

SUPPLEMENTARY TABLE 1. NEUROLOGICAL OUTCOME SCALE FOR TRAUMATIC BRAIN INJURY  
(NOS-TBI) EXAMINATION INSTRUCTIONS

---

*Instructions to examiner*

The Neurological Outcome Scale for Traumatic Brain Injury (NOS-TBI) is an evaluation of basic neurological functioning, including level of consciousness, orientation, language, cranial nerve function, sensation, and motor assessment.

The scale contains 13 items that can be administered and/or scored for nearly all patients, and two supplemental items (gait ataxia and limb ataxia) that should be administered if the patient is able (e.g., weight-bearing and ambulatory for gait ataxia, and free of hemiparesis, significant weakness, or orthopedic injuries that would preclude finger-nose-finger and heel-knee-shin testing in limb ataxia). Items in the test include several items on the National Institute of Health Stroke Scale (NIHSS), as well as four additional items designed to measure additional common neurological manifestations of traumatic brain injury (TBI).

In most cases, a trained neuropsychologist, nurse, psychometrician, or other technician may administer this scale, provided he or she has some awareness of patient injuries when performing examination items that may present a risk of additional physical injury to the patient (e.g., performing lower-extremity limb ataxia testing in a patient with a recent pelvic fracture). If the patient is comatose or uncooperative at the time of the assessment and is in an inpatient setting, a physician or trained nurse may administer items that the examiner is unable to assess or is uncomfortable assessing. Instructions follow for administration and scoring of this scale in the unresponsive patient.

We recommend that the examiner note the perceived effort of the patient during administration of the scale, and also note factors that may impact the reliability of results on the measure (e.g., sedation or lack of cooperation).

*Guidelines for administering the NOS-TBI exam (from the NIHSS):*

1. **Record only the first response.** The most reproducible response is generally the first response. For example, on level of consciousness (LOC) questions, the patient is asked to state age and current month. The patient who initially responds incorrectly, but later corrects himself, is scored as having given an incorrect response. This approach is critical, because we have no way of standardizing the myriad verbal and non-verbal cues that might be given to patients to promote a correction of an initially incorrect response.
2. **Do not coach the patient.** It is not permissible to coach patients on any item unless specified in the instructions. For example, when asking a patient the current month, it would be inappropriate to point to a calendar or to give the patient any clues that would indicate that he or she were correct. There are some examples where coaching is allowed (i.e., in the case of blindness), but those exceptions are detailed in the instructions.
3. Most importantly, **record what the patient does**, not what you think the patient can do, even if the findings appear contradictory. Many times a competent examiner forms an impression of the patient's level of function, but this impression must not influence scoring.

*Instructions to patient*

Introduce the measure with a brief statement, such as "I would like to ask you about and briefly test some common areas of functioning, such as your vision, hearing, ability to move your arms and legs, and your ability to sense things."

**Neurological Outcome Scale for Traumatic Brain Injury (NOS-TBI)**

**1a. Level of consciousness**

*Testing instructions:* Ask the patient "How do you feel today? Do you feel any pain?" If the patient is alert and responsive, score a 0. If patient does not respond, loudly speak his or her name (i.e., "Mr. Smith, how do you feel today?"). If the patient reacts to verbal stimulation, score a 1. If there is still no response, use a physical stimulus (rubbing on the chest, pinching, pressing against the supraorbital margin, placing a pencil just above the nailbed). If the patient responds to this, score a 2. If there is still no response after repeated stimulations, score a 3.

*Comatose or difficult-to-arouse patient:* Choose a response even if a full evaluation is prevented by obstacles such as an endotracheal tube, a language barrier, or orotracheal trauma/bandages. A 3 is scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimulation. Note that a patient with a 3 on this item is considered to be in coma.

*Vegetative state patients:* Patients may exhibit spontaneous eye opening, but should be scored on ability to move in response to a painful stimulus.

0 = Alert: Patient is fully alert and responsive.

1 = Not alert, but arousable by minor stimulation (verbal) to obey, answer, or respond.

2 = Not alert, requires repeated stimulation to attend, or is mentally dulled and requires strong or painful physical stimulation to make movements (not stereotyped).

3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.

