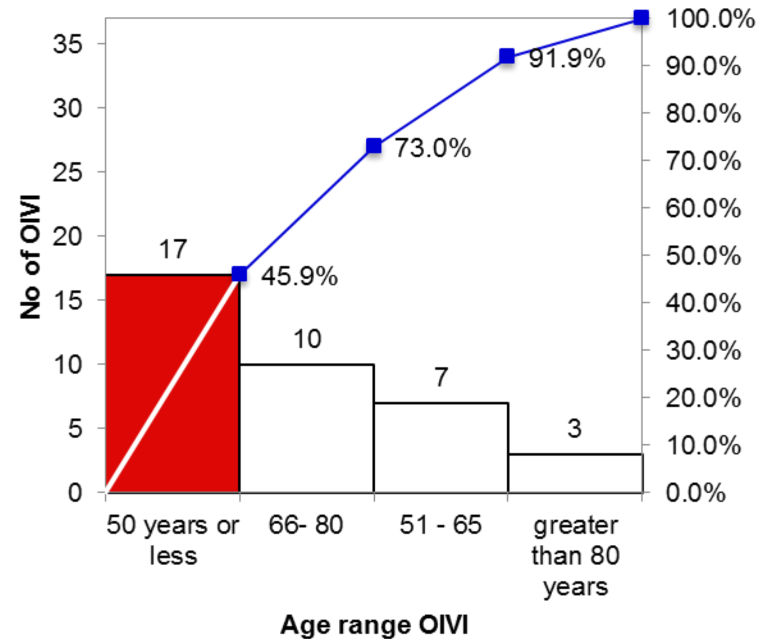
Understanding the problem digging into data

- Y540 data provided useful information on unrecognised issues.
- Providing learning from the OIVI events.
- Ability to track our outcome data – and assess effectiveness of changes.

Post op OIVI





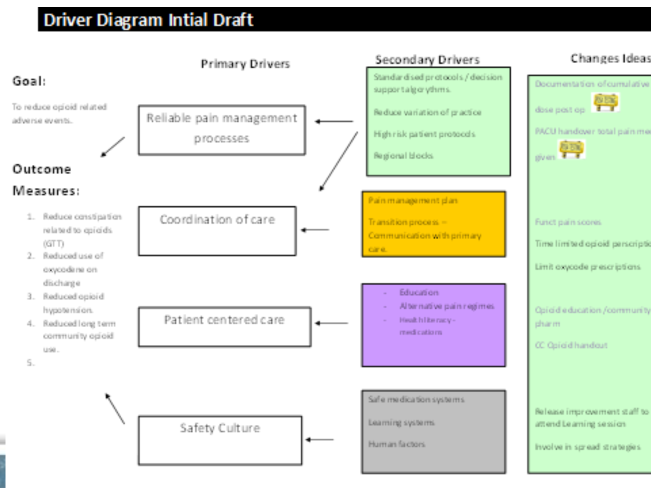
Issues identified

Bugger

- OIVI events in the post op patient occurring on a regular basis (aver 9 days)
- Event occurring in a young patient group than expected (under 50s)
- 70% in women
- OIVI events often occurring shortly after return from PACU
- Almost all OIVI patients on a PCA
- Most patients had an earlier trigger event

Initial change concepts

- Identify those at risk - OSA
- Better communication of opioids given.
- Identify triggers for OIVI –in PACU
- Risk mitigation – naloxone use

