Statement on

Preventing Harm from Oversedation in Adult Hospitalized Patients

Oregon Patient Safety Commission
Workgroup on Oversedation

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Introduction

Over the past six years the Oregon Patient Safety Commission has received a number of adverse event reports involving hydromorphone (Dilaudid)/morphine dosing confusion, conscious sedation issues, or unexpected deaths in patients receiving pain medications. These reports, along with comments from the medical quality officer at a large Oregon hospital, prompted the Commission to convene a workgroup. Its charge was to identify strategies that could be shared with all Oregon hospitals to decrease the risks associated with opioids and other sedating medications.

The multidisciplinary workgroup was comprised of pharmacists, physicians, nurses, and quality specialists representing large and small hospitals and hospitals in urban and rural settings. Additionally, a subgroup included respiratory therapists, anesthesiologists, and a sleep specialist addressed specific risks in surgical patients with obstructive sleep apnea (OSA). We want to thank the many healthcare professionals who gave of their time to participate in the workgroup and to review drafts of the statement. In addition to the contributors, we would like to thank Jean Henderson, MD; David Hickam, MD; Nicole Wade, RT; and Jennifer Williams, MD.

As in many areas of healthcare, our understanding of sedation risk is growing, and technologies for patient monitoring are increasingly sophisticated. We therefore provide selected guidance for the components of an oversedation prevention program within a framework that allows each hospital to develop more detailed strategies based upon patient characteristics, practice parameters, and changes in knowledge. Where evidence was lacking, the group drew upon their collective expertise in creating recommendations.

Purpose: Describe strategies to prevent opioid over sedation in adult hospitalized patients.
Scope: Adult medical and surgical acute care patients who receive opioid therapy for acute pain management; patients admitted for the treatment of chronic pain and palliative care patients are excluded from these strategies.

This statement is offered as a starting point for hospitals to use in their efforts to decrease patient harm associated with sedation and is consistent with The Joint Commission's recent Sentinel Event Alert, Safe Use of Opioids in Hospitals (2010).

Executive Summary

Oversedation results when the level of the patient's sedation is greater than the desired therapeutic level of sedation. It can be associated with significant actual or potential patient harm such as respiratory depression, falls, and aspiration. The risk of oversedation is present in all patients receiving opioids, other respiratory depressants, or sedating agents. In particular, four medications (morphine, fentanyl, hydromorphone, and meperidine) are disproportionately involved in harmful medical errors. In addition, a number of agencies have issued alerts and advisories regarding the risks associated with dose confusion between hydromorphone (Dilaudid) and morphine.

Factors that contribute to the risk of adverse events from oversedation are numerous and varied, encompassing both patient and health system factors. Among the health system factors are variations in medication availability, differing physician preferences, changing manufacturer doses, and inconsistent monitoring practices. Surgical patients, particularly those with serious undiagnosed obstructive sleep apnea (OSA), are at risk when receiving potent analgesics following anesthesia.

Since a range of factors could contribute to unintentional oversedation and its associated risks, any strategy for eliminating oversedation should begin with a sedation risk assessment, including consistent, standardized approaches to pain management and careful respiratory monitoring. Clear communications among hospital personnel and with the patient or family are equally important. Accordingly, the Commission's workgroup recommends that Oregon hospitals develop an oversedation prevention program, to include:

- Screening of inpatients for possible sleep apnea with a validated tool such as STOP-BANG, prior to administering opioids;
- Developing and implementing a standardized pain management protocol;
- Serially assessing patients who are on respiratory depressants, monitoring respiratory quality and carbon dioxide and oxygen levels;
- Developing and implementing a consistent method for communicating sedation risk among providers and staff, and with patients.

Oversedation

Oversedation results when the level of the patient's sedation is greater than the desired therapeutic sedation level; it can be associated with actual or potential patient harm, such as respiratory depression, falls, or aspiration. Much of the difficulty in preventing oversedation is due to the multiple patient and treatment[1] factors that play a part. In reviewing many factors that contribute to oversedation, the workgroup identified critical elements for safe and effective pain control and strategies to reduce risk:

Critical Element	Strategies
Identification of patients with increased risk	Screening
Clarity and reliability in opioid dosing	Protocolized pain management plans
Early recognition of oversedation	Monitoring standards
Full and accurate patient information	Targeted shift reports/handovers/handoffs Clear discharge information for patients, including risks

Prevention of oversedation begins with identifying patients who are at risk for adverse events resulting from sedation. While some groups such as surgical patients or those with obstructive sleep apnea (OSA) pose special challenges, it is important to recognize that any patient receiving opioid analgesia is at risk for oversedation. The second preventive step is the development of standardized and simplified order sets which, by decreasing variability, increase the likelihood of safe dosing. Early recognition of oversedation is critical in preventing adverse events. Recent improvements in technology such as capnography and telemetry monitoring of O_2 provide more specific and continuous information on patients' respiratory status. Finally, consistent, structured communication among the health care professionals caring for the patient is essential, as is discharge information for patients and their families that includes ways to decrease risk during their recovery at home.

Reliable implementation of risk screening, pain protocols, evidence-based monitoring, and complete handoff/discharge information should significantly reduce the risk of harm. This workgroup statement provides guidance regarding patients treated with opioid analgesia for risk screening; essential elements for pain protocols, including use of patient controlled analgesia (PCA); considerations for the care of OSA patients; patient monitoring; and communication among healthcare professionals and with the patient.

