



# Optimum sedation

Sedation management in the ICU –  
are we at a crossroads?

Dr Carl Waldmann

Royal Berkshire Hospital, Reading



**The Intensive Care Society**

This medical education programme has been sponsored by  
GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10

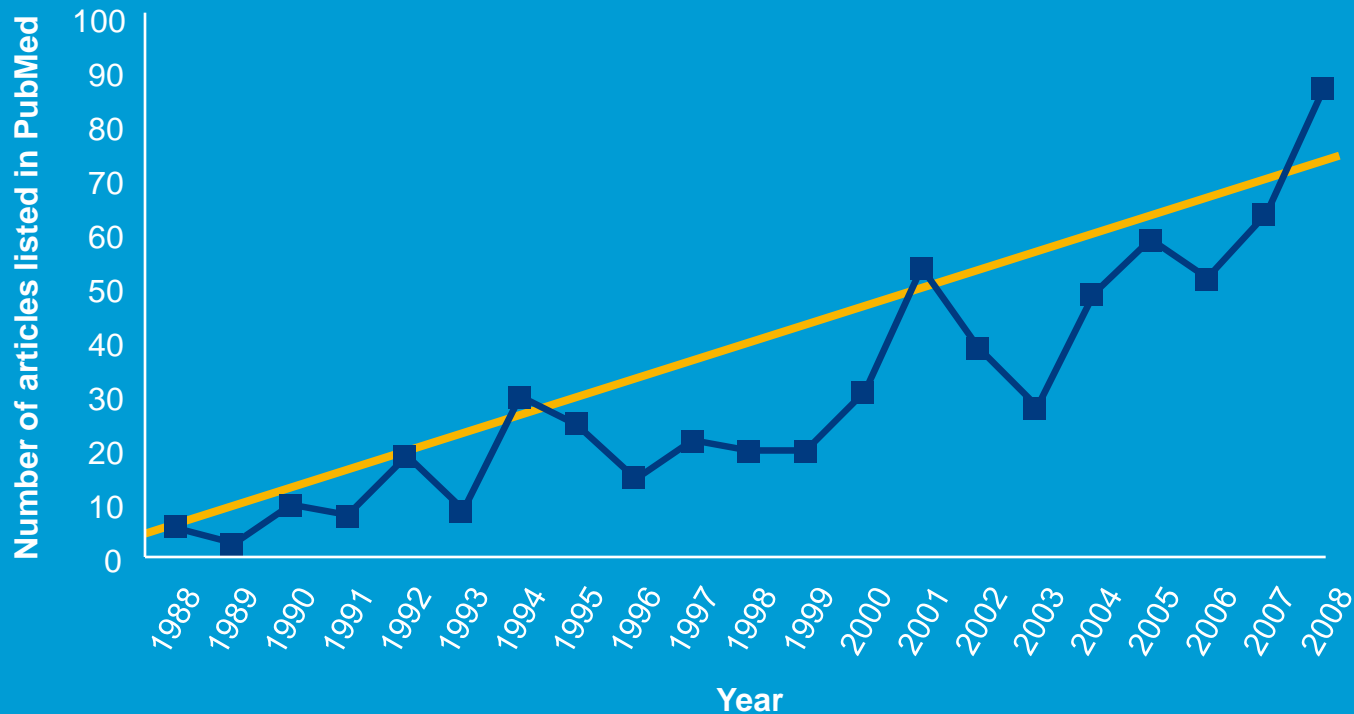


# Sedation in the ICU

- Most ICU patients require sedative and analgesic medications<sup>1</sup>
  - Sedation practice can have wide-ranging negative effects on physical health and response to stress<sup>1</sup>
- ...but is often taken for granted

1. De Jonghe B, *et al.* Intensive Care Med 2000; 26: 275-285.

# Growing sedation research over past 20 years



PubMed search of articles containing 'sedation' and 'ICU' between 1988 and 2008.

# Importance of sedation scoring

Under-sedation<sup>1</sup>

Pain  
Anxiety  
Hypertension  
Tachycardia  
Hypoxia  
Hypercarbia

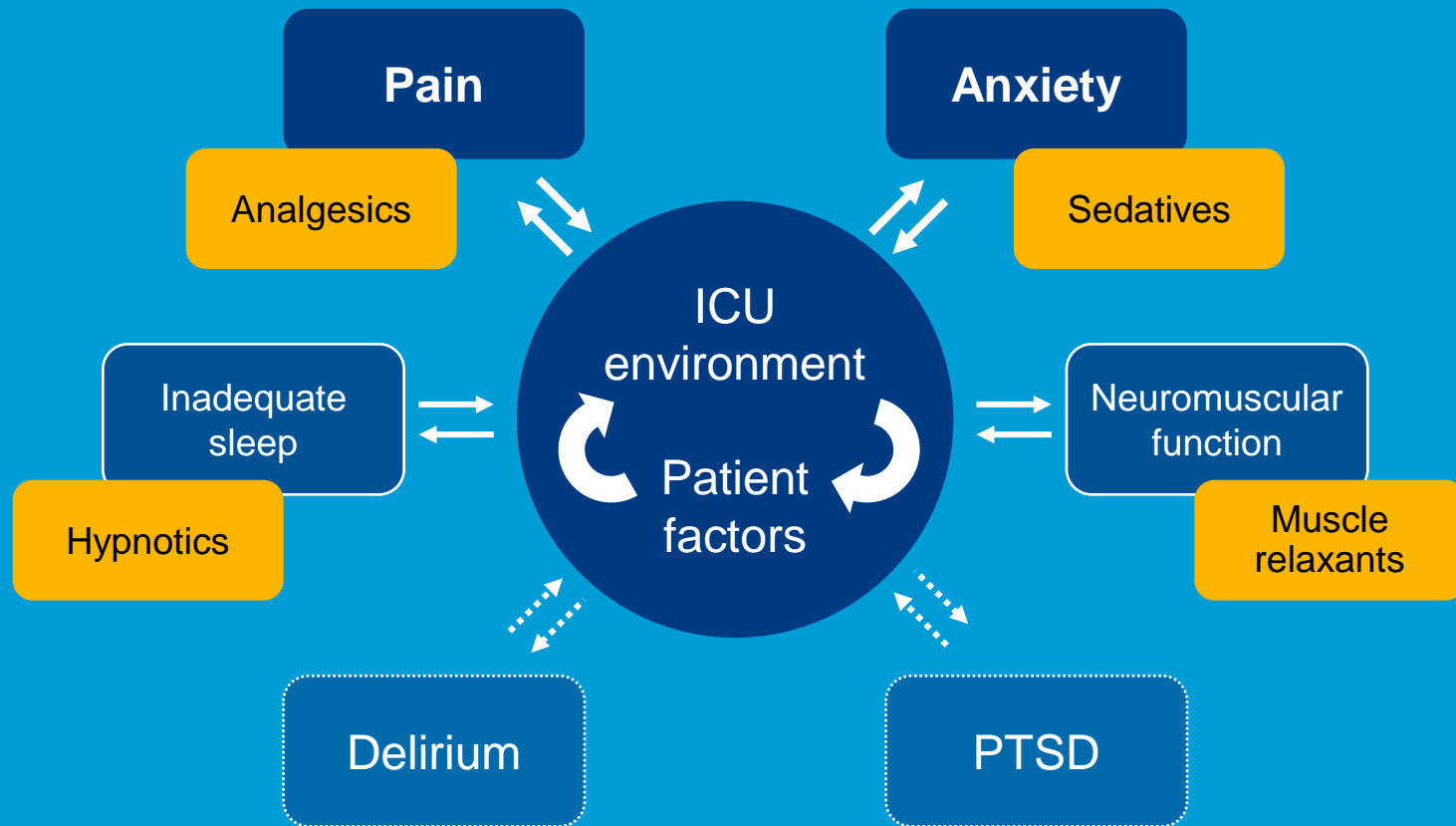
← LEVEL OF SEDATION →

Over-sedation<sup>1</sup>

Coma  
Respiratory depression  
Poor cough  
Hypotension  
Bradycardia  
GI tract paralysis  
Immune suppression  
Renal failure  
Immobility  
Depression

1. Park G. Current Anaesth Crit Care 2002; 13: 313-320.

# Providing patient comfort and safety in a complex environment



# What is optimum sedation?

## Providing a level of sedation that achieves the best possible patient outcomes

- Providing patient comfort and safety<sup>1,2</sup>
  - Minimising pain
  - Minimising anxiety
  - Avoiding adverse effects
- Optimising patient recovery<sup>2</sup>

1. American Society of Anesthesiologists. Anesthesiology 2002; **96**: 1004-1017.

2. Schweikert WD, Kress JP. Crit Care 2008; **12** (Suppl 3): S6.



# Hypnotic-based sedation

**A common approach to sedation over the past 20 years is the use of hypnotic drugs to sedate the patient to a desirable level considered appropriate by the ICU team<sup>1</sup>**

- Sedation to the point of unconsciousness results in patients being unable to express any discomfort and pain<sup>1</sup>
- Therefore difficult to objectively assess discomfort and pain experienced by the patient<sup>2</sup>

1. Park G, *et al.* Br J Anaesth 2007; **98**: 76-82.

2. Tonner PH, *et al.* Curr Opin Anaesthesiol 2003; **16**: 113-121.

# Hypnotic-based sedation

## Hypnotic-based sedation may not achieve satisfactory levels of sedation<sup>1</sup>

### Consequences of oversedation include:

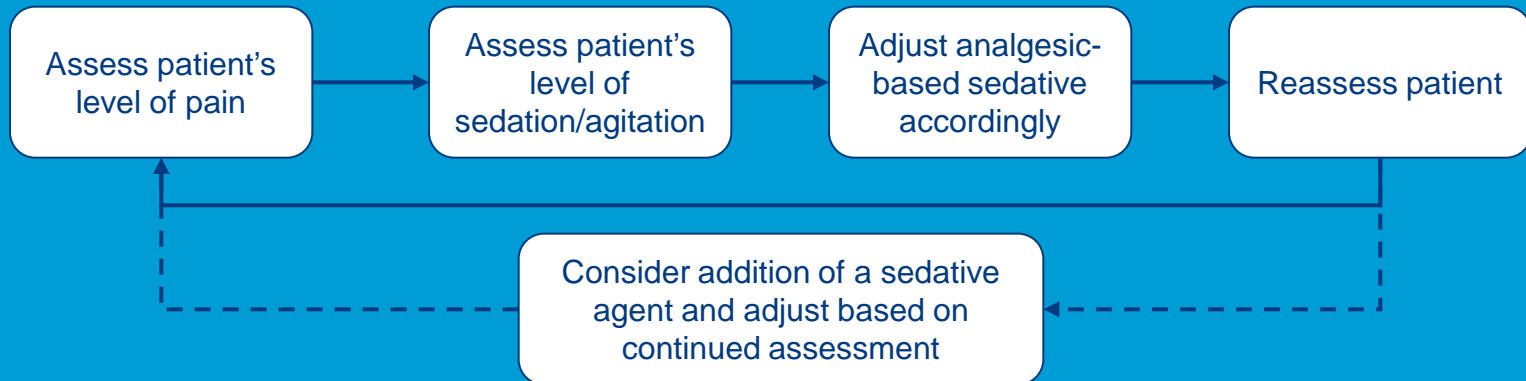
- Increased time on mechanical ventilation<sup>2</sup>
  - Ventilator-associated pneumonia<sup>3</sup>
  - Ventilator-associated lung injury<sup>4</sup>
- Longer length of stay<sup>5</sup>
- Increased costs<sup>5</sup>

1. Park G, *et al.* Br J Anaesth 2007; **98**: 76-82.
2. Kollef MH, *et al.* Chest 1998; **114**: 541-548.
3. Cook DJ, *et al.* Ann Intern Med 1998; **129**: 433-440.
4. Meade MO, *et al.* Crit Care Med 1997; **25**: 1915-1922.
5. Ramsay MAE. Baillieres Clin Anaesthesiol 2000; **14**: 419-432.