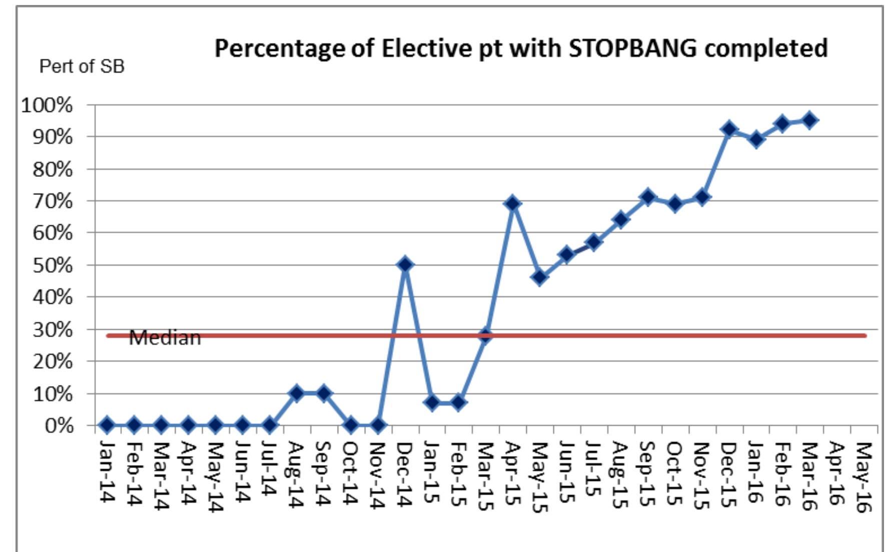


STOPBANG - OSA assessments

STOP Bang

Snoring
Tiredness / sleepiness / fatigue
Observed apnea
P BP (>140/90) Rx or no

Questionnaire



Improved communications of opioid doses

Cumulative opioid sticker

- Sticker used now spread to surgical areas.
- Version for medical patients to be tested

Cumulative Opiate OT/PACU Handover OSA Risk YES/NO

Patient has received... Circle all that apply

GA LA Sedation Regional/Block Epidural PCA Wound/nerve infusion

Intrathecal Morphine Dose__________micrograms at ______ hrs ____/____/____

Naloxone given ________ Dose__________

	PREOP	INTRA OP	PACU
FENTANYL			
MORPHINE			
PETHIDINE			

Plan / Comments:

Narcosis Management Guideline

A THE PATIENT IS AWAKE

V THE PATIENT RESPONDS TO VERBAL STIMULATION

Yes

Respiratory rate greater than 8 breaths per min

Yes → Maintain physiological observations as per EWS chart

No

- **Naloxone administration is NOT warranted at this stage**
- Stop opioid administration and/or remove PCA handset from patient
- Administer 15 litres/min oxygen via face mask
- Monitor and reassess at regular 15 minute intervals until RR > 8
- **Contact Pain Team/Rapid Response Team/ICU team / on-call anaesthetist to discuss concerns**

Preparation & Administration of Naloxone

Naloxone 400microgram/ml 1ml ampoules are available in the emergency box on all crash trolleys.

IM administration - if no IV access
Give naloxone 100-400microgram (using an undiluted ampoule) IM and establish IV access for further boluses.

IV bolus
Dilute 1ml of naloxone 400microgram/ml with 9ml sodium chloride 0.9% to give 10ml of a 40microgram/ml solution.

Give 2 - 3 ml (80 - 120microgram) of this solution IV.
If no response after 2 minutes, repeat IV bolus every 2 minutes to maximum of 400microgram (10ml).
Titrate the dose to reverse respiratory depression without reversing analgesia.

IV infusion
Add 2mg naloxone (5ml of undiluted amps) of to 100ml sodium chloride 0.9% or glucose 5% (dextrose) to give a final concentration of 20microgram/ml.

Usual infusion rate is 5 - 20ml per hour (100 - 400microgram/hr)

Rate of infusion should be adjusted according to the response, and can be increased up to 40ml per hour (800microgram/hr)

Infusion can be commenced on the ward before patient is transferred to HDU/ICU for monitoring

No dose adjustment required for patients with renal dysfunction

Monitoring Requirements :
As per EWS chart – include RR and sedation score Q15min until doctor is satisfied that patient is stable enough for routine observation intervals.

P THE PATIENT RESPONDS TO PAINFUL STIMULATION

U THE PATIENT IS COMPLETELY UNRESPONSIVE

Yes

Respiratory rate less than 8 breaths per minute

No → Consider other causes for decreased level of consciousness.

