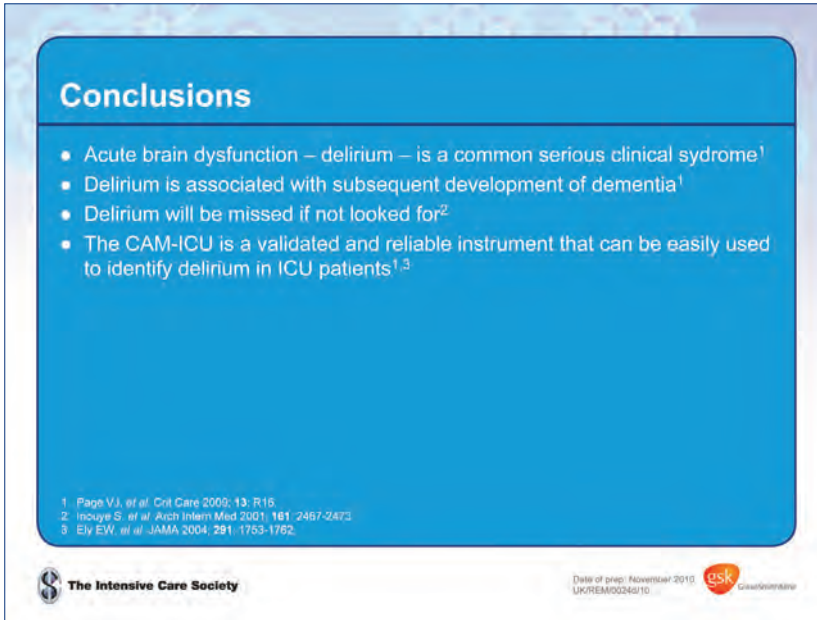


## 3.10 Conclusions





**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.

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Delirium is a manifestation of acute brain dysfunction<sup>6</sup> and is a common serious clinical syndrome, which is present in up to 69% of UK ICU patients.<sup>15</sup>

It is associated with long-term cognitive outcomes, including mild dementia, as well as a threefold increase in mortality.<sup>6</sup>

Screening for delirium is essential because, if it is not looked for, it is very easily missed.<sup>2</sup>

The CAM-ICU is a validated, simple and accurate screening tool that can be easily used to identify delirium in ICU patients.<sup>4,6</sup>

### 3.11 Further information



Further information

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

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For further information about delirium in the context of the ICU, please visit [www.icudelirium.co.uk](http://www.icudelirium.co.uk) or [www.icudelirium.org](http://www.icudelirium.org).

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1. Page V, *et al.* Sedation and delirium assessment in the ICU. *Care of the Critically Ill* 2008; **24**: 153-158.
2. 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.
3. 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.
4. Ely EW, *et al.* Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA* 2004; **291**: 1753-1762.
5. Milbrandt EB, *et al.* Costs associated with delirium in mechanically ventilated patients. *Critical Care Medicine* 2004; **32**: 955-962.
6. Page VJ, *et al.* Routine delirium monitoring in a UK critical care unit. *Critical Care* 2009; **13**: R16.
7. 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.
8. 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.
9. Devlin JW, *et al.* Delirium assessment in the critically ill. *Intensive Care Medicine* 2007; **33**: 929-940.
10. 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.
11. Bergeron N, *et al.* Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. *Intensive Care Medicine* 2001; **27**: 859-864.
12. ICU Delirium. Diagnosing delirium. <http://www.icudelirium.co.uk/diagnosing-delirium/> (last accessed 19 May 2009).
13. Inouye S. Delirium in older persons. *New England Journal of Medicine* 2006; 1157-1165.
14. ICU Delirium. Treatment. <http://www.icudelirium.co.uk/treatment/> (last accessed 19 May 2009).
15. ICU Delirium. Why it matters. <http://www.icudelirium.co.uk/why-it-matters/> (last accessed 19 May 2009).

# Chapter 4: Post-traumatic stress disorder (PTSD) post ICU Dr Christina Jones



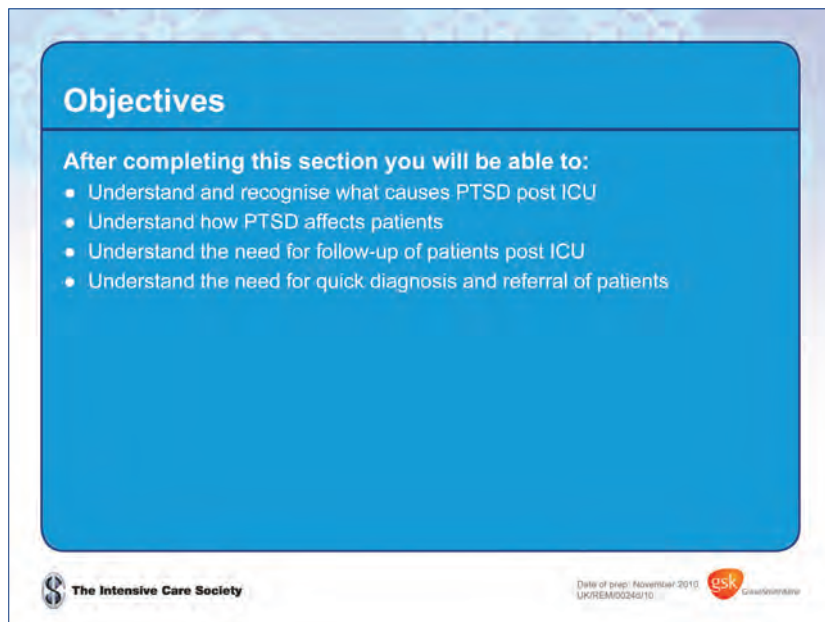
**Post-traumatic stress disorder  
(PTSD) post ICU**

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This chapter provides background information about post-traumatic stress disorder (PTSD) following a stay in the intensive care unit (ICU), together with practical information about ICU outreach and follow-up. This chapter has been developed by Dr Christina Jones, Nurse Consultant in Critical Care at the Whiston Hospital in Preston and Honorary Lecturer at the School of Clinical Science, University of Liverpool.


## 4.1 Objectives




**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

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After working through this chapter, you should gain an understanding of:

- What causes PTSD in patients who have been admitted to the ICU;
- The types of symptoms experienced by patients with PTSD and how to recognise and assess these symptoms;
- The need for outreach and follow-up of patients following discharge from the ICU;
- The need for a quick diagnosis and referral if patients continue to show signs of PTSD.

## 4.2 What is PTSD?

### 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.

The DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th revision) provides diagnostic criteria for a range of psychological illnesses including PTSD. PTSD is an anxiety disorder that can develop in individuals following exposure to a stressful event in which their life was threatened, or in which they experienced serious injury.<sup>1</sup> If individuals respond to this event with intense fear, helplessness or horror, then this may cause extreme psychological trauma and PTSD.<sup>1</sup> Individuals with PTSD may experience recurring and intrusive recollections of the event, or re-experience the event in ‘flashbacks’. These may lead to persistent avoidance of stimuli associated with the traumatic event.<sup>1</sup> Patients with PTSD have persistent symptoms of anxiety or increased levels of arousal, which were not present before the trauma.<sup>1</sup> These symptoms include recurrent nightmares about the event and disrupted sleep.<sup>1</sup> For symptoms to be classified as PTSD, the DSM-IV states that symptoms must be evident for at least 1 month and must significantly affect the individual’s normal social or occupational functioning.<sup>1</sup>

A period of stay in an ICU can be a stressful event, due to factors associated with the ICU, such as awareness during painful procedures, feelings of helplessness due to a lack of personal control and an impending sense of death. Therefore, individuals admitted to ICU may be at risk of developing PTSD.<sup>2</sup>

## 4.2.1 Acute and chronic PTSD

**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.

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Acute PTSD is defined by symptoms being evident for less than 3 months, whereas chronic PTSD is defined by symptoms being evident for more than 3 months.<sup>1</sup> Individuals experiencing acute PTSD following a stay in ICU may find that their symptoms settle down over time and they may not go on to develop chronic PTSD. However, it is important that individuals are followed up and monitored over time to ensure that they are provided with a specialist referral if one is required (see section 4.7).

## 4.2.2 PTSD symptoms

**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

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The DSM-IV lists 17 types of symptoms, which fall into one of three symptom categories: ‘recurrent recollection’; ‘avoidance’; and ‘arousal’.<sup>1</sup> The diagnostic criteria for PTSD provided by the DSM-IV requires that individuals experience symptoms across all three of these categories.<sup>1</sup>

‘Recurrent recollection’ symptoms include distressing flashbacks of the event, nightmares of the event, feelings that the event is happening again, or psychological distress and physiological reactivity when confronted with triggers that symbolise the traumatic event.<sup>1</sup> Individuals may have flashbacks or nightmares about their stay in ICU. These recollections may form delusional memories, such as recollections that people were trying to hurt them while they were ill.

‘Avoidance’ symptoms are those where the individual avoids thoughts or activities associated with the traumatic event.<sup>1</sup> Patients with PTSD as a result of their stay in ICU may avoid visiting hospitals or watching medical programmes on television.

‘Arousal’ symptoms may include an exaggerated startle response, difficulty in concentrating and not being able to sleep properly.<sup>1</sup>

## 4.3 PTSD post ICU

**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 James G, et al. Intensive Care Med 2007; 33: 978-985

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It is thought that approximately one in 10 surviving ICU patients will develop PTSD or symptoms associated with PTSD. In a prospective multicentre follow-up study across five ICUs in Europe (three teaching hospitals and two district general hospitals), 9.2% of patients were diagnosed with PTSD at 3 months after ICU discharge.<sup>3</sup>

The incidence of PTSD may vary considerably between units.<sup>1</sup> Furthermore, centres and studies investigating the incidence of PTSD may employ different measures, ranging from brief screening tools to in-depth diagnostic assessments (for an overview of some of the different assessment tools available, please see section 4.5).

