

Delirium and posttraumatic amnesia

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Over half of presentations with ISS>15 are people 60+

*Major Trauma in Older People
Trauma Audit and Research
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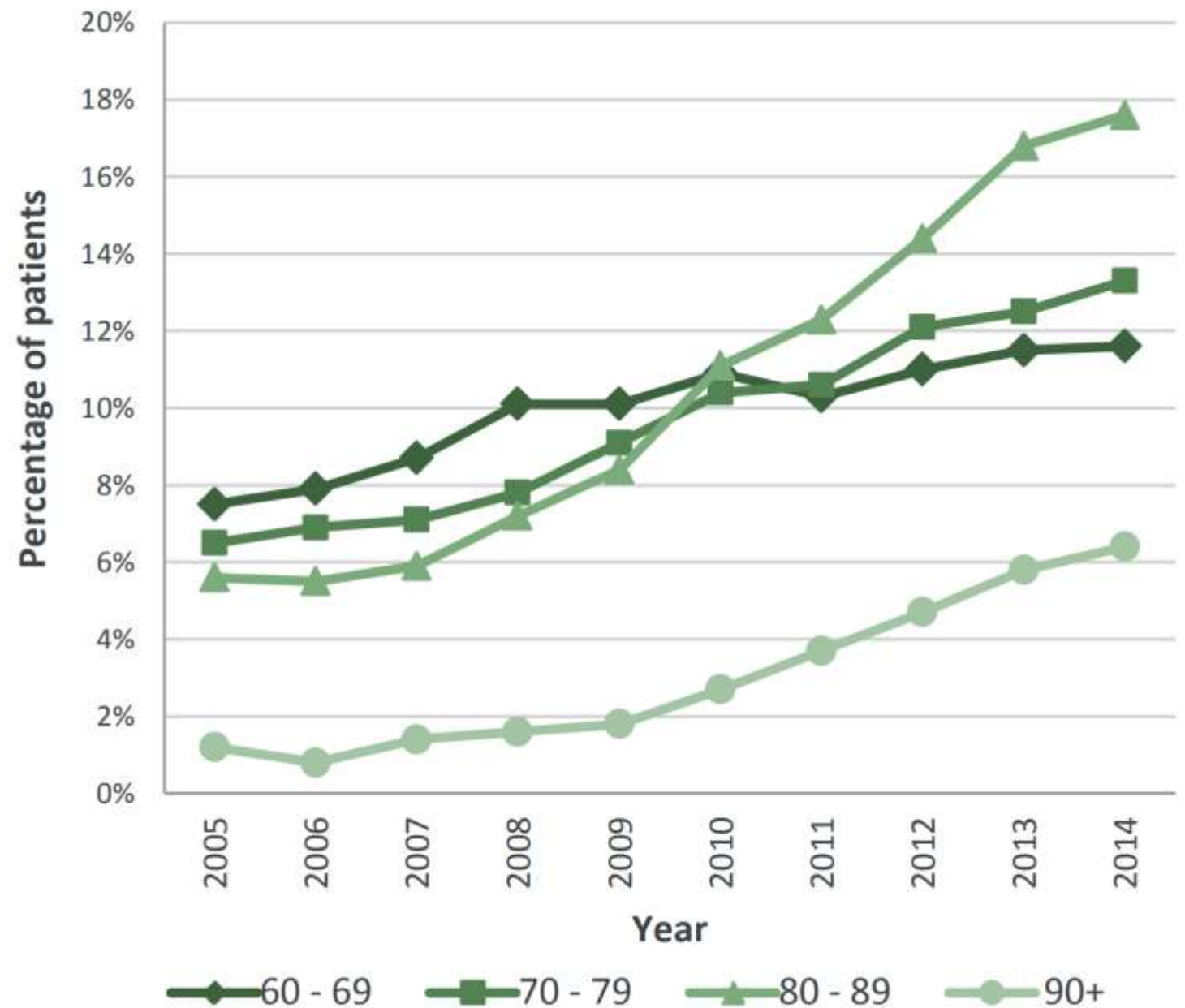