Oversedation Risk

The risk of oversedation is present in all patients receiving opioids, other respiratory depressants and sedating agents. A 2007 MedMarx report noted that just four medications (morphine, fentanyl,

[1] For example: wide variation in medication protocols, multiple order sets with multiple drugs; confusion of hydromorphone and morphine dosages; synergistic effects of multiple medications that increase sedation; changes in manufacturers' drug/dose supply; lack of consistent, and effective monitoring; and multiple physicians' ordering preferences.

hydromorphone, and meperidine) were involved in over 11% of harmful medication errors (Cohen, 2010). Combinations of these medications can increase the risk of respiratory depression from oversedation. The Anesthesia Patient Safety Foundation (APSF) considers respiratory depression a continuing patient safety risk (Weinger & Lee 2011). Jarzyna, Jungquist, Pasero, Willens, Nisbet, Oakes, & Polomano (2011) identified over 20 risk factors from a systematic review of the literature, including both patient and treatment factors. Additive effects of anxiolytics or sedative-hypnotics, limited monitoring, and inadequate communication among healthcare professionals are major contributing factors for oversedation resulting in patient harm. Because of these concerns, screening for oversedation risk is important for all patients on opioid therapy (Pasero, 2009), including:

- Non-surgical elective medical admissions screened on admission to receiving unit or prior to receiving opioids
- Emergently admitted patients, either on admission to receiving unit or prior to receiving opioids
- Surgical patients prior to non-emergent surgery
- Patients on chronic opioids admitted to the hospital;
- Emergency Department patients receiving or discharged with opioids

Sedation Risk and Obstructive Sleep Apnea

A well-known patient-related risk factor for oversedation is sleep apnea. Generally, patients with sleep-disordered breathing have an increased morbidity and mortality risk (Young et al. 2002) and surgical patients with obstructive sleep apnea (OSA) are at particularly high risk for oversedation (Adesanya, Lee, Greilich, & Joshi 2010; Chung, Yuan, & Chung 2008), in part due to the physiologic stresses of surgery (Liao, Yegneswaran, Vairavanathan, Zilberman, & Chung 2009). The prevalence of OSA patients is reported to be higher in the surgical population (Chung et al. 2008a). However, oversedation risk applies to all OSA patients receiving opioids, especially in combination with other sedating medications, hypnotics, sedatives, and anxiolytics.

The overall prevalence of OSA in the general population is estimated at 20% (Young, Peppard, & Gottlieb, 2002); approximately 93% of women and 82% of men with moderate to severe OSA are undiagnosed (Young, Evans, Finn & Palta 1997). Thus, screening for OSA becomes imperative. One strategy, screening by primary care providers, is constrained by resources and awareness. (Young et al. 2002). It then falls to hospital staff to minimize risk by screening patients prior to their receiving opioids. However, in a recent study of Veterans Affairs hospitals, investigators found a high level of variability in both preoperative screening and postoperative care of OSA patients (Patil & Patil, 2012).

Screening Tools

The surgical and anesthesia literature includes a number of validated screening tools to identify OSA patients (Abrishami, Khajehdehi, & Chung, 2010; ASA Report 2006; Chung et al., 2008a, 2008b; Gali, Whalen, Schroeder, Gay, & Plevak, 2008; Netzer, Stoohs, Netzer, Clark, & Strohl, 1999). None of these tools have been tested in the non-surgical patient population and none are diagnostic; the diagnosis and severity of obstructive sleep apnea requires a sleep study with interpretation by a

sleep specialist. Consensus among the Commission's workgroup members indicated that these tools may be useful with undiagnosed non-surgical patients to increase suspicion that the patient may have OSA and allow the physician to determine appropriate risk reduction measures.

One screening tool, STOP-BANG (see Appendix A), is becoming a widely adopted tool because of its ease of use. According to Chung and her colleagues (2012), it identifies patients with a high probability of OSA. In a meta-analysis, Ramachandran & Josephs (2009) concluded it was an excellent screening test for severe OSA. In a separate study, Vasu and his colleagues (2010) found the tool useful for the perioperative identification of patients with higher than normal risk for surgical complications. The STOP-BANG tool consists of eight questions regarding Snoring; Tiredness/fatigue; Observed apnea; Pressure (elevated blood pressure); Body mass index; Age; Neck (circumference); and Gender, with one point for every positive response. A score of three or more indicates risk for OSA.

STOP-BANG and Oversedation Risk

Using the published literature and clinical considerations, the workgroup developed a general categorization for surgical patients as Low, Moderate, or High risk for oversedation. Indicators include both the STOP-BANG score and patient characteristics.

Risk Category	Indicators
Low Risk	No observed sleep apnea AND
	STOP-BANG <3 or equivalent other screen AND
	No relevant comorbidities AND
	BMI <40
Moderate Risk	Observed sleep apnea OR
	STOP-BANG 3-6 or equivalent other screen OR
	BMI >35 and on chronic opioids OR
	Diagnosed sleep apnea on prescribed therapy OR
	BMI >40 (consider obesity-hypoventilation syndrome)
High Risk	Diagnosed sleep apnea, not adherent to therapy OR
	STOP-BANG >6 or equivalent OR
	Known obesity-hypoventilation syndrome

A patient's STOP-BANG score is only one of a number of considerations in the pre-surgical evaluation of patient risk. Other considerations include:

- Type and length of surgical procedure
- Anesthesia requirements
- Duration of recovery prior to discharge
- Pain control modalities that obviate the need for post-surgical opioids
- Route of opioid administration if needed

These considerations have significant implications for decisions regarding monitoring requirements (see Appendix B), when and if a patient is discharged to home following surgery, and whether the surgery is performed in the outpatient/ambulatory or inpatient setting (see Appendix C).

For those patients whose screening STOP-BANG score is greater than three, consideration should be given to sleep specialist consultation prior to surgery. Increasingly, portable monitoring devices are helpful to identify individuals with OSA; these need to be used in conjunction with a complete sleep evaluation supervised by a sleep specialist (Portable Monitoring Task Force of the American Academy of Sleep Medicine, 2007). The Task Force recommendations also state that: "Negative or technically inadequate PM [portable monitoring] tests in patients with a high pretest probability of moderate to severe OSA should prompt in-laboratory polysomnography."

