In August 2002, a group of critical care experts (Figure 1) met in Nashville, Tenn, for a consensus conference on sedation assessment. The conference was made possible though a collaboration between the American Association of Critical-Care Nurses (AACN); Abbott Laboratories, Abbott Park, Ill; and Saint Thomas Health System, Nashville, Tenn, and was designed to address the critical need for a valid and reliable scale for sedation assessment in critically ill patients. The collaboration was envisioned to be a 3-phase process: Phase 1: Convene a group of experts in sedation assessment to validate the state of the science on sedation assessment and to recommend characteristics of an “ideal” sedation assessment scale. Phase 2: Develop a new sedation assessment scale for critically ill adult patients. Phase 3: Conduct a multisite clinical research project to test the validity and reliability of the new scale.

The members of this expert panel were selected on the basis of their expertise in a variety of critical care areas and aspects of sedation to get a broad perspective on the sedation needs in critical care practice. Members had practice expertise in medical, surgical, cardiovascular, neurosurgical, pediatric, and adult critical care nursing and represented hospital practice from across the United States. In addition, members were selected for participation in the panel on the basis of their expertise specifically relevant to sedation assessment, including pain management, anxiety/fear, sleep, patient-ventilator synchrony, delirium, clinical pharma-
synchrony, or sleep and rest; lack of discrimination between different levels of sedation observed with new sedative agents; and poorly developed levels that often include more than a single aspect of sedation (eg, agitation, anxiety, consciousness).

In their recent review of published sedation assessment scales, De Jonghe et al observed that of 25 scales published from 1966 to 1999, only 3 had undergone more than a cursory effort at validity and reliability testing in adults: the Ramsay Scale, the Motor Activity Assessment Scale (MAAS), and the Sedation-Agitation Scale (SAS). Although some testing of these scales was performed, the expert panel agreed with the conclusion of De Jonghe and colleagues that all of the scales have problems that limit the usefulness of the scales for sedation assessment in a variety of critically ill patients.

Areas of concern related to the narrow focus of the scales on agitation and/or consciousness, failure to separate assessment domains into separate subscales, and the need for additional validity and reliability testing in different types of critical care situations.

Since that review, results of validity and reliability testing of the Richmond Agitation Sedation Scale (RASS) have been published. Although the validity and reliability testing of the RASS was done in a variety of critically ill patients, many of the criticisms of De Jonghe et al of the Ramsay Scale, SAS, and MAAS also pertain to the RASS. Moreover, several recent publications have emphasized the need for developing better sedation assessment scales that can be used to evaluate more than a single domain of sedation in a variety of populations of critically ill patients.

Kathleen Vollman, RN, MSN, Clinical Nurse Specialist/ Educator/Consultant
We currently use the MAAS, but prior to that we used the Ramsay Scale, which is inefficient because it lacks enough information on behaviors to guide medication administration. While the MAAS is much better, it is primarily a motor assessment score, so it has nothing to do with other reasons for sedation therapy, such as comfort, anxiety, or ventilator synchrony. The current sedation assessment scales do not get at all of the subcomponents that need to be evaluated when determining sedation therapy needs.

Meg Campbell, RN, MSN, Nurse Practitioner, Palliative Care and Clinical Ethics at Detroit Receiving Hospital
Current scales do not address individual patients’ goals for sedation—for example, facilitating mechanical ventilation, patient safety, comfort, or anxiety.
Panel members focused a great deal on the perception that the structure of the current sedation assessment scales is too simplistic for adequate evaluation of a complex array of signs and symptoms in critically ill patients. The scales have only a single domain or subscale, with 6 to 10 different levels within that domain, depending on the particular scale (Table 1). For the most part, the single domain of each of these scales is for evaluation of only consciousness and/or agitation. Yet sedatives are used to manage a variety of physiological and psychological symptoms or problems experienced during a critical illness, not just consciousness or agitation.12-14 The most common reasons for administration of a sedative include relief of anxiety