### 4.3.1 PTSD post ICU incidence studies in ICUs

**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: 450-465	-	78	14%
7. Jones C, <i>et al.</i> Intensive Care Med 2007; 33: 978-985	-	238 (5 ICUs)	3-15% <sup>a</sup>
8. Girard TD, <i>et al.</i> Crit Care 2007; 11: R28	-	43	14%

<sup>a</sup>PTSD diagnostic tool used, as opposed to a screening tool

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A number of studies have investigated the incidence of PTSD after discharge from the ICU, as shown in this slide. In ICU survivors who had acute respiratory distress syndrome (ARDS), the observed incidence of PTSD-related symptoms has been shown to be as high as 27.5%.<sup>4</sup> In a study of patients admitted to ICU following trauma caused by severe accidental injuries, the incidence of PTSD or PTSD related symptoms was 14.2%.<sup>5</sup> In other studies looking at the incidence of PTSD across all ICU patients, there is wide variability ranging between 3% and 51%.<sup>3,6-10</sup>


The largest of these studies, by Jones *et al* (2007), which included 238 ICU survivors from five ICUs, observed incidence rates ranging between 3% and 15% at the individual study centres.<sup>3</sup> This study employed an in-depth PTSD diagnostic tool as opposed to a screening tool (Post-traumatic Stress Diagnostic Scale – see section 4.5).<sup>3</sup> Therefore, this study may provide a good indication of the likely incidence of PTSD in patients following a stay in the ICU. However, it is important to acknowledge that the nature of ICU care at different centres may affect the risk for developing PTSD.<sup>3</sup>



## 4.3.2 Factors related to PTSD

### Factors related to PTSD

ICU factors	Patient factors
<ul style="list-style-type: none"><li>• Increased length of stay<sup>1</sup><ul style="list-style-type: none"><li>– ICU</li><li>– Hospital</li></ul></li><li>• Increased duration of mechanical ventilation<sup>1,2</sup></li><li>• Greater levels of or duration of sedation<sup>1,3,4</sup></li><li>• Use of physical restraint<sup>3</sup></li></ul>	<ul style="list-style-type: none"><li>• Younger age<sup>1,2,5</sup></li><li>• Female gender<sup>1,5</sup></li><li>• Previous psychological illness<sup>1,2</sup></li><li>• Memories of ICU stay<sup>1,3</sup></li></ul> <p>Hydrocortisone may provide a preventive effect by mediating the stress response<sup>6,7</sup>.</p>

1. Jackson JC, et al. Crit Care 2007; 11: R27.  
2. Culbertson BH, et al. Intensive Care Med 2004; 30: 450-455.  
3. Jones C, et al. Intensive Care Med 2007; 33: 979-985.  
4. Nelson BJ, et al. Crit Care Med 2000; 28: 3626-3630.  
5. Girard TD, et al. Crit Care 2007; 11: R25.  
6. Schelling G, et al. Crit Care Med 1999; 27: 2678-2683.  
7. Schelling G, et al. Biol Psychiatry 2004; 55: 627-633.

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In the ICU setting, there are many factors that are thought to be associated with the development of PTSD. These factors can broadly be classified as being related either to the ICU environment and treatment, or to individual patient characteristics.

### ICU- or treatment-related factors

An increased length of stay, both in the ICU and the hospital, is associated with an increased risk of PTSD or post-traumatic stress symptoms (PTSS), as is increased duration of mechanical ventilation.<sup>2</sup> Greater levels and longer duration of sedation have also been identified as risk factors for PTSD.<sup>2,3,11</sup> Furthermore, in one study, the use of physical restraint with no sedation was found to predispose patients to developing PTSD.<sup>3</sup>

## Patient factors

In the general PTSD literature, younger individuals and females are thought to be at a greater risk of PTSD<sup>2</sup> and this has also been demonstrated in the ICU setting.<sup>10</sup> However, in one study no relationship between gender and PTSD was observed.<sup>9</sup> Patients with previous psychological illness may be at a greater risk of developing PTSD.<sup>2</sup> Patients who stated that they had visited a healthcare professional for psychological distress before critical illness and a stay in ICU had a greater level of PTSS.<sup>9</sup> Patients' memories of their stay in ICU also appear to be related to PTSD. The absence of memories of the traumatic event has been thought to provide protection against PTSD.<sup>2</sup> However, in the ICU setting, patients may experience delusional memories. These may include the misinterpretation of events, such as thinking that staff are trying to kill them by injection.<sup>3</sup> These false memories may be particularly traumatic and, therefore, be the trigger for PTSD as opposed to factual memories.<sup>3</sup>

The administration of stress doses of hydrocortisone during periods of septic shock may help to mediate the stress response and has been shown to reduce the incidence of PTSD symptoms at 6 months after cardiac surgery.<sup>12,13</sup>



## 4.4 Sedation practice and PTSD

**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

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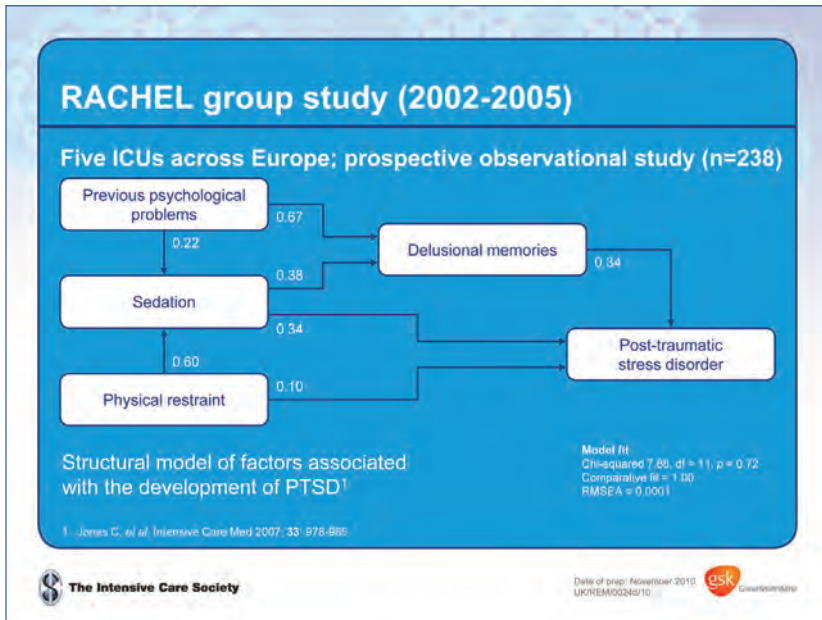
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From the list of factors associated with PTSD, it is clear that obtaining the right level of sedation for patients in the ICU is important to help prevent PTSD symptoms. But what level of sedation will help to minimise the risk of traumatisation and the later development of PTSD?

The frequent use of sedatives in the care of the critically ill may imply a common belief that these agents will help to prevent patients consolidating the experience of the ICU to permanent memory and, therefore, help to reduce the risk of PTSD.<sup>14</sup> However, does sedation to the level at which it prevents the formation of consolidated memories reduce the risk of PTSD?

## 4.4.1 RACHEL group study (2002-2005)



To investigate the relationship between PTSD, sedation practice and patients' memories of ICU, Jones *et al* (2007) conducted a survey of five European adult ICUs which had experience in ICU follow-up – known as the RACHEL group.<sup>3</sup> Sedation, delirium and demographic information were collected for 238 patients. Patients' memories of their stay on the ICU and the post-traumatic related symptoms were assessed at 1-2 weeks, 2 months and 3 months following discharge from the ICU.<sup>3</sup> Structural equation modelling was used to model the relationships between the observed factors.<sup>3</sup>

The model with the best fit to the observed data contained pathways from the following:<sup>3</sup>

- Prolonged sedation and opiates to PTSD;
- Previous psychological problems to prolonged sedation and opiates, to the formation of delusional memories for ICU to PTSD;
- Physical restraint (with no or little sedation) to PTSD.

While this study was observational and designed to generate hypotheses for further investigation, the model demonstrates the multi-factorial nature of the development of PTSD in the setting of the ICU and the importance of sedation and subsequent formation of delusional memories.<sup>3</sup>

## 4.4.2 Delusional memories


**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. Ringdahl M, et al. *Intensive Crit Care Nurs* 2009; 22: 346-354.  
2. Granja C, et al. *Crit Care* 2005; 9: R56-R109.

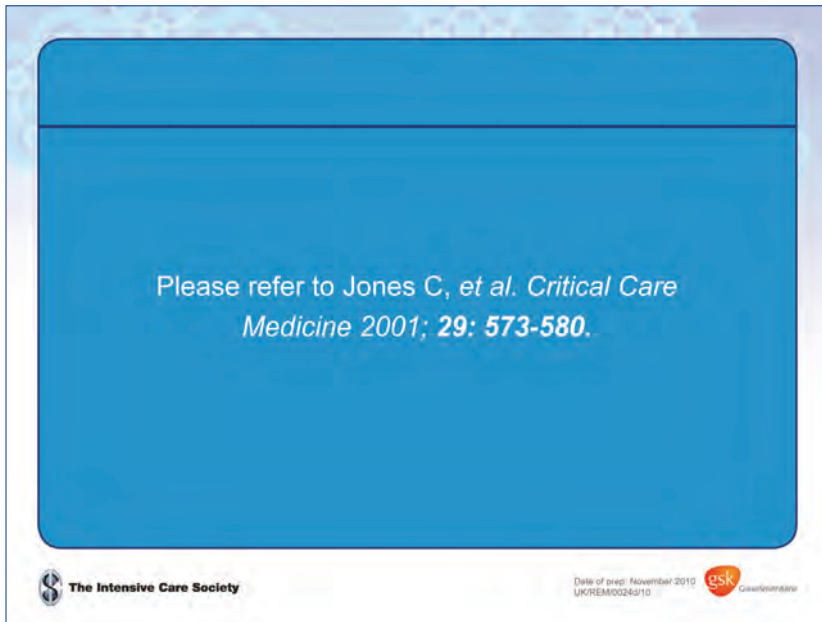
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Delusional memories of the ICU are often reported by patients. In a multicentre study of 239 ICU patients surveyed 8-16 months after discharge from the ICU, the whole ICU stay was clearly recalled by 30% of patients.<sup>15</sup> Patients who had no clear memory of the whole stay were significantly more likely to have received sedatives ( $p < 0.001$ ) and also reported more delusional memories.<sup>15</sup> Twenty-six percent of patients reported delusional memories, which included dreams, hallucinations, nightmares and memories that people were trying to hurt them.<sup>15</sup>

Significant factors associated with delusional memories included patients under the age of 50 years ( $p < 0.05$ ), an ICU stay of 3 days or more ( $p < 0.001$ ), temperature of  $38^{\circ}\text{C}$  or higher ( $p < 0.01$ ), and the use of sedatives (propofol,  $p < 0.001$ ; benzodiazepines,  $p < 0.05$ ) and opioid drugs ( $p < 0.01$ ).<sup>15</sup> Furthermore, patients who had delusional memories were more likely to have not returned to work 1 year after the trauma than those without delusional memories, thus indicating that delusional memories may be associated with a reduced quality of life.<sup>15</sup> Indeed, in a separate study assessing ICU patients' memories 6 months after discharge, amnesia of the ICU, recurrent dreams and nightmares were independent predictors of worse health-related quality of life (HR-QoL).<sup>16</sup>