Diagnosed patients with moderate to severe OSA requiring general anesthesia and post-operative opioids are at greatest risk, and decisions for ambulatory or outpatient surgery should be made with caution. (Ankichetty & Chung, 2011; Bolden, Smith, & Auckley, 2009; Stierer, Wright, George, Thompson, Wu, & Collop, 2010). Because CPAP or other prescribed therapy use and patient recall can be variable, the workgroup recommends information downloaded from the CPAP machine for assessment of mean hours of nightly use, leaks, and the apnea-hypopnea index on therapy, prior to decisions about surgery where to perform the surgery.

The three risk categories have clear implications for sedation monitoring in post-surgical patients. An argument may also be made for more general application to medical patients receiving opioid therapy. Although the STOP-BANG screening tool for OSA has yet to be tested in this population, it provides significant information regarding a patient's risk of OSA. It is an easy tool to use and requires little additional time or resources, leading the workgroup to recommend its use with patients receiving opioids.

Pain Protocols

Pain protocols assure consistency, communication, and a multimodal approach, but are often limited to special situations. Given the numerous factors that can lead to oversedation, it is important that in-patients requiring opioid analgesia have a protocol-based pain management plan. The protocol should include screening for obstructive sleep apnea (OSA) and use of patient controlled analgesia (PCA) as part of an overall pain management approach that includes epidurals, peripheral nerve blocks, and oral or IV medication[1] as well as non-opioid analgesics and non-pharmacologic methods.

Use of equianalgesia tables may decrease adverse events related to dosing confusion between morphine and hydromorphone, as well as provide a resource when changing medications. In an era of drug shortages and constantly changing concentration formulations and nonstandard infusion

[1] IM (intramuscular) pain medication is a rarely used option and is limited to situations in which the patient cannot take oral medications and/or does not have IV access. This route has unpredictable absorption of the medication so is difficult to dose and can be painful.

formulations, equianalgesia tables may offer a means to assure reliability in dosing. However, these tables present their own risks. In a survey of dosing information from a variety of sources, Shaheen, Walsh, Lasheen , Davis, & Lagman, (2009) found inconsistent and variable equianalgesic ratios, stating that such tables are "…confusing to physicians and dangerous to patients" (p. 416).

Assessments of pain and sedation levels require validated pain and sedation scales, which systematically and consistently determine patient response to analgesia. Modifications of these scales reduce their validity and are unnecessary. Easy to administer scales are available for both medical-surgical and intensive care patients (see Appendix D and Appendix E). The following offers recommendations for the content of a pain management protocol. The information can be used to identify opportunities for improvement in a pain management protocol and is available in a separate document (see Appendix F).

Pain Management Protocol Content

Order Sets

- Range orders follow American Society of Pain Management Nursing (ASPMN) and American Pain Society (APS) recommendations
- Set limits for number and types of drugs

Drug Dosing

- Maximum dose no greater than 2-4 times the minimum dose
- Indicate intervals between doses and incremental increases in doses
- Limit acetaminophen dosage to 325 mg/tablet or capsule and 4000 milligrams/day or less1
- Dose in milligrams (mg), not milliliters (mL) to decrease risk of inadvertent dosing errors
- Use equianalgesia tables with caution; establish periodic reviews and updates approved by a pharmacy and therapeutics committee
    - When changing medications, (e.g., from one product to another) decrease initial dose of new medication by 25%-50%

PCA (Patient Controlled Analgesia)

- Basal rates for opioid tolerant patients only
- Centralized continuous pulse oximetry monitoring
- Exclusion criteria – e.g., unable to understand PCA, physically unable to use
- PCEA (Patient Controlled Epidural Analgesia) — provide 24/7 anesthesia or pain management consultation coverage
- No PCA by proxy

Specified changes to dosing/lockout intervals

- Change dose if medication has short peak action and there has been no/little pain relief
- Change interval if pain increases near end of lockout time

[1] Current (January 13, 2011) FDA recommendation for maximum dose is 4G (4000 milligrams)/day; however, a further decrease to 3000 milligrams/day is anticipated.

Specialty/Setting-Specific Modifications

- Options for opioid-tolerant patients[1]
- Opioid titration in patients with regional blocks
- Patients with OSA
- Opioid naïve patients should not receive long-acting opioids, fentanyl patches, buccal tablets, dosing by intranasal route

Multimodal Therapy Options

- Differing dosage forms
- Scheduled use of adjunctive pain therapies (gabapentin) and non-opioid pain medications (acetaminophen, non-steroidal anti-inflammatory drugs)
- Local anesthetic infiltration
- Non-pharmacologic methods

Indicators for Pharmacist Consultation

- Identify drug and/or doses that would trigger a pharmacist review (e.g., fentanyl patches, >1mg IV hydromorphone)

Indicators for Acute Pain Management Specialty Consultation

- Pain-Sedation mismatch (excessive pain in presence of high sedation)
- Sub-optimal pain control in chronic pain patient, or patient with history of opioid-related adverse drug event
- Difficult pain control in any patient

Valid Population-Specific Sedation Assessment Tools (e.g., adults, non-verbal patients)

- Pasero Opioid Sedation Scale (POSS) – medical/surgical patients (see Appendix D)
- Richmond Agitation Sedation Scale (RASS) – intensive care patients (see Appendix E)

Standardized Serial Sedation and Respiratory Depression Monitoring

- See the following section

Sedation and Respiratory Depression Monitoring

Respiratory depression from oversedation does not have clear clinical or laboratory markers; there is little correspondence with laboratory opioid levels, dosing levels, or any single objective test. Additionally, monitoring practices are inconsistent, and nurses vary in the importance they place on sedation assessments (Gordon, Pellino, Higgins, Pasero, & Murphy-Ende, 2008).

Standardized sedation monitoring practices that increase the reliability of care across healthcare professionals and shifts is a necessary component of sedation monitoring policies and protocols. Use of technology in sedation and respiratory assessments is increasing. The APSF Conference on

[1] Opioid-tolerant patients are defined as patients who have been taking 60mg morphine/day OR 30mg oral oxycodone OR 8mg oral hydromorphone/day for the week immediately preceding (if off less than one week, still consider opioid-tolerant) OR equianalgesia of other opioid.