<table>
<thead>
<tr>
<th>Table 1 Four different sedation assessment scales with validity and reliability in adult patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramsay Scale 3</td>
</tr>
<tr>
<td>6 No response</td>
</tr>
<tr>
<td>5 Patient asleep with a sluggish response to a light glabellar tap</td>
</tr>
<tr>
<td>4 Patient asleep with a brisk response to a light glabellar tap</td>
</tr>
<tr>
<td>3 Patient responds to commands only</td>
</tr>
<tr>
<td>2 Patient cooperative, oriented, and tranquil</td>
</tr>
<tr>
<td>1 Patient anxious or agitated or both</td>
</tr>
<tr>
<td>7 Dangerous agitation (pulling at endotracheal tube, trying to remove catheter, climbing over bed rail, striking at staff, thrashing side to side)</td>
</tr>
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</tbody>
</table>
and/or agitation, promotion of rest and sleep, creation of an amnesic state, promotion of hemodynamic stability, and prevention of self-harm. Other less common reasons for sedation include reduction of intracranial pressure, promotion of patient-ventilator synchrony, provision of an adjunct to neuromuscular blockade, and prevention of discomfort associated with invasive instrumentation (eg, endotracheal tubes, chest tubes) and critical care management.

So, although the simplistic assessment scales that are available today may be easy to use, they are woefully inadequate for assessing sedation needs in most critically ill patients. The nature of critical illness is such that sedation therapy in critically ill patients is rarely used for just a single reason. A recent survey of sedation practices in critically ill patients indicated that having more than a single goal for sedation therapy is not unusual; critical care nurses identified comfort, amnesia, and patients’ safety as the most common goals.

Why then are sedation assessment scales so limited in the domains of sedation that they are used to assess? One reason might be attempts to keep sedation assessment quick and easy for busy clinicians. Another might be that sedation assessment scales were originally developed for use during anesthesia, in which level of consciousness is the primary focus. Certainly the latter reason is true for the Ramsay Scale, which was designed to measure consciousness in a study of patients receiving an experimental anesthetic drug during surgery. Whatever the reason, the members of the expert panel agreed that currently used scales do not include the necessary parameters for adequately evaluating sedation therapy in critically ill patients.

Dorrie Fontaine, RN, DNSc, Associate Dean, University of California, San Francisco, School of Nursing

It’s probably time to stop using the Ramsay Scale—it’s just too simple for our needs. Sedation assessment in the critically ill patient is complex—and we may need to incorporate some type of technology for sedation assessment to make it easy and quick to use at the bedside, but the solution is not to make the assessment scale simple by having only 1 or 2 domains evaluated.

Lorie Wild, RN, PhD, Director, Patient Care Services, University of Washington Medical Center

Complex care can be managed by today’s critical care nurse. Think about hemodynamic monitoring and ICP management by nurses—they are able to assess a variety of physiologic variables and then determine which of many pharmacologic interventions to use.

What Is Needed to Improve Sedation Assessment in Critically Ill Patients?

When asked what is needed to improve sedation assessment in critically ill patients, panel members described various ideal characteristics of a sedation assessment scale (Table 2). The primary recommendation was that an assessment tool be developed that parallels the goals for sedation therapy in critically ill patients. Group discussion centered on having a separate domain or sub-scale for each of the most common goals for sedation therapy. Ideally, the sedation scale would encourage a multidisciplinary approach to identifying sedation goals.

Meg Campbell, RN, MSN, Nurse Practitioner, Palliative Care and Clinical Ethics at Detroit Receiving Hospital

It is critical that a sedation assessment scale be guided by the goals of sedation. For example, if the goal of sedation is ventilator synchrony, then the nurse should be cued to a dimension of the scale that assesses ventilator synchrony and not other dimensions of the sedation scale. Individual patient goals should drive which dimensions of the scale should be used.

Table 2 Recommendations of the sedation expert panel for an ideal sedation assessment scale

- Assessment scale should have domains to represent each of the goals for sedation assessment. Ideally, the scale would encourage a multidisciplinary approach to identifying goals of sedation therapy before sedation is assessed.
- Each domain of the assessment scale should evaluate only a single goal and should avoid combining 2 different concepts into the same domain.
- Both subjective and objective measures for each domain should be assessed, if appropriate.
- Assessment scale should direct clinicians to evaluate and treat pain, and potentially delirium, before assessing sedation.
- The scale should be easy for clinicians to use at the bedside. Plans to use technology (eg, personal digital assistant or computer) to simplify complex scale should be developed.