### 4.4.3 ICU memories and PTSD-related symptoms



To further investigate the effects of ICU memories and PTSD-related symptoms, Jones *et al* (2001) assessed patients' memories at 2 and 8 weeks following discharge from ICU, and PTSD-related symptoms at 8 weeks.<sup>17</sup> The presence of factual and delusional memories were recorded, and the Impact of Events Scale (IES) was employed to detect avoidance and intrusion symptoms.<sup>17</sup> Patients who had delusional memories, but no factual memories scored significantly higher on the IES than patients who had both delusional memories and factual memories, and patients who had no delusional memories ( $p < 0.001$ ).<sup>17</sup>

Treatments used in the ICU, such as sedative agents, may cause a general 'dampening' effect on memory, possibly as a result of delirium and sleep disturbances.<sup>17</sup> The ability to form factual memories of events during a period of critical illness, even of relatively unpleasant experiences, may provide patients with a better chance of recognising that delusional memories were in fact not real, and hence help to protect against PTSD symptoms.<sup>17</sup>

## 4.4.4 Levels of sedation and PTSD

### 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 ( $p=0.02$ )
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

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To investigate the effects of daily sedation interruption and awakening on PTSD-related symptoms, Kress *et al* (2003) compared psychological outcomes of critically ill patients receiving daily sedative interruption (intervention group) with outcomes in patients who were awakened only at the discretion of the ICU staff (control group).<sup>14</sup> IES scores (assessed after a minimum of 6 months following discharge) were significantly greater for control patients than for patients receiving daily sedative interruption ( $p=0.02$ ).<sup>14</sup> Thus, it is possible that the ability to form even fragmented factual memories, by not being under continuous deep sedation, may help to protect against PTSD-related symptoms.<sup>14</sup>


## 4.4.5 Optimum sedation and memory

### 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: 87227.

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In light of the evidence for the importance of factual memories for ICU on PTSD symptoms, 'optimum' or 'light' sedation, where the patient is calm, cooperative and communicative, may have a positive effect on long-term patient outcomes.<sup>18</sup> To investigate this hypothesis, Treggiari (2008) studied 137 ICU patients who were randomised either to a light level of sedation (patient awake and cooperative) or a deep level of sedation (patient asleep or awakening on physical stimulation).<sup>18</sup>

Patients receiving light sedation had a shorter ICU length of stay and more ventilator-free days than patients receiving deep sedation.<sup>18</sup> On ICU discharge, patients receiving light sedation were less likely to have depression ( $p=0.02$ ).<sup>18</sup> At the 1-month timepoint, lightly sedated patients also had less trouble remembering their stay in the ICU ( $p=0.02$ ).<sup>18</sup> No significant differences were observed between the groups in measures of depression, anxiety or PTSD symptoms at 1 month.<sup>18</sup> Treggiari concluded that light sedation provides the opportunity to reduce ICU length of stay and duration of ventilation, without negatively affecting patient psychological well being or safety.<sup>18</sup> Further research is required to assess whether the ability to form factual memories by use of light sedation translates to improved long-term protection against PTSD.

## 4.4.6 Optimum sedation and PTSD

**Optimum sedation and PTSD**

Fully sedated  
Unresponsive

Calm, cooperative,  
comfortable,  
communicative

Fully awake  
Agitated and  
uncooperative

**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. *Ballieres Clin Anaesthesiol* 2000; 14: 419-432.

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As discussed in Chapter 1, sedating patients to an ‘optimum’ level where they are calm, cooperative, comfortable and communicative can help to facilitate nursing care and management. Controlling pain and anxiety using a patient-centred approach to ensure patient comfort and safety, while at the same time avoiding the adverse effects of oversedation, provides the opportunity to improve interaction between patients and their family and the ICU team.<sup>19</sup> This may help patients to form factual memories of the ICU, minimise delusional memories, and help to reduce the risk of PTSD.

## 4.5 PTSD and memory assessment tools

**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

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This section outlines some of the tools available to assess patients' memories and signs of PTSD.

The Confusion Assessment Method for the ICU (CAM-ICU) is a test for delirium in critically ill patients, including those who are unable to speak (i.e. who are intubated).<sup>20</sup> Hallucinations caused by delirium may result in the formation of delusional memories and so monitoring for delirium is important in the ICU. For further information on delirium and the CAM-ICU, please see Chapter 3.

The ICU Memory (ICUM) tool is a 14-item interview tool that can be used to assess patients' memories for the ICU 2 weeks after ICU discharge.<sup>21</sup> The ICUM tool contains eight questions about factual events and six supplementary questions to assess any period of amnesia and the re-experiencing of ICU memories after ICU discharge.<sup>21</sup> Further information about the ICUM tool is provided in section 4.5.1.

*(continued overleaf)*

## 4.5 PTSD and memory assessment tools (continued)

The UK Post-Traumatic Stress Syndrome 14-Questions Inventory (UK-PTSS-14) is a screening tool for PTSD, which can be used 2-3 months following discharge from the ICU.<sup>22</sup> The questionnaire contains items across the three DSM-IV symptom categories of PTSD (re-experiencing, avoidance and arousal) and it can be used to identify patients in need of specialist referral to help ensure early intervention for treatment of PTSD.<sup>22</sup>

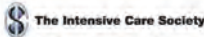

The Post-Traumatic Stress Diagnostic Scale (PDS) is an in-depth self-report tool that can be used to obtain a diagnosis of PTSD on the DSM-IV criteria and a measure of PTSD symptom severity.<sup>23</sup> In the context of PTSD following ICU, the PDS could be used after the administration of a shorter screening tool, for example at 3 months following discharge from the ICU.<sup>23</sup>

## 4.5.1 ICU Memory (ICUM) Tool

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>1</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>1</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?

1. 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

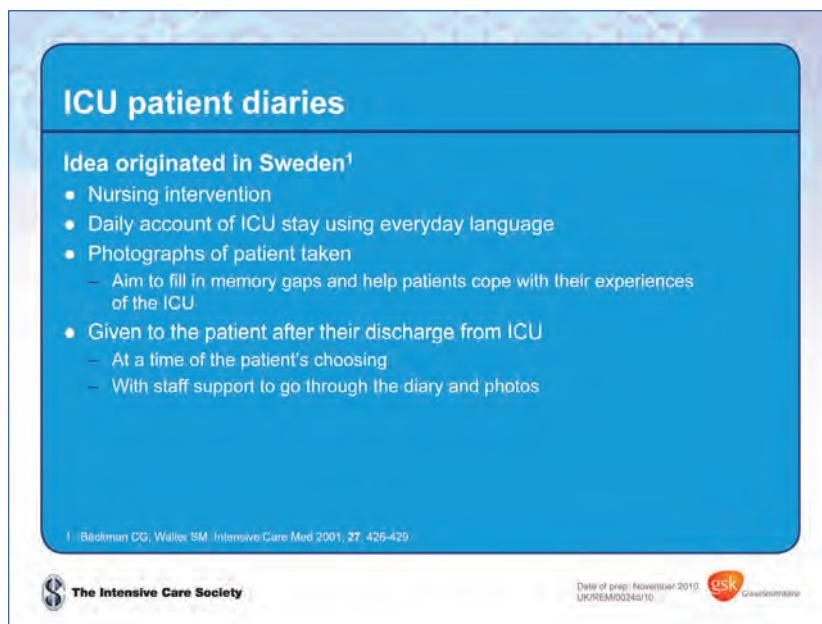
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The eight core questions that make up the ICUM tool assess memories before, during and after the stay in ICU.<sup>21</sup> Patients are asked whether they remember being admitted to hospital and whether they remember their time in hospital before being admitted to the ICU. They are then asked whether they remember being in the ICU and whether they remember the whole stay clearly or not. In addition, patients are asked to provide details of what they can remember about the ICU, such as visits from family, the presence of an endotracheal tube and any hallucinations, nightmares or dreams. Patients are then asked questions about the time following ICU discharge to help identify any PTSD symptoms. These questions include whether they have had any unexplained feelings of panic or apprehension or intrusive memories about their ICU stay and whether they have talked about their experiences of being in ICU with anyone.<sup>21</sup>

The ICUM tool can be used to classify patients as follows:<sup>21</sup>

- (a) If a patient cannot recall any routine events from their stay in the ICU, then they have an absence of factual recall of the ICU;
- (b) If a patient reports hallucinations, nightmares or feelings that people were trying to hurt them, then they have delusional memories;
- (c) If a patient recalls memories of pain, panic or discomfort, then they have memories of feelings.

## 4.6 ICU patient diaries





**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, Walther SM. Intensive Care Med 2001; 27: 426-429

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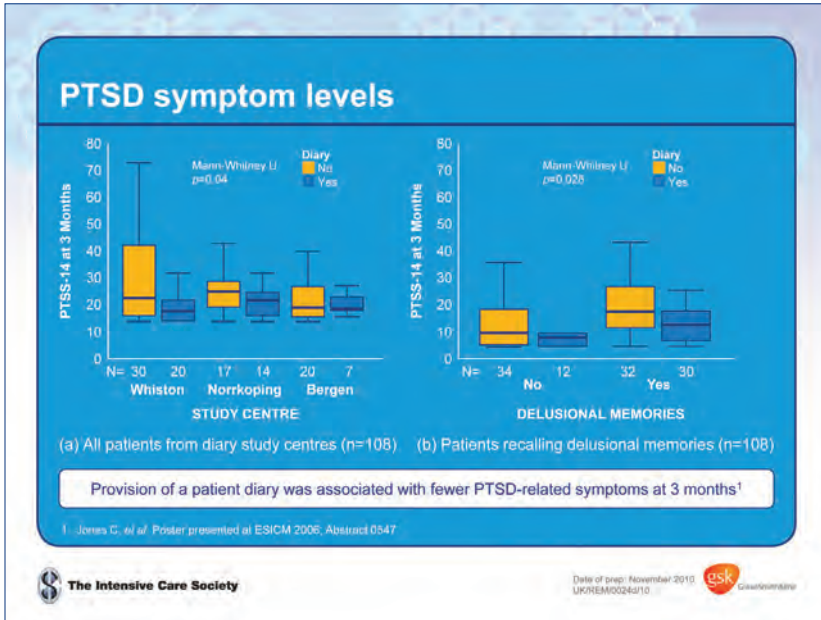
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In an effort to help patients form a factual, coherent account of their time in the ICU, Bäckman and Walther (2001) investigated the use of patient diaries to provide a detailed narrative of patients' time in the ICU and help patients come to terms with their experiences. It was hypothesised that the provision of the diaries would help to provide a coherent story from any fragmented or distorted memories or nightmares.<sup>24</sup>