Electronic Monitoring Strategies (Stoetling & Overdyk, 2010) noted that intermittent pulse oximetry does not reliably identify developing respiratory depression and recommended capnography when the patient is unable to maintain acceptable oxygen saturations in the presence of supplemental oxygen. Recent work at the Dartmouth-Hitchcock Medical Center demonstrated a decrease in rescue events and ICU transfers with implementation of routine post-surgical oxygen saturation (SpO_2) monitoring (Taenzer, Pyke, McGrath, & Blike, 2010). See Appendix B for monitoring considerations. Implementation of technology that increases reliability in recognizing respiratory depression represents a significant financial commitment, but is supported by evolving evidence.

The American Society for Pain Management Nursing's monitoring guidelines (Jarzyna et al., 2001) recommends evidence-based institutional policies defining sedation monitoring practices for patients receiving opioids. These policies and procedures should allow for individualization based on a patient's risk factors, specific pharmacologic therapy, and iatrogenic risks; and should include use of continuous electronic monitoring technology (APSF 2010). The following offers recommendations for sedation monitoring policies.

Sedation and Respiratory Depression Monitoring Policies

- Identify intervals for monitoring with criteria for increasing or decreasing intervals based on patient status
- Use a valid and reliable sedation assessment scale
- Define serial assessments for trending of sedation and respiratory depression that include:
    - Respiratory rate, depth, regularity
    - Presence of apneic periods, snoring, and arousal status
    - SpO2, ETCO2
- Establish criteria for use of electronic monitoring, including indications for telemetry
- Definition of alarm thresholds and notifications

Sedation Assessment Scales

A number of sedation scales are described in the literature (Carrasco, 2000; De Jong et al., 2005; Nisbet & Mooney-Cotter, 2009; Stawicki, 2007). They vary in both the dimensions measured and the population in which they were tested. Of frequently used scales, the Ramsay/Modified Ramsay Scale, and the RASS - Richmond Agitation and Sedation Scale (see Appendix E) (Sessler, Gosnel, Grap, Brophy, & O'Neal, 2002) generally are used for patient assessment with purposeful sedation or in critical care. The POSS - Pasero Opioid-Induced Sedation Scale (see Appendix D) (Pasero, 2009) has been validated in the general medical surgical population. Nisbet and Mooney-Cotter (2009) found the POSS easier to use and provided more accurate guidance for nursing actions than the other scales tested.

Communication Related to Oversedation Risk

Consistently, around 70% of reports to the Joint Commission have identified communication factors as contributing to the adverse event; the rate is similar for reports submitted to the Oregon Patient Safety Commission. Handoffs or hand-overs present a specific risk, whether they are between nurses or between physicians. A number of studies have identified a complex set of factors, including system failures that contribute to adverse events (Freisen, White, & Byers, 2008). Validated best practices in handoff communication are limited, although recommendations found in the literature include use of a standardized process, adequate time, avoidance of distractions, inclusion of read-backs, and using a structured tool (Freisen et al. 2008; WHO Collaborating Centre for Patient Safety Solutions, 2007).

One study of physician-to-physician handovers (Bhabram, MacKeith, Monteiro, & Pothier, 2007) demonstrated a dramatic loss of information with verbal handovers, as compared to use of a printed sheet. A similar earlier study in nursing also showed dramatic reduction in lost information with a printed sheet (Pothier, Monteiro, Mooktiar, & Shaw, 2005). When using a structured communication technique such as SBAR[1] (see Appendix G for an example), include patient information related to the risks for respiratory depression.

Transitions in care, whether between staff or units within the hospital, or when going from the acute care setting to home or to a nursing facility, pose a high risk for the loss of important information. The following offers recommendations for oversedation risk information needed in care transitions.

Oversedation Risk Information for Care Transitions

Among Healthcare Professionals

Resources

- Available medical record forms/fields for risk criteria, including STOP-BANG score
- Forms such as screening tools and tracking forms for serial respiratory status indicators

Content

- Last opioid dose – drug, time of administration, dose
- Concurrent hypnotics, anxiolytics, sedatives
- ASA class if surgical patient
- Respiratory status – current and any trends

With the Patient Prior to Discharge

Resources

- Written instructions in lay language
- Written indications for when and how to contact provider/hospital

[1] SBAR (Situation-Background-Assessment-Recommendation) is an easy to use framework for relaying patient information among healthcare professionals.

Content

- Name and dosage for each medication
- Interval of highest sedation risk
- Any recommendations for sleep position
- C-PAP settings
- Follow-up for polysomnography if indicated
- Next post-hospital appointment (make prior to discharge if possible)

Resources

Protocol Example

Perioperative Obstructive Sleep Apnea Monitoring – PeaceHealth (Appendix G)

Pain Scales

NIH Pain Consortium Pain Intensity Scales – The following pain intensity scales are used by researchers at the NIH Clinical Center to measure how intensely individuals are feeling pain and to monitor the effectiveness of treatments. The following scales are appropriate for adults in a variety of healthcare settings.

> Numeric Rating Scale. Available at: http://painconsortium.nih.gov/pain_scales/NumericRatingScale.pdf
>
> Wong-Baker Faces (English and Spanish). Available at: http://painconsortium.nih.gov/pain_scales/Wong-Baker_Faces.pdf
>
> COMFORT Scale. Available at: http://painconsortium.nih.gov/pain_scales/COMFORT_Scale.pdf
>
> Checklist of Nonverbal Indicators. Available at: http://painconsortium.nih.gov/pain_scales/ChecklistofNonverbal.pdf

New Mexico Medical Review Association. (n.d.). Pain Scale for Cognitively Impaired Non-verbal Adults. Available at: http://www.nmmra.org/resources/Nursing_Homes/156_1560.pdf

Tools

Stop-Bang Tool (Appendix A)

Pasero Opioid-Induced Sedation Scale (POSS) With Interventions (Appendix D)

Richmond Agitation-Sedation Scale (RASS) (Appendix E)

SBAR Example: Golden Valley Memorial Hospital, Clinton MO (Appendix H). This example of an SBAR format used at different handoff opportunities can be modified to include respiratory depression risks.