**1b. LOC questions**

*Testing instructions:* Ask the patient the month of the current year and his or her birth date or age. The answer must be correct; there is no partial credit for being close (for example, being off by one year in age). If the patient gives the wrong initial answer but then corrects it, the answer should still be scored as incorrect. Other measures of orientation such as time of day and location are not asked as part of this examination. Patients who do not understand are scored a 2. Patients who cannot speak are allowed to write, but do not give a list of multiple choice responses.

*(continued)*

SUPPLEMENTARY TABLE 1. (CONTINUED)

*Comatose patient:* score 2

0 = Answers both correctly.

1 = Answers one correctly.

2 = Both answers are incorrect or the patient fails to respond.

### 1c. LOC commands

*Testing instructions:* Ask the patient to follow two commands. First, ask the patient to open and close his or her eyes, and then ask him or her to make a grip or fist (i.e., close and open the hand). For a patient with paralysis or other prohibitive injury on one side of the body, making a fist with the unaffected hand or an attempt to move an affected limb in response to the command (even if unable to form a fist) would be a normal response. Credit is given if a sincere attempt is made, but not completed due to weakness. If neither hand can be used, substitute another one step command (e.g., "stick out your tongue" or "wiggle your toes"). Only the initial response is scored. If a patient is unable to follow verbal commands, perform these movements (pantomime), and observe any attempt to imitate.

*Comatose patients:* score 2

0 = Obeys both commands correctly.

1 = Obeys one command correctly.

2 = Both commands are incorrectly executed or no response.

### 2. Gaze (patient's ability to look left and right)

*Testing instructions:* First, look at the position of the eyes at rest. Spontaneous eye movements to the left or right should be noted. Have the patient follow your finger to the right and to the left. Only horizontal eye movements are tested. Disorders of vertical (up and down) gaze, nystagmus (rhythmic movement of the eyeball), or skew deviation (eyes move in opposite directions) are not measured.

*Comatose patients:* Reflexive eye movements (oculocephalic or oculovestibular) should be tested in patients who are unable to respond to commands. **A physician who is well aware of the patient's medical history should always perform this maneuver.** Caloric testing is not done.

*Other complicating factors:* Patients with ocular trauma, bandages, or other disorders of visual acuity or fields should be tested with reflexive movements by a physician. Patients with difficulty understanding can be tested by establishing eye contact and then moving the examiner's head about the patient from one side to the other to see if the patient tracks this head movement with his or her eyes.

*Scoring:* If a patient has ocular problems, such as strabismus, but leaves the midline and attempts to look both right and left, he or she should be considered to have a normal response. If a patient has an isolated peripheral nerve paresis (cranial nerves III, IV, or VI), score a 1. If the patient has abnormal gaze at rest, but demonstrates control during voluntary or reflexive activity, the score should be 1. If there is deviation in both eyes that is **NOT** overcome with reflexive movements, the score should be 2.

0 = Normal: The patient has normal lateral eye movements.

1 = Partial gaze palsy: The patient is unable to move one or both eyes completely in at least one direction, but there is evidence of some horizontal eye movement.

2 = Forced deviation or total gaze paresis: The patient has conjugate deviation of the eyes to the right or left, even with reflexive movements.

### 3a and 3b. Visual fields (right and left)

*Testing instructions:* If possible, sit facing the patient at eye level, with the examiner's knees next to the patient's knees. Have the patient cover his or her left eye while the examiner covers his or her right eye (mirror image eye). Ask the patient to fixate on the examiner's left eye with his or her right eye. Present stimuli to the patient to assess sensory function. One of the examiner's hands will be covering one eye, and the other hand, the test hand, should be halfway between the examiner's eye and the patient's eye. Briefly (for about 0.5 sec) present the test hand in the lower outside quadrant of the visual field with zero to five fingers. Ask the patient to identify the number of fingers. Repeat test in all four quadrants, until sensory function is established or is conclusively missing in each quadrant. Have the patient switch eyes and repeat the exam for the other eye. If the patient has attention difficulties, an object (preferably brightly colored), instead of fingers, is moved through the visual field and the patient is asked if there is any point at which the object cannot be seen. If the patient is aphasic or obtunded, observe any attempt at visual tracking of the object moving through the field. Each eye is independently tested.