# Analgesia-based sedation

## Patient-centred approach focusing on the analgesic needs of patients<sup>1,2</sup>

- Addition of a sedative only if necessary



**Unlike hypnotic-based sedation, analgesia-based sedation enables analgesic and sedative to be adjusted to the patient's expressed needs, rather than the needs perceived by the ICU team<sup>2</sup>**

1. Muellejans B, *et al.* Crit Care 2004; 8: R1-R11.

2. Park G, *et al.* Br J Anaesth 2007; 98: 76-82.

# What is optimum sedation? (revisited)

Providing a level of sedation that achieves the best possible patient outcomes...

...in calm, cooperative, comfortable and communicative patients<sup>1</sup>

...facilitating nursing care and management<sup>1</sup>

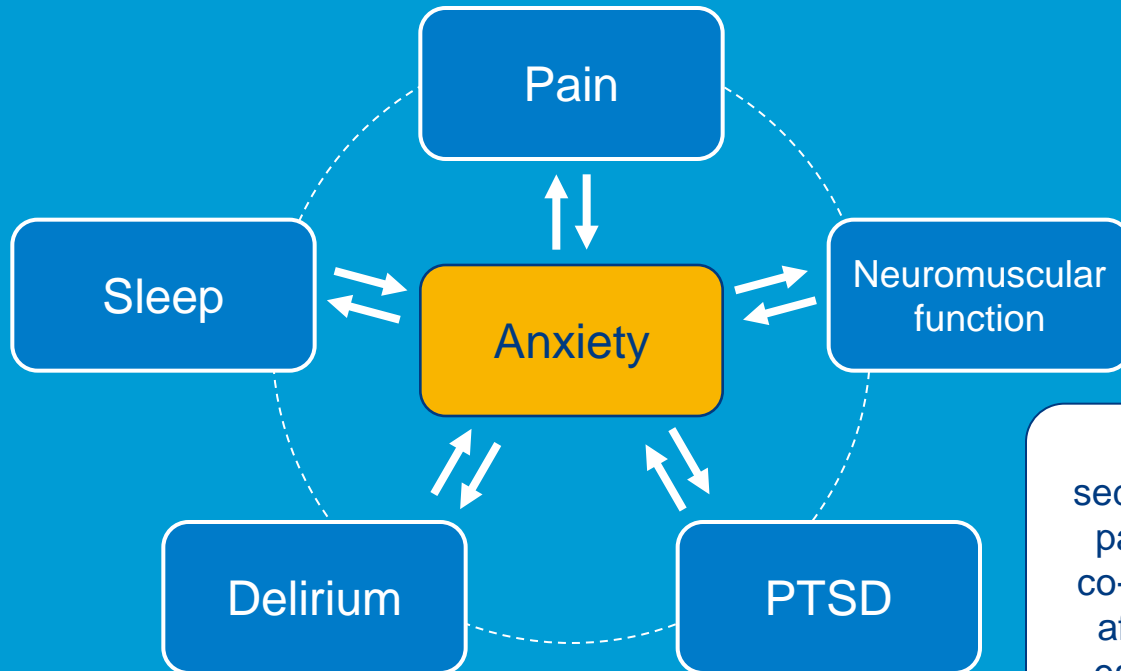
Validated tools are available to assess and monitor pain and agitation in patients<sup>2</sup>

- Provide patient-centred assessment
- Identify pain and agitation to enable treatment when required
- Avoid excessive or prolonged sedation
- Improve communication among clinicians

1. Ramsay MAE. Baillieres Clin Anaesthesiol 2000; 14: 419-432.

2. Sessler CN, Varney K. Chest 2008; 133: 552-565.

# Optimum sedation at the heart of ICU practice<sup>1,2</sup>



Using an analgesic-based sedation, with the aim of ensuring patients are calm, comfortable, co-operative and communicative, affords the opportunity to more easily assess the patient and in turn address pain, inadequate sleep, neuromuscular dysfunction, delirium and PTSD

1. Ramsay MAE. *Baillieres Clin Anaesthesiol* 2000; 14: 419-432.

2. Park G, *et al. Br J Anaesth* 2007; 98: 76-82.

# Sedation in the ICU – are we at a crossroads?

- Choice of analgesics and sedatives
- Expanding evidence base
  - Importance of achieving an optimal level of sedation in ICU<sup>1</sup>
  - Importance of objective assessment of patients' expressed needs<sup>2</sup>
- Validated tools available to assess pain and agitation, affording a patient-centred analgesia-based approach to sedation<sup>2</sup>
- Opportunity to improve patient outcomes and increase ICU efficiency<sup>1</sup>

1. Ramsay MAE. *Baillieres Clin Anaesthesiol* 2000; **14**: 419-432.

2. Sessler CN, Varney K. *Chest* 2008; **133**: 552-565.

# Optimum Sedation Toolkit

## Pain Management

- Causes and effects of pain
- Pain assessment
- Pain management strategies

## Post-traumatic stress disorder

- Causes and symptoms
- Use of ICU patient diaries
- Patient follow-up post ICU

## Delirium

- Delirium in the ICU
- Screening for delirium
- Management of delirium

## Sedation scoring

- Importance of sedation scoring
- Sedation scoring tools available
- Implementing sedation scoring

# References and further reading

American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by non-anesthesiologists. *Anesthesiology* 2002; **96**: 1004-1017.

Breivik H. Postoperative pain management: why is it difficult to show that it improves outcome? *European Journal of Anaesthesiology* 1998; **15**: 748-751.

Cook DJ, *et al.* Incidence of and risk factors for ventilator-associated pneumonia in critically ill patients. *Annals of Internal Medicine* 1998; **129**: 433-440.

Davydow DS, *et al.* Posttraumatic stress disorder in general intensive care unit survivors: a systematic review. *General Hospital Psychiatry* 2008; **30**: 421-434.

De Jonghe B, *et al.* Acquired neuromuscular disorders in critically ill patients: a systematic review. *Intensive Care Medicine* 1998; **24**: 1242-1250.

De Jonghe B, *et al.* Using and understanding sedation scoring systems: a systematic review. *Intensive Care Medicine* 2000; **26**: 275-285.

De Wit M, *et al.* Observational study of patient-ventilator asynchrony and relationship to sedation level. *Journal of Critical Care* 2009; **24**: 74-80.

Girard TD, *et al.* Delirium in the intensive care unit. *Critical Care* 2008; **12** Suppl 3: S3.

Herridge MS, *et al.* One-year outcomes in survivors of the acute respiratory distress syndrome. *New England Journal of Medicine* 2003; **348**: 683-693.

# References and further reading

Kollef MH, *et al.* The use of continuous IV sedation is associated with prolongation of mechanical ventilation. *Chest* 1998; **114**: 541-548.

Meade MO, *et al.* How to use articles about harm: the relationship between high tidal volumes, ventilating pressures, and ventilator-induced lung injury. *Critical Care Medicine* 1997; **25**: 1915-1922.

Muellejans B, *et al.* Remifentanyl versus fentanyl for analgesia based sedation to provide patient comfort in the intensive care unit: a randomized, double-blind controlled trial. *Critical Care* 2004; **8**: R1-R11.

Needham DM. Mobilizing patients in the intensive care unit: improving neuromuscular weakness and physical function. *JAMA* 2008; **300**: 1685-1690.

Park G, *et al.* A comparison of hypnotic and analgesic based sedation in a general intensive care unit. *British Journal of Anaesthesia* 2007; **98**: 76-82.

Park G. Remifentanyl in the ICU: a new approach to patient care. *Current Anaesthesia and Critical Care* 2002; **13**: 313-320.

Ramsay MAE. Intensive care: problems of over- and undersedation. *Baillière's Clinical Anaesthesiology* 2000; **14**: 419-432.

Schweikert WD, Kress JP. Strategies to optimize analgesia and sedation. *Critical Care* 2008; **12** (Suppl 3): S6.

Sessler CN, *et al.* Evaluating and monitoring analgesia and sedation in the intensive care unit. *Critical Care* 2008; **12** (Suppl 3): S2.

# References and further reading

Sessler CN, Varney K. Patient-focused sedation and analgesia in the ICU. *Chest* 2008; **133**: 552-565.

Soliman HM, *et al.* Sedative and analgesic practice in the intensive care unit: the results of a European survey. *British Journal of Anaesthesia* 2001; **87**: 186-192.

Stawicki SP. Sedation scales: very useful, very underused. *OPUS 12 Scientist* 2007; **1**: 10-12.

Tamburri LM, *et al.* Nocturnal care interactions with patients in critical care units. *American Journal of Critical Care* 2004; **13**: 102-112.

Tonner PH, *et al.* Sedation and analgesia in the intensive care unit. *Current Opinion in Anaesthesiology* 2003; **16**: 113-121.



# Management of pain in the intensive care patient

Dr Kevin Gunning

John Farman Intensive Care Unit  
Addenbrooke's Hospital, Cambridge



**The Intensive Care Society**

This medical education programme has been sponsored by GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10



# What will you learn from this section?

- The potential causes and effects of pain in critically ill patients
- Methods for the assessment of pain
- Pain management strategies, including analgesia-based sedation



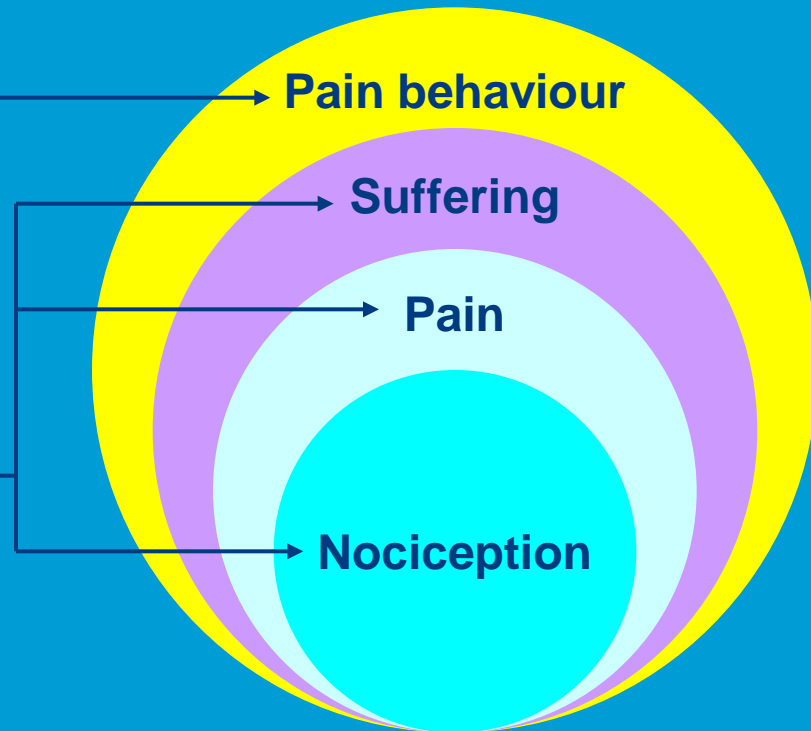
# What is pain?