Sedation-Related Process Improvements

Comprehensive Program that Includes Standardized Protocols and Pain Management Team Significantly Reduces Narcotic Oversedation in Hospital Setting. Available at: http://www.innovations.ahrq.gov/content.aspx?id=1778

Intravenous Infusion Safety Initiative Prevents Medication Errors, Leading to Cost Savings and High Nurse Satisfaction. Available at: http://www.innovations.ahrq.gov/content.aspx?id=2375

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Guidelines and Position Statements

PCA Toolkit (2008) San Diego Patient Safety Council. Available at: http://patientsafetycouncil.org/uploads/Tool-Kit-PCA_Dec_2008.pdf

ICU Sedation Guidelines of Care (2009) San Diego Patient Safety Council. Available at: http://www.chpso.org/meds/sedation.pdf (Note: medications and dosages listed were current as of the publication dates)

The Use of "As-Needed" Range Orders for Opioid Analgesics in the Management of Acute Pain. Consensus Statement of the American Society for Pain Management Nursing and the American Pain Society. Available at: http://aspmn.org/pdfs/As%20Needed%20Range%20Orders.pdf

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Part II - How to prevent errors (July 24). Available at: http://www.ismp.org/newsletters/acutecare/articles/20030724.asp

ISMP Alert – Beware of Basal Opioid Infusions with PCA Therapy (2009, March 12). Available at: http://www.ismp.org/newsletters/acutecare/articles/20090312.asp

ECRI Institute Healthcare Risk Control (2011) Pulse Oximetry. Available at: https://www.ecri.org/Documents/RM/HRC_TOC/CritCare6ES.pdf

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Appendix A

STOP-BANG Patient Questionnaire

Last Name_____ **First Name**_____ **Date**_____

Please answer the questions below to help us see if you might have sleep apnea. This is when your breathing pauses sometimes while you are sleeping. Sleep apnea adds risk with pain medicines. It can increase your risk for breathing problems after surgery. Your answers will tell us if we need to take special steps for your safety while in the hospital. In general, scores of less than three yes answers indicate low-risk for sleep apnea. Your provider will discuss your individual score with you and may ask you to see a sleep physician before any surgery.

	Yes	No
1. Snoring: Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?	☐	☐
2. Tiredness/fatigue: Do you often feel tired, fatigued, or sleepy during the daytime, even after a "good" night's sleep?	☐	☐
3. Observed apnea: Has anyone has ever observed you stop breathing during your sleep?	☐	☐
4. Pressure: Do you have or are you being treated for high blood pressure?	☐	☐
5. Body mass index: Do you weigh more for your height than shown in the *Height/Weight* table below?	☐	☐
6. Age: Are you older than 50 years?	☐	☐
7. Neck size: Does your neck measure more than15¾ inches (40 cm) around?	☐	☐
8. Gender: Are you male?	☐	☐

STOP-BANG Patient Questionnaire used with permission, F. Chung 2012

Score _____ # of yes

Table 1. Height/Weight

Height	Weight	Height	Weight
4' 10"	166	5' 9"	235
4' 11"	172	5' 10"	242
5' 0''	178	5' 11"	249
5' 1"	184	6' 0''	257
5' 2"	190	6' 1"	264
5' 3"	196	6' 2"	271
5' 4"	203	6' 3"	278
5' 5"	209	6' 4"	286
5' 6"	215	6' 5"	293
5' 7"	222	6' 6"	302
5' 8"	229	6' 7"	310

Weights greater than those shown correspond to a BMI of 35 or greater.

Table from: nhlbi.nih.gov/guidelines/obesity/bmi_tbl.htm
Calculations from: http://www.nhlbisupport.com/bmi/

Appendix B

Patient Care Considerations for Hospitalized Adults Requiring Opioid Therapy

General

- Non-supine position if tolerated
- Head of bed at 30° if no contraindications
- O_2 if needed
- CPAP

Inpatient Monitoring

- Serial sedation assessments with valid scale
- Serial respiratory depression assessments
- Centralized continuous pulse oximetry
- Capnography if supplemental O_2 needed to maintain acceptable oxygen saturations
- Continuous cardiac monitoring for high risk patients

Surgical Patients

While in the PACU

- Lateral position if tolerated
- Head of bed at 30° if no contraindications
- O_2 if needed
- Continuous pulse oximetry monitoring
- Digital monitoring of respiratory rate
- Close nursing monitoring

Criteria for PACU Discharge

- No apnea/hypopnea/desaturation episodes in 60 minutes following last IV opioid; none in last 30 minutes in quiet environment on room air, or baseline SpO_2 within 2% of preoperative baseline.
- Respiratory rate ≥ 10/minute and able to maintain airway

Criteria for Inpatient Admission

- Witnessed apnea
- Increasing O_2 requirements/unable to wean off O_2
- Pain-sedation mismatch

See: APSF (2010) Essential Monitoring Strategies to detect clinically significant drug-Induced respiratory depression in the Postoperative period. Conclusions and Recommendations. Conference on Electronic Monitoring Strategies. Retrieved 1/20/2012 from http://apsf.org/announcements.php?id=7
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Appendix C