*Comatose patients:* Test using bilateral visual threat. Hold the patient's eyes open and create a sudden movement towards the face, coming from outside the visual field into the patient's visual field. If the patient responds with an attempt to blink (the examiner will feel the attempt while holding the eyes open), score as 0 for that field (right or left). Test each field independently. Absence of response should be scored as 2.

*Double simultaneous stimulation* is performed next. This test is inserted here to help maintain the flow of the exam. Results from this test will not be used for scoring items #3a and 3b, but will influence the scoring of item #12 dealing with neglect. Have the patient look directly into the examiner's eyes. Hold up both hands in the upper quadrants of the patient's field of view. Begin by moving one finger at a time on the right or left hand and ask the patient to tell you (or point to) which hand is moving. After adequate sensation is established in each visual field, add in several trials where both hands move simultaneously. Repeat the procedure for the lower quadrants of the visual field. The patient should be able to keep track of fingers in two quadrants simultaneously. If a patient has trouble speaking or exhibits confusion of right versus left, ask him or her to point to the side where the finger is moving. Encourage the patient to keep focusing on the examiner's face (as opposed to the hands), but if the patient looks at the moving fingers appropriately, this can be scored as normal.

(continued)

SUPPLEMENTARY TABLE 1. (CONTINUED)

*Scoring:* Scoring for items 3a and 3b should be done only with reference to the tests of the visual field. The information obtained in the double simultaneous stimulation test should be noted, but will be used later for scoring item #12. A partial field cut in either hemifield should be scored 1 under the appropriate section (3a for right, 3b for left). The entire hemifield (both upper and lower quadrants of either the right or the left hemifield) should be involved with a dense field loss to be scored 2 on 3a or 3b as appropriate. If a patient has severe visual loss in one eye due to intrinsic eye disease or enucleation and the visual fields in the other eye are normal, score the visual fields as normal. If the patient has blindness in one eye and the visual fields in the other unaffected eye demonstrate a partial or full visual field defect, the visual loss should be scored as 1 or 2 as appropriate on either 3a or 3b.

0 = No visual loss.

1 = Partial hemianopia: There is a partial visual field defect (usually with both eyes); included is a quadrantic field defect or sector field defect.

2 = Complete hemianopia: There is a dense visual field defect (usually with both eyes); a homonymous hemianopia is included.

#### 4. Pupillary response

*Testing instructions:* This requires three steps. First, have the patient focus on a distant object and inspect the pupils for symmetry to determine whether they are round. Second, test for direct reaction to light by observing whether there is a change in pupillary size when a penlight is directed into the eye. To perform this test, swiftly move a penlight from the temporal area and shine the beam into one eye. Repeat this on the alternate side. Third, to test accommodation, observe the size of each pupil as the patient focuses on the examiner's fingertip about 3 feet away from the patient's nose, and then as the fingertip is slowly moved to about 14 inches from the patient's nose.

*Comatose patients:* This procedure can be performed in comatose patients by having the examiner hold open the patient's eyelids and observing the size/shape of the pupil and the response to direct stimulation with light.

*Scoring instructions:* Normally, pupils are round and equal with a smooth margin. Both pupils are appropriately reactive to light in that they constrict with direct stimulation. Both pupils equally constrict with accommodation (fingertip moving towards nose).

Common abnormalities include distortion in the shape of the pupil (oval, irregularly shaped, or scalloping on the margins), notable asymmetry in the size of the two pupils, and diminished or absent constriction reaction to direct stimulation with a light source in either eye.

0 = No deficits. Pupils are round, equally reactive, and responsive to light and accommodation.

1 = Abnormal but partial response of one eye in comparison to the other in pupillary response (e.g., sluggishness). A unilateral abnormality of pupil shape is also scored as 1.

2 = Abnormal and complete absence of response in at least one pupil. Bilateral abnormalities are also scored as a 2.