## Four components of pain<sup>1</sup>

- Can be:
- Measured
  - Observed
  - Quantified

Private,  
internal events

## Environmental interactions



1. Loeser JD. World Congress on Clinical Pharmacology and Therapeutics. 1980.

# Pain in the ICU patient

**‘...an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’<sup>1</sup>**

**‘Pain in hospitalised patients can be viewed as a preventable adverse event’<sup>2</sup>**

**Pain is what the patient says it is**

1. International Association for the Study of Pain. Pain 1986; Suppl 3.
2. Erdek MA, Pronovost PJ. Int J Qual Health Care 2004; 16: 59-64.

# What causes pain?

**Acute**

**Changing character of pain**

**Chronic**

- Incisions
- Trauma
- Cannulation
- Intubation
- Catheterisation

- Turning
- ET suction
- Drains
- Dressings
  - Ileus
- Constipation

- Hard bed
- Immobility
- Joint pain
- Myopathy
- Neuropathic

# Pain – is there a problem?

## Mechanical ventilation<sup>1</sup>

Anxiety	47%
Frustration (i.e. not able to talk)	46%
<b>Pain</b>	<b>36%</b>
Sleep difficulty	35%
Nightmares	26%

## Post surgical ICU

- 63% reported pain moderate to severe<sup>2</sup>

1. Bergbom-Engberg I, Haljamäe H. Crit Care Med 1989; 17: 1068-1072.

2. Puntillo KA. Heart Lung 1990; 19: 526-533.

# Why is it important to assess and manage pain?<sup>1</sup>

## Cardiovascular:

↑ HR, BP,  
myocardial ischaemia, DVT

## Respiratory:

↓ lung volume, atelectasis

## GI:

↓ gastric/bowel motility

## GU:

- retention

## Endocrine:

↑ catabolic hormones,  
-ve nitrogen balance, ADH

## Immunosuppression

## Psychological:

- fear, anxiety, insomnia, delirium

1. Macintyre PE, Schug SA. Acute Pain Management. 2007.

# Pain in the ICU patient: nurses' viewpoint

## Q: How do you know a patient is in pain?

- Hypertension,\* tachycardia, tachypnoea in the appropriate clinical setting
- Grimacing on movement
- Patient looks uncomfortable
- Sixth sense, intuition!!

\*mentioned first by nearly 100%  
GSK data on file

Please refer to Puntillo KA, *et al. Critical Care Medicine* 1997; **25**: 1159-1166.



# Benefits of pain control

- Earlier mobilisation<sup>1</sup>
- Decreased incidence of pulmonary complications<sup>2</sup>
- Reduced stress response<sup>1</sup>
- Reduced incidence of DVT<sup>1</sup>
- Shorter hospital stay<sup>1</sup>
- Better patient care and experience<sup>1</sup>

1. Macintyre PE, Schug SA. Acute Pain Management. 2007.

2. Jacobi J, *et al.* Crit Care Med 2002; **30**: 119-141.



# Impact of systematic evaluation of pain and agitation in an ICU<sup>1</sup>

- Two-phase prospective controlled study
- 12-bed medical ICU (university hospital)
- 230 consecutive patients with >24 hour length of stay
- Assessed with BPS, NRS, RASS
- **Control phase** 21 weeks - observation
- **Interphase** 4 weeks - education
- **Intervention phase** 29 weeks - systematic evaluation
- After procedures, 08:00-10:00, 20:00-22:00
- Physician notification and treatment

1. Chanques G, *et al.* Crit Care Med 2006; **34**: 1691-1699.

# Impact of systematic evaluation of pain and agitation in an ICU: results<sup>1</sup>

- ↓ Pain 63% vs 42%  $p=0.002$  (% reporting  $\geq 1$  event)
- ↓ Agitation 29% vs 12%  $p=0.002$
- ↓ Severe pain 36% vs 16%  $p<0.001$
- ↓ Duration of mechanical ventilation  $p<0.01$
- ↓ Nosocomial infections  $p<0.05$
- Greater nurse satisfaction with control of pain & agitation

1. Chanques G, *et al.* Crit Care Med 2006; 34: 1691-1699.

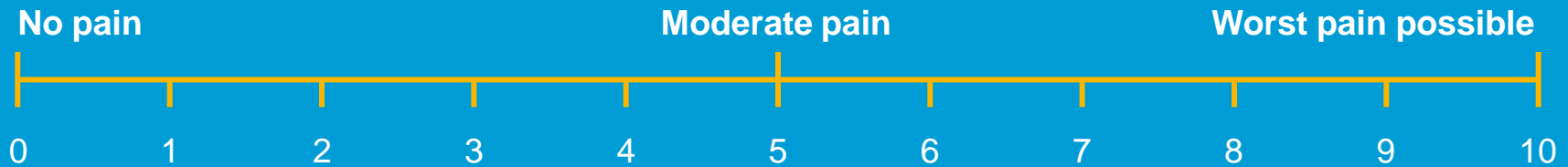
# Assessment of pain

- Self reporting
- Surrogate reporting
- Verbal rating scale
- Visual analogue scale
- McGill Pain Questionnaire\*
- Numeric rating scale
- Behavioural & physiological indicators

**Difficult  
in the  
ICU patient**

\*Using descriptive words, e.g. throbbing, aching, to rate character of pain

# Assessment methods: numeric rating scale<sup>1</sup>

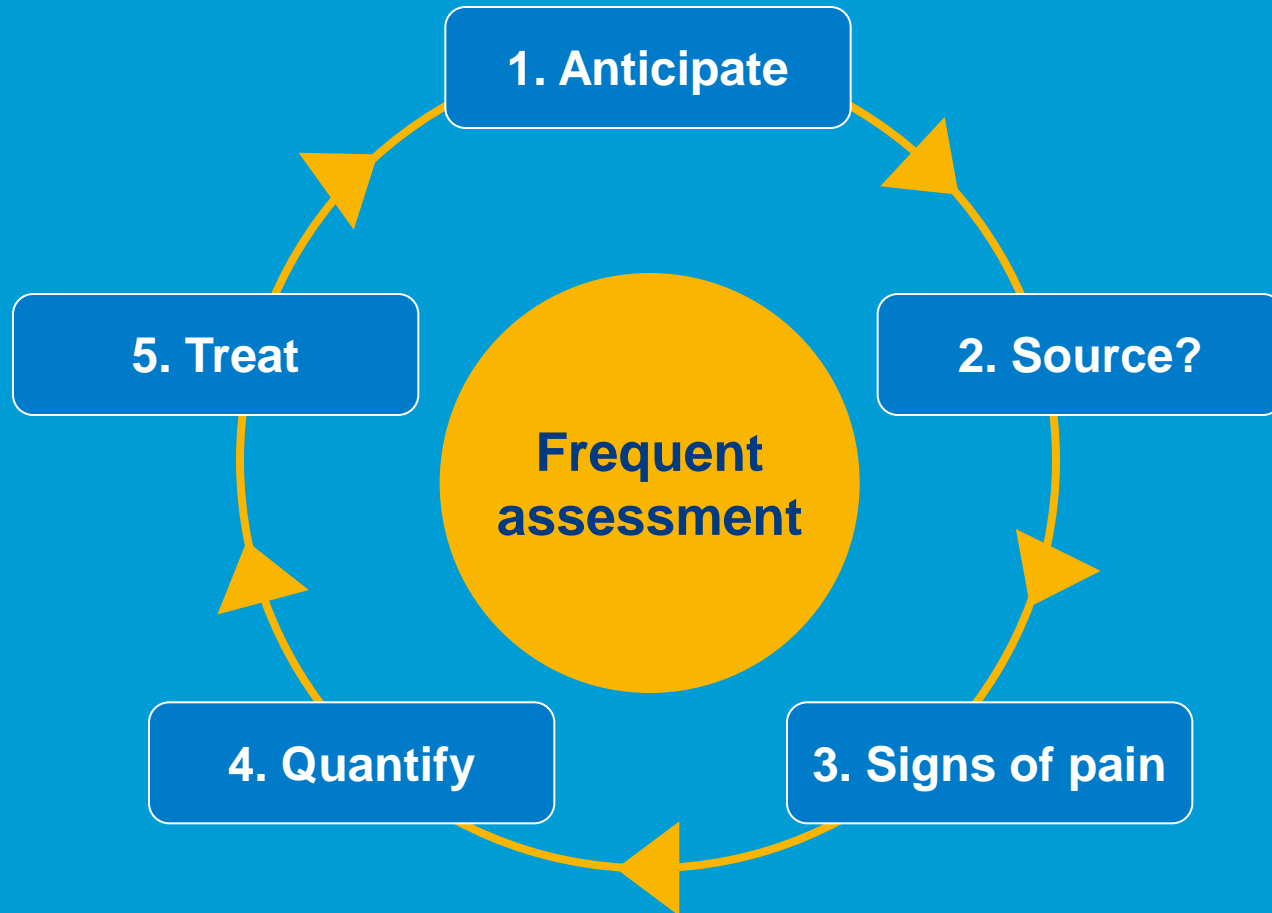


## Numeric rating scale can describe:

- How a patient's pain feels at its worst
- How a patient's pain feels most of the time
- How a patient's pain feels at its least
- How a patient's pain changes with treatment

1. Hartrick CT, *et al.* Pain Pract 2003; 3; 310-316.

# An approach to management of pain in the ICU



# Pain in the ICU patient: drug management

Opioids

NSAIDs

Gabapentin

Dexmedetomidine

Clonidine

Ketamine

Paracetamol

Local anaesthesia

# What might the ideal analgesic look like?

- Rapid onset of action
- Easy to titrate
- Potent agonist
- No active metabolites
- No histamine release
- Does not induce tolerance
- Short context-sensitive half-life
- No withdrawal phenomenon
- Metabolism independent of liver or renal function



# Pain in the ICU patient: analgesia<sup>1</sup>

- Analgesia should be the cornerstone of sedation
- Adequate analgesia could reduce the requirement for sedation
- Adequate analgesia could improve patient's experience of ICU
- Traditional opioids difficult to use

1. Jacobi J, *et al.* Crit Care Med 2002; **30**: 119-141.

# Pain in the ICU patient: conclusions

- Pain is important in ICU and matters to patients
- Pain changes during ICU stay
- Pain is often unrecognised and inadequately treated
- We can assess pain in the ICU
- Sedation should be analgesia based<sup>1</sup>
- Every patient needs an individual pain plan<sup>1</sup>
- If we pay attention to pain we can improve quality of care

1. Jacobi J, *et al.* Crit Care Med 2002; **30**: 119-141.



# Delirium assessment in the ICU

Dr Valerie Page

Watford General Hospital  
[valerie.page@whht.nhs.uk](mailto:valerie.page@whht.nhs.uk)



**The Intensive Care Society**

This medical education programme has been sponsored by  
GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10



# What will you learn from this section?

- The scale and impact of delirium in the ICU
- The effect of delirium on patient outcomes
- That routine monitoring of sedation and screening for delirium is recommended in all patients
- The practical application and implementation of routine delirium assessment

# Delirium: a definition

- Acute brain dysfunction<sup>1</sup>
- Sudden change in mental status<sup>2</sup>
- Develops over short time, fluctuates<sup>2</sup>
- Impaired attention and disorganised thinking<sup>2</sup>
- Disturbance of consciousness<sup>2</sup>
- Seen in 69% of ventilated patients<sup>1</sup>

1. Page V, *et al.* Care Crit Ill 2008; 24: 153-158.

2. <http://www.nlm.nih.gov/medlineplus/ency/article/000740.htm>.