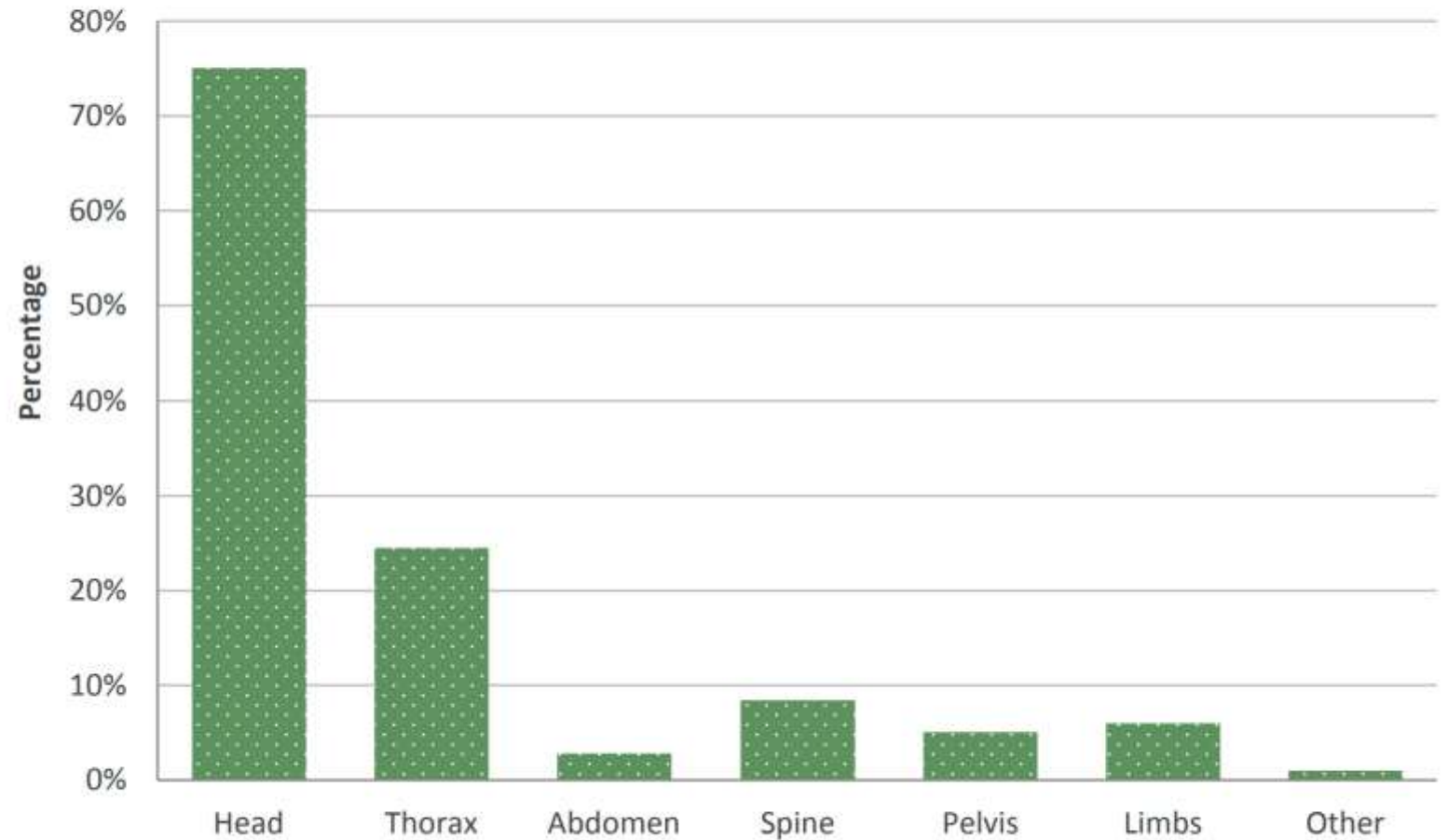
Figure 3a: Severely injured patients since 2005

Major Trauma in Older People (ISS>15)

