

# Wessex Head Injury Matrix in Patients with Prolonged Disorders of Consciousness: A Reliability Study

Maria Daniela Cortese <sup>1</sup>, Francesco Arcuri <sup>1</sup>, Martina Vatrano <sup>1</sup>, Giovanni Pioggia <sup>2</sup>, Antonio Cerasa <sup>1,2</sup>, Maria Girolama Raso <sup>1</sup>, Paolo Tonin <sup>1</sup> and Francesco Riganello <sup>1,\*</sup>

Table S1s	test (32 UWS/VS; 19 MCS)							re-test (32 UWS/VS; 19MCS)						
		CRS-R total score		WHIM TNB		WHIM MAB		CRS-R total score		WHIM TNB		WHIM MAB		
	time from injury (days)	A	B	A	B	A	B	A	B	A	B	A	B	aetiology
UWS/VS	185	3	3	2	2	7	7	5	5	4	4	7	7	HEM
UWS/VS	219	3	3	1	1	7	7	5	5	3	3	7	7	HEM
UWS/VS	340	4	4	3	3	7	7	7	7	5	5	14	14	HEM
UWS/VS	538	4	4	5	5	14	14	5	5	5	5	14	14	HEM
UWS/VS	200	4	4	2	3	17	17	9	9	10	10	31	31	HEM
UWS/VS	280	4	4	4	4	24	24	10	10	12	12	32	32	HEM
UWS/VS	195	4	4	3	4	7	7	5	5	4	4	7	7	ANOX
UWS/VS	182	4	4	4	4	7	7	5	5	4	4	13	13	ANOX
UWS/VS	213	4	4	2	1	4	3	5	5	3	3	7	7	ANOX
UWS/VS	214	4	4	4	4	7	7	5	5	5	5	12	12	ANOX
UWS/VS	299	4	4	4	4	7	7	5	5	5	6	12	12	ANOX
UWS/VS	290	4	4	4	4	7	7	4	4	5	4	13	8	TBI
UWS/VS	194	4	4	3	3	7	7	3	3	4	4	7	7	OTHER
UWS/VS	277	4	4	3	3	7	7	4	5	3	3	7	7	HEM
UWS/VS	200	5	5	5	5	14	14	5	5	5	5	14	14	ANOX
UWS/VS	192	5	5	6	7	14	14	6	6	5	5	14	14	HEM
UWS/VS	280	5	5	3	3	7	7	7	7	4	4	7	7	TBI
UWS/VS	968	6	6	5	5	12	12	5	5	6	6	14	14	HEM
UWS/VS	309	6	6	5	5	8	8	6	6	5	5	14	14	HEM
UWS/VS	1072	6	6	4	4	14	14	6	6	4	4	14	14	HEM
UWS/VS	185	6	6	8	8	34	34	8	8	7	7	33	33	ANOX
UWS/VS	213	6	6	6	6	23	23	8	8	6	6	23	23	ANOX
UWS/VS	2320	6	6	3	3	7	7	8	8	9	9	23	23	ANOX
UWS/VS	250	6	6	7	7	32	32	7	7	10	10	32	32	TBI
UWS/VS	394	6	6	8	9	24	24	7	7	5	5	16	16	TBI
UWS/VS	254	7	7	5	5	15	15	7	7	5	5	15	15	HEM
UWS/VS	297	7	7	4	4	11	11	7	7	5	5	11	11	HEM**

UWS/VS	190	7	7	9	9	36	36	10	10	10	10	36	36	TBI
UWS/VS	258	7	7	7	6	20	20	7	7	7	7	20	20	TBI
UWS/VS	190	7	7	7	7	14	14	7	7	7	7	14	14	ANOX
UWS/VS	189	8	8	16	10	23	23	11	11	17	17	36	36	OTHER
UWS/VS	253	8	8	11	11	24	24	7	7	15	15	24	24	TBI
MCS	182	9	9	12	13	22	22	10	10	13	13	22	22	HEM
MCS	182	9	9	13	13	22	22	9	9	14	14	22	22	HEM**
MCS	240	9	9	10	10	21	21	11	11	12	12	22	22	HEM
MCS	295	9	9	10	10	28	28	9	9	11	11	22	22	HEM**
MCS	317	9	9	15	15	24	24	10	10	15	15	24	24	TBI
MCS	394	9	9	17	17	30	30	10	10	17	17	30	30	TBI
MCS	1488	9	9	12	12	24	24	10	10	13	13	24	24	TBI
MCS	200	10	10	16	16	35	35	10	10	14	14	35	35	HEM**
MCS	1040	10	10	9	9	22	22	9	9	9	9	22	22	HEM
MCS	2143	10	10	10	10	23	23	10	10	10	9	23	23	HEM
MCS	190	10	10	16	16	23	23	12	12	17	17	29	29	TBI
MCS	411	10	10	12	11	24	23	10	10	12	12	24	23	TBI
MCS	2568	10	10	15	15	22	22	10	10	14	14	22	22	TBI**
MCS	194	10	10	13	13	28	28	11	11	15	15	28	28	OTHER
MCS	1591	11	11	25	25	40	40	13	13	25	25	40	40	HEM
MCS	3012	12	12	19	19	38	38	12	12	18	18	36	36	TBI**
MCS	3325	12	12	10	10	31	31	12	12	10	10	31	31	TBI
MCS	822	13	13	20	20	36	36	13	13	19	19	36	36	HEM**
MCS	241	17	17	16	16	33	33	17	17	16	16	33	33	HEM