The diary format consisted of daily accounts of a patient's stay in the ICU using everyday language.<sup>24</sup> Photographs of the patient while they were in the ICU were taken so they could be added to the diary at a later date. All healthcare professionals helping to care for the patient were able to contribute to the diary, as were family members and close friends. Entries were written in the diary until the patient was discharged from the ICU or died.<sup>24</sup>

Patients were offered their diary at a follow-up visit 2-4 weeks following ICU discharge.<sup>24</sup> The diaries were used as a guide to help explain the patients' recall of their time on the ICU and the diaries were considered to be a useful tool as part of the ICU follow-up process.<sup>24</sup>

## 4.6.1 PTSD symptom levels



The effect of patient diaries on PTSD-related symptoms was investigated by Jones *et al* (2006) as part of a larger prospective observational study at five European ICUs.<sup>25</sup> Of the five units, three were implementing patient diaries and were included in the diary analysis.<sup>25</sup> Following ICU discharge, patients' memories were assessed using the ICUM tool and patients for whom diaries were completed had a follow-up appointment with a nurse to introduce the diary to them.<sup>25</sup>

When PTSD-related symptoms were assessed at 3 months using the UK-PTSS-14, patients who received a diary had significantly lower scores (indicating fewer PTSD-related symptoms) than those who did not receive a diary ( $p=0.04$ ).<sup>25</sup> The value of patient diaries may be particularly important for patients who have delusional memories – in this group of patients, those receiving a diary had much lower levels of PTSD-related symptoms than those who did not.<sup>25</sup>

It is hypothesised that the use of an ICU diary may help patients come to terms with traumatic delusional memories and therefore reduce the emotional and physiological arousal experienced when they are reminded of these memories.<sup>25</sup>

## 4.7 Outreach and follow-up

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

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Critical care outreach programmes provide a multidisciplinary approach to identify patients at risk of developing critical illness and enable early intervention to aid the recovery of patients who have been discharged from the ICU to the ward.<sup>26</sup> Outreach services help to ensure that patients receive a continuum of care when transferred to the ward<sup>26</sup> and involves not only the patient, but also their family and ward teams.

Follow-up services, extending beyond discharge from the hospital, are particularly valuable to provide information to patients about physical, emotional and psychological recovery.<sup>27</sup> Follow-up appointments provide patients with reassurance from experts who are familiar with the ICU experience and who can share similar experiences of other patients.<sup>27</sup> Furthermore, they provide a forum to discuss treatment and referrals to specialists if required.<sup>27</sup>

## 4.7.1 Aiding recovery and returning to normal

### 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. Blackman CG, Walter SM. Intensive Care Med 2001; 27: 426-429

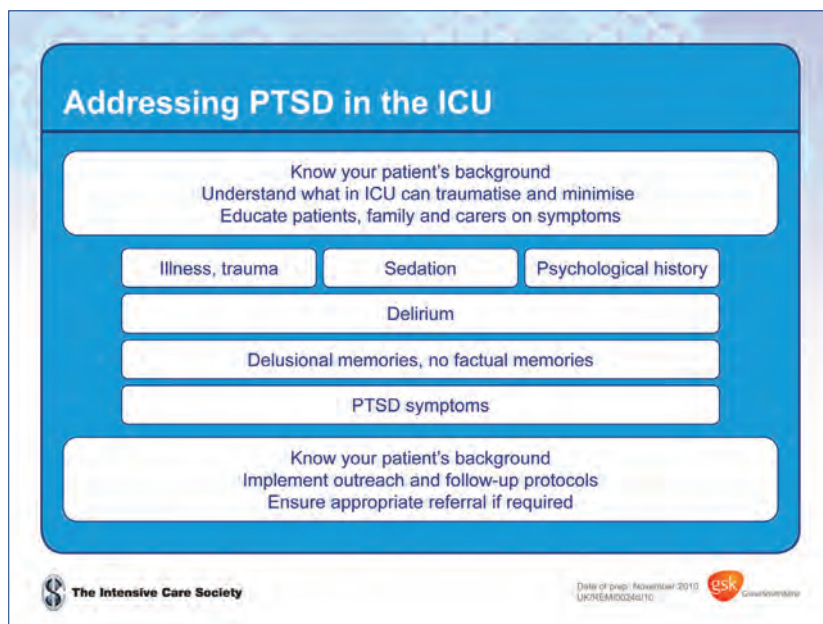
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To aid patients' recovery after a stay in ICU, it is important to provide opportunities for patients to ask questions about their stay and discuss their dreams, nightmares and hallucinations.<sup>27</sup> Providing reassurance to patients that these experiences are normal after a stay in an ICU can help patients to cope and come to terms with their experiences.<sup>27</sup>

ICU patient diaries are a useful tool to help patients reconstruct their memory<sup>24</sup> and can be integrated into outreach and follow-up programmes. Outpatient appointments provide an opportunity to go through the patient's ICU story (if they are ready to discuss their experiences), revisit and monitor their level of recovery and provide a specialist referral if needed.

## 4.8 Addressing PTSD in the ICU



Many factors are associated with the development of PTSD in patients who have had a critical illness. Understanding these factors is crucial to help recognise patients who are at risk of developing PTSD-related symptoms. The extent of the patient's illness or trauma, any previous psychological history and the use of sedation may all affect the patient's experience in the ICU. If patients have hallucinations, possibly as a result of a period of delirium, they may develop delusional memories and be at risk of developing PTSD or related symptoms. The ability to communicate with patients while they are admitted to the ICU is important to help assess for delirium and to educate patients about symptoms associated with PTSD. Patients should continue to be monitored and cared for after ICU discharge through outreach and follow-up programmes, to ensure that a specialist referral can be provided if needed.

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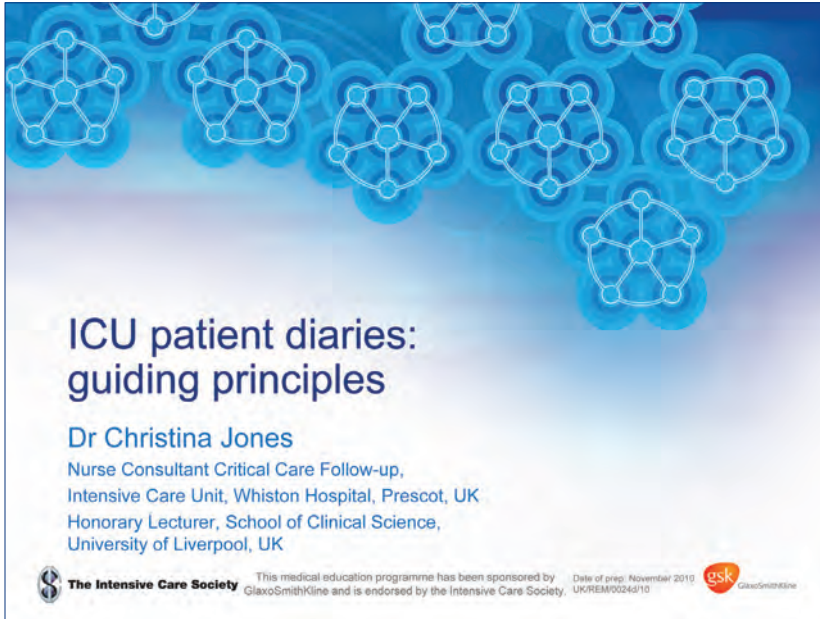
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# Appendix A ICU patient diaries: guiding principles

Dr Christina Jones



**ICU patient diaries:  
guiding principles**

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This appendix provides guiding principles to help facilitate the introduction of patient diaries in the intensive care unit (ICU). The content for this appendix has been developed from Whiston Hospital Intensive Care Unit and High Dependency Unit Patient Diary Guidelines.<sup>1</sup> The guidance should be adapted to meet local needs and discussed and agreed with ethical, legal and Caldicott representatives prior to implementation.

## A.1 Key requirements

**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

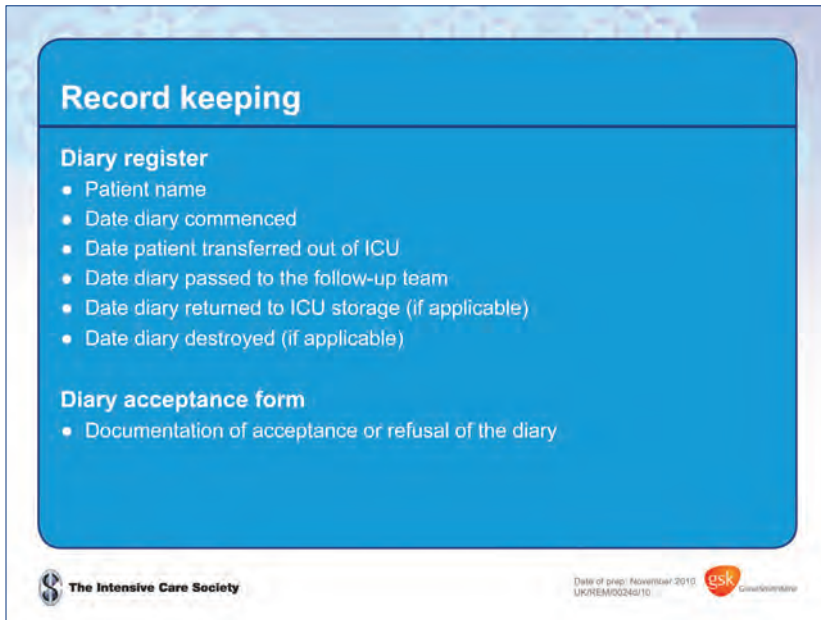
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When implementing ICU patient diaries, the first step is to agree a set of guidelines of how the diaries will be implemented. This process should involve an ethics committee, legal team and Caldicott guardian to discuss how information will be collected, stored and shared with patients and their families.

A supply of notebooks will be needed to form the diaries, together with a Polaroid camera or a digital camera (with printer) so that photographs can be included in the diary. A diary register should be created to track which patients have a diary and the current location of all diaries. A secure, lockable storage cupboard should be used to safely store diaries once patients have been discharged from the ICU. Finally, whenever implementing a new initiative, it is vital that someone champions the process – ensuring that meetings take place with the right people, procedures are implemented as agreed, and any obstacles are proactively addressed are just some of the skills needed when implementing a protocol for ICU patient diaries.

## A.2 Record keeping




**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

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A diary register should be established to provide an accurate record of which patients have had diaries created for them and the current location of each diary. When a patient is transferred out of ICU, the diary register should be updated detailing the date of the transfer and where the patient has been transferred to. If the diary is passed to the ICU follow-up team, this should also be recorded in the register. A 'diary acceptance' form should be created to document the patient's or family's decision of whether they wish to keep the diary and/or photographs, or not – the outcome of which should be detailed in the register.