Sleep Apnea Risk Guide to Assess Suitability for Outpatient Surgery Patients

Low Risk

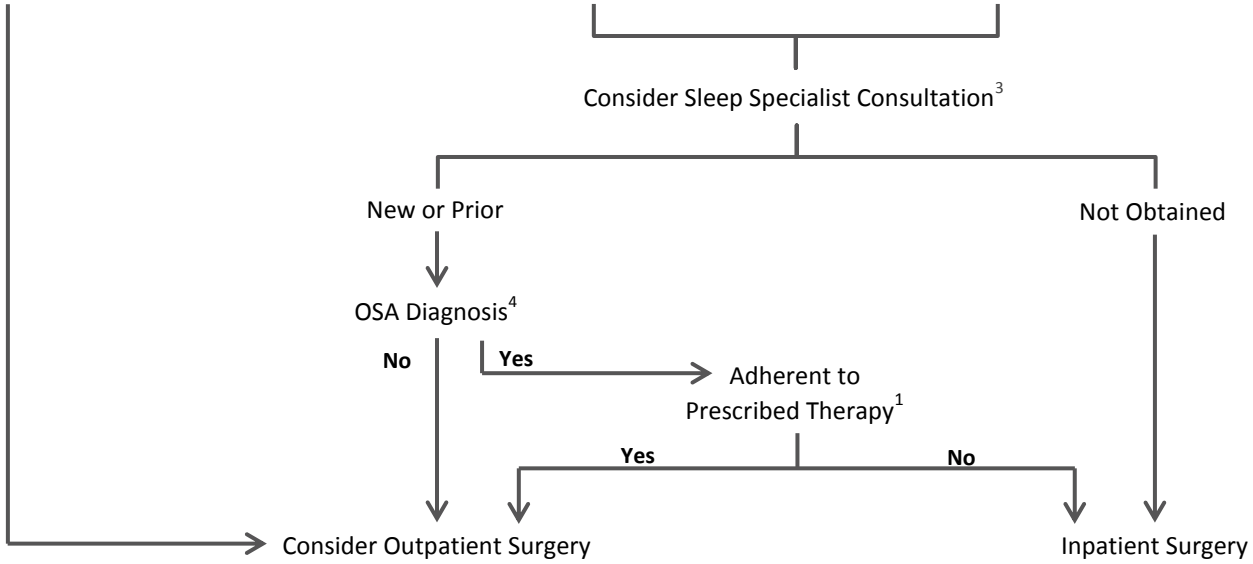
- No observed sleep apnea AND STOP-BANG <3 or equivalent, AND
- No relevant comorbidities AND BMI <40

Moderate Risk

- OSA patient adherent to prescribed therapy[1], OR
- STOP-BANG 3-6 or equivalent, OR
- Observed sleep apnea, OR
- BMI >35 AND chronic opioids OR BMI >40[2]

High Risk

- Diagnosed OSA, not adherent to therapy, OR
- STOP-BANG >6 or equivalent, OR
- Known obesity-hypoventilation syndrome



[1] Adherence to prescribed therapy is demonstrated by verified use (ideally two weeks).
[2] Consider obesity-hypoventilation syndrome
[3] See Chung F, Subramanyam R, Liao P, Sasaki E, Shapiro C & Sun Y (2012). High STOP-Bang score indicates a high probability of obstructive sleep apnoea. *British Journal of Anaesthesia*. 8pages. [Epub before print] 8 March
[4] See Chung F. (2011). It may be unsafe for patients with untreated severe OSA requiring postoperative narcotic to undergo ambulatory surgery. *Journal of Clinical Sleep Medicine*. 7(1), 111.

Appendix D

Pasero Opiod-Induced Sedation Scale (POSS) with Interventions

Italics at each level of sedation indicate appropriate action.

S = Sleep, easy to arouse

Acceptable; no action necessary; may increase opioid dose if needed

1 = Awake and alert

Acceptable; no action necessary; may increase opioid dose if needed

2 = Slightly drowsy, easily aroused

Acceptable; no action necessary; may increase opioid dose if needed

3 = Frequently drowsy, arousable, drifts off to sleep during conversation

Unacceptable; monitor respiratory status and sedation level closely until sedation level is stable at less than 3 and respiratory status is satisfactory; decrease opioid dose 25% to 50%[1] or notify primary[2] or anesthesia provider for orders; consider administering a non-sedating, opioid-sparing nonopioid such as acetaminophen or a NSAID, if not contraindicated; ask patient to take deep breaths every 15-30 minutes.

4 = Somnolent, minimal or no response to verbal and physical stimulation

Unacceptable; stop opioid; consider administering naloxone[3,4]; stay with patient, stimulate, and support respiration as indicated by patient status; call Rapid Response Team (Code Blue) if indicated; notify primary[2] or anesthesia provider; monitor respiratory status and sedation level closely until sedation level is stable at less than 3 and respiratory status is satisfactory.

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[1] Opioid analgesic orders or a hospital protocol should include the expectation that a nurse will decrease the opioid dose if a patient is excessively sedated.

[2] For example, the physician, nurse practitioner, advanced practice nurse, or physician assistant responsible for the pain management prescription.

[3] For adults experiencing respiratory depression, mix 0.4 mg of naloxone and 10 mL of normal saline in syringe and administer this dilute solution very slowly (0.5 mL over 2 minutes) while observing the patient's response (titrate to effect). If sedation and respiratory depression occurs during administration of transdermal fentanyl, remove the patch; if naloxone is necessary, treatment will be needed for a prolonged period, and the typical approach involves a naloxone infusion (see text). Patient must be monitored closely for at least 24 hours after discontinuation of the transdermal fentanyl.

[4] Hospital protocols should include the expectation that a nurse will administer naloxone to any patient suspected of having life-threatening opioid-induced sedation and respiratory depression.

See: Pasero, C. (2009). Assessment of sedation during opioid administration for pain management. Journal of PeriAnesthesia Nursing, 24(3), 186-190.