Yes

- Stop opioid administration and/or remove the PCA handset
- Attempt to waken patient
- Administer 100% oxygen via a non re-breathing mask
- Seek urgent assistance from Rapid Response Team/ICU team/anaesthetist on call. **If respiratory arrest has occurred, ring 777 and declare a CODE BLUE**
- Support ventilation by face mask or Ambu-bag if rate declines further or if respiratory depression persists
- Administer naloxone by IV bolus immediately as per guideline in middle panel.
- **Be aware that respiratory depression can return as the naloxone may act for a shorter time period than the opioid. Consider naloxone infusion. Always involve ICU team where infusion considered.**
- **Alternative analgesia and/or timing of recommencement of opioid should be considered and documented**
- Document events in case notes.

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TITLE: Narcosis Management Guideline			Page 1 of 1
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AUTHORISED BY: Dr Chanchal Ajodha, Anaesthetic MOSS			

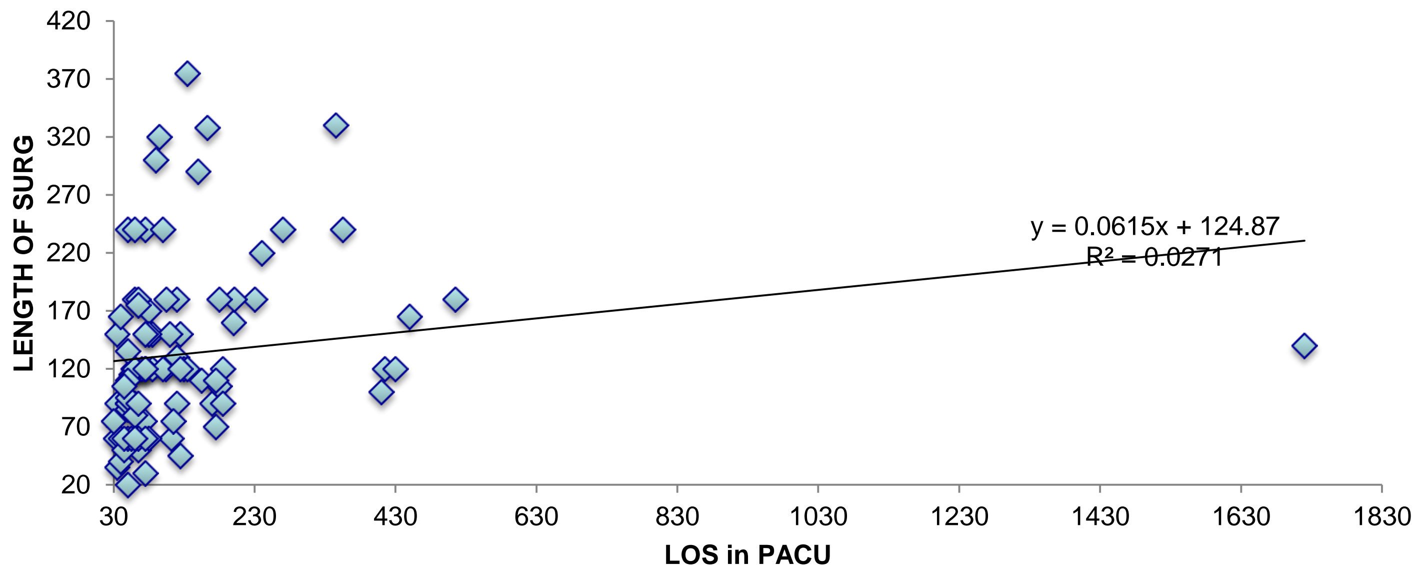
Identifying triggers for OIVI

Review of OIVI patients:

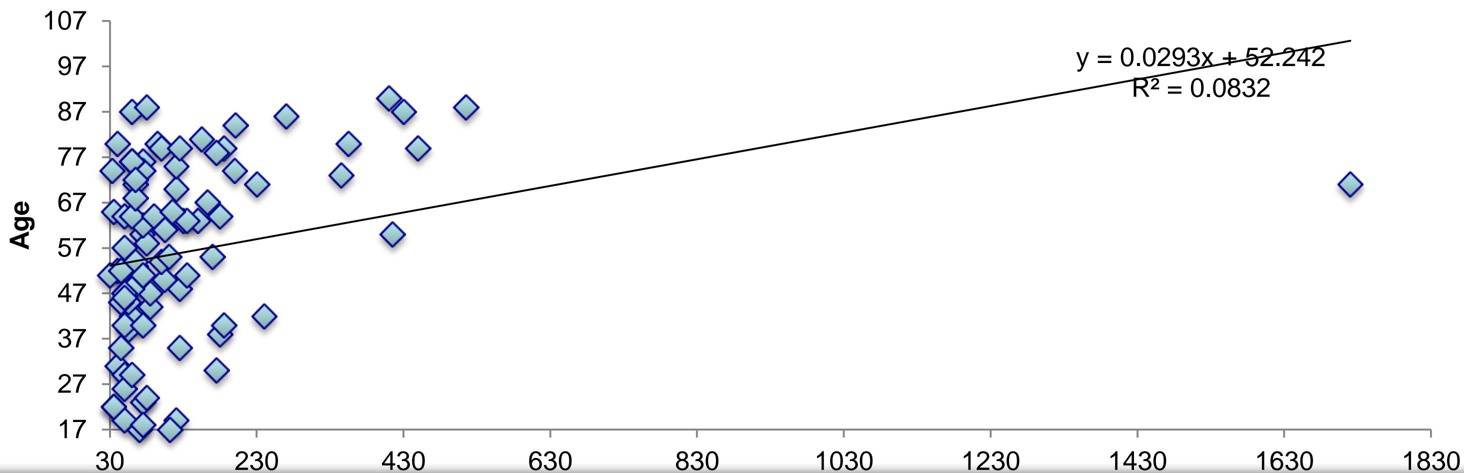
Opioid doses
LOS PACU
Decreases RR
Naloxone use
Sedation
PCA use

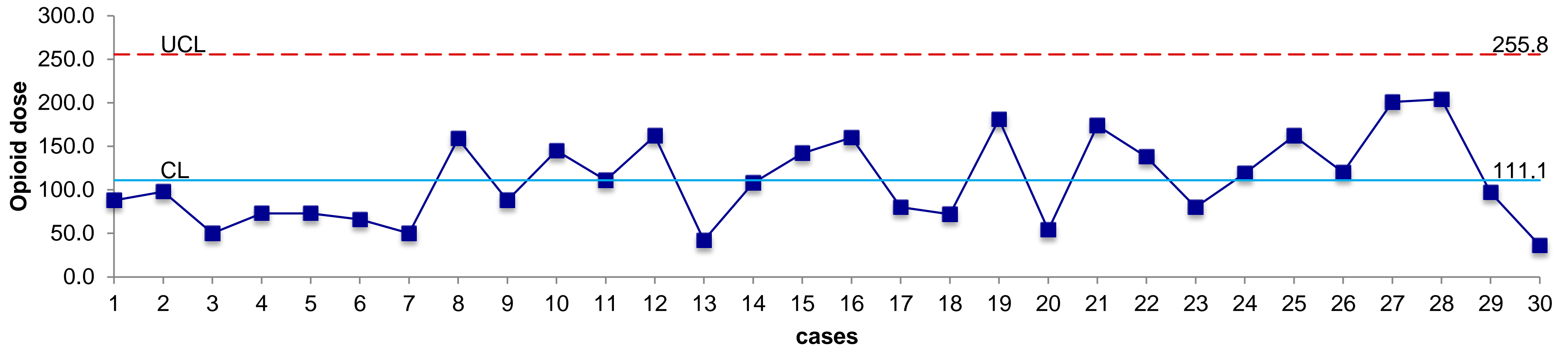
Random audit of surgical patients to look for these triggers and any relationships.