## A.3 Starting a diary

**Starting a diary**

Cover page	Inside page
<ul style="list-style-type: none"><li>● ID Sticker<ul style="list-style-type: none"><li>– Name</li><li>– Hospital ID #</li></ul></li><li>● Should not have<ul style="list-style-type: none"><li>– Patient's address</li></ul></li></ul>	<ul style="list-style-type: none"><li>● Patient's name</li><li>● Hospital ID number</li><li>● Bed space</li><li>● Date of ICU admission</li></ul>

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When a new diary is created, the patient's name should be added to the diary register. The outer cover page of the diary may be labelled with an ID sticker, but should not include the patient's address (e.g. just the patient's name and hospital number). The first inside page should include the patient's name, hospital number, bed space and date of ICU admission to aid identification. The diary should be kept by the patient's bedside so that it is easily accessible for entries to be added.


## A.4 Healthcare professionals' entries

### 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

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All healthcare professionals caring for the patient should be given the opportunity to contribute to the diary and encouraged to do so. Black ink should be used for clarity and each entry should be signed and dated by the member of staff. The first diary entry should describe the reason why the patient was admitted to the ICU, followed by information about their initial condition. For example:

*"This diary is being written to help you understand what has been happening to you in Intensive Care. You came to ... Hospital on ... at ... by ambulance. You had been vomiting since the day before and had tummy pain."*

*"Your circulation was struggling and needed support with a drug called noradrenaline to keep your blood pressure up. We passed a tube through your nostril into your stomach to start feeding you. Our doctor updated your family to explain what had happened to you and our plans for treating you. We started you on antibiotics and chest physiotherapy for the pneumonia."*

(continued overleaf)

## A.4 Healthcare professionals' entries (continued)

Entries should be made daily where possible, but it is not essential to provide an entry for every shift. Significant milestones or events should be included (e.g. extubation, tracheotomy, sitting out of bed for the first time). For example:

*"You went for a CT scan of your chest and tummy this morning. In the afternoon you had a tracheostomy. This involves a small operation where a tube is put into your windpipe through a cut in the skin of your neck. This is then connected to the ventilator and is much more comfortable than the tube in your mouth."*


Sensitive information, such as details of malignancy, HIV status, sexuality or substance abuse should be avoided. If the patient is restless, this information should be included in the diary as the patient may remember hallucinations from this period. To ensure the diary can be understood by the patient and/or family, avoid the use of medical jargon and abbreviations and use layman's terms instead. As with other forms of professional documentation, remember to keep entries professional and relevant. When making entries, remember to leave space for photographs to be mounted in at a later date.


## A.5 Relatives' entries

**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)

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Patients' relatives should also be encouraged to contribute to the diary. Discussing the role of the diary with family members and providing them with an information sheet about the purpose of the diary and how they can contribute, may help to encourage relatives to make regular entries. Suitable topics include events from home, visits to the ICU, family milestones, or events of interest to the patient such as sport or current affairs.

## A.6 Patient photographs

**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

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It is suggested that an initial photograph of the patient is taken when the patient is sedated and ventilated, followed by subsequent photographs to demonstrate the patient's progress throughout their stay in the ICU. Relatives can be included in the photographs if they so wish. However, the photographs should not be given to the family until the patient has provided consent. Therefore, photographs should be labelled with the patient's name and the date taken and then securely stored for safe keeping. A space should be left in the diary for the photograph to be mounted at a later date. The photographs should be discussed with the patient after they have been discharged and should only be mounted in the diary once the patient has given their consent. If the patient does not give consent for any or some of the photographs to be included in the diary, then they should be stored for a period of 12 months in case the patient changes their mind.

## A.7 Returning the diary to the patient

### 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**

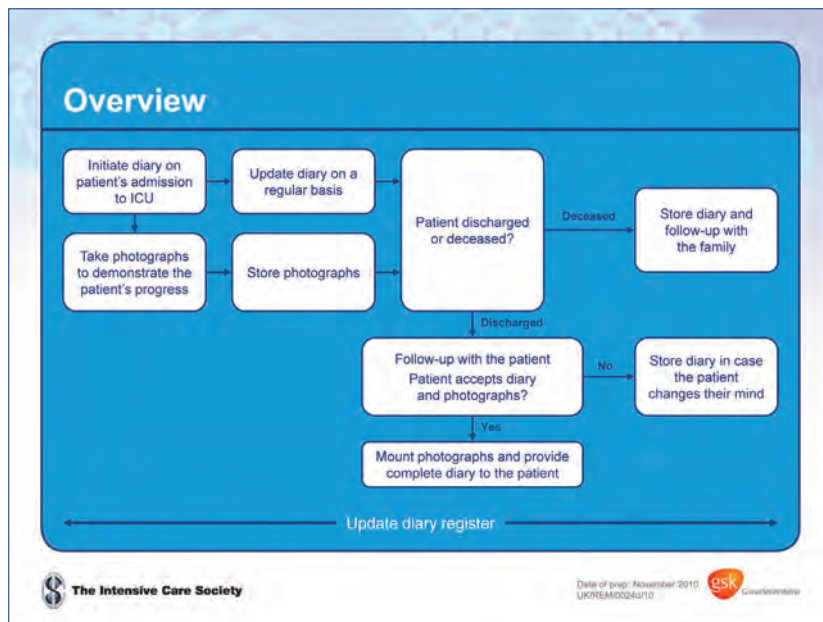
- Store the diary for 3 months
- Write a letter to the family to see if they would like to receive the diary

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Once the patient has been discharged from ICU, the diary should remain in the ICU and stored securely. At a time deemed appropriate by the ICU follow-up team, and with the agreement of the patient, the diary should be discussed with the patient. This may be before the patient is discharged from the hospital, e.g. while on HDU or on a general ward. The contents of the diary should be explained and the photographs shown to the patient. If the patient chooses not to keep the diary, the diary should be stored for 12 months. A form should be created and signed to record the patient's decision. The outcome of the handover should also be recorded in the patient diary register so that the diary can be tracked should a patient initially refuse their diary or photographs. If after 12 months the patient still does not wish to see the diary, the diary should be destroyed by shredding. Diaries and photographs of deceased patients should be stored for a period of 3 months. A member of the diary team should then write to the family to ask them if they would like to receive the diary.

## A.8 Overview



The diagram in the slide above provides an overview of the processes discussed for creating and using ICU patient diaries.

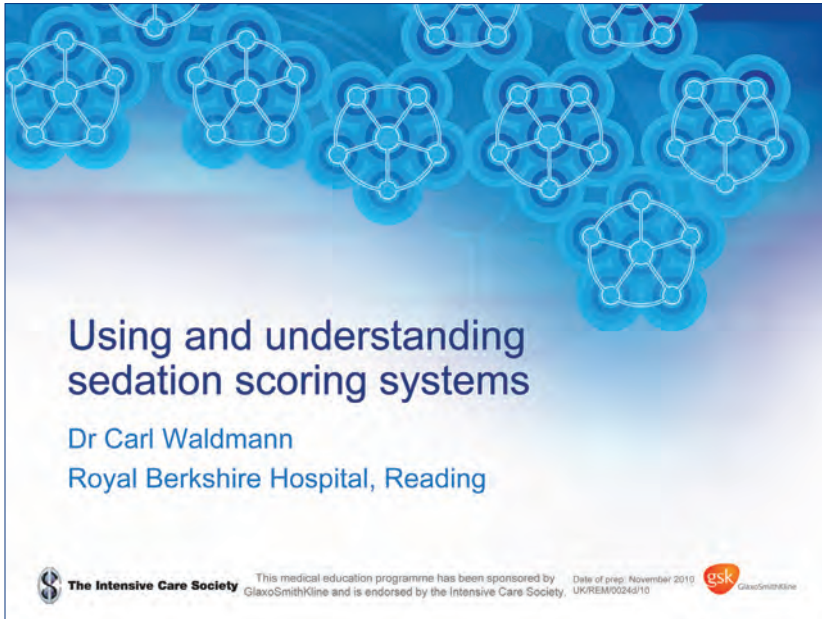
- On admission to the ICU, initiate the patient diary
- Make regular entries and take photographs to demonstrate the patient's progress
- If the patient is discharged from ICU, follow-up with the patient
- If the patient accepts the diary/photographs, mount the photographs in the diary and provide to the patient
- If the patient refuses the diary/photographs, store them in case the patient changes their mind
- If the patient dies, store the diary and follow-up with the family
- At all stages, the diary register should be updated to ensure the current status and location of the diary is known.

## Reference

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

# Chapter 5: Using and understanding sedation scoring systems

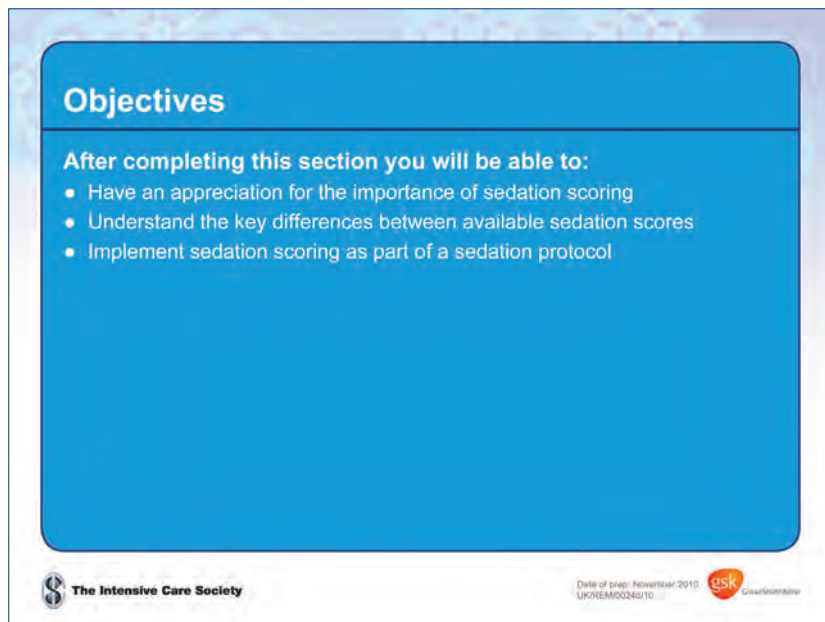
Dr Carl Waldmann



This chapter outlines some of the common sedation scoring systems that can be used in the intensive care unit (ICU) and discusses them in the context of optimum sedation. In addition, the importance of integrating sedation scoring as part of a standardised sedation protocol is also discussed.

The chapter has been developed with Dr Carl Waldmann, Intensive Care Consultant, Royal Berkshire Hospital, Reading, UK.