**WHIM** : Wessex Head Injury Matrix; **MAB**: Most Advanced Behavior; **TNB**: Total Number of different Behaviors; **CRS-R**: Coma Recovery Scale-Revised. **UWS/VS**: vegetative state/unresponsive wakefulness syndrome; **MCS**: minimally conscious state; **HEM**: hemorrhagic; **TBI**: traumatic brain injury; **ANOX**: anoxic; **OTHER**: other aetiology; **A & B**: Raters.

**\*\*** both raters observe changes in the WHIM TNB but no in the CRS-R total score

Table S2: Coma Recovery Scale-R - IRR

	test (A & B) (n=51)							re-test (A & B) (n=51)						
patients	uditive	visual	motor	oro-verbal	communication	arousal	total score	uditive	visual	motor	oro-verbal	communication	arousal	total score
1	0	0	2	1	0	0	3	1	0	1	1	0	2	5
2	1	0	1	1	0	0	3	1	0	2	1	0	1	5
3	0	0	2	1	0	1	4	2	0	2	1	0	2	7
4	1	0	1	1	0	1	4	1	0	1	1	0	2	5
5	1	0	1	1	0	1	4	3	2	1	1	0	2	9
6	1	0	1	1	0	1	4	2	3	2	1	0	2	10
7	1	0	1	1	0	1	4	1	0	1	1	0	2	5
8	1	0	2	0	0	1	4	1	0	2	1	0	1	5
9	1	0	2	1	0	0	4	1	0	2	1	0	1	5
10	1	0	1	1	0	1	4	1	1	1	1	0	1	5
11	1	0	1	1	0	1	4	1	1	1	1	0	1	5
12	1	0	1	0	0	2	4	1	0	1	0	0	2	4
13	1	0	1	1	0	1	4	1	0	1	1	0	0	3
14 A	1	0	2	1	0	1	5	1	0	1	1	0	1	4
14 B	1	1	1	0	0	2	5	1	1	1	0	0	2	5
15	1	0	2	1	0	1	5	1	0	2	1	0	1	5
16	1	0	2	1	0	1	5	1	0	2	1	0	2	6
17	1	1	2	0	0	1	5	1	1	2	1	0	2	7
18	1	0	2	1	0	2	6	1	0	2	1	0	1	5
19	1	0	2	1	0	2	6	1	0	2	1	0	2	6
20	1	0	2	1	0	2	6	1	0	2	1	0	2	6
21	2	1	1	1	0	1	6	2	1	1	2	0	2	8
22	1	1	2	1	0	1	6	2	1	2	1	0	2	8
23	1	1	2	1	0	1	6	2	1	2	1	0	2	8
24	1	0	2	1	0	2	6	2	0	2	2	0	1	7
25	1	0	1	2	0	2	6	2	1	1	1	0	2	7
26	2	1	1	1	0	2	7	2	1	1	1	0	2	7
27	2	1	2	1	0	1	7	2	1	2	1	0	1	7
28	2	0	2	1	0	2	7	3	1	2	2	0	2	10
29	2	1	1	1	0	2	7	2	1	1	1	0	2	7
30	2	0	2	1	0	2	7	2	0	2	1	0	2	7
31	1	1	2	2	0	2	8	3	3	1	2	0	2	11
32	2	1	2	1	0	2	8	2	1	2	1	0	1	7
33	2	3	2	1	0	1	9	2	3	2	1	0	2	10
34	2	1	2	2	0	2	9	2	1	2	2	0	2	9