# Why is delirium important?

## Delirium is a predictor of death & associated with long-term cognitive impairment<sup>1</sup>

- Nine times more likely to be discharged with cognitive impairment<sup>1</sup>
- Threefold increased risk of death<sup>1</sup>
- Significant impact on length of ICU stay (median 8 vs 5 days) and hospital stay (median 21 vs 11 days;  $p < 0.001$ )<sup>2</sup>

## Cost associated with delirium<sup>2</sup>

- 1.4-fold increase in ICU costs<sup>2</sup>
- 1.3-fold increase in total hospital costs<sup>2</sup>

1. Ely EW, *et al.* JAMA 2004; **291**: 1753-1762.

2. Milbrandt EB, *et al.* Crit Care Med 2004; **32**: 955-962.

Please refer to Ely EW, *et al.* *JAMA* 2004; **291**:  
**1753-1762.**



# Incidence of delirium by patient subgroup: a UK critical care unit study<sup>1</sup>

	Delirious	Not delirious
Elective post-operative (n=23)	1 (4%)	22 (96%)
Emergency admissions (n=57)	22 (45%)	27 (55%)
Ventilated patients (n=27)	17 (63%)	10 (37%)

1. Page VJ, *et al.* Crit Care 2009; 13: R16.

# Incidence of delirium: demographic data of 71 prospective patients<sup>1</sup>

	Delirious	Not delirious
Number of patients	22 (31%)	49 (69%)
Age	70 (56 to 76)	73 (60 to 77)
Male	16	34
APACHE II	21 (17 to 30)	15 (11 to 20)
Deaths	8	5
Mortality	36% (15-57%)	8% (3-16%)

- Data are n (%) or median (interquartile range)
- APACHE = Acute Physiology Chronic Health Evaluation

1. Page VJ, *et al.* Crit Care 2009; 13: R16.

# Why is screening necessary?

- Routine screening of all critically ill patients for delirium has been recommended in the Society of Critical Care Medicine Guidelines since 2002<sup>1</sup>
- Incidence in UK ventilated patients up to 69%<sup>2</sup>
- Delirium is often missed<sup>3</sup>
- Hypoactive delirium has worse outcomes<sup>4</sup>

1. Jacobi J, *et al.* Crit Care Med 2002; **30**: 119-141.
2. Page V, *et al.* Care Crit Ill 2008; **24**: 153-158.
3. Inouye S, *et al.* Arch Intern Med 2001; **161**: 2467-2473.
4. Truman B, Ely EW. Crit Care Nurse 2003; **23**: 25-36.

# What are the barriers?

## Reluctance to implement routine delirium monitoring<sup>1</sup>

### Some potential reasons include:<sup>2</sup>

- Perceived complexity/lack of familiarity with assessment tools
- Assessment tools designed for research not clinical practice
- Lack of clarity re. who is responsible for the assessment
- Existing time constraints prohibit additional assessments
- Perception that highly sedated patients cannot be screened

1. Ely EW, *et al.* Crit Care Med 2004; **32**: 106-112.

2. Devlin JW, *et al.* Intensive Care Med 2007; **33**: 929-940.

# How to screen for delirium?

**All patients can be screened even if intubated and sedated<sup>1</sup>**

- If sedated, patient needs to be able to open eyes on calling patient's name<sup>2</sup>

## **Option 1.**

**Confusion Assessment Method for the Intensive Care Unit (CAM- ICU), experience suggests monitoring at least once a shift**

## **Option 2.**

**Intensive Care Delirium Screening Checklist (ICDSC), assessed over a shift**

1. Page VJ, *et al.* Crit Care 2009; 13: R16.  
2. Page V, *et al.* Care Crit Ill 2008; 24: 153-158.

# Confusion Assessment Method for the ICU (CAM-ICU)<sup>1</sup>

Feature	Assessment
Altered mental status	Has the patient shown any sign of being other than completely 'themselves'?
Inattention	Using 10-letter sequence where patient is required to squeeze clinician's hand only when letter 'A' is stated: 'SAVE A HAART'
Disorganised thinking	Ability to answer 4 simple yes/no questions Ask the patient to raise two fingers with one hand and then repeat the process with the other hand
Altered level of consciousness	Anything other than awake and alert

1. Ely EW, *et al.* Crit Care Med 2001; 29: 1370-1379.

# Confusion Assessment Method for the ICU (CAM-ICU)<sup>1</sup>

**Feature 1:** Acute onset of mental status changes or fluctuating course

AND

**Feature 2:** Inattention  
Squeezing hand correctly on 4 As in a 10 letter sequence e.g. "SAVE A HAART"

AND (if two mistakes are made above)

**Feature 3:** Disorganised thinking;  
4 simple questions, one command

OR

**Feature 4:**  
Altered level of consciousness

1. <http://www.icudelirium.co.uk/diagnosing-delirium/>.

# Intensive Care Screening Delirium Checklist (ICSDC)<sup>1</sup>

- Altered level of consciousness
- Inattention
- Disorientation
- Hallucinations or delusions
- Psychosis
- Psychomotor agitation or retardation
- Inappropriate speech or mood
- Sleep/wake cycle disturbance
- Symptom fluctuation
- Delirium = 4 or more seen over a shift

1. Bergeron N, *et al.* Intensive Care Med 2001; 27: 859-864.

# How is ICU delirium managed?

- Agree local management guidelines<sup>1</sup>
- Address predisposing risk factors<sup>2</sup>
- Treat precipitating causes<sup>2</sup>
- Review drugs and infusions<sup>2</sup>
- Consider treatment with antipsychotics<sup>3</sup>

1. Page V, *et al.* Care Crit Ill 2008; **24**: 153-158.

2. Inouye S. N Engl J Med 2006; 1157-1165.

3. <http://www.icudelirium.co.uk/treatment/>.



# Conclusions

- Acute brain dysfunction – delirium – is a common serious clinical syndrome<sup>1</sup>
- Delirium is associated with subsequent development of dementia<sup>1</sup>
- Delirium will be missed if not looked for<sup>2</sup>
- The CAM-ICU is a validated and reliable instrument that can be easily used to identify delirium in ICU patients<sup>1,3</sup>

1. Page VJ, *et al.* Crit Care 2009; **13**: R16.
2. Inouye S, *et al.* Arch Intern Med 2001; **161**: 2467-2473.
3. Ely EW, *et al.* JAMA 2004; **291**: 1753-1762.

# Further information

[www.icudelirium.co.uk](http://www.icudelirium.co.uk)  
[www.icudelirium.org](http://www.icudelirium.org)

# References and further reading

Bergeron N, *et al.* Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. *Intensive Care Medicine* 2001; **27**: 859-864.

Devlin JW, *et al.* Delirium assessment in the critically ill. *Intensive Care Medicine* 2007; **33**: 929-940.

Ely EW, *et al.* Evaluation of delirium in critically ill patients: validation of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). *Critical Care Medicine* 2001; **29**: 1370-1379.

Ely EW, *et al.* Current opinions regarding the importance, diagnosis, and management of delirium in the intensive care unit: a survey of 912 healthcare professionals. *Critical Care Medicine* 2004; **32**: 106-112.

Ely EW, *et al.* Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA* 2004; **291**: 1753-1762.

ICU Delirium. Diagnosing delirium. <http://www.icudelirium.co.uk/diagnosing-delirium/> (last accessed 19 May 2009).

ICU Delirium. Why it matters. <http://www.icudelirium.co.uk/why-it-matters/> (last accessed 19 May 2009).

ICU Delirium. Treatment. <http://www.icudelirium.co.uk/treatment/> (last accessed 19 May 2009).

# References and further reading

Inouye S, *et al.* Nurses' recognition of delirium and its symptoms: comparison of nurse and researcher ratings. *Archives of Internal Medicine* 2001; **161**: 2467-2473.

Inouye S. Delirium in older persons. *New England Journal of Medicine* 2006; 1157-1165.

Jacobi J, *et al.* Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. *Critical Care Medicine* 2002; **30**: 119-141.

Milbrandt EB, *et al.* Costs associated with delirium in mechanically ventilated patients. *Critical Care Medicine* 2004; **32**: 955-962.

Page V, *et al.* *Care of the Critically Ill* 2008; **24**: 153-158.

Page VJ, *et al.* Routine delirium monitoring in a UK critical care unit. *Critical Care* 2009; **13**: R16.

Truman B, Ely EW. monitoring delirium in critically ill patients. Using the confusion assessment method for the intensive care unit. *Critical Care Nurse* 2003; **23**: 25-36.

US National Library of Medicine, National Institutes of Health. MedlinePlus Medical Encyclopaedia: delirium. <http://www.nlm.nih.gov/medlineplus/ency/article/000740.htm> (last accessed 19 May 2009).