#### 5a and 5b. Hearing (right and left sides)

*Testing instructions:* Stand behind the patient and rub the thumb and index finger together approximately 2 inches from the patient's ear, out of the patient's visual field, and without touching the patient's hair or clothing. One hand at a time, ask the patient if he or she can hear the sound of the finger rub in his or her right or left ear. Then, using finger rub at one ear at a time, ask the patient to verbally (e.g., by responding "right" or "left"), or by nonverbally (e.g., by pointing), indicate to which ear the stimulus is being presented. This information is used to score item #5. In the interest of preserving a smooth flow in the examination, once the hearing in the right and left ears has been established, check for suppression on double simultaneous stimulation by testing both ears at the same time. This information should be noted and used later to assess item #12, Neglect. If a hearing deficit is detected or reported, it is important to establish the onset of the deficit (e.g., whether it was likely a result of head injury versus if it was present prior to the head injury). In confused or aphasic patients, watch for any indication of a response to the stimulus presented in each ear.

*Comatose patients:* Coma implies loss of all cognitive function and normal sensory response; therefore, score 2.

0 = No deficits in hearing noted.

1 = Mild hearing deficit: The patient can only inconsistently detect the stimulus.

2 = Severe or complete hearing deficit: The patient cannot detect the subtle stimulus with multiple trials.

#### 6a and 6b. Facial movement (facial paresis; right and left sides)

*Testing instructions:* Look at the patient's face at rest to note whether both sides are symmetrical. Ask the patient to smile, show his or her teeth, to puff out his or her cheeks, to pucker, to raise his or her eyebrows, and to close his or her eyes forcefully.

*Complicating factors:* If the patient is unable to follow commands, have the patient attempt to imitate the facial movements. If facial trauma/bandages, orotracheal tube, tape, or other physical barrier obscures the face, ask the physician or nurse for information on facial palsy or ask the patient to move these parts of the face to the extent possible so that this can be evaluated.

*Comatose or uncooperative patients:* The facial responses to painful stimuli (grimace) may substitute for responses to commands in a patient who has decreased levels of alertness.

*Scoring instructions:* Normally, all parts of the face should activate evenly and at the same time when the face is at rest, during spontaneous facial movements, and during forced facial movements. Slight asymmetries in mouth configuration should not be overinterpreted, as some normal individuals have one corner of the mouth slightly higher than the other.

Common abnormalities include ptosis (drooping of the eyelid); flattening of the nasolabial fold (from the edge of each nostril to the corner of the mouth), either at rest, during spontaneous/forced smiling, or when the patient bares his or her teeth; and asymmetry in facial movements or muscle tone with raising the eyebrows (the forehead does not wrinkle symmetrically), blowing out the cheeks, and opening/closing the eyes.

(continued)

SUPPLEMENTARY TABLE 1. (CONTINUED)

- 0 = Normal facial movements: No asymmetry.
- 1 = Minor paresis: Asymmetrical facial movements or facial asymmetry at rest. This response may be noted with a spontaneous smile, but not with forced facial movements.
- 2 = Partial paresis: Unilateral "central" facial paresis. Decreased spontaneous and forced facial movements with changes most prominent at the mouth. Orbital and forehead musculature movements are generally normal, while movements around the mouth are abnormal.
- 3 = Complete palsy: Dysfunction involves the forehead, orbits, and muscles surrounding the mouth (the entire distribution of the facial nerve; most of the side of the face does not move).

**7a and 7b. Motor function of the arms (right and left)**

*Testing instructions:* The patient's arm is placed outstretched in front of his or her body at 90 degrees (if sitting) or at 45 degrees (if supine), with palm down and fingers spread apart. The arm is released and the patient is instructed to hold the arm still for a full 10 sec. Count to 10 aloud in a strong voice to encourage the patient to maintain the limb's position. If a limb is paralyzed, test the "normal" limb first. If a patient has comprehension difficulties, directions may be achieved by non-verbal cues or pantomime. The examiner may demonstrate the expected response with all patients. If the patient has restricted limb function due to non-TBI-related limitations, attempt to judge the best motor response. Be watchful for an initial dip of the limb when released. Only score as abnormal if there is drift after the dip. Watch for any loss of extension in the hand (drop in the fingers or thumb).

*Comatose patients or other patients with decreased level of consciousness:* An estimate of response to noxious stimuli should be measured. If the patient has reflexive responses, such as flexor or extensor posturing, the response should be scored as 4.

*Scoring:* Volitional motor responses that are performed well should be graded as 0. Loss of extension in the hand receives a score of 1. The only indication for scoring this item as untestable is if the limb is missing or amputated, or if the shoulder joint is fused. A patient with a partial limb amputation should be tested.