Head injuries are the most common area of injury in people 60+

Injuries

Body area injured

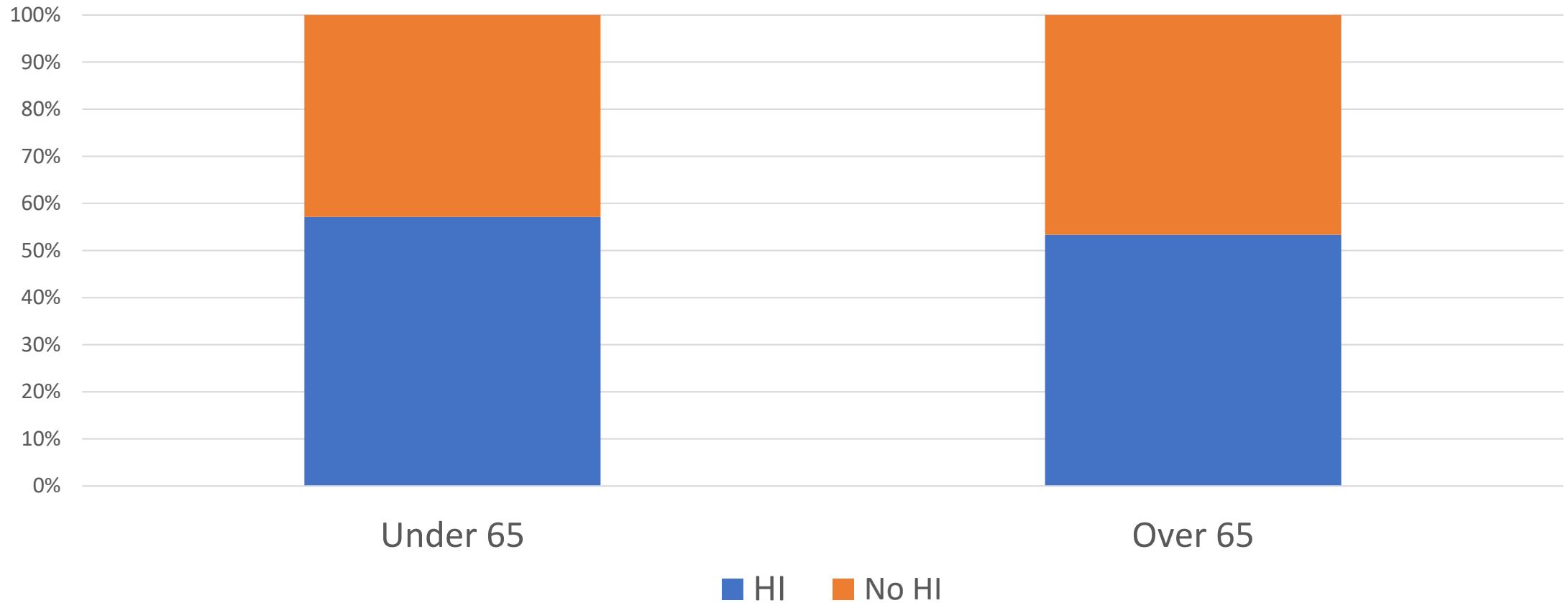


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Figure 15: Prevalence of body area injured in 60+ patients (Appendix 2, Table 14)

March – August 2021 (SEoS MTC data)

Head vs Non Head Injuries by Age



Why is this relevant?

90,000

People with dementia¹

20% of gen med inpatients
have delirium²

Confusion is a common
symptom following HI



1) Alzheimer Scotland 2) SIGN 157

Delirium DSM V

- Attention
- “Sudden” onset
- Cognitive change
- Not something else
- Another medical condition

A not exhaustive list

- **Polypharmacy** (anticholinergics)
- FBC, U+Es, LFTs, CRP
- B12/folate, Glucose
- TFTs ?Hypothyroid
- Calcium, magnesium, phosphate
- PR (constipation)
- ECG
- MSU/bladder scan if indicated
- CT head: ?subdural ?stroke
?vasospasm etc

- Pain?
- Social isolation?
- Source of infection?
- Seizures? (Arcienagas et al., 2010)

Need to consider intracranial and extracranial causes simultaneously

74 year
old man

- Frontotemporal contusions and SAH. SDH, parietal skull fracture
- Recent Left PACS
- Unwitnessed injury

74 year
old man

- Started on Abx (unclear why)
- Blood sugar deranged
- NG tube and catheter inserted

74 year old man

- Inattentive in short conversation
- Seemingly new changes
- WCC and CRP ok
- Wandering, distressed
- 4AT 12

74 year
old man

- Stopped antibiotics
- Removed NG and catheter
- Hx 2-3 year decline in cognition
- Referred SJH to be closer to family

74 year
old man

The result was that he
improved

The 4AT

- Simple
- Minimal training
- Existing standard in NHS for 4AT to be done at any transition of care
- Used widely across Scotland

4AT
Assessment test for delirium & cognitive impairment

Patient name: _____
Date of birth: _____
Patient number: _____
Date: _____
Tester: _____ Time: _____

(1) ALERTNESS
This includes patients who may be markedly drowsy (i.e. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If awake, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

Normal (fully alert, but not agitated, throughout assessment)	0
Not sleepy for <10 seconds after waking, then normal	1
Clearly abnormal	2

(2) AMT4
Age, date of birth, place (name of the hospital or building), current year

No mistakes	0
1 mistake	1
2 or more mistakes/unintelligible	2

(3) ATTENTION
Ask the patient: "Please list the five months of the year in backwards order, starting at December." To assist initial understanding one prompt of "what is the month before December?" is permitted.

Achieves 7 months or more correctly	0
Starts but scores <7 months / refuses to start	1
Unintelligible (cannot start because unwell, drowsy, inattentive)	2

(4) ACUTE CHANGE OR FLUCTUATING COURSE
Evidence of significant change or fluctuation in alertness, cognition, other mental function (i.e. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs.