## 5.1 Objectives




**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

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After working through this chapter, you should gain an understanding of:

- Why sedation scoring systems are important in everyday ICU practice;
- What are the common sedation scoring systems and the principal differences between them;
- How to implement sedation scoring as part of a sedation protocol.

## 5.2 What is sedation scoring?


**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. *British J Clin Anaesth* 2000; 14: 418-432.

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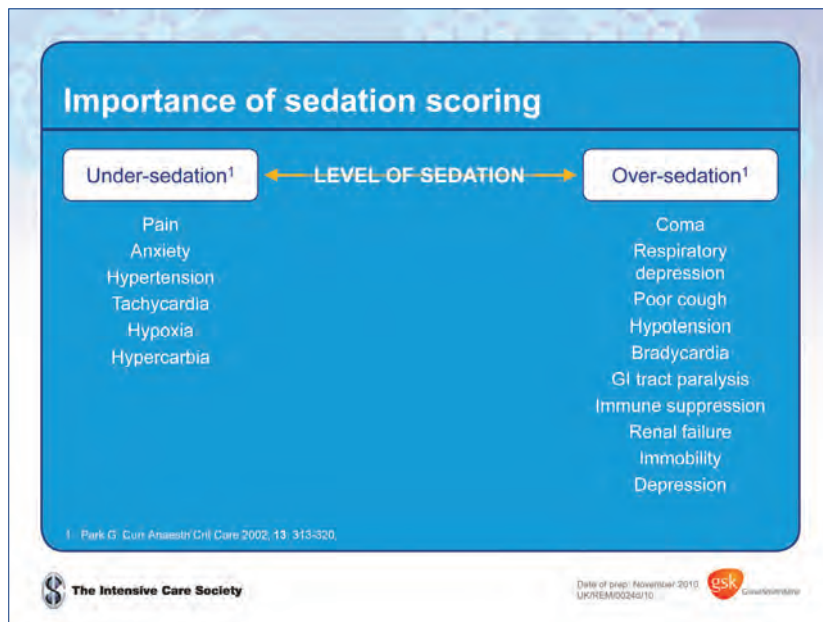
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Over the past decade, the primary goal of sedation therapy has changed. The previous objective of having patients deeply sedated or comatose has progressed to a goal of making patients calm, comfortable, co-operative and communicative.<sup>1</sup> This approach facilitates the management of critically ill patients to help meet patient-specific objectives<sup>2</sup> and avoid associated morbidity and mortality.<sup>1</sup> (For further information see Chapter 1.) Sedation scoring provides ICU teams with the tools needed to assess patients' depth of sedation, such that sedative and analgesic therapies can be adjusted to reach an optimum level of sedation.<sup>2</sup>

Specific objectives of this approach include the following:<sup>1</sup>

- Provision and maintenance of patient comfort;
- Adequate pain control;
- Reduction of anxiety and memory loss;
- Facilitation of nursing and management;
- Avoidance of muscle relaxants;
- Normalisation of sleep patterns;
- Avoidance of adverse outcomes, such as post-traumatic stress disorder (PTSD).

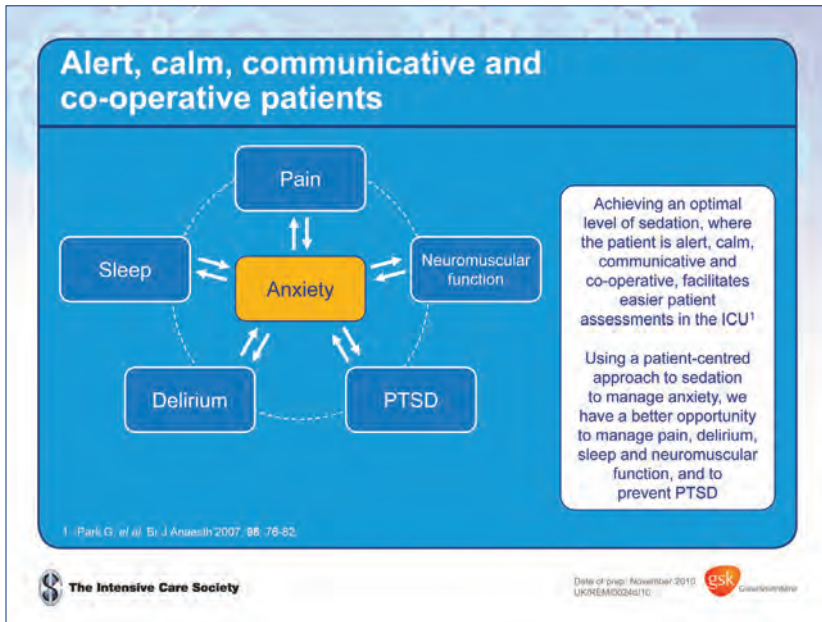
## 5.3 Importance of sedation scoring



Achieving optimum sedation in the ICU can help to avoid the adverse consequences of under- or oversedation. In the case of undersedation, these include pain, anxiety, hypertension and tachycardia.<sup>3</sup> If patients are agitated they may inadvertently remove devices and catheters.<sup>4</sup> Furthermore, if patients do not synchronise with the ventilator, hypoxia and hypercarbia may also occur.<sup>3</sup> Conversely, oversedation may result in coma, respiratory depression, poor cough, hypotension, bradycardia, gastrointestinal tract paralysis, immune suppression, renal failure and depression.<sup>3</sup> Patients may require an increased duration of mechanical ventilation,<sup>5</sup> which may in turn increase the risk of ventilator-associated pneumonia<sup>6</sup> and lung injury.<sup>7</sup>

Sedation scoring enables a patient's level of sedation to be assessed in order to help avoid under- and oversedation. The patient's current level of sedation can be compared with their target level and sedative treatments can be adjusted accordingly.

## 5.4 Alert, calm, communicative and co-operative patients




Achieving an optimum level of sedation, where the patient is alert, calm, communicative and co-operative, facilitates easier patient assessments in the ICU.<sup>8</sup> By adopting a patient-centred approach to sedation, each patient's susceptibility to pain, delirium, disrupted sleep patterns and neuromuscular dysfunction can be more efficiently managed. Hence, this may not only improve the patient's experience while in the ICU, but may also help protect against long-term psychological trauma such as PTSD.


## 5.5 Measuring levels of sedation

**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

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The assessment of sedation in critically ill patients should be performed in a structured and consistent way – guessing the depth of sedation merely by looking at the patient will not provide an accurate or consistent assessment. Scoring systems that assess sedation based on a patient's response to various verbal and physical stimuli are recommended for measuring sedation in the ICU.<sup>9</sup> Essentially, the level of response determines the patient's numerical score, which indicates the patient's level of sedation. Regular assessments allows sedative therapies to be titrated based on individual patient circumstances to help achieve an optimum level of sedation.<sup>9</sup>



## 5.5.1 What would the ideal sedation assessment tool look like?

**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>

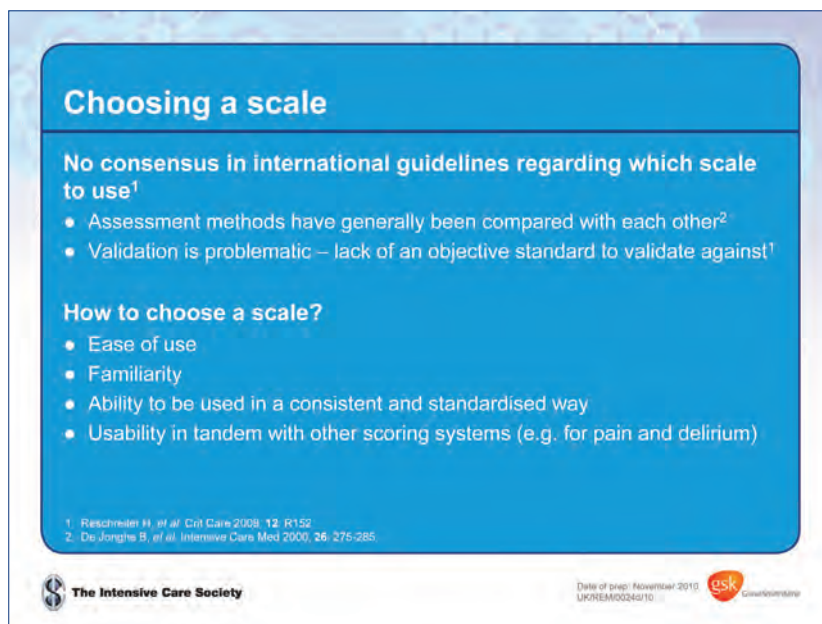
1. Jacobi J, et al. *Crit Care Med* 2002; 30: 119-141.  
2. De Jonghe B, et al. *Intensive Care Med* 2000; 25: 275-285.

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An ideal sedation assessment tool should provide an accurate measure of the level of sedation or agitation within well defined categories.<sup>9</sup> These categories may include behavioural descriptors about the level of consciousness, agitation, pain or synchrony with the ventilator.<sup>9</sup> An ideal sedation scale should show good reliability and validity to ensure that it accurately and consistently measures sedation across ICU patients, while at the same time being simple and user-friendly so that it can be easily implemented into everyday clinical practice.<sup>2,9</sup>

## 5.5.2 Choosing a scale



**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. Reischstein H, et al. *Crit Care* 2009; 12: R152  
2. De Jonghe B, et al. *Intensive Care Med* 2000; 26: 275-285

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Many sedation scoring systems are available, but a true global standard for a sedation scale has not yet been established. Since the 1970s, a number of different sedation scoring systems have been used in clinical ICU investigations and daily practice.<sup>2</sup>

Most of these scales enjoy good correlation between their measurements and other measures of sedation, and in some cases inter-scale comparisons have been directly performed.<sup>2,9</sup> However, validation itself is problematic as there is currently no agreed objective standard against which to validate sedation scales.<sup>10</sup>

In light of this, it is suggested that clinicians should choose a sedation scale that best fits the requirements of their local practice. Such decisions may be based on pragmatic criteria such as ease of use, familiarity, ability to use in a consistent manner and compatibility with other scoring systems (e.g. for pain or delirium).

## 5.6 Ramsay Scale

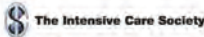

**Ramsay Scale<sup>1</sup>**

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: 856-859.