Normal: The patient should be able to sustain the position without the limb turning or falling.

- 0 = No drift: The patient is able to hold the outstretched limb for the full 10 sec.
- 1 = Drift: The patient is able to hold the outstretched limb for 10 sec, but there is some drift of the limb before the full 10 sec. The limb does not hit the bed (if supine) or other support.
- 2 = Some effort against gravity: The patient is not able to get the limb to or maintain a 90-degree or 45-degree angle, and/or the limb drifts down to the bed or support, but there is some effort against gravity.
- 3 = No effort against gravity: The limb is raised in the correct position by the examiner, and the patient is unable to sustain the position at all (the limb falls). However, there is some movement (no matter how minor).
- 4 = No movement: The patient is unable to move the limb.

UN = Untestable: May be used only if the limb is missing or amputated, or if the shoulder joint is fused.

Reason: \_\_\_\_\_

**8a and 8b. Motor function of the leg (right and left)**

*Testing instructions:* The supine patient is asked to hold the outstretched leg 30 degrees above the surface. Place the patient's limb in the appropriate position, and ask the patient to hold this position for a full 5 sec. If it is impractical to have the patient assume a supine position, the patient may sit on the edge of the chair such that the leg can be extended without the support of the seat of the chair. The examiner may demonstrate the expected response with all patients. Count aloud to five to encourage the patient to maintain the limb's position for a full count to five. If the right leg is paralyzed, examine the unaffected left leg first. If a patient is unable to follow verbal commands, nonverbal cues may be used, or the limb may be placed in the desired position.

*Comatose patients:* If the patient has a decreased level of consciousness, an estimate of response to noxious stimuli should be measured. If the patient has reflexive responses only, such as flexor or extensor posturing, the response should be scored 4.

*Scoring instructions:* Volitional motor responses that are performed well should be scored 0. The only indication for scoring this item as untestable is if the limb is missing or if the hip joint is fused. Patients with artificial joints or partial limb amputations should be tested.

- 0 = No drift: The patient is able to hold the outstretched limb for 5 sec.
- 1 = Drift: The patient is able to hold the outstretched limb for 5 sec, but there is unsteadiness or drift of the limb that does not fall to the bed or support.
- 2 = Some effort against gravity: The patient is unable to hold the outstretched limb for 5 sec, and the limb falls to the bed or support, but there is some effort against gravity.
- 3 = No effort against gravity: The patient is not able to bring the limb off the bed, and when the examiner places the limb in the correct position, it falls. There is no effort against gravity, but there is some movement (however minor).
- 4 = No movement: The patient is unable to move the limb.

UN = Untestable: May be used only if the limb is missing, the hip joint is fused, or there are complicating orthopedic injuries.

Reason: \_\_\_\_\_

**9a through 9d. Sensory (right and left upper and lower extremities)**

*Testing instructions:* Sensation to pinprick is tested by pricking the patient directly on the skin using a clean, disposable pin (e.g., a safety pin). Do not test through clothing. Start with the upper extremities. Test one side and then the other. Ask the patient if he or she feels the prick equally on both sides, or if there is a difference between the two sides. Sensation is then tested more objectively by explaining to the patient that the safety pin has a sharp end and a dull end. Ask the patient to close his or her eyes and indicate whether the sensation is sharp or dull. Repeat testing of arms and then legs in the same manner. Only sensory loss attributed to TBI is scored as abnormal. Test as many areas as needed to establish sensation loss on one side of the body (i.e., the arms just below the elbows or the legs just below the knees). Do not test limb extremities (hands and feet) and avoid any areas with compromise of or injury to the skin or scarring.

(continued)

SUPPLEMENTARY TABLE 1. (CONTINUED)

*Comatose or obtunded patients:* Test for withdrawal from noxious stimulus. A score of 2, "severe or total," should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous or obtunded patients will therefore probably score 1 or 0. The patient with brainstem damage who has bilateral loss of sensation is scored as a 2 on applicable items for both sides of the body.

0 = Normal: No sensory loss.

1 = Mild to moderate sensory loss: The patient feels that the pinprick is less sharp or is dull on the affected side, or there is a loss of superficial pain with pinprick, but the patient is aware he or she is being touched.