# Post-traumatic stress disorder (PTSD) post ICU

Dr Christina Jones

Nurse Consultant Critical Care Follow-up,  
Intensive Care Unit, Whiston Hospital, Prescot, UK

Honorary Lecturer, School of Clinical Science, University of Liverpool, UK



**The Intensive Care Society**

This medical education programme has been sponsored by  
GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10



# Objectives

## After completing this section you will be able to:

- Understand and recognise what causes PTSD post ICU
- Understand how PTSD affects patients
- Understand the need for follow-up of patients post ICU
- Understand the need for quick diagnosis and referral of patients

# What is PTSD?

## DSM-IV definition<sup>1</sup>

- A. The person has been exposed to a traumatic event
- B. The traumatic event is persistently re-experienced
- C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma)
- D. Persistent symptoms of increased arousal (not present before the trauma)
- E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month
- F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

1. American Psychiatric Association. DSM-IV-TR, 2000.

# Acute and chronic PTSD

## Acute<sup>1</sup>

- Symptoms present <3 months

## Chronic<sup>1</sup>

- Symptoms present >3 months

1. American Psychiatric Association. DSM-IV-TR, 2000.

# PTSD symptoms

## Three symptom categories<sup>1</sup>

- Recurrent recollection:
  - Flashbacks or nightmares leading to delusional events
  - Hallucinations
  - Feelings that people were trying to hurt them while they were ill
- Avoidance:
  - Avoiding visiting the hospital
  - Unable to watch medical programmes on TV
- Arousal:
  - Exaggerated startle response
  - Difficulty concentrating
  - Not being able to sleep

1. American Psychiatric Association. DSM-IV-TR, 2000.

# PTSD post ICU

**Approximately 1 in 10 of ICU-surviving patients will develop PTSD or PTSD-related symptoms<sup>1</sup>**

**Incidence varies considerably from unit to unit due to:**

- Case mix
- Diagnostic or screening tool used

1. Jones C, *et al.* Intensive Care Med 2007; 33: 978-985.

# PTSD post ICU incidence studies in ICUs

Study	Subgroup	N	PTSD
1. Koshy G, <i>et al.</i> Intensive Care Med 1997; 23(S1): S160	-		15%
2. Schelling G, <i>et al.</i> Crit Care Med 1998; 26: 651-659	ARDS	80	27.5%
3. Schnyder U, <i>et al.</i> Am J Psychiatry 2001; 158: 594-599	Trauma	106	14%
4. Scragg P, <i>et al.</i> Anaesthesia 2001; 56: 9-14	-	80	15%
5. Jones C, <i>et al.</i> Crit Care Med 2003; 31: 2546-2461	-	126	51%
6. Cuthbertson BH, <i>et al.</i> Intensive Care Med 2004; 30: 450-455	-	78	14%
7. Jones C, <i>et al.</i> Intensive Care Med 2007; 33: 978-985	-	238 (5 ICUs)	3-15%*
8. Girard TD, <i>et al.</i> Crit Care 2007; 11: R28	-	43	14%

\*PTSD diagnostic tool used, as opposed to a screening tool

# Factors related to PTSD

## ICU factors

- Increased length of stay<sup>1</sup>
  - ICU
  - Hospital
- Increased duration of mechanical ventilation<sup>1,2</sup>
- Greater levels of or duration of sedation<sup>1,3,4</sup>
- Use of physical restraint<sup>3</sup>

## Patient factors

- Younger age<sup>1,2,5</sup>
- Female gender<sup>1,5</sup>
- Previous psychological illness<sup>1,2</sup>
- Memories of ICU stay<sup>1,3</sup>

Hydrocortisone may provide a preventive effect by mediating the stress response<sup>6,7</sup>

1. Jackson JC, *et al.* Crit Care 2007; **11**: R27.
2. Cuthbertson BH, *et al.* Intensive Care Med 2004; **30**: 450-455.
3. Jones C, *et al.* Intensive Care Med 2007; **33**: 978-985.
4. Nelson BJ, *et al.* Crit Care Med 2000; **28**: 3626-3630.
5. Girard TD, *et al.* Crit Care 2007; **11**: R28.
6. Schelling G, *et al.* Crit Care Med 1999; **27**: 2678-2683.
7. Schelling G, *et al.* Biol Psychiatry 2004; **55**: 627-633.

# Sedation practice and PTSD

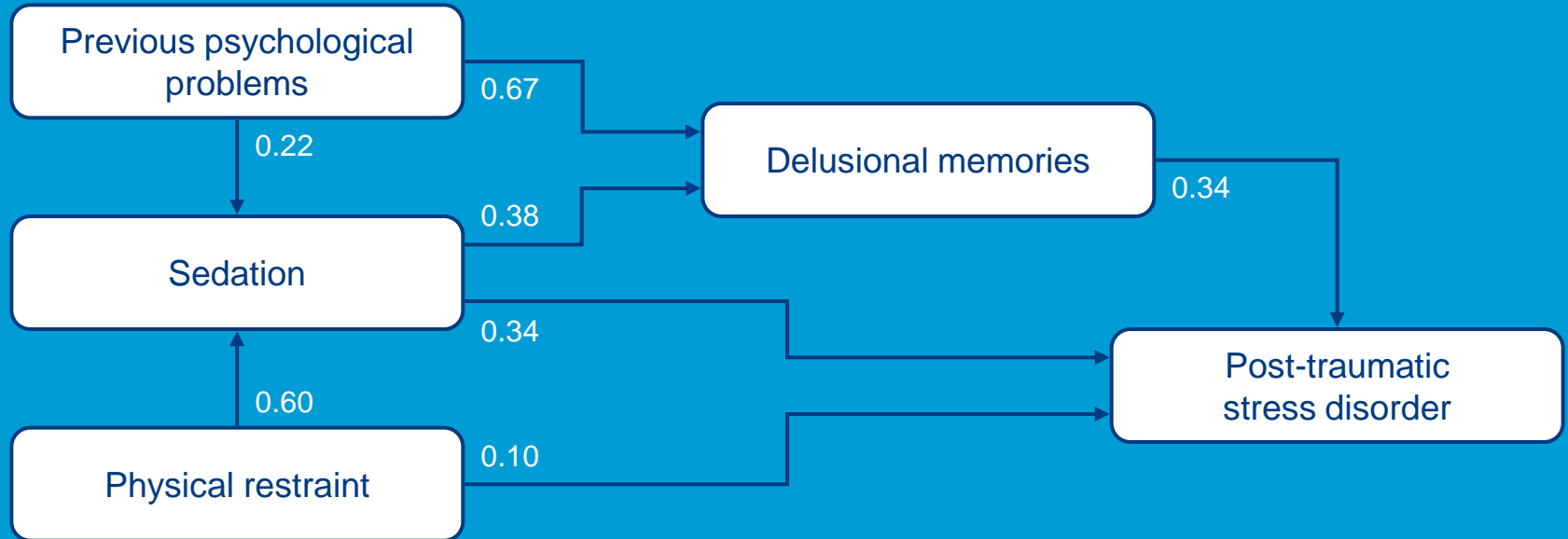
## What level of sedation during the ICU stay will help to minimise the risk of traumatisation following discharge?

- Common use of sedatives may imply a perception that, if a patient is deeply sedated, then they will be less likely to remember their experience in ICU and therefore be less traumatised<sup>1</sup>
- Is this actually the case?

1. Kress JP, *et al.* Am J Respir Crit Care Med 2003; **168**: 1457-1461.

# RACHEL group study (2002-2005)

Five ICUs across Europe; prospective observational study (n=238)



Structural model of factors associated with the development of PTSD<sup>1</sup>

#### Model fit

Chi-squared 7.88, df = 11,  $p = 0.72$

Comparative fit = 1.00

RMSEA = 0.0001

1. Jones C, *et al.* Intensive Care Med 2007; 33: 978-985.

# Delusional memories

## Delusional memories are often reported post ICU<sup>1</sup>

- 239 patients completed a self-administered questionnaire about their memory for the ICU (ICUM tool) at 6-18 months post ICU discharge
- 26% recalled delusional memories
- Some factors associated with delusional memories
  - Younger patients (<50 years)
  - ICU stay  $\geq 3$  days
  - Temperature  $\geq 38^{\circ}\text{C}$
  - Treatment with sedatives and opioids
- More likely not to have returned to work at 1 year after the trauma

**6 months after discharge, amnesia, dreams and nightmares of the ICU stay have been found to be associated with a worse HR-QoL<sup>2</sup>**

1. Ringdal M, *et al.* Intensive Crit Care Nurs 2006; 22: 346-354.

2. Granja C, *et al.* Crit Care 2005, 9: R96-R109.



Please refer to Jones C, *et al. Critical Care Medicine* 2001; **29: 573-580.**

# Levels of sedation and PTSD

## Daily sedation interruption and awakening may reduce the signs of PTSD<sup>1</sup>

Sedation group	IES <sup>†</sup> Scores ( <i>p</i> =0.02)
Sedative interruption only at the discretion of the ICU team (n=19)	27.3 ± 19.2
Daily sedative interruption until awake (n=13)	11.2 ± 14.9

<sup>†</sup>The IES assesses PTSD-related symptoms (of avoidance and intrusion).

## The ability to form even fragmented factual memories may help to protect against PTSD-related symptoms<sup>1</sup>

1. Kress JP, *et al.* Am J Respir Crit Care Med 2003; **168**: 1457-1461.

# Optimum sedation and memory

- Sedating ICU patients to a level where they are awake, cooperative and able to form factual memories may provide protection against PTSD-related symptoms<sup>1</sup>
- Randomised controlled trial of 137 patients<sup>1</sup>
  - ‘Light sedation’ - awake and cooperative
  - ‘Deep sedation’ - asleep or awakening on physical stimulation
- Results
  - Shorter ICU length of stay and more ventilator-free days in awake group<sup>1</sup>
  - Follow-up at 1 month<sup>1</sup>
    - Less trouble remembering their stay in awake group
    - No significant difference in depression, anxiety or PTSD
- More long-term research required

1. Treggiari MM. Dissertation Abstracts International. B, The Sciences and Engineering 2008; 68: B7227.

# Optimum sedation and PTSD



## Optimum sedation should aim to:<sup>1</sup>

- Control pain and anxiety, ensuring patient comfort and safety
- Avoid oversedation and adverse effects
- Enable patients to interact with family and ICU team
- Reduce the risk of PTSD

1. Ramsay MAE. Baillieres Clin Anaesthesiol 2000; 14: 419-432.

# PTSD and memory assessment tools

- CAM-ICU (in ICU)<sup>1</sup>
  - Delirium test
- ICU Memory (ICUM) tool (2 weeks)<sup>2</sup>
  - Memory for hospital admission
  - Memory for ICU
    - factual events
    - feelings
    - delusional events (nightmares, hallucinations, paranoid delusions)
- UK-PTSS-14 (2-3 months)<sup>3</sup>
  - Short PTSD symptom screening tool
- PDS (3 months)<sup>3,4</sup>
  - PTSD interview tool

1. Ely EW, *et al.* Crit Care Med 2001; **29**: 1370-1379.
2. Jones C, *et al.* Clin Intensive Care 2000; **11**: 251-255.
3. Twigg E, *et al.* Acta Anaesthesiol Scand 2008; **52**: 202-208.
4. Foa EB, *et al.* Psychol Assess 1997; **9**: 445-451.

# ICU Memory (ICUM) Tool<sup>1</sup>

Period/objective	Item	Details
Before ICU admission	1	Do you remember being admitted to hospital?
	2	Can you remember the time in hospital before you were admitted to intensive care?
During ICU stay <sup>†</sup>	3	Do you remember being in intensive care
	4a	Do you remember the whole stay clearly?
	4b	What can you remember? (checklist)
After discharge <sup>†</sup> (Identify PTSD symptoms)	5	Do you remember being transferred from intensive care to the general wards?
	6	Have you had any unexplained feelings of panic or apprehension?
	7	Have you had any intrusive memories from your time in hospital or of the event that led to your admission?
	8	Have you talked about what happened to you in intensive care with family or healthcare professionals?