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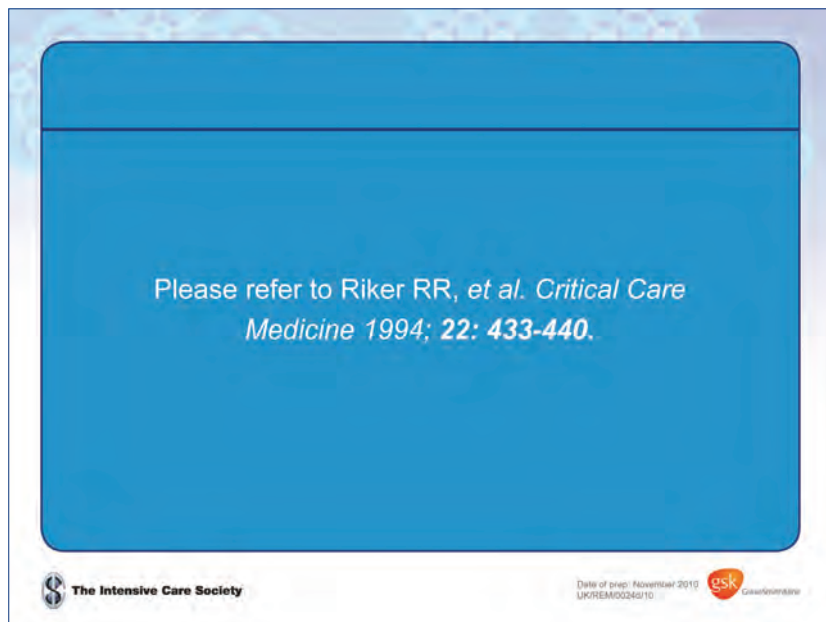
The Ramsay Scale was first cited in 1974 and was developed to assess ICU patients' depth of sedation in a study of the use of the sedative alphaxalone-alphadolene.<sup>11</sup> The scale quickly gained popularity and has become widespread in clinical practice.<sup>9</sup>

The Ramsay Scale provides three levels of 'awake' states and three levels of 'asleep' states.<sup>11</sup> If the patient is awake, they can be observed to see whether they are anxious and agitated or restless (score = 1) or co-operative, orientated and tranquil (score = 2). If the patient is neither of these but responds to verbal commands, then they are scored as a 3. If there is no response, a light glabellar tap or loud auditory stimulus can be applied and the level of response can be observed: brisk (score = 4), sluggish (score = 5) or no response (score = 6).<sup>11</sup>

The optimum sedation level, based on the modern criteria of calm, co-operative, comfortable patients, best fits a Ramsay Scale score of 2.

The Ramsay Scale has attracted criticism as it does not provide clear discrimination between sedation levels due to an absence of detailed descriptors.<sup>12</sup> Furthermore, the different levels described in the Ramsay Scale are not mutually exclusive – a patient may be restless or agitated (score = 1), while at the same time being responsive to a light glabellar tap or loud auditory stimulus (score = 4 and 5, respectively).<sup>12</sup> These factors may result in the Ramsay Scale providing a rather subjective measure of sedation if it is not used in a consistent way by ICU staff.

## 5.7 Sedation-Agitation Scale (SAS)

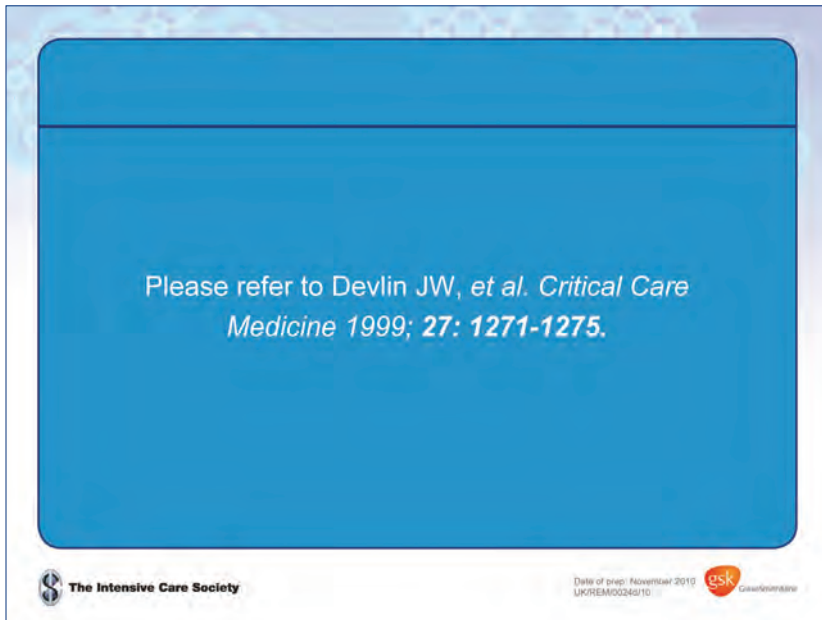


The Riker Sedation-Agitation Scale (SAS) was first cited in 1994 and was the first scale to demonstrate reliability and validity in critically ill adults.<sup>9</sup> The scale was developed to provide a small number of defined levels of sedation to help maintain consistency between observers and to provide a symmetrical range of scores for under- and oversedation.<sup>13</sup>

The SAS scores a patient's level of consciousness and agitation from a seven-item list which describes patient behaviour. If a patient is agitated then they are scored from +3 to +1 depending on the degree of agitation. If the patient is awake and calm, or awakens easily, then they are scored as 0. If the patient is difficult to arouse then they are scored as -1 or -2, depending on the level of stimulus required to awaken them. If the patient does not awaken to even noxious stimuli, then they are scored as -3.<sup>13</sup> The SAS has been found to show excellent inter-rater reliability and has been validated against other common sedation scales.<sup>9</sup>

The optimum sedation level, based on the modern criteria of calm, co-operative, comfortable patients, best fits a SAS score of 0.

## 5.8 Motor Activity Assessment Scale (MAAS)

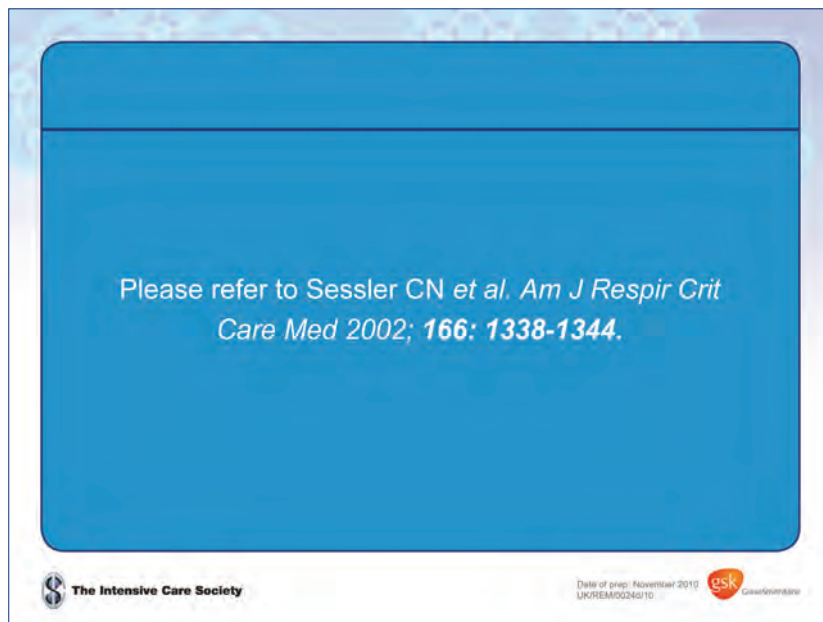


The Motor Activity Assessment Scale (MAAS) has also been validated in critically ill patients.<sup>14</sup> It was first cited in 1994, as a sedation scale for use with mechanically ventilated surgical ICU patients, and was developed in response to the perceived limitations of the Ramsay Scale.<sup>14</sup>

The MAAS has seven categories to describe patients' levels of sedation, each based on the observed level of motor activity (i.e. movement) of the patient. Highly active and agitated patients who do not calm down when asked are scored as a 6. If the patient shows some signs of agitation, such as attempting to sit up, and does not follow commands, then they are scored as a 5. If the patient shows some signs of restlessness, such as picking at sheets or tubes, but does follow commands, then they are scored as a 4. A score of 3 is awarded if the patient shows purposeful movement and follows commands. If the patient only shows signs of movement in response to being touched or when their name is loudly spoken then they are scored as a 2. If a noxious stimulus is required to elicit movement a score of 1 is awarded. However, if no movement is observed, even in response to noxious stimuli, then the patient is classified as unresponsive and scored as 0.<sup>14</sup>

The optimum sedation level, based on the modern criteria of calm, co-operative, comfortable patients, best fits a MAAS score of 3.

## 5.9 Richmond Agitation-Sedation Scale (RASS)

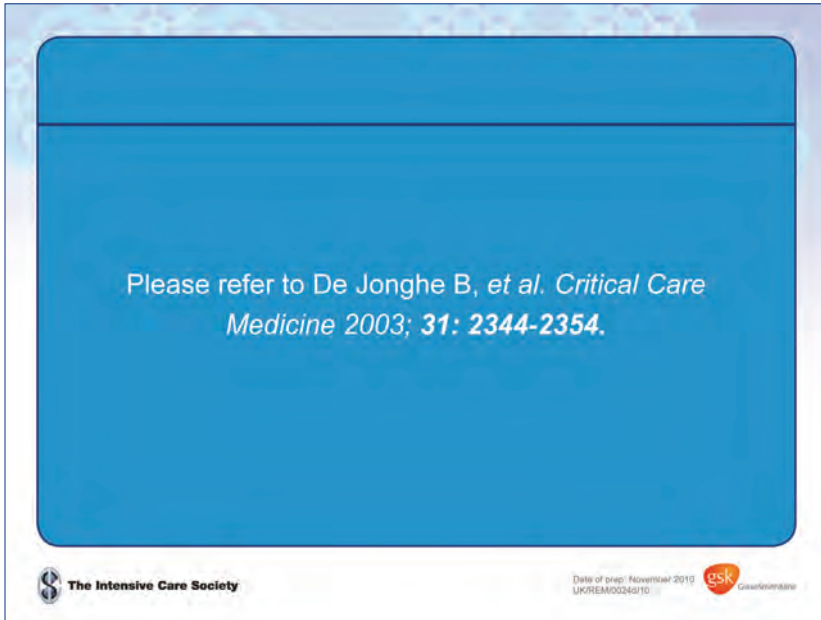


The Richmond Agitation-Sedation Scale (RASS) is an easy-to-use validated sedation assessment tool for all adult ICU patients.<sup>15</sup> It comprises a 10-point scale from combative to unarousable, and its originators reported robust inter-rater reliability for medical and surgical patients, patients with and without mechanical ventilation and patients with and without sedative medications.<sup>15</sup>

The patient is first observed to see whether they are alert and calm (score = 0). If the patient is showing signs of restlessness or agitation, the patient is scored from +1 (restless) to +4 (combative). However, if the patient is not alert, the patient's name is spoken in a loud clear voice followed by asking the patient to open their eyes and to look at the speaker. If the patient opens their eyes and maintains eye contact with the speaker for more than 10 seconds they score -1. If eye contact is maintained for under 10 seconds they score -2. If the patient does not give eye contact, but does show other movement in response to the verbal command, then they score -3. If the patient does not respond in any way to the verbal command, the patient can be gently shaken on the shoulder, or rubbed on the sternum. If they show movement in response to this, they score -4. If no response is elicited from the verbal command or physical stimulation, they score -5.<sup>15</sup>

The optimum sedation level, based on the modern criteria of calm, co-operative, comfortable patients, best fits a RASS score of 0.