No	0
Yes	1

4AT SCORE

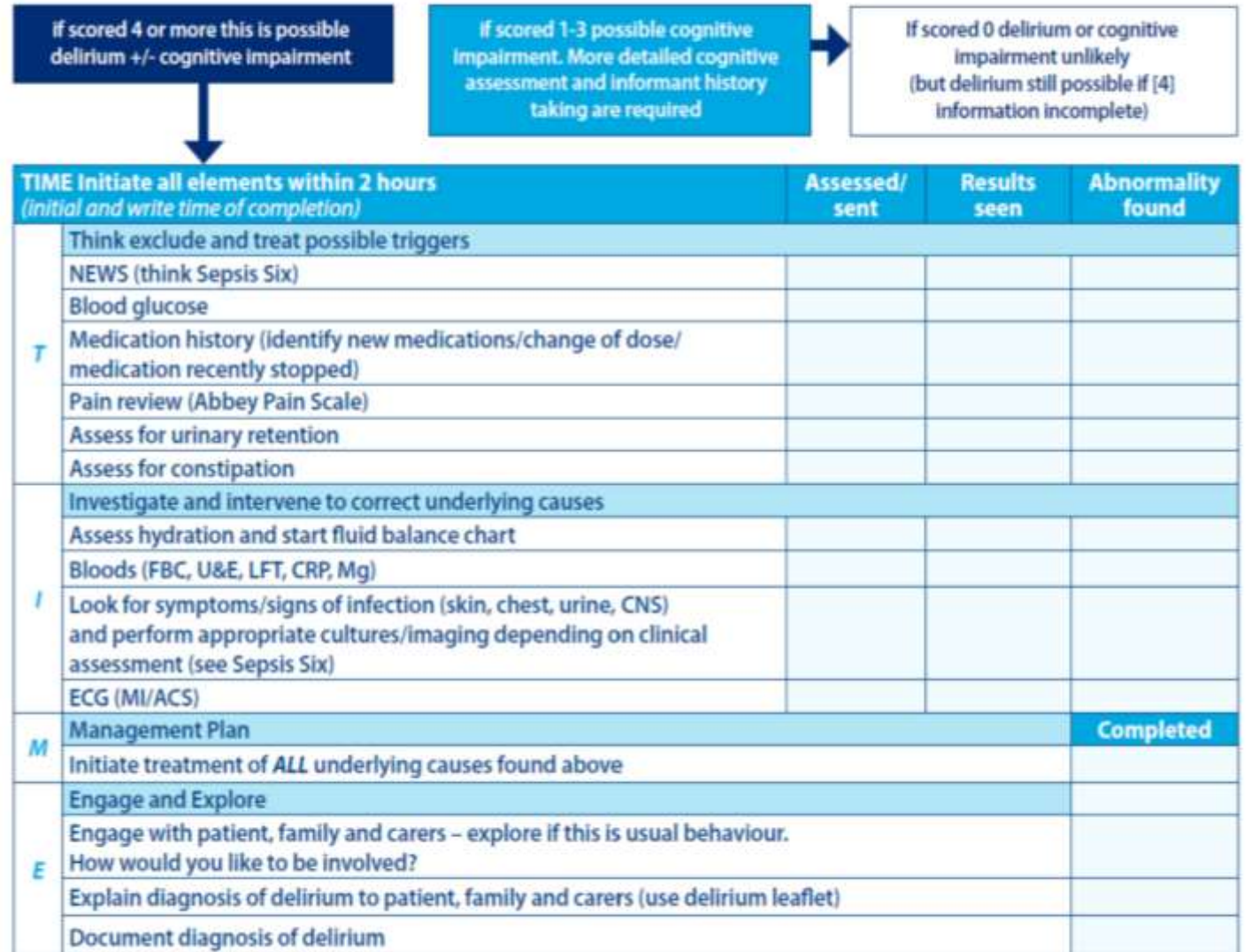
GUIDANCE NOTES
The 4AT is a screening instrument designed for rapid initial measurement of delirium and cognitive impairment. A score of 4 or more suggests delirium but is not diagnostic. More detailed assessment of mental status may be required to reach a diagnosis. A score of 1-3 definitively excludes delirium and more detailed cognitive testing and informant history-taking are required. A score of 0 does not rule out delirium or cognitive impairment. More detailed testing may be required depending on the clinical context. Items 1-3 are based on observation of the patient at the time of assessment. Item 4 requires information from one or more sources (e.g. your own knowledge of the patient, other staff who know the patient (e.g. ward nurses), GP letter, case notes, carers). The tester should take account of communication difficulties (hearing impairment, dysphasia, lack of common language) when carrying out the test and item 4.

Alertness: Altered level of alertness is very likely to be delirium in general hospital settings. If the patient shows significant altered alertness during the baseline assessment, score 4 for this item. **AMT4 (Abbreviated Mental Test - 4):** This score can be extracted from items 1-3 of the 4AT if the latter is done retrospectively before. **Acute Change or Fluctuating Course:** Fluctuation can occur without delirium in some cases of dementia, but marked fluctuation usually indicates delirium. To help elicit any hallucinations and/or paranoid thoughts ask the patient questions such as: "Are you concerned about anything going on here?", "Do you feel frightened by anything or anything that you have been seeing or hearing anything unusual?"

Version 1.3. Information and download: www.the4at.co.uk

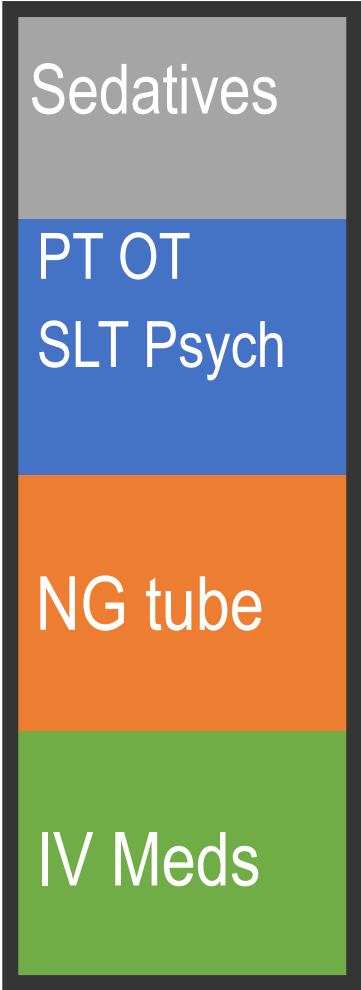
TIME Bundle

- Suggested interventions in delirium from Healthcare Improvement Scotland.
- Early engagement with physical rehab – focus on show how, not tell how