<table>
<thead>
<tr>
<th>Area of Sedation</th>
<th>Ideal Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort</td>
<td>- Subjective measures</td>
</tr>
<tr>
<td>Amnesia</td>
<td>- Objective measures</td>
</tr>
<tr>
<td>Patient Safety</td>
<td>- Multidisciplinary</td>
</tr>
</tbody>
</table>

It is critical that a sedation assessment scale be guided by the goals of sedation. For example, if the goal of sedation is ventilator synchrony, then the nurse should be cued to a dimension of the scale that assesses ventilator synchrony and not other dimensions of the sedation scale. Individual patient goals should drive which dimensions of the scale should be used.
Another recommendation was that the sedation assessment scale should direct clinicians to first evaluate and treat pain, and potentially delirium, before sedation is assessed. Discussion was lively about the problem of inadequate pain management in critically ill patients. Panel members noted that clinicians commonly use sedation therapy to control disruptive behavior when, in fact, the underlying problem is actually one of inadequate analgesia. Sedative drugs do not have analgesic properties, so pain should be treated before sedatives are administered. Adequate pain management may preempt the need for sedation therapy.

Mary Campbell, RN, MSN,
Nurse Practitioner, Palliative Care and Clinical Ethics at Detroit Receiving Hospital

If we did a better job of pain management, our need to use benzodiazepines or neuroleptics would dramatically decrease. Sedative therapies should be used as an adjunct to analgesia. Almost all critically ill patients have pain—whether it’s sequelae of surgery or iatrogenic pain from procedures or positioning. If pain is addressed adequately, the need for sedation is very, very small.

Mary Kay Bader, RN, MSN,
Neuroscience Clinical Nurse Specialist at Mission Hospital

An ideal sedation assessment scale should also provide direction to caregivers for clinical management. When clinicians have assessed the appropriate sedation domains, the next step is to determine what, if any, additional treatment is necessary. Panel members were unanimous in their belief that a valuable addition to the sedation assessment process would be a protocol that could guide the approach of bedside clinicians to sedation management.

Marla De Jong, RN, MSN,
Doctoral Student, School of Nursing, University of Kentucky

Protocols and algorithms are useful as teaching tools and as a basis for standing medical orders.

Mary Kay Bader, RN, MSN,
Neuroscience Clinical Nurse Specialist at Mission Hospital

The use of evidence-based protocols allows team members to apply proven appropriate assessment tools to guide interventions found to impact patient outcomes. A standardization of care based on solid scientific evidence not only places the entire team on the same page, it allows for the transfer of science to practice.

And last, but not least, the panel recommended that the ideal sedation assessment tool must be easy for bedside clinicians to use. Clinicians will not use a tool that is too cumbersome or time-consuming to complete. In light of earlier discussions about the simplicity and narrow focus of current scales, most likely some type of technological application (eg, personal digital assistants) would keep the assessment process easy, when several domains are assessed. Even if 8 domains are included in the sedation assessment scale, clinicians may need to evaluate only 3 domains when the other 5 domains do not relate to a patient’s goals of therapy.
What Subscales or Domains Should Be Included in a Sedation Assessment Scale?

Panel members had little hesitation when asked to identify the domains, or subscales, that should be included in a new sedation assessment scale. Consensus was rapidly achieved that the scale needed to include the following domains:

- anxiety;
- sleep/rest;
- consciousness;
- agitation/restlessness;
- prevention of self-harm;
- amnesia; and
- comfort.

Other items that were suggested but had less than unanimous support included delirium, pain, fear, patient-ventilator synchrony, and physiological signs.

Substantial discussion was devoted to the inclusion of pain and delirium as individual domains in a sedation assessment scale. Many members of the panel thought that although pain and delirium are important concepts, these abnormalities are not resolved by treatment with sedative agents and so are inappropriate to include in a sedation assessment scale. Although everyone agreed that critically ill patients often have pain and delirium, the panel thought that management of pain and delirium should be separate from sedation assessment and management. The panel’s strongest recommendation was that directions for the sedation assessment scale include a reminder to first assess and manage pain and delirium.