2 = Severe or total sensory loss: The patient is not aware of being touched on the arm or leg.

#### 10. Best language (comprehension)

*Testing instructions:* First, present the patient with the "Cookie Theft" stimulus card. Ask the patient to describe what he or she sees. Assess whether or not the patient is describing the picture in adequate detail. Also make sure the patient is describing both halves of the picture, as this will be important in assessing item #12, Neglect. Next, point to an object on the *object naming* stimulus card and have the patient identify the object. Finally, give the patient the *sentence* stimulus card and ask the patient to read the sentences. Comprehension of language should be judged from the patient's responses on these items, as well as the rest of examination.

*Scoring instructions:* On naming items, only the first response is measured. If the patient misidentifies the object and later corrects himself, the response is still considered abnormal. The first attempt to read the sentence is measured. If the patient misreads the sentence and later corrects himself, the response is still considered abnormal. If the patient's visual loss or illiteracy precludes visual identification of objects or reading, judge the patient's spontaneous speech and ability to repeat sentences. If the responses are normal, the score should be 0. If the patient is intubated or is unable to speak, check the patient's ability to write, if possible. Comprehension may be tested in an aphasic patient by asking the patient to follow simple and complex commands (e.g., simple: "point to the ceiling"; complex: "point to your right ear with your left thumb and then point to the floor"). The stimulus card may also be used, asking patients to indicate yes or no responses (e.g., "Is this a glove?" or "Is this a rocking chair?"). A patient who misses more than two-thirds of the naming objects and sentences, or who followed only very few and simple one-step commands would score a 2.

*Comatose patients:* Comatose patients score a 3 on this item.

0 = No aphasia: The patient is able to read the sentences well and is able to correctly name the objects from the stimulus card.

1 = Mild to moderate aphasia: The patient has mild to moderate naming errors, word-finding errors, paraphasias, or mild impairment of comprehension or expression. There is some obvious loss of fluency or facility of comprehension, without significant limitation of ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided material difficult.

2 = Severe aphasia: The patient has severe aphasia with difficulty in reading and/or naming objects. All communication is through fragmentary expression, with great need for inference, questioning, and guessing by the listener. The range of information that can be exchanged is limited, and the examiner carries the burden of communication. The examiner cannot identify materials provided from the patient's response.

3 = Mute, global aphasia: No useable speech or auditory comprehension or comatose patient.

#### 11. Dysarthria (speech production)

*Testing instructions:* Ask the patient to read aloud (pronounce) a standard list of words on the stimulus card. The patient's speech through other parts of the examination may also be used in scoring this item. The patient should not be told that clarity of speech is being tested.

*Complicating factors:* If the patient is unable to read the words because of visual loss, say the word and ask the patient to repeat it. If the patient has severe aphasia, the clarity of articulation of spontaneous speech should be rated and/or the examiner may say the words and ask the patient to repeat them.

*Scoring:* If the patient has an endotracheal tube or other physical barrier to producing speech, this item can be rated as untestable, but the reason should be clearly noted. Patients who are mute, unresponsive, or cannot be understood in any meaningful way are scored on this item as 2. Patients who are notably aphonic are scored as 1.

*Comatose patients:* score 2

0 = Normal articulation: Patient is able to pronounce all the words clearly and without any problem in articulation.

1 = Mild to moderate dysarthria: Patient has problems in articulation. Patient slurs at least some words, and at worst, can be understood with some difficulty.

2 = Severe: Patient's speech is so slurred as to be unintelligible in the absence of, or out of proportion to, any dysphasia or is mute/anarthric.

UN = Untestable: Intubated or other physical barrier to speech.

Reason: \_\_\_\_\_

#### 12. Extinction and inattention (neglect)

*Testing instructions:* Assess the patient's ability to recognize bilateral simultaneous touch to the hands and face. Touch the patient with the patient's eyes closed. First touch the patient on only one side or the other and ask them to identify whether the stimulus is being presented on the right or left side (verbally or nonverbally). Once sensory function has been established on both sides, perform double simultaneous stimulation.