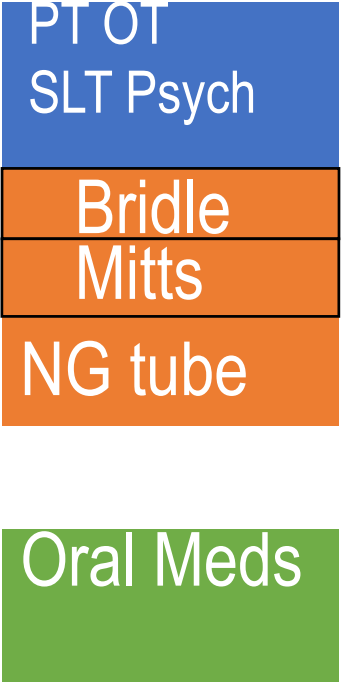


Intervention budget

20 year old
with TBI



Timetable with goal
orientated rehab



90 year old
with TBI



Principles of the adults with incapacity act

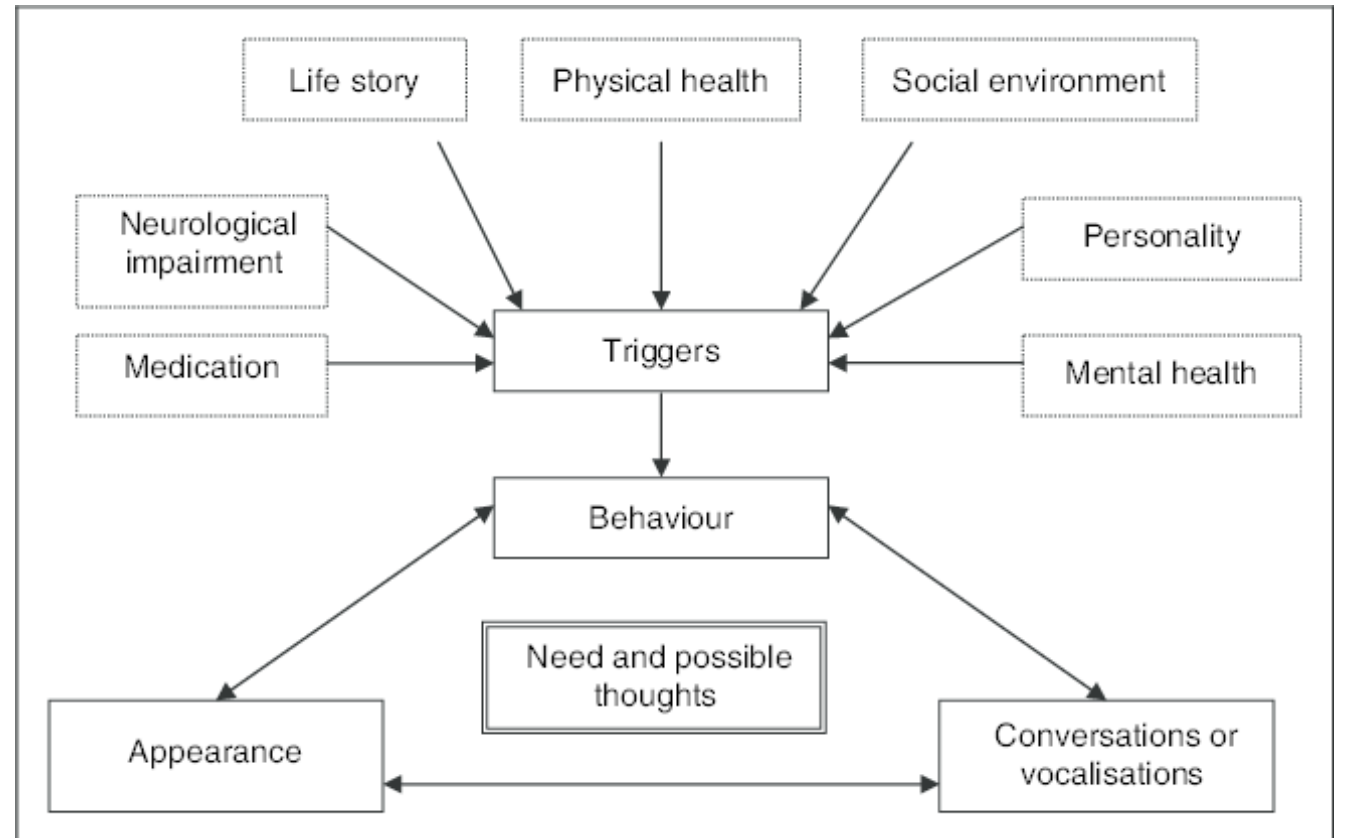
- Intervention must benefit the adult
- Least restrictive option
- Past and present views of the adult must be considered
- Views of relevant other parties must be considered
- Interventions must encourage the adult to use existing skills and develop new skills