<sup>†</sup>Additional questions (4c, 4d, 6a, 7a and 7b) elicit further detail for specific types of reported ICU memories.

1. Jones C, *et al.* Clin Intensive Care 2000; 11: 251-255.



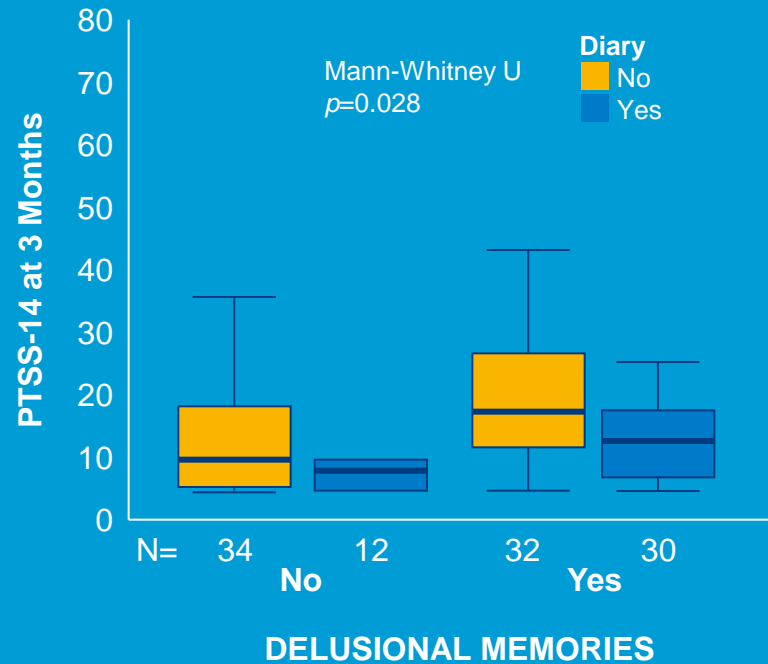
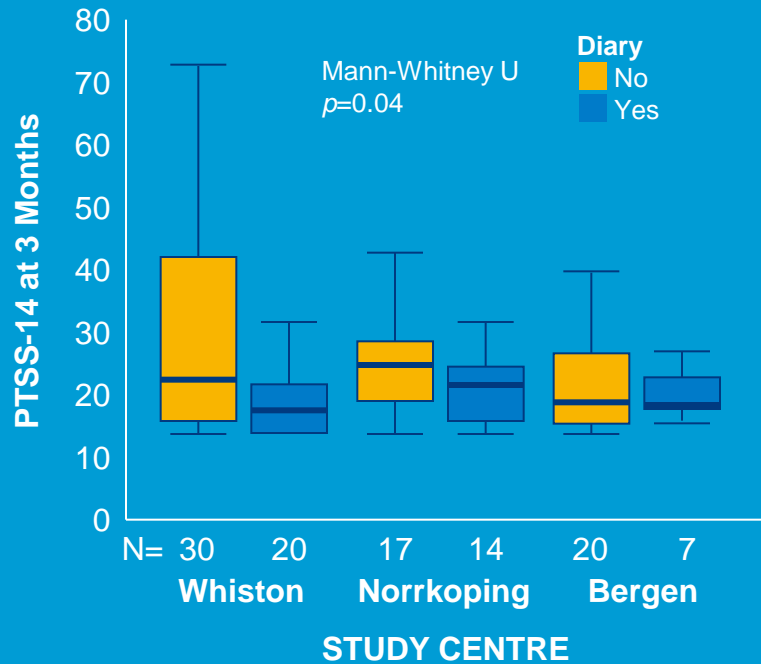
# ICU patient diaries

## Idea originated in Sweden<sup>1</sup>

- Nursing intervention
- Daily account of ICU stay using everyday language
- Photographs of patient taken
  - Aim to fill in memory gaps and help patients cope with their experiences of the ICU
- Given to the patient after their discharge from ICU
  - At a time of the patient's choosing
  - With staff support to go through the diary and photos

1. Bäckman CG, Walter SM. Intensive Care Med 2001; 27: 426-429.

# PTSD symptom levels



(a) All patients from diary study centres (n=108)

(b) Patients recalling delusional memories (n=108)

Provision of a patient diary was associated with fewer PTSD-related symptoms at 3 months<sup>1</sup>

1. Jones C, *et al.* Poster presented at ESICM 2006; Abstract 0547.

# Outreach and follow-up

## Outreach<sup>1</sup>

- Collaborative approach to enable appropriate and early intervention to meet patients' individual needs; e.g. enable smooth transition from ICU to the ward

## Follow-up<sup>2</sup>

- Normalisation of problems through provision of information and advice
  - Reassurance to patient and family
- Identification of ongoing physical and psychological problems, e.g. on-going delirium
  - Advice on treatment
  - Referral if appropriate

1. Intensive Care Society, Guidelines for the introduction of outreach services, 2002.

2. Prinjha S, *et al.* Crit Care 2009; 13: R46.

# Aiding recovery and returning to normal

## Examine memories for ICU<sup>1</sup>

- 'Normalisation' – telling it is normal
- Helping to handle nightmares

## Prospective ICU diaries with photographs<sup>2</sup>

- Given to patient either on the ward or in follow-up clinic

## Outpatient appointment at 2 months

- Going through their ICU story (once they are ready)
- Revisit level of recovery
  - if no recovery refer on

1. Prinjha S, *et al.* Crit Care 2009; 13: R46.

2. Bäckman CG, Walter SM. Intensive Care Med 2001; 27: 426-429.

# Addressing PTSD in the ICU

Know your patient's background  
Understand what in ICU can traumatise and minimise  
Educate patients, family and carers on symptoms

Illness, trauma

Sedation

Psychological history

Delirium

Delusional memories, no factual memories

PTSD symptoms

Know your patient's background  
Implement outreach and follow-up protocols  
Ensure appropriate referral if required



# References and further reading

American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fourth edition, text revision. Washington DC, American Psychiatric Association, 2000.

Bäckman CG, Walther SM. Use of a personal diary written on the ICU during critical illness. *Intensive Care Medicine* 2001; **27**: 426-429.

Cuthbertson BH, *et al.* Post-traumatic stress disorder after critical illness requiring general intensive care. *Intensive Care Medicine* 2004; **30**: 450-455.

Ely EW, *et al.* Evaluation of delirium in critically ill patients: validation of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). *Critical Care Medicine* 2001; **29**: 1370-1379.

Foa EB, *et al.* The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment* 1997; **9**: 445-451.

Girard TD, *et al.* Risk factors for post-traumatic stress disorder symptoms following critical illness requiring mechanical ventilation: a prospective cohort study. *Critical Care* 2007; **11**: R28.

Granja C, *et al.* Patients' recollections of experiences in the intensive care unit may affect their quality of life. *Critical Care* 2005; **9**: R96-R109.

Intensive Care Society. Guidelines for the introduction of outreach services. London, Intensive Care Society, 2002.

Jackson JC, *et al.* Post-traumatic stress disorder and post-traumatic stress symptoms following critical illness in medical intensive care unit patients: assessing the magnitude of the problem. *Critical Care* 2007; **11**: R27.

# References and further reading

Jones C, *et al.* Preliminary validation of the ICUM tool - a tool for assessing memory of the intensive care experience. *Clinical Intensive Care* 2000; **11**: 251-255.

Jones C, *et al.* Memory, delusions, and the development of acute posttraumatic stress disorder-related symptoms after intensive care. *Critical Care Medicine* 2001; **29**: 573-580.

Jones C, *et al.* Rehabilitation after critical illness: a randomized, controlled trial. *Critical Care Medicine* 2003; **31**: 2546-2461.

Jones C, *et al.* Intensive care diaries may reduce later symptoms of posttraumatic stress disorder. Poster presented at ESICM 2006; Abstract 0547.

Jones C, *et al.* Precipitants of post-traumatic stress disorder following intensive care: a hypothesis generating study of diversity in care. *Intensive Care Medicine* 2007; **33**: 978-985.

Koshy G, *et al.* Intensive care unit follow up program at a district general hospital. *Intensive Care Medicine* 1997; **23**(S1): S160.

Kress JP, *et al.* The long-term psychological effects of daily sedative interruption on critically ill patients. *American Journal of Respiratory and Critical Care Medicine* 2003; **168**: 1457-1461.

Nelson BJ, *et al.* Intensive care unit drug use and subsequent quality of life in acute lung injury patients. *Critical Care Medicine* 2000; **28**: 3626-3630.

Prinjha S, *et al.* What patients think about ICU follow-up services: a qualitative study. *Critical Care* 2009; **13**: R46.

Ramsay MAE. Intensive care: problems of over- and undersedation. *Bailliere's Clinical Anaesthesiology* 2000; **14**: 419-432.

# References and further reading

Ringdal M, *et al.* Delusional memories from the intensive care unit – experienced by patients with physical trauma. *Intensive and Critical Care Nursing* 2006; **22**: 346-354.

Schelling G, *et al.* Health-related quality of life and posttraumatic stress disorder in survivors of the acute respiratory distress syndrome. *Critical Care Medicine* 1998; **26**: 651-659.

Schelling G, *et al.* The effect of stress doses of hydrocortisone during septic shock on posttraumatic stress disorder and health-related quality of life in survivors. *Critical Care Medicine* 1999; **27**: 2678-2683.

Schelling G, *et al.* Stress doses of hydrocortisone, traumatic memories, and symptoms of posttraumatic stress disorder in patients after cardiac surgery: a randomized study. *Biological Psychiatry* 2004; **55**: 627-633.

Schnyder U, *et al.* Incidence and prediction of posttraumatic stress disorder symptoms in severely injured accident victims. *American Journal of Psychiatry* 2001; **158**: 594-599.

Scragg P, *et al.* Psychological problems following ICU treatment. *Anaesthesia* 2001; **56**: 9-14.

Treggiari MM. Randomized trial of light versus deep sedation on mental health after critical illness. *Dissertation Abstracts International: Section B: The Sciences and Engineering* 2008; **68**: B7227.

Twigg E, *et al.* Use of a screening questionnaire for post-traumatic disorder (PTSD) on a sample of UK ICU patients. *Acta Anaesthesiologica Scandinavica* 2008; **52**: 202-208.