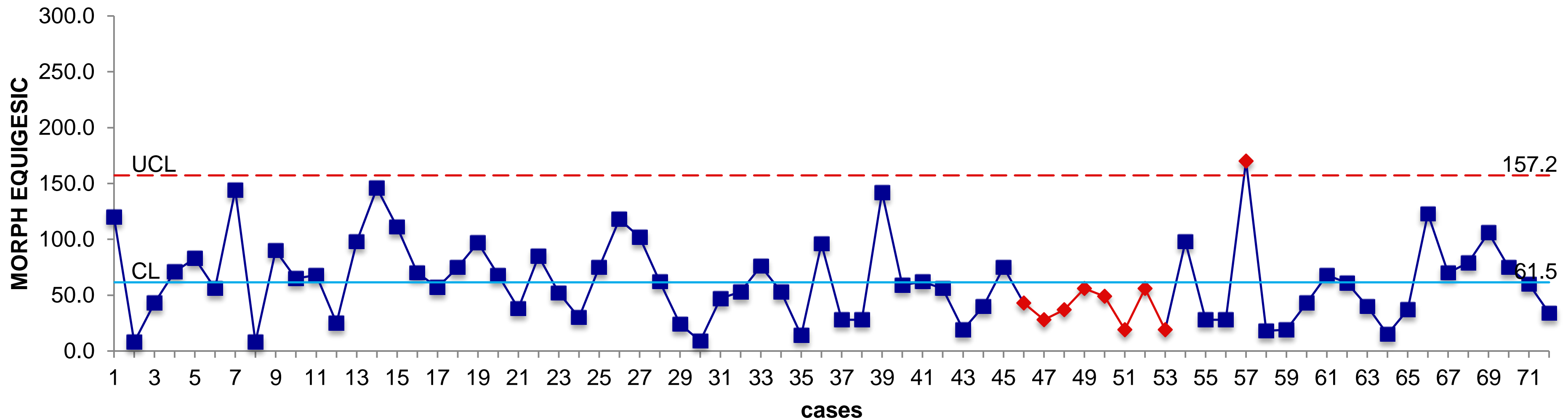
LENGTH OF SURG vs LOS in PACU



Age vs LOS in PACU




Opioid doses given in post-op patients with OIVI
Opioid dose
UCL
255.8
CL
111.1
300.0
250.0
200.0
150.0
100.0
50.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
cases


Random audit opioid dose
MORPH EQUIGESIC
UCL
157.2
CL
61.5
300.0
250.0
200.0
150.0
100.0
50.0
0.0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71
cases

Post Op OIVI results

Time between Post op OIVI

Time between Events

200
180
160
140
120
100
80
60
40
20
0

23.98

28/01/14 1/04/14 16/04/14 10/05/14 5/06/14 19/06/14 3/07/14 18/08/14 4/10/14 22/10/14 8/03/15 24/06/15 12/08/15 9/09/15 29/09/15 6/01/16 1/03/16

Date/Time/Period/Number

= GOOD

First iteration learning

STOPBANG – seem screening effective
•Sticker – improved awareness
? Some Hawthorn effect – changing in anaesthetics
Almost all OIVI patients had PCAs

•Difficult to reliably identify those at risk of OIVI.
•Gaps in knowledge recognising and management of OIVI
•Practice issues in monitoring sedation
•Safe care monitoring ability

Updated theory and changes now being tested

- Moved from respiratory depression to OIVI
- Reducing variation – guideline for prescribing, administration and monitoring for acute pain.
- Multimodal anaesthetics
- Revised process for dx criteria from PACU.
- Sedation score monitoring –integrated into EWS.
- Revised PCA processes
- Revised pre-op process for Gyne