35	2	3	2	1	0	1	9	2	3	4	1	0	1	11
36	2	2	2	1	0	2	9	2	3	1	1	0	2	9
37	2	2	2	1	0	2	9	2	3	2	1	0	2	10
38	2	3	1	1	0	2	9	2	3	1	2	0	2	10
39	2	3	1	1	0	2	9	2	3	2	1	0	2	10
40	2	3	2	1	0	2	10	2	3	2	1	0	2	10
41	4	0	3	1	0	2	10	3	0	3	1	0	2	9
42	2	3	2	1	0	2	10	2	3	2	1	0	2	10
43	2	3	2	1	0	2	10	3	3	2	2	0	2	12
44	2	3	2	1	0	2	10	2	3	2	1	0	2	10
45	2	3	2	1	0	2	10	2	3	2	1	0	2	10
46	3	3	1	1	0	2	10	3	3	2	1	0	2	11
47	2	3	3	2	0	1	11	2	3	4	2	0	2	13
48	0	3	5	2	0	2	12	0	3	5	2	0	2	12
49	2	2	5	1	0	2	12	2	2	5	1	0	2	12
50	2	3	4	2	0	2	13	2	3	4	2	0	2	13
51	4	5	5	1	0	2	17	4	5	5	1	0	2	17
	A & B: Raters.													

The Wessex Head Injury Matrix																	
Assessment number →		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Behaviour observed															Operational definitions		
1	Eyes open briefly	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Less than 30 seconds.
2	Eyes open for extended period	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	More than 30 seconds
3	Eyes open/move but do not focus on object/person	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Eyes move in random manner. No sign of tracking and eyes do not rest on object or person.
4	Attention held momentarily by dominant stimulus	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Momentarily = 2 seconds or longer. Dominant stimulus = noisy/ large/brightly-coloured/painful. Identifiable change in behaviour however momentary e.g. from agitated to quiet, eyes closed to open, not moving to moving etc.
5	Looks at person briefly	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Looks at = eyes move around room aimlessly ... when object/person is noticed eyes remain on this. Briefly = momentarily – impression of 'looking at'.
6	Volitional vocalisation, to express feelings	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Moans or groans as if to express discomfort, either spontaneously or when having procedures carried out e.g. passive movements to contracted limbs /injections /blood taken.
7	Grinding of teeth/clamping down of teeth	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Teeth grinding spontaneously or when swab placed in mouth. Teeth clamp down in response to a foam mouth swab when placed in mouth.
8	Makes eye contact	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Stand where patient is not directly looking at you and call patient's name. Patient switches gaze to you and maintains eye contact for at least 3 seconds.
9	Patient looks at person who is talking to them	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Switches gaze from somewhere else to look at person talking directly to patient. Continues to look for at least 3 seconds.
10	Expletive utterance ('Get off!', etc.)	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	('Get off!', etc.).
11	Marked arousal & agitation prior to urination/defecation	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Patient becomes increasingly restless and agitated immediately prior to urination/defecation. Patient calms down immediately afterwards.
12	Eyes follow person moving in line of vision	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Patient's eyes move in direction of person moving in from midline to right or from midline to left. Patient need not track through whole visual field.
13	Looks at person giving attention	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Eyes rest for at least 3 seconds on person who is giving attention, such as adjusting bed clothes or moving limbs.
14	Mechanical vocalisation (with yawn, sigh, etc.)	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Sound must be produced... silent yawns are not counted. (Able to produce normal sound when coughing.)
15	Performs physical movement on verbal request	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	I.e. obeys a command to verbal request single element. (e.g. raise arm).
16	Turns head/eyes to look when someone is talking	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Eyes initially directed elsewhere. Moves eyes or turns head to look at person talking. Person is not necessarily talking to the patient.
17	Watches person moving in line of vision	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Person moves from one side of bed around bottom of bed and to other side. Patient's eyes follow from end of bed to right or left or both.
18	Tracks for 3-5 seconds	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Attract patient's attention with large brightly coloured object and move through visual field. Record if patient tracks through at least 90°.
19	Speaks in whispered tones	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Patient vocalises in whispered tones.
20	Vocalises to express mood or needs	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Vocalises as if to express mood or need either spontaneously or when having unpleasant procedures e.g. blood taken, injection, chest physio etc.
21	Crying	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Patient cries, tears may or may not be present.
22	Tracks a source of sound	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	Bell, whistle, buzzer or similar. Patient turns head or eyes towards source of sound.
23	Shows selective response to preferred people	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	To family when tester is present ... obeys commands for relative, cooperates with relative but not with staff, becomes quiet/more relaxed when relative is present or becomes noisier when relative is present. Appears more 'relaxed' or 'cooperative' with some members of staff than others.

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Figure S1: image of the first page of the WHIM (English version). The WHIM scale does not exist in the free version. The French free version is available at <https://www.uslegalforms.com/form-library/103332-wessex-head-injury-matrix-pdf>.