# ICU patient diaries: guiding principles

Dr Christina Jones

Nurse Consultant Critical Care Follow-up,  
Intensive Care Unit, Whiston Hospital, Prescot, UK  
Honorary Lecturer, School of Clinical Science,  
University of Liverpool, UK



**The Intensive Care Society**

This medical education programme has been sponsored by  
GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10



# Key requirements

**Ethics committee / legal team / Caldicott guardian approval**

**Diary notebooks**

**Polaroid camera or digital camera with printer**

**Diary register**

- To enable tracking of which patients have a diary and where each diary is currently located

**Secure, lockable storage**

- To store the diaries between patient discharge and follow-up

**Diary champion**

# Record keeping

## Diary register

- Patient name
- Date diary commenced
- Date patient transferred out of ICU
- Date diary passed to the follow-up team
- Date diary returned to ICU storage (if applicable)
- Date diary destroyed (if applicable)

## Diary acceptance form

- Documentation of acceptance or refusal of the diary

# Starting a diary

## Cover page

- ID Sticker
  - Name
  - Hospital ID #
- Should not have
  - Patient's address

## Inside page

- Patient's name
- Hospital ID number
- Bed space
- Date of ICU admission



# Healthcare professionals' entries

**All healthcare professionals should be given the opportunity to contribute to the diary and encouraged to add entries**

- Use black ink
- Date and sign entries
- Include significant milestones
- Avoid sensitive information
- Avoid medical jargon – use layman's terms
- Make daily entries, where possible
- Take photographs

# Relatives' entries

## Encourage relatives to contribute to the diary

- Events from home
- Their visits to ICU
- Family milestones
- Information about the patient's interests (e.g. sport, current affairs etc)

# Patient photographs

## Photographs of patient's stay in the ICU

- Include relatives in the photographs
- Do not give the photographs to the family

## Label all photographs

- Patient name
- Date taken

## Do not include the photographs within the diary immediately

- Leave a space in the diary
- Only mount the photographs when the diary has been discussed with the patient following their discharge and once they have given consent
- Store unmounted photographs for a period of 12 months



# Returning the diary to the patient

## Follow-up team

- Discuss the diary with the patient
- Determine when they are ready to see the diary

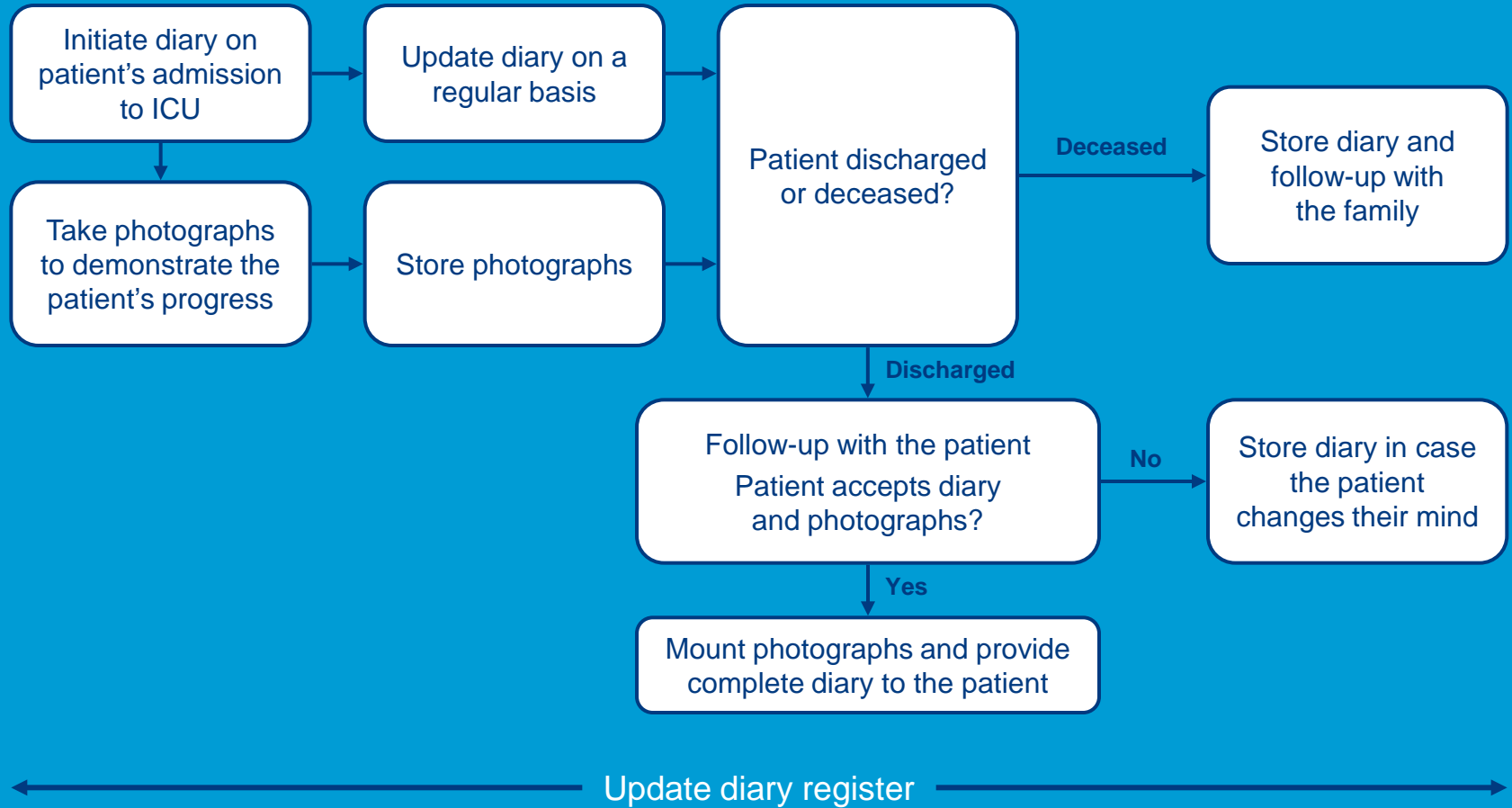
## If the patient refuses the diary

- Store for 12 months
- If after this time the patient still does not wish to see the diary, destroy the diary by shredding

## If the patient dies

- Store the diary for 3 months
- Write a letter to the family to see if they would like to receive the diary

# Overview



# References and further reading

Bäckman CG, Walther SM. Use of a personal diary written on the ICU during critical illness. *Intensive Care Medicine* 2001; **27**: 426-429.

Jones C. Whiston Hospital Intensive Care Unit and High Dependency Unit Patient Diary Guidelines. October 2006. St Helens and Knowsley Hospitals NHS Trust.

Jones C, *et al.* Intensive care diaries may reduce later symptoms of posttraumatic stress disorder. Poster presented at ESICM 2006; Abstract 0547.

Knowles RE, Tarrier N. Evaluation of the effect of prospective patient diaries on emotional well-being in intensive care unit survivors: a randomized controlled trial. *Critical Care Medicine*. 2009; **37**: 184-191.



# Using and understanding sedation scoring systems

Dr Carl Waldmann

Royal Berkshire Hospital, Reading



**The Intensive Care Society**

This medical education programme has been sponsored by  
GlaxoSmithKline and is endorsed by the Intensive Care Society.

Date of prep: November 2010  
UK/REM/0024d/10



# Objectives

**After completing this section you will be able to:**

- Have an appreciation for the importance of sedation scoring
- Understand the key differences between available sedation scores
- Implement sedation scoring as part of a sedation protocol



# What is sedation scoring?

**Assessment of the depth of patient sedation to meet patient-specific objectives<sup>1</sup>**

**These objectives include<sup>2</sup>**

- Patient comfort
- Pain control
- Reduction of anxiety
- Facilitation of nursing care
- Sleep management
- Avoidance of adverse outcomes, such as PTSD

1. De Jonghe B, *et al.* Intensive Care Med 2000; **26**: 275-285.  
2. Ramsay MAE. Baillieres Clin Anaesthesiol 2000; **14**: 419-432.

# Importance of sedation scoring

Under-sedation<sup>1</sup>

Pain  
Anxiety  
Hypertension  
Tachycardia  
Hypoxia  
Hypercarbia

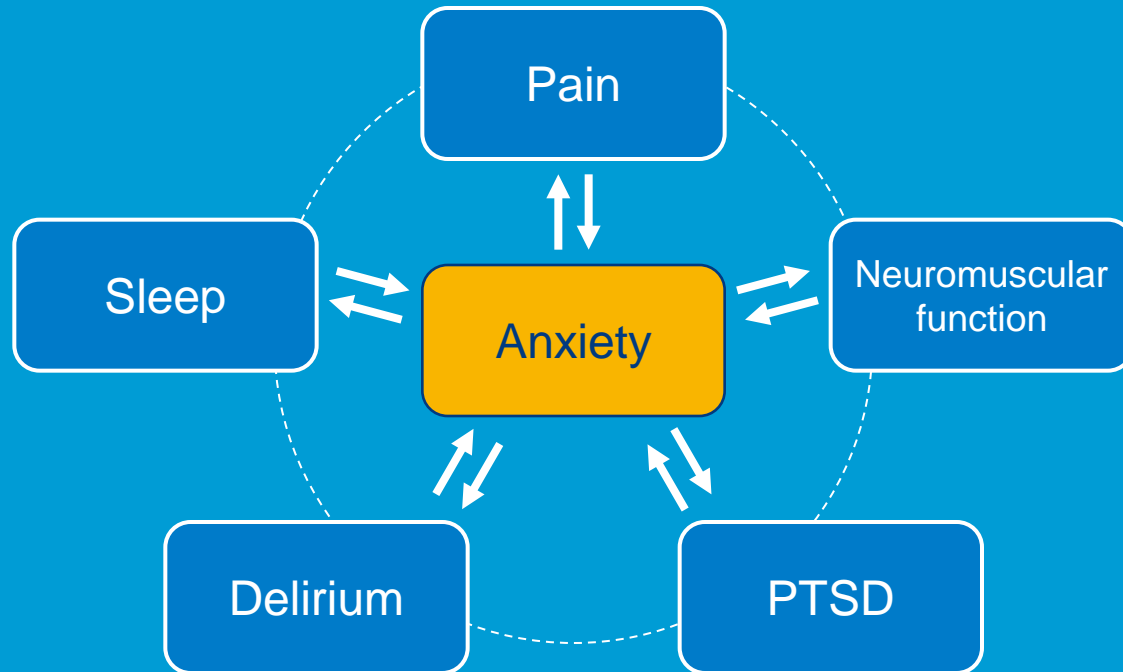
← LEVEL OF SEDATION →

Over-sedation<sup>1</sup>

Coma  
Respiratory depression  
Poor cough  
Hypotension  
Bradycardia  
GI tract paralysis  
Immune suppression  
Renal failure  
Immobility  
Depression

1. Park G. Curr Anaesth Crit Care 2002; 13: 313-320.

# Alert, calm, communicative and co-operative patients



Achieving an optimal level of sedation, where the patient is alert, calm, communicative and co-operative, facilitates easier patient assessments in the ICU<sup>1</sup>

Using a patient-centred approach to sedation to manage anxiety, we have a better opportunity to manage pain, delirium, sleep and neuromuscular function, and to prevent PTSD

1. Park G, *et al.* Br J Anaesth 2007; 98: 76-82.

# Measuring levels of sedation

**Bedside assessment of sedation is objective – if you guess you won't get it right!**

- Patients' responses to verbal and physical stimuli are observed
- These responses are matched to a numeric score, which indicates the level of sedation
- Regular assessments enable sedation to be titrated to patients' needs

# What would the ideal sedation assessment tool look like?

- Level of sedation and agitation<sup>1</sup>
- Well defined categories<sup>1</sup>
- Behavioural descriptors<sup>2</sup>
- Good reliability and validity in ICU patients<sup>1,2</sup>
- Simple and user-friendly<sup>1,2</sup>

1. Jacobi J, *et al.* Crit Care Med 2002; **30**: 119-141.

2. De Jonghe B, *et al.* Intensive Care Med 2000; **26**: 275-285.

# Choosing a scale

## No consensus in international guidelines regarding which scale to use<sup>1</sup>

- Assessment methods have generally been compared with each other<sup>2</sup>
- Validation is problematic – lack of an objective standard to validate against<sup>1</sup>

## How to choose a scale?

- Ease of use
- Familiarity
- Ability to be used in a consistent and standardised way
- Usability in tandem with other scoring systems (e.g. for pain and delirium)

1. Reschreiter H, *et al.* Crit Care 2008; **12**: R152.

2. De Jonghe B, *et al.* Intensive Care Med 2000; **26**: 275-285.

# Ramsay Scale<sup>1</sup>

Score	Awake levels (observed)
1	Patient anxious and agitated or restless or both
2	Patient co-operative, orientated and tranquil
3	Patient responds to commands only
Asleep levels (response to a light glabellar tap or a loud auditory stimulus)	
4	Brisk response
5	Sluggish response
6	No response

1. Ramsay MAE, *et al.* Br Med J 1974; 2: 656-659.

Please refer to Riker RR, *et al. Critical Care Medicine* 1994; **22**: 433-440.