Marla De Jong, RN, MSN,
Doctoral Student, School of Nursing, University of Kentucky

Changes in physiologic signs (for example, heart rate, blood pressure, respiratory rate) are inherently difficult to put into a separate domain. And, changes in physiologic variables may be related to other phenomena that are unrelated to the domains of sedation.

Lorie Wild, RN, PhD, Director,
Patient Care Services, University of Washington Medical Center

Ventilator synchrony, while a goal sometimes of sedation management, may not really be a separate domain but should be included in the agitation domain as a level that includes “not tolerating medical treatments/devices.”

Kathleen Vollman, RN, MSN,
Clinical Nurse Specialist/Consultant

Assessment of delirium should occur after pain and other potential physiologic causes for agitation are ruled out. Then delirium should be assessed, followed by assessment of motor activity.

Meg Campbell, RN, MSN, FAAN,
Nurse Practitioner, Palliative Care and Clinical Ethics at Detroit Receiving Hospital

I’m worried that if we assess for delirium first, by itself, we’ll end up labeling the patient as delirious and jump to treatment with a neuroleptic and not recognize that the real problem is anxiety or poor pain management. Betty Ferrel’s work with nursing home patients that were labeled delirious found that those patients were grossly undermedicated for pain. The label of delirium can lead to the wrong treatment.

Suzi Burns, RN, MSN, Associate Professor of Nursing, University of Virginia Health System

I agree with you Meg. It’s the part I’m struggling with—how can we come to a diagnosis up front before we have done a thorough, accurate assessment? You may decide it’s delirium, and treat with neuroleptic drugs without excluding pain, or anxiety, or other causes. If we don’t do that thorough assessment, we skip a step and then many patients will be labeled as delirious and treated with neuroleptics instead of what they may need.

Dorrie Fontaine, RN, DNSc,
Associate Dean, University of California, San Francisco,
School of Nursing

Is it that delirium is really the outcome of poor control of pain, or anxiety, or due to sleep deprivation? What comes first, the chicken or the egg?

The domains or subscales proposed by the members of the expert panel were initially a list of individual domains related to the goals of sedative therapy (Table 3). As the discussion of the items progressed, and after thoughtful reflection, a logical grouping of the individual domains emerged (Figure 2). The grouping of the domains into the 3 categories of physiological stability, comfort, and patients’ safety helped the panel members better conceptualize the sedation assessment and management process.
Panel members recommended that for each domain, both subjective and objective methods for evaluating the domain be included, if appropriate. This type of approach would ensure applicability of the scale to both responsive and unresponsive patients. For example, subjective measures of a domain might include the patient’s self-report of his or her status vis-à-vis the domain, and objective measures might include observation of facial expressions, body movements, or physiological variables.

Although a 1-day meeting did not permit complete development of these domains, panel members identified the 2 anchors, or ends, for each domain or subscale (Table 4). Additional work will be required to complete the intermediate levels between the 2 anchoring points before the new scale can be tested. In defining the levels for each domain, it will be important to ensure that they are in alignment with the effects produced by current sedative agents. One example of this is the effect of a new sedative agent, dexmedetomidine, an α-agonist that creates a sedative state that is not reflected in the current scales. Patients sedated with dexmedetomidine are asleep but can be easily aroused by verbal or light touch stimuli, and, depending on the interpretation of the evaluator, might be classified as level 2, 3, or 4 on the Ramsey scale (see Table 1). Therefore, using current sedation tools to evaluate patients receiving dexmedetomidine might lead to erroneous rating and inappropriate administration of this sedative agent.

**What Are the Challenges to Ensuring That Critically Ill Patients’ Sedation Needs Are Adequately Addressed?**

The panel discussed the challenges that exist relative to ensuring that critically ill patients’ sedation needs are addressed. First, and foremost, is the challenge to develop a sedation assessment tool that can be used to evaluate the range of domains applicable to the variety of clinical uses of sedation management in critical care. Everyone agreed that the approach being taken by the Abbott/AACN/Saint Thomas Health System collaboration is an excellent beginning in addressing that challenge. Although much work remains to be done before a new scale is developed, the panel members clearly witnessed the partners’ commitment to the development of a new and clinically useful sedation scale.