How to manage distress

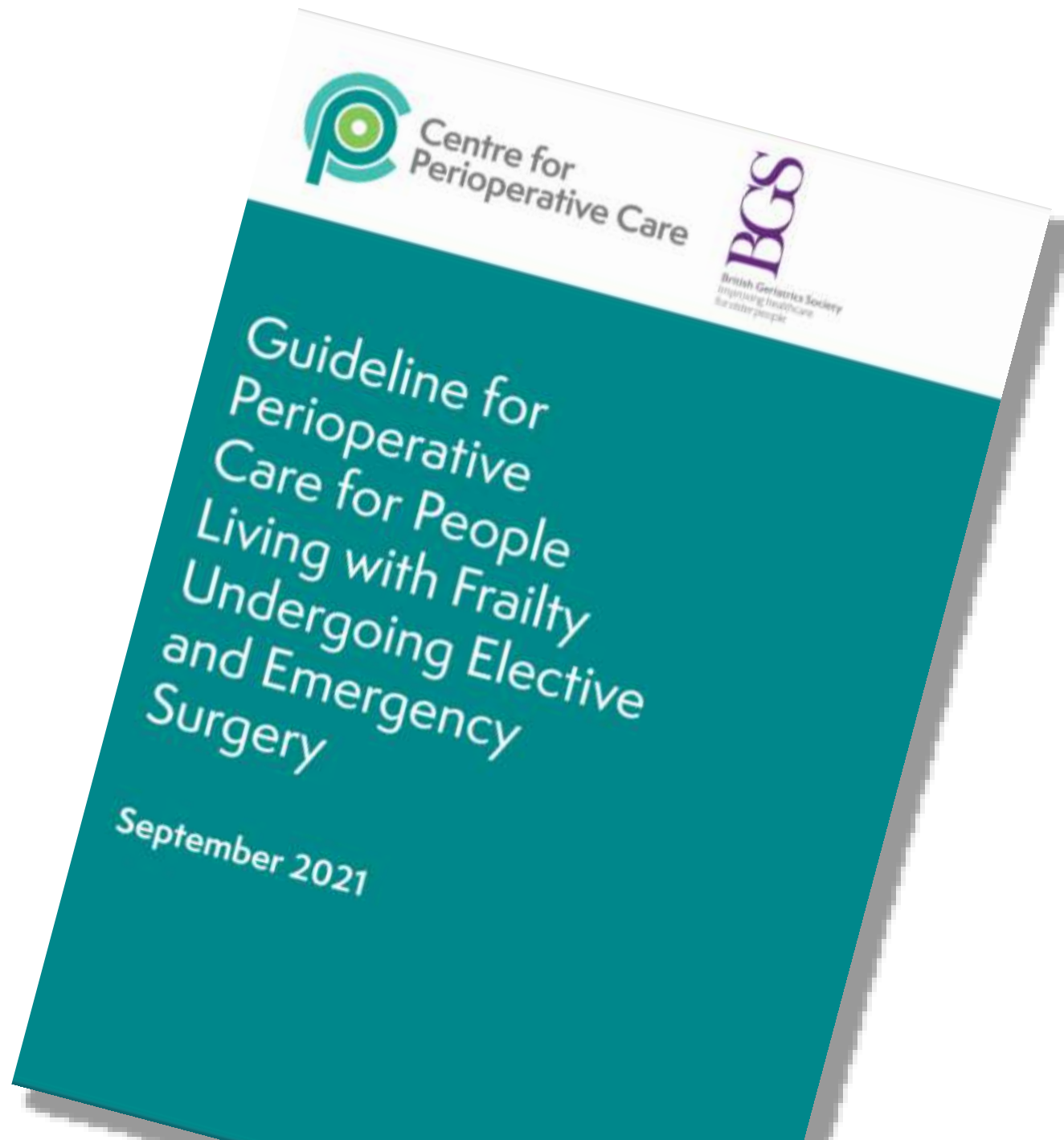
Unfamiliar environment	Personalise where possible	Wanderguard
Lack of routine	Facilitate where possible	Flexible visiting
Loss of autonomy	Offer choice	Preserve dignity
Unfamiliar people	Introduce and explain	Familiar items
Patient unfamiliar to staff	Getting to Know Me	Attentive, personalised care

Unmet needs model

- This is the Newcastle model
- Evidence based in dementia but applicable in other settings
- Critical to rule out contributing physical health factors e.g. UTI, heart failure, AKI, ECG etc



- Assess, document and modify risk factors for delirium
- Anticipate, prevent and treat delirium





Emergency admission

Assess and document frailty (CFS).
 Consider atypical presentations of surgical pathology associated with frailty.
 Obtain timely collateral history.
 Establish presence of ACD, ADRT, DNAR decisions and LPA for health and welfare, and agree treatment escalation plan.

Refer to perioperative frailty team/other services for optimisation, or use frailty intervention tool.
 Assess, document and modify risk factors for delirium.
 Undertake SDM and consider involving relatives and/or carers.
 Follow emergency care pathways.



Primary care referral for elective surgery

Start SDM including discussion about non-surgical options.
 Make Every Contact Count; medical and lifestyle optimisation.
 Referral to include:

- frailty score (CFS/eFI)
- presence, severity and management of comorbidities
- presence of ACD, ADRT, DNAR decisions and LPA for health and welfare.



Surgical and preoperative assessment out-patient services

Use information from primary care.
 Reassess and document frailty.
 Refer to perioperative frailty team/other services for optimisation, or use frailty intervention tool.
 Establish and review existing ACD, ADRT, DNAR decisions and LPA for health and welfare, and agree treatment escalation plan.
 Undertake SDM including discussion about non-surgical and palliative surgical options.
 Consider involving relatives and/or carers.
 Plan admission and discharge.