Please refer to Devlin JW, *et al. Critical Care Medicine* 1999; **27**: 1271-1275.



Please refer to Sessler CN *et al. Am J Respir Crit Care Med* 2002; **166**: 1338-1344.

Please refer to De Jonghe B, *et al. Critical Care Medicine* 2003; **31: 2344-2354.**



# Sedation scales: dimensions

Scale	Consciousness	Agitation	Ventilator synchrony	Pain	Comprehension
Ramsay Scale (RS) <sup>1</sup>	✓	✓			
Sedation Agitation Scale (SAS) <sup>2</sup>	✓	✓			
Motor Activity Assessment Scale (MAAS) <sup>3</sup>	✓	✓			
Richmond Agitation-Sedation Scale (RASS) <sup>4</sup>	✓	✓	✓		
Adaptation to the Intensive Care Environment (ATICE) <sup>5</sup>	✓	✓	✓	✓	✓

1. Ramsay MAE, *et al.* Br Med J 1974; **2**: 656-659.
2. Riker RR, *et al.* Crit Care Med 1994; **22**: 433-440.
3. Devlin JW, *et al.* Crit Care Med 1999; **27**: 1271-1275.
4. Sessler CN, *et al.* Am J Respir Crit Care Med 2002; **166**: 1338-1344.
5. De Jonghe B, *et al.* Crit Care Med 2003; **31**: 2344-2354.

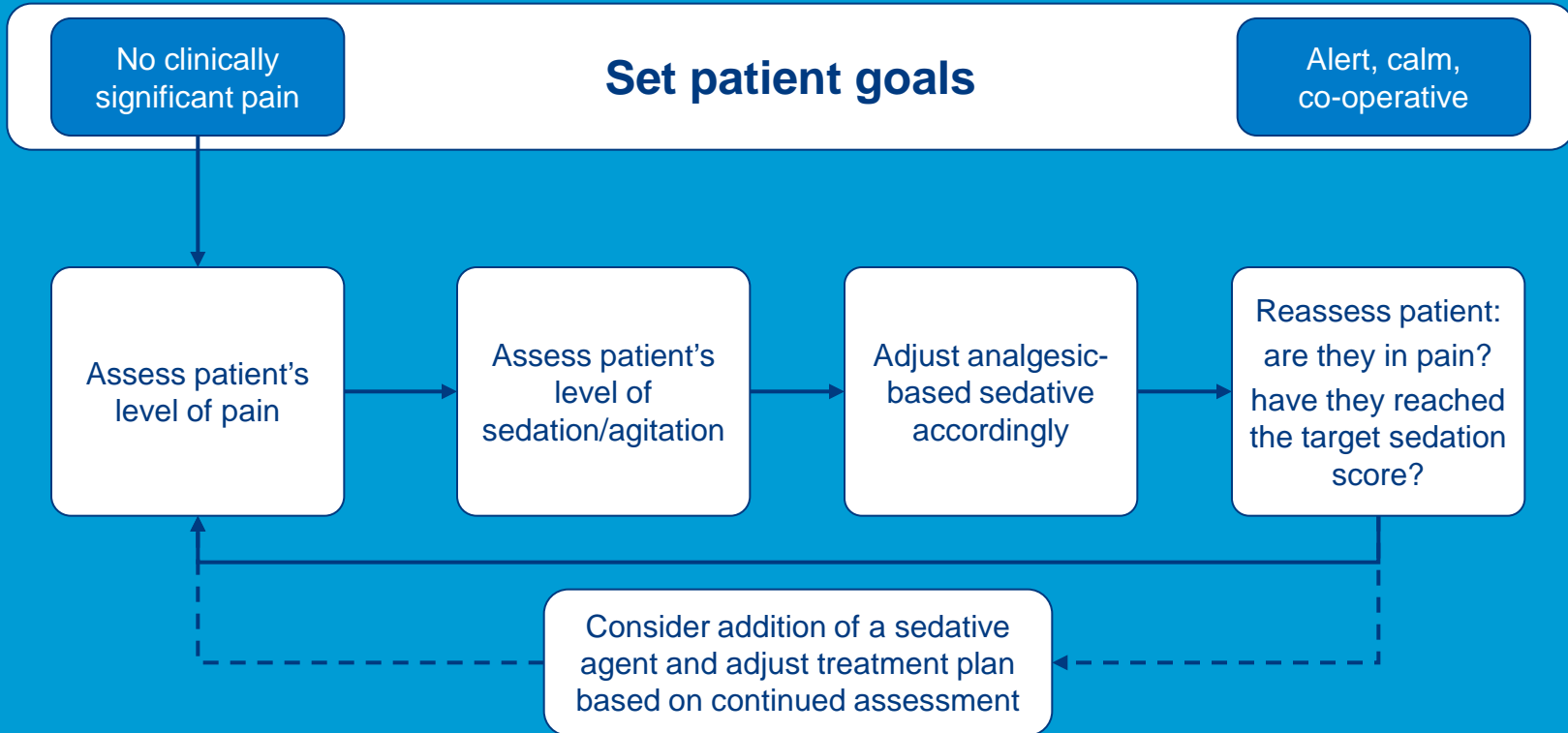
# Nurse-led ICU sedation protocols

## Provide a systematic approach to the use of sedation in the ICU using sedation scoring<sup>1</sup>

- Assessment of need for analgesics, sedatives or both, to provide optimal level of care
- Dosage and method of administration of sedative determined to reach target level of sedation
- Reassessment of patient and sedation regimen and adjustment accordingly
- Treatment may deviate from protocol if deemed to be in the patient's best interest

1. Brook AD, *et al.* Crit Care Med 1999, **27**: 2609-2615.

# Analgesia-based sedation protocols<sup>1,2</sup>



1. Muellejans B, *et al.* Crit Care 2006; **10**: R91.

2. Park G, *et al.* Br J Anaesth 2007; **98**: 76-82.

# Analgesia-based ICU sedation protocols

- Fewer days on mechanical ventilation<sup>1</sup>
- Reduced need for sedative medication<sup>2</sup>
- Shorter stay in ICU<sup>1</sup>
- Potential to reduce costs<sup>1</sup>
- Patient-centred assessments easier due to greater interaction with patient<sup>2</sup>

1. Muellejans B, *et al.* Crit Care 2006; **10**: R91.

2. Park G, *et al.* Br J Anaesth 2007; **98**: 76-82.



# Conclusions

- Rigorous measurement of sedation in critically ill patients is essential
- Optimal sedation: analgesia-based, protocol-driven management of pain and sedation
- Many scales are available to monitor sedation in ICU patients
- Evaluate, plan and re-evaluate to achieve target sedation score
- Enable patient-centred assessments in calm, co-operative, communicative and comfortable patients



# References and further reading

Brook AD, *et al.* Effect of a nursing-implemented sedation protocol on the duration of mechanical ventilation. *Critical Care Medicine* 1999; **27**: 2609-2615.

Cook DJ, *et al.* Incidence of and risk factors for ventilator-associated pneumonia in critically ill patients. *Annals of Internal Medicine* 1998; **129**: 433-440.

De Jonghe B, *et al.* Using and understanding sedation scoring systems: a systematic review. *Intensive Care Medicine* 2000; **26**: 275-285.

De Jonghe B, *et al.* Adaptation to the Intensive Care Environment (ATICE): development and validation of a new sedation assessment instrument. *Critical Care Medicine* 2003; **31**: 2344-2354.

Devlin JW, *et al.* Motor Activity Assessment Scale: a valid and reliable sedation scale for use with mechanically ventilated patients in an adult surgical intensive care unit. *Critical Care Medicine* 1999; **27**: 1271-1275.

Hansen-Flaschen J, *et al.* Beyond the Ramsay scale: need for a validated measure of sedating drug efficacy in the intensive care unit. *Critical Care Medicine* 1994; **22**: 732-733.

Jacobi J, *et al.* Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. *Critical Care Medicine* 2002; **30**: 119-141.

Kollef MH, *et al.* The use of continuous IV sedation is associated with prolongation of mechanical ventilation. *Chest* 1998; **114**: 541-548.

Meade MO, *et al.* How to use articles about harm: the relationship between high tidal volumes, ventilating pressures, and ventilator-induced lung injury. *Critical Care Medicine* 1997; **25**: 1915-1922.

# References and further reading

Muellejans B, *et al.* Sedation in the intensive care unit with remifentanil/propofol versus midazolam/fentanyl: a randomised, open-label, pharmacoeconomic trial. *Critical Care* 2006; **10**; R91.

Park G, *et al.* A comparison of hypnotic and analgesic based sedation in a general intensive care unit. *British Journal of Anaesthesia* 2007; **98**: 76-82.

Park G. Remifentanil in the ICU: a new approach to patient care. *Current Anaesthesia and Critical Care* 2002; **13**: 313-320.

Ramsay MAE, *et al.* Controlled sedation with alphaxalone-alphadolone. *British Medical Journal* 1974; **2**: 656-659.

Ramsay MAE. Intensive care: problems of over- and undersedation. *Baillière's Clinical Anaesthesiology* 2000; **14**: 419-432.

Reschreiter H, *et al.* Sedation practice in the intensive care unit: a UK national survey. *Critical Care* 2008; **12**: R152.

Riker RR, *et al.* Continuous infusion of haloperidol controls agitation in critically ill patients. *Critical Care Medicine* 1994; **22**: 433-440.

Sessler CN, *et al.* The Richmond Agitation-Sedation Scale. *American Journal of Respiratory and Critical Care Medicine* 2002; **166**: 1338-1344.

Stawicki SP. Sedation scales: very useful, very underused. *OPUS 12 Scientist* 2007; **1**: 10-12.