Monitoring changes

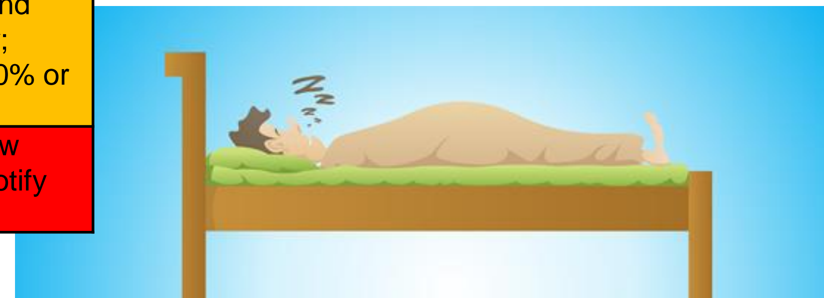
S = Sleep - easy to rouse can stay awake to answer questions	*Acceptable; no action necessary; may increase opioid does if needed*
1 = Awake and alert	*Acceptable; no action necessary; may increase opioid dose if needed*
2 = Slightly drowsy, easily roused	*Acceptable; no action necessary; care in dose increase.*
3 = Frequently drowsy, can be rouse, but drifts off to sleep during conversation	**Unacceptable**; monitor respiratory status, Sa02 and sedation level closely(q 15 -30 mins) until sedation level is stable and less than 3 and respiratory status is satisfactory; decrease opioid dose 25% to 50% or notify prescriber. Consider administering a non-sedating opioid sparing such as paracetamol or a NSAID, if not contraindicated**.**
4 = Very drowsy, minimal or no response to verbal or physical stimulation	**Unacceptable, stop opioid, follow OIVI management guidelines notify medical staff monitor respiratory status, Sa02 and sedation level continuously until sedation level is stable at less than 3 and respiratory status is satisfactory**

Route	**Frequency of monitoring (Respiratory rate, sedation and pain score)**		
IV Protocol	Prior to administration	Every 5 min. during protocol	After last dose every 5 min for 15 min then every 30 min. for 2 hours
PCA	½ hourly for 4 hours	Hourly for 4 hours	4 hourly until PCA stopped
Epidural	½ hourly for 4 hours	Hourly for 4 hours	2 hourly for 4 hours 4 hourly until epidural stopped
IT Morphin e	*Hourly for first 24 hours		* Respiratory rate, sedation and pain score as per this table
Oral Opioids	Prior to administration	1 hour after administration 4 hourly thereafter	Remaining observation as per patient assessment requirements

NEW KEY MESSAGE

Falling asleep mid- sentence implies excessive sedation and risk of OIVI.

		Description	Opioid management
0	A	Pt. awake, alert or sleeping. When sleeping, is easy to rouse and stays awake to answer questions.	Acceptable; no action necessary; may increase opioid does if needed
1	V	Pt. wakes to voice. Slightly drowsy, but easily roused	Acceptable; no action necessary; care in dose increase.
1	A	Pt. displaying signs of new altered cognitive function or confusion	Concerning; asses for changes in condition, increase monitoring
2	P	Pt. responsive to pain. Frequently drowsy, can be roused but drifts off to sleep during conversation.	Unacceptable; monitor respiratory status, Sa02 and sedation level closely(q 15 -30 mins) until sedation level is stable and less than 2 and respiratory status is satisfactory; decrease opioid dose 25% to 50% or notify prescriber.
3	U	Pt. is unresponsive. Very drowsy, minimal or no response to verbal or physical stimulation.	Unacceptable, stop opioid, follow OIVI management guidelines notify medical staff.



PACU Safe Dx Bundle

- Sedation score ≤ 2 (Passero) on Dx
- Patients with higher risk identified
- Cumulative opioid dose (Sticker and handover)
- Resp rate criteria
- Discharge time post last IV opioid dose criteria

Key Learning and Challenges

- Significant under estimation of this issue.
- Coding a useful source to identify this and other clinical issues.
- Patient stories and Data stories needed to Build WILL for change.
- Need for a paradigm shift – from respiratory depression to OIVI – Opioid induced ventilatory impairment.
- Challenges in designing reliable processes to reduce incidents, also need be able to detect and appropriately manage those events that do occur.

- SEDATION SCORES AND MONITORING

QUESTION ????

"All that stands between us and universal post-operative monitoring is the will to require it"

Lenore Alexander