## 5.10 Adaptation to the Intensive Care Environment (ATICE)



The Adaptation to the Intensive Care Environment (ATICE) Scale was first cited and validated in 2003 in mechanically ventilated adult ICU patients. ATICE comprises five assessment items: Awakeness and Comprehension fall within its Consciousness domain, whereas Calmness, Ventilator Synchrony and Face Relaxation combine to form its Tolerance domain. Its comprehensive assessment criteria were developed because of a perceived need for an instrument that measured patient responsiveness, a clinical variable considered by some to be a fundamental property for evaluating change in a patient's sedation level over time.<sup>16</sup>

*(continued overleaf)*

## 5.10 Adaptation to the Intensive Care Environment (ATICE) (continued)


Awakeness is graded by the level of stimulation required for the patient to open their eyes, from 5 (eyes open spontaneously when entering the patient's room and saying 'hello') to 0 (eyes closed with no facial mimic, even in response to physical stimulation). Comprehension is measured by asking the patient a series of five commands, with their comprehension score being the sum of correct responses. Calmness is measured by observing movement during the period of assessment on a scale of 0-3. Observation of the occurrence of any abnormal respiratory patterns is used to assess ventilator synchrony and is scored as a sum of the 1-point elements (no blockade of the inspiratory phase of ventilation, no respiratory rate >30, no cough and no use of accessory respiratory muscles). Face relaxation is measured in response to either positioning the patient transiently on their side or through passive limb movement. It is scored from 0 (permanent grimacing) to 3 (relaxed face).<sup>16</sup>



The optimum sedation level, based on the modern criteria of calm, co-operative, comfortable patients, is an Awakeness score of 4 or 5, a Comprehension score of 5, a Calmness score of 3, a Ventilator Synchrony score of 4 and a Face Relaxation score of 3.

## 5.11 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. DeJonghe B, et al. *Crit Care Med* 2005; 31: 2344-2354

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The ATICE is the most comprehensive of these five sedation scoring systems. Indeed, it is the only scale to include a combined assessment of consciousness, agitation, ventilator synchrony, pain and comprehension. However, ATICE was developed and validated using an ICU population with a medical diagnosis, and it is possible that a surgical ICU population may require different measurable properties.<sup>16</sup> Conversely, the developers of the RASS placed their emphasis on ease of use and clarity. The single-item numerical structure of RASS avoids the complexity of multiple subscale scores and can be administered quickly (30-60 seconds) using three sequential steps: observation, response to auditory stimulation, and response to physical stimulation.<sup>15</sup> The three older scales assess only two of the five sedation domains – consciousness and agitation – but they are still commonly used in ICUs.

Different ICUs may choose to implement different sedation scales – the choice of a scale should take into consideration the requirements of local practice. Regardless of which specific scale is chosen, it is important that sedation scoring is integrated into routine clinical practice to help meet patient-specific objectives of sedation.<sup>2</sup>

## 5.12 Nurse-led ICU sedation protocols

**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

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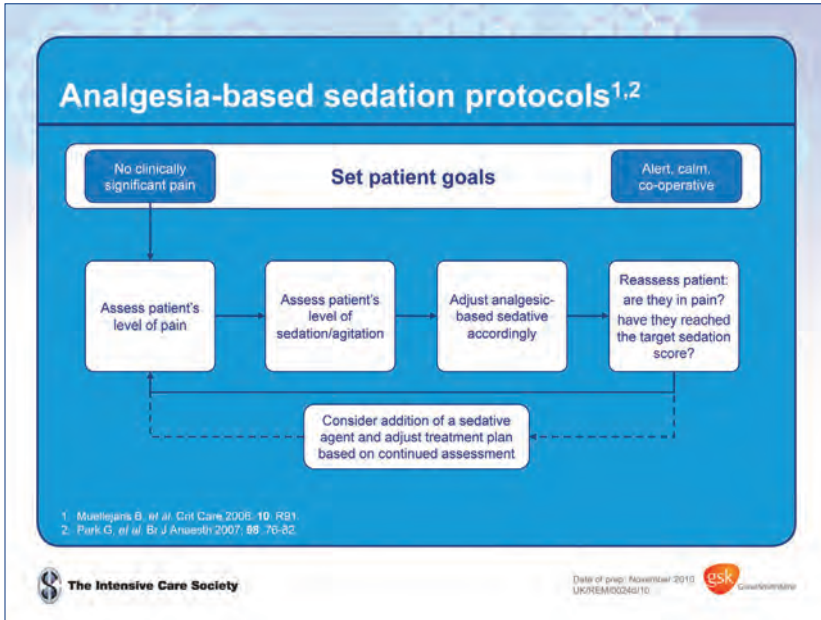
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Implementing sedation scoring as part of an ICU sedation protocol can help improve patient outcomes. A prospective, randomised, controlled trial has shown that, compared with conventional non-protocol-directed sedation administration, the use of a nurse-led sedation protocol in mechanically ventilated, critically ill patients with acute respiratory failure can reduce the duration of mechanical ventilation, ICU and hospital length of stay, and the need for tracheostomy.<sup>17</sup>

The sedation protocol used in this study dictated that the nurse should determine whether analgesics, sedatives, or both were necessary for each patient and should select the dose and type of sedative administered (i.e. continuous infusion or bolus administration). Patient sedation was reassessed and adjusted, in accordance with the protocol. Treatment was allowed to deviate if it was deemed to be in the patient's best interest.<sup>17</sup>

The need for effective communication between bedside caregivers and physicians to make treatment decisions may delay changes to sedation regimens.<sup>17</sup> This study demonstrated that sedation protocols can be successfully implemented by intensive care nurses.<sup>17</sup> Empowering nurses to implement sedation protocols in the ICU may lead to more rapid clinical decision-making and therefore improve patient outcomes.<sup>17</sup>

## 5.12.1 Analgesia-based sedation protocols



As discussed in Chapter 1, analgesia-based sedation (ABS) in the ICU provides a patient-centred approach to help achieve optimum levels of sedation.<sup>8</sup>

A typical simple ABS protocol might use the following principles:<sup>8,18</sup>

- Set a primary goal of establishing an alert, calm, co-operative patient who experiences no clinically significant pain;
- Assess the patient's initial levels of pain and agitation and provide ABS as required;
- Reassess pain and anxiety levels on a continuous basis;
- Adjust the analgesic agent and/or initiate an additional sedative agent as required;
- If excessive sedation occurs, reduce the sedative agent first.

## 5.12.2 Analgesia-based ICU sedation protocols

**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. Muehleisen B, et al. *Crit Care* 2008; 10: R91.  
2. Park G, et al. *Br J Anaesth* 2007; 88: 76-82.

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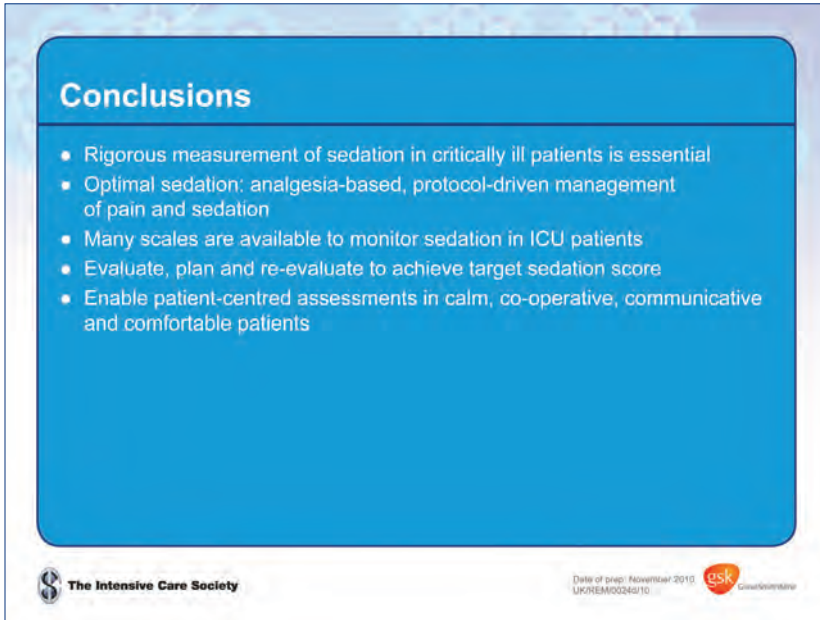
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The evolution of more modern sedation criteria, which advocate a calm, comfortable, co-operative and alert patient, are best served using analgesic-based sedation (ABS).<sup>8</sup> The principal alternative approach, hypnotic-based sedation (HBS), renders the patient unconscious, meaning that sedative titrations are dependent on the perception of the ICU staff.<sup>8</sup>

Until recently, HBS was the sedative strategy of choice, mainly because hypnotic agents (e.g. midazolam, propofol) behaved more predictably than their ABS counterparts (e.g. morphine).<sup>8</sup> Recently, however, the emergence of newer-generation analgesics, which evoke more predictable analgesic effects and ultimately allow the patient to maintain consciousness, has led to an increase in ABS within the ICU community.


Two recent studies have compared the effect of an ABS approach with that of a HBS approach. ABS patients have been shown to require fewer days on mechanical ventilation and shorter duration of ICU stays.<sup>18</sup> Furthermore, ABS can reduce the need for sedative medication and enable greater patient interaction and easier patient assessments.<sup>8</sup>


## 5.13 Conclusions



### 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

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Regular assessments of anxiety and sedation in critically ill patients admitted to the ICU are essential to avoid negative outcomes associated with under- or oversedation. Many sedation scoring systems exist, providing the tools needed to assess sedation levels in critically ill patients. These include the comprehensive ATICE scale and the easy-to-use RASS.

Providing an optimum level of sedation, where patients are calm, co-operative, communicative and comfortable, provides the opportunity to adopt a patient-centred approach to the management of patients in the ICU. Implementing a validated sedation scoring system as part of an analgesia-based sedation protocol can help achieve this goal. Consequently, factors such as pain, delirium, sleep, neuromuscular function and PTSD can be assessed and addressed in the ICU.

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