Appendix E

Richmond Agitation – Sedation Scale

Score	Term	Description
+4	Combative	Overtly combative or violent; immediate danger to staff
+3	Very Agitated	Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff
+2	Agitated	Frequent nonpurposeful movement or patient–ventilator dyssynchrony
+1	Restless	Anxious or apprehensive but movements not aggressive or vigorous
0	Alert and calm	
-1	Drowsy	Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice
-2	Light sedation	Briefly (less than 10 seconds) awakens with eye contact to voice
-3	Moderate sedation	Any movement (but no eye contact) to voice
-4	Deep sedation	No response to voice, but any movement to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Procedure

1. Observe patient. Is patient alert and calm (score 0)?
   Does patient have behavior that is consistent with restlessness or agitation (score +1 to -4 using the criteria listed above, under Description)?
2. If patient is not alert, in a loud speaking voice state patient's name and direct patient to open eyes and look at speaker. Repeat once if necessary. Can prompt patient to continue looking at speaker.
   Patient has eye opening and eye contact which is sustained for more than 10 seconds (score -1).
   Patient has eye opening and eye contact, but this is not sustained for 10 seconds (score -2).
   Patient has any movement in response to voice, excluding eye contact (score -3).
3. If patient does not respond to voice, physically stimulate patient by shaking shoulder and then rubbing sternum if there is no response to shaking shoulder.
   Patient has any movement to physical stimulation (score -4).
   Patient has no response to voice or physical stimulation (score -5).

Modified from: Sessler CN, Gosnell MS, Grap MJ, Brophy GM, O'Neal PV, Keane KA, Tesoro EP, & Elswick RK. (2002). The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care unit patients. *American Journal of Respiratory Critical Care Medicine. 166* (10), 1338-1344. doi: 10.1164/rccm.2107138. Retrieved from: http://ajrccm.atsjournals.org/content/166/10/1338.full.pdf+html

Appendix F

Pain Management Protocol Content

The following recommendations for the content of a pain management protocol can be used to identify opportunities for improvement in an organization's current pain management protocol.

Order Sets

- Range orders follow American Society of Pain Management Nursing (ASPMN) and American Pain Society (APS) recommendations
- Set limits for number and types of drugs

Drug Dosing

- Maximum dose no greater than 2-4 times the minimum dose
- Indicate intervals between doses and incremental increases in doses
- Limit acetaminophen dosage to 325 mg/tablet or capsule and 4000 milligrams/day or less1
- Dose in milligrams (mg), not milliliters (mL) to decrease risk of inadvertent dosing errors
- Use equianalgesia tables with caution; establish periodic reviews and updates approved by a pharmacy and therapeutics committee
    - When changing medications, (e.g., from one product to another) decrease initial dose of new medication by 25%-50%

PCA (Patient Controlled Analgesia)

- Basal rates for opioid tolerant patients only
- Centralized continuous pulse oximetry monitoring
- Exclusion criteria – e.g., unable to understand PCA, physically unable to use
- PCEA (Patient Controlled Epidural Analgesia) — provide 24/7 anesthesia or pain management consultation coverage
- No PCA by proxy

Specified changes to dosing/lockout intervals

- Change dose if medication has short peak action and there has been no/little pain relief
- Change interval if pain increases near end of lockout time

Specialty/Setting-Specific Modifications

- Options for opioid-tolerant patients[2]
- Opioid titration in patients with regional blocks
- Patients with OSA

---

[1] Current (January 13, 2011) FDA recommendation for maximum dose is 4G (4000 milligrams)/day; however, a further decrease to 3000 milligrams/day is anticipated.

[2] Opioid-tolerant patients are defined as patients who have been taking 60mg morphine/day OR 30mg oral oxycodone OR 8mg oral hydromorphone/day for the week immediately preceding (if off less than one week, still consider opioid-tolerant) OR equianalgesia of other opioid.

- Opioid naïve patients should not receive long-acting opioids, fentanyl patches, buccal tablets, dosing by intranasal route

Multimodal Therapy Options

- Differing dosage forms
- Scheduled use of adjunctive pain therapies (gabapentin) and non-opioid pain medications (acetaminophen, non-steroidal anti-inflammatory drugs)
- Local anesthetic infiltration
- Non-pharmacologic methods

Indicators for Pharmacist Consultation

- Identify drug and/or doses that would trigger a pharmacist review (e.g., fentanyl patches, >1mg IV hydromorphone)

Indicators for Acute Pain Management Specialty Consultation

- Pain-Sedation mismatch (excessive pain in presence of high sedation)
- Sub-optimal pain control in chronic pain patient, or patient with history of opioid-related adverse drug event
- Difficult pain control in any patient

Valid Population-Specific Sedation Assessment Tools*

- Pasero Opioid Sedation Scale (POSS) – medical/surgical patients
- Richmond Agitation Sedation Scale (RASS) – intensive care patients

Sedation and Respiratory Depression Monitoring Policies

- Identify intervals for monitoring with criteria for increasing or decreasing intervals based on patient status
- Use a valid and reliable sedation assessment scale
- Define serial assessments for trending of sedation and respiratory depression that include:
    - Respiratory rate, depth, regularity
    - Presence of apneic periods, snoring, and arousal status
    - SpO2, ETCO2
- Establish criteria for use of electronic monitoring, including indications for telemetry
- Definition of alarm thresholds and notifications

* Pasero, C. (2009). Assessment of sedation during opioid administration for pain management. Journal of PeriAnesthesia Nursing, 24(3), 186-190.

Sessler CN, Gosnell MS, Grap MJ, Brophy GM, O'Neal PV, Keane KA, Tesoro EP, & Elswick RK. (2002). The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care unit patients. *American Journal of Respiratory Critical Care Medicine. 166* (10), 1338-1344. doi: 10.1164/rccm.2107138. Retrieved from: http://ajrccm.atsjournals.org/content/166/10/1338.full.pdf+html

Appendix G

Protocol: Peri-operative Obstructive Sleep Apnea (OSA) Monitoring

PeaceHealth	Protocol	Permanent Part of Patient Record	Protocol

Place all Total Joint post-op patients with either known OSA or suspected OSA (STOP-BANG greater than or equal to 3) on continuous Sp O_2 monitoring (centrally monitored or nurse pager/phone alerted).