In theatre and recovery

Consultant surgeon and anaesthetist involvement for high-risk cases.
 Identify frailty and co-existing conditions at the WHO team briefing.
 Employ strategies for positioning and moving cognisant of frailty.
 Ensure physiological homeostasis cognisant of frailty.
 Informed by frailty status and agreed treatment escalation plans, anticipate postoperative care requirements and setting, and review again at the end of surgery.



Surgical wards providing care for emergency and/or elective patients

Assess and document frailty.
 Anticipate, prevent, and treat:

- delirium
- pain
- medical and surgical complications
- hospital acquired deconditioning.

Review treatment escalation plans.

Promote recovery and timely discharge:

- review discharge plans
- regular multidisciplinary team meeting
- proactive communication with patients and consider involving relatives and carers.



Transfer of care to the community

Ensure timely and comprehensive written discharge information to patient and GP, including:

- diagnoses
- treatment (operative and/or non-operative)
- complications
- continuing medical and/or functional impairments
- medication changes
- follow up plans and referrals
- safety-net advice and points of contact
- patient and carer education
- agreed escalation and advance care plans.

Frailty Pathway

Underpinning principles

Iterative Shared Decision Making; Streamlined communication and documentation; Comprehensive Geriatric Assessment and optimisation; Multispecialty, multidisciplinary working.

Frailty domain	Assessment	Intervention
Cognition	History/collateral history Use tools for objective assessment including 4AT, Clock (as part of Edmonton Frailty Scale, EFS), mini-Cog, Montreal Cognitive Assessment (MoCA) Assess risk of delirium by considering predisposing factors (age/dementia etc) or precipitating factors (pain/infection/ emergency surgery etc) Formulate differential diagnosis Assessment of capacity specific to the decision	Vascular risk factor optimisation Modify risk of delirium Consider referral to memory services Information provision to patient and carer to include diagnosis of cognitive impairment/dementia Provision of patient and carer information about delirium

Frail people should be assessed for delirium and underlying dementia

Delirium

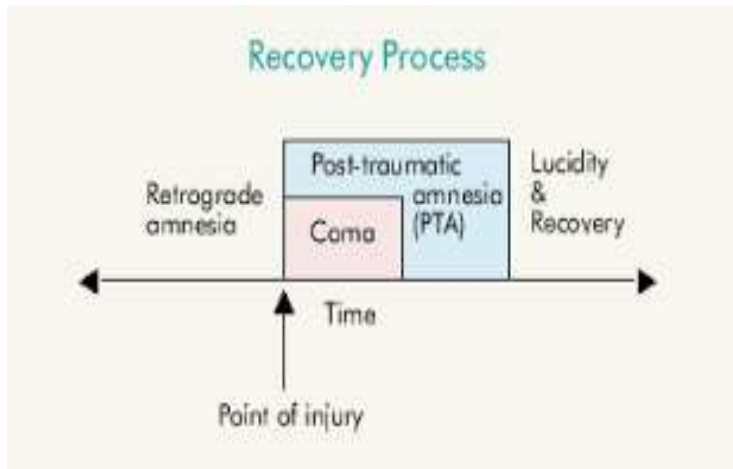
Key points

- It can worsen existing neurology
- Even if they have a TBI need to consider other physical/psychological causes
- Family are key
- Lasts 1-2 weeks

Post Traumatic Amnesia (PTA)

- After HI
- Disorientation/ confusion
- Amnesia- no continuous memory
- Reverse sleep-wake cycle
- Fatigue
- Behaviour changes (agitation)

PTA and Outcome Prediction



PTA Duration	Severity
< 5 minutes	Very Mild
5-60 minutes	Mild
1-24 hours	Moderate
1-7 days	Severe
1-4 weeks	Very Severe
More than 4 weeks	Extremely Severe

A not exhaustive list

- Polypharmacy (anticholinergics)
- FBC, U+Es, LFTs, CRP
- B12/folate, Glucose
- TFTs ?Hypothyroid
- Calcium, magnesium, phosphate
- PR (constipation)
- ECG
- MSU/bladder scan if indicated
- CT head: ?subdural ?stroke
?vasospasm etc

- Pain?
- Social isolation?
- Source of infection?
- Seizures? (Arcienagas et al., 2010)

Need to consider intracranial and extracranial causes simultaneously

Assessment of PTA

ABBREVIATED WESTMEAD PTA SCALE (A-WPTAS) GCS & PTA testing of patients with MTBI following mild head injury

Abbreviated Westmead PTA Scale (A-WPTAS)
incorporating Glasgow Coma Scale (GCS)

MPI's sticker here

Date:		T1	T2	T3	T4	T5
Time						
Motor	Obeys commands	6	6	6	6	6
	Localises	5	5	5	5	5
	Withdraws	4	4	4	4	4
	Abnormal flexion	3	3	3	3	3
	Extension	2	2	2	2	2
None	1	1	1	1	1	
Eye Opening	Spontaneously	4	4	4	4	4
	To speech	3	3	3	3	3
	To pain	2	2	2	2	2
None	1	1	1	1	1	
Verbal	Oriented** (Pick if correct)	5	5	5	5	5
	Name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Why are you here	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Confused inappropriate words	4	4	4	4	4
Incomprehensible sounds	3	3	3	3	3	
None	2	2	2	2	2	
GCS	Score out of 15	/15	/15	/15	/15	/15
	Picture 1					
A-WPTAS	Score out of 18	/18	/18	/18	/18	/18