### Table 3

<table>
<thead>
<tr>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
</tr>
<tr>
<td>Comfort</td>
</tr>
<tr>
<td>Agitation</td>
</tr>
<tr>
<td>Amnesia</td>
</tr>
<tr>
<td>Sleep/rest</td>
</tr>
<tr>
<td>Consciousness/arousal</td>
</tr>
<tr>
<td>Potential for self-harm</td>
</tr>
<tr>
<td>Patient/ventilator synchrony - ?</td>
</tr>
<tr>
<td>Delirium - ?</td>
</tr>
<tr>
<td>Pain - ?</td>
</tr>
<tr>
<td>Fear - ?</td>
</tr>
<tr>
<td>Physiological signs - ?</td>
</tr>
</tbody>
</table>

### Table 4

<table>
<thead>
<tr>
<th>Domain</th>
<th>One anchor end</th>
<th>Other anchor end</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients’ safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arousability</td>
<td>Awake</td>
<td>No arousal to physical stimuli</td>
</tr>
<tr>
<td>Agitation</td>
<td>Calm</td>
<td>Very agitated</td>
</tr>
<tr>
<td>Behavior</td>
<td>Tolerates treatment</td>
<td>Frequent behavior dangerous to self and others</td>
</tr>
<tr>
<td><strong>Physiological stability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemodynamic stability</td>
<td>Blood pressure, heart rate, and cardiac index stable</td>
<td>Blood pressure, heart rate, and cardiac index unstable</td>
</tr>
<tr>
<td>Ventilator synchrony</td>
<td>Synchrony with ventilator</td>
<td>Complete dyssynchrony with ventilator</td>
</tr>
<tr>
<td><strong>Psychological comfort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>No anxiety</td>
<td>Severe anxiety</td>
</tr>
<tr>
<td>Fear</td>
<td>No fear</td>
<td>Terror</td>
</tr>
<tr>
<td>Sleep/rest</td>
<td>Balanced sleep</td>
<td>Insomnia</td>
</tr>
<tr>
<td>Amnesia</td>
<td>No recall or pleasant recall</td>
<td>Vivid recall</td>
</tr>
</tbody>
</table>
of critically ill patients. In addition to medical, surgical, and cardiovascular critically ill patients, it will be important to test the new scale in patients with neurological impairment or severe respiratory failure that initially requires ventilatory control and later weaning from mechanical ventilation. Testing should also be done in patients who receive sedation to facilitate short-term procedures or transport within the hospital.

Dorrie Fontaine, RN, DNSc; Associate Dean, University of California, San Francisco, School of Nursing

I would hope that this would be a widely used tool, so the broader testing of the tool in a range of acutely ill patients is what is needed.

The panel recommended an intensive focus on validity testing, which should not only compare the new scale with existing scales but also use technology and biological markers as reference standards for each domain, where appropriate. Suggested reference standards included electroencephalography for the consciousness domain, polysomnography for the sleep/rest domain, quantification of movement by actigraphy for the domains of agitation and patients’ safety, facial electromyographic monitoring for fear, and measurement of catecholamine levels for the anxiety/fear domain. The panel also recommended enlisting a group of clinical experts to rate each domain in order to establish reference standards for the tool.

In addition to validity testing on the instrument, studies to determine the reliability of the tool will be needed. Both interrater reliability among nurses using the tool and reliability of assessments in which the tool is used with the same patients over time and across populations of patients will be important.

Once a valid and reliable, multidomain sedation assessment scale has been developed and tested, the next challenge will be to develop algorithms to guide clinicians through the maze of sedation management possibilities. This step, although potentially one of the most challenging, is crucial to ensure optimal sedation management in critically ill patients.

Future Direction

The convening of the sedation expert panel was just the first step in the collaboration of Abbott Laboratories, AACN, and Saint Thomas Health System. Guided by the wisdom of the expert panel members, phase 2 of the project is currently in progress. Further refinement of the sedation assessment scale is under way, with plans for preliminary testing of the scale within the next year. It is hoped that wide-scale clinical testing, phase 3 of the project, will begin late in 2004. Although much work remains to achieve this goal, the journey has begun.

Acknowledgments

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