- Set Sp O_2 alarm at 88%
- Position patients with head of bed elevated greater than 30 degrees or if contraindicated, in lateral position rather than supine unless contraindicated.
- Discontinue basal continuous opiate infusions on PCAs (unless patient is in ICU) and contact physician for alternative orders.
- For inpatients with documented OSA or PACU Respiratory Event, following surgery Respiratory Therapist will:
  Assist patient to use their own CPAP/BIPAP or a hospital owned device, set with home pressures whenever:
  - Level of sedation is greater than 2 (Modified Wilson Scale), or
  - Patient is asleep
- Place patient on hospital-owned APAP device if patient's home device is not available, pressure settings are unknown, or not adequate to maintain oxygen saturation greater than 88% with a respiratory rate greater than 10.
- Use hospital APAP pressure ranges
- For inpatients with **suspected OSA (STOP-BANG score greater than or equal to 3):**
  If saturations are below 88% the RN will call Respiratory Therapy:
  - If RT is going to be delayed, RN will initiate oxygen temporarily while awaiting RT evaluation and titrate per policy to keep Sat greater than 88%.
  - Respiratory Therapy will evaluate the patient for hypoventilation or airway obstruction and:
    - Initiate appropriate positive airway pressure device if indicated
    - Notify Physician if more than 4L O_2 are required to maintain saturation greater than 88%

Note: *Use of supplemental oxygen without assessing for airway obstruction and hypoventilation in a patient with known or suspected OSA is inappropriate, potentially harmful, and can delay recognition of serious patient deterioration.*

If known or suspected sleep apnea patient develops a level of sedation score of 3:

- Hold all opioids (stop PCA) until score is less than 3
  - Call Physician if patient continues to request opioids
- Notify RT to apply positive airway pressure device

If patient develops a level of sedation score of 4, or a respiratory rate less than 10:

- Administer naloxone per Naloxone (Narcan) IV Administration Policy

If patient is unresponsive or not breathing:

- Initiate Code Blue and administer naloxone (Narcan) 0.4 mg (1 mL) IV push, undiluted
- Manually bag ventilate patient until Code Team arrives

Oversedation

Level of Sedation Score (modified Wilson Scale)

1 = Alert, oriented, easy to arouse
2 = Occasionally drowsy, easy to arouse (example: by voice)
3 = Frequently drowsy, difficult to arouse (e.g. sternal rub or painful stimulus), confused
4 = Somnolent, unable to arouse

Narcan Administration Instructions

- Dilute 1 vial of Naloxone as follows:
    a. Expel 1 mL from a 10 mL saline syringe
    b. Draw up 0.4 mg (1 mL) Naloxone into the same saline syringe
- Give 1 mL/min (0.04 mg/min) and repeat every minute until:
    1. Respiratory rate greater than 10/minute
    2. SpO2 greater than or equal to 92%
    3. Level of sedation score is less than 3

Patient Identification:	Sacred Heart Medical Center SH0379 (05/05/11) **Peri-operative Obstructive Sleep Apnea (OSA) Monitoring Protocol** 1 of 1
Clinical Staff: Scan protocol to pharmacy with the order	

Appendix H

Report Guideline

Instructions: All items need to be addressed for intra-hospital handoff (ex: shift report, transfers: ER to ICU, transfer between floors, to IRF). Those items with an (*) need to be addressed with **all** handoffs.

Situation	***Name & room #** ***Age** **Admit date**
	Code Status **Ht** **Wt** **Scale Used**
	Doctor Consults?
	Surgery or procedure and date **Diagnosis**
	*Accurate mode of transportation □ Bed □ Stretcher □ Wheelchair □ Ambulatory
	How many to Assist? Activity? ***Fall Risk □ Yes □ No**
	Current Vital signs (Include pain score) **Alarm(s)?
	Pain interventions used
Background	*Current condition
	*Current treatments or findings
	*Current abnormal lab results
	*Drug Allergies - Allergies
	*Isolation □ Yes □ No For What? And Where?
	*Medication given - not given How taken?
	Flu - Pneumonia Vaccine Given? Medical - Surgical Hx?
	Staples to be removed?
	Fluid Restriction – **amount restricted and amount taken in?**
	I & O
	PCA – **Drug Type & rate?** **O2 sat?** **Pain score?**
	Diet Feeding Assistance? How much (percent)? Snacks?
	Blood Sugars – **Times and results?** **Insulin type** **SS level**
Assessment	**Physical Assessment**
	LOC □ Alert □ Lethargic □ Confused □ Orients easily □ Agitated □ No response
	Heart □ Regular □ Irregular □ Other
	Lungs □ CTA □ Coarse □ Other Cough? □ Productive □ Non-productive
	O2 □ Yes □ No # of liters Delivered by? **O2 Sat?** Sputum?
	Breathing tx?
	Abdomen □ Soft □ Firm □ Distended □ Other **N - V?**
	Bowel sounds □ Present □ Absent →Quad(s) **– Last BM** Diarrhea?
	Peripheral pulses □ Present □ Absent □ Other
	Edema □ +1 □ +2 □ +3 □ +4 **– location?**
Recommendation	IV's □ IV □ NS lock □ PICC line □ Central line – **Solution and rate?**
	Telemetry? – **Rhythm & rate?**
	Incontinences? – **Devices used?** Bath done □ Yes □ No **Type?**
	Tubes and drains – **Foley? Reason? Other drains? Type?**
	Urine color - consistency
	Skin Assessment **Wounds - Interruptions? Dressing Type?**
	Order Review - Changes?
	Pt Needs? Psychosocial Issues?
	Discharge Date & Plan? Completed→ Not Completed→
	Other – Unit-Specific Information:

Report taken from_____ Golden Valley Memorial Hospital