Use of A-WPTAS and GCS for patients with MTBI

The A-WPTAS combined with a standardised GCS assessment is an objective measure of post-traumatic amnesia (PTA).
Only for patients with **current GCS of 13-15 (GCS pre-injury)** with impact to the head resulting in confusion, disorientation, anterograde or retrograde amnesia, or brief LOC. **Administer both tests at hourly intervals** to gauge patient's capacity for full orientation and ability to retain new information. Also, **note the following:** poor resolution, depression, pre-recorded analgesic/tranquilliser or possible medication, drug or alcohol effects. **NB:** This is a screening device, so exercise clinical judgement. In cases where doubt exists, more thorough assessment may be necessary.

Admission and Discharge Criteria:

A patient is considered to be out of PTA when they score 18/18.
Both the GCS and A-WPTAS should be used in conjunction with clinical judgement.

Patients scoring 18/18 can be considered for discharge.
For patients who do not obtain 18/18 re-assess after a further hour.

Patients with persistent score < 18/18 at 4 hours post time of injury should be considered for admission.

Clinical judgement and consideration of pre-existing conditions should be used where the memory component of A-WPTAS is abnormal but the GCS is normal (15/15).
Refer to GP on discharge if abnormal PTA was present, provide patient advice sheet.

Target set of picture cards



PUPIL ASSESSMENT		T1	T2	T3	T4	T5	+	=	REACTS BRISKLY
	R	L	R	L	R	L	R	L	SLUGGISH
Size									CLOSED
Reaction									NL

Comments _____

Pupil Size (mm)

2 3 4 5 6 7 8

Shores & Lammell (2007) - further copies of this score sheet can be downloaded from <http://www.psy.mq.edu.au/GCS>



Shores & Lammell (2007) - further copies of this score sheet can be downloaded from <http://www.psy.mq.edu.au/GCS>

GLASGOW COMA SCALE (GCS) AND ABBREVIATED WESTMEAD PTA SCALE (A-WPTAS)

1. Orientation Questions
Question 1: NAME (10 POINTS)
 The patient must provide the full name.
Question 2: WHAT IS THE NAME OF THIS PLACE? (10 POINTS)
 The patient must state the name of the hospital. For example Westmead Hospital. NB: The patient does not get any points for just saying 'hospital'. If the patient can not name the hospital, give them a choice of 2 options. To clarify, ask if they prefer to name the hospital or your location or neighbouring region.
Question 3: DATE AND TIME (10 POINTS)
 The patient must state the date and the time. For example: 1st April 2008. NB: An incorrect date is considered correct for patients to answer in the last year (e.g. 1st April 2007). Also, an incorrect date is considered correct for the rest of the GCS (e.g. 1st April 2008 and what?).

2. Picture recognition
 Though often administered the GCS unmodified version, administer the A-WPTAS by presenting the 9 Westmead PTA cards. Repeat cards for the first 11. Show patients the target set of picture cards for about 5 seconds and ensure that they can repeat the names of each card. Ask the patient to remember the pictures for the next 10 minutes and use these Picture Cards at each subsequent time (10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000).
 NB: For patients who have visual or cognitive impairment, assign a score of 1 for each card and use the patient's score out of 18 and A-WPTAS scores compared to give the A-WPTAS score (18 - 18). Present the 9 target pictures again and re-test in 1 hour.
 For patients who can not hear, read, or only partially hear, read, the 9 target pictures, present the 9 target pictures again. If patient still cannot hear correctly, score 1 for correct item and correct score (GCS and A-WPTAS scores 18/18 - 18). Present the target set of pictures again with re-test in 1 hour.
 For patients who cannot hear/see any pictures, use the target set of pictures again with re-test in 1 hour.



Shores & Lammell (2007) - further copies of this score sheet can be downloaded from <http://www.psy.mq.edu.au/GCS>

**55 year
old man**

- **Fall from height No known past medical hx**
- **CT (whole body): L-SDH, traumatic SAH within FL bilaterally, contusions R-TL and L-FL. No other injuries**
- **GCS 14 (confusion) on admission**

55 year old man

- Confused and agitated over next 7 days. Distant supv as fully mobile and trying to leave ward
- Unable to recall incident, disoriented to time, place and reason for admission.
- WPTA – 12/18- considered to be in PTA
- No other health concerns
- No NoK for collateral

55 year old man

- Daily orientation
- Melatonin and move room to help with sleep (daylight/night-time) restoration of sleep cycle
- Focus on implicit tasks/ADLs
- Diversion/avoidance confrontation
- Ongoing WPTA and O-Logs
- The result was that he improved

Delirium

- Family visiting
- Frequent reorientation including occupation
- Behavioural management of agitation and find cause
- Less restraint/ attachments
- Hearing aids/Glasses
- Preserve sleep wake cycle

PTA