*Scoring:* First, use the patient's performance on the "Cookie Theft" picture when this was previously shown to the patient. If the patient does not identify parts of the picture on one side, the result should be considered abnormal. Encourage the patient to compensate for any visual loss (e.g., by asking "Do you see anything else in the picture?"). Consider results from double simultaneous stimulation testing for the visual field (items 3a and 3b) and hearing (item 4). The tactile portion of this test should be considered abnormal if the patient ignores simultaneous sensory stimuli from one side of the body.

(continued)

SUPPLEMENTARY TABLE 1. (CONTINUED)

*Complicating factors:* If the patient has tactile sensory loss on one side, rely upon data gathered during testing of other modalities (auditory or visual) to determine the score. If the patient has a severe visual loss, but the responses to other stimuli are normal, the score should be 0. If the patient has a loss of comprehension and is unable to describe the picture, but does attend visually to both sides, the score should be 0. A score of 0 should be given in any case for which a positive (abnormal) finding cannot be unequivocally determined.

*Comatose patients:* Coma implies a loss of all cognitive functions; score 2.

0 = No abnormality: The patient is able to recognize bilateral simultaneous stimuli in tactile, auditory, and visual domains.

1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation is present in one or more of the sensory modalities.

2 = Profound hemi-inattention or hemi-inattention to more than one modality. The patient does not recognize his or her own hand or orients only to one side of space.

**13. Smell**

*Testing instructions:* Test olfactory nerve function by having the patient identify four different odors (i.e., lemon, orange, licorice, vanilla and cinnamon). Do not use stimulant odors such as peppermint or camphor. First encourage a spontaneous response, but a multiple choice card may be used for patients who have language difficulties, who provide a response other than the four correct responses, or who report a decreased ability to perceive the stimulus. If the patient has a cold or other transient complicating factor, attempt the test, but note this on the scoring form.

*Comatose patients:* Coma implies a loss of all cognitive functions and impaired response to sensation; score 2.

0 = No observed or reported change in sense of smell: The patient makes no error, or at most a single error, in identifying the stimuli.

1 = Decreased sense of smell by observation or report: The patient makes more than one error in identifying the stimuli or reports a decrease in ability to smell.

2 = Absent sense of smell by observation.

UN = Untestable.

Reason: \_\_\_\_\_

**14. Gait ataxia (supplemental)**

*Testing instructions:* To test the patient's coordination while walking, ask the patient to stand and perform tandem gait (walk in a straight line heel to toe, alternately touching the heel of one foot against the toes of the other as if walking on a tightrope). The patient continues to walk heel to toe for 10 steps. Walk next to the patient in case the patient requires assistance, but do not steady the patient unless necessary.

*Comatose patients:* score 2

0 = Normal tandem gait.

1 = Occasional lateral missteps (2 or less within 10 consecutive steps).

2 = Frequent lateral missteps (more than 2 within 10 consecutive steps).

UN = Untestable. The patient is unable to stand independently due to injury (including orthopedic injury).

Reason: \_\_\_\_\_

**15a and 15b. Limb ataxia (supplemental; right and left sides)**

*Testing instructions:* Ask the patient to look straight ahead. Have the patient reach out and touch a target (your index finger) with his or her index finger, and then have the patient touch his or her nose. Move the target and have the patient repeat the procedure several times (finger-nose-finger test). Next instruct the patient to place his or her left heel immediately below the right knee, and then to move the left heel down the shin of the right leg up to the big toe (i.e., heel-knee-shin testing). Repeat on the opposite side. **The loss of coordination must be present out of proportion to other weakness.** A score is given for each limb where coordination is abnormal up to two limbs, but no points are given if the ataxia is not clearly out of proportion to the weakness.

*Complicating factors:* If a patient is blind, perform the test by having the patient touch his or her nose from an extended arm position. The item is untestable if there is complete paralysis of the limb, if the limb is missing, or if there are orthopedic or other injuries that would make this painful (e.g., hip fracture).

*Comatose patient:* Ataxia is scored only if present out of proportion to weakness.

0 = No ataxia: Movements are accurate, smooth, and precise.

1 = Ataxia present in either arm or leg: One of the two tests is performed well.

2 = Ataxia present in both arm and leg or bilaterally: Movements are inaccurate, clumsy, or poorly done on both tasks.

UN = Untestable: Paralysis of the limb or the limb is missing, or orthopedic or other injuries that would make performing this test painful or potentially injurious to the patient are present.

Reason: \_\_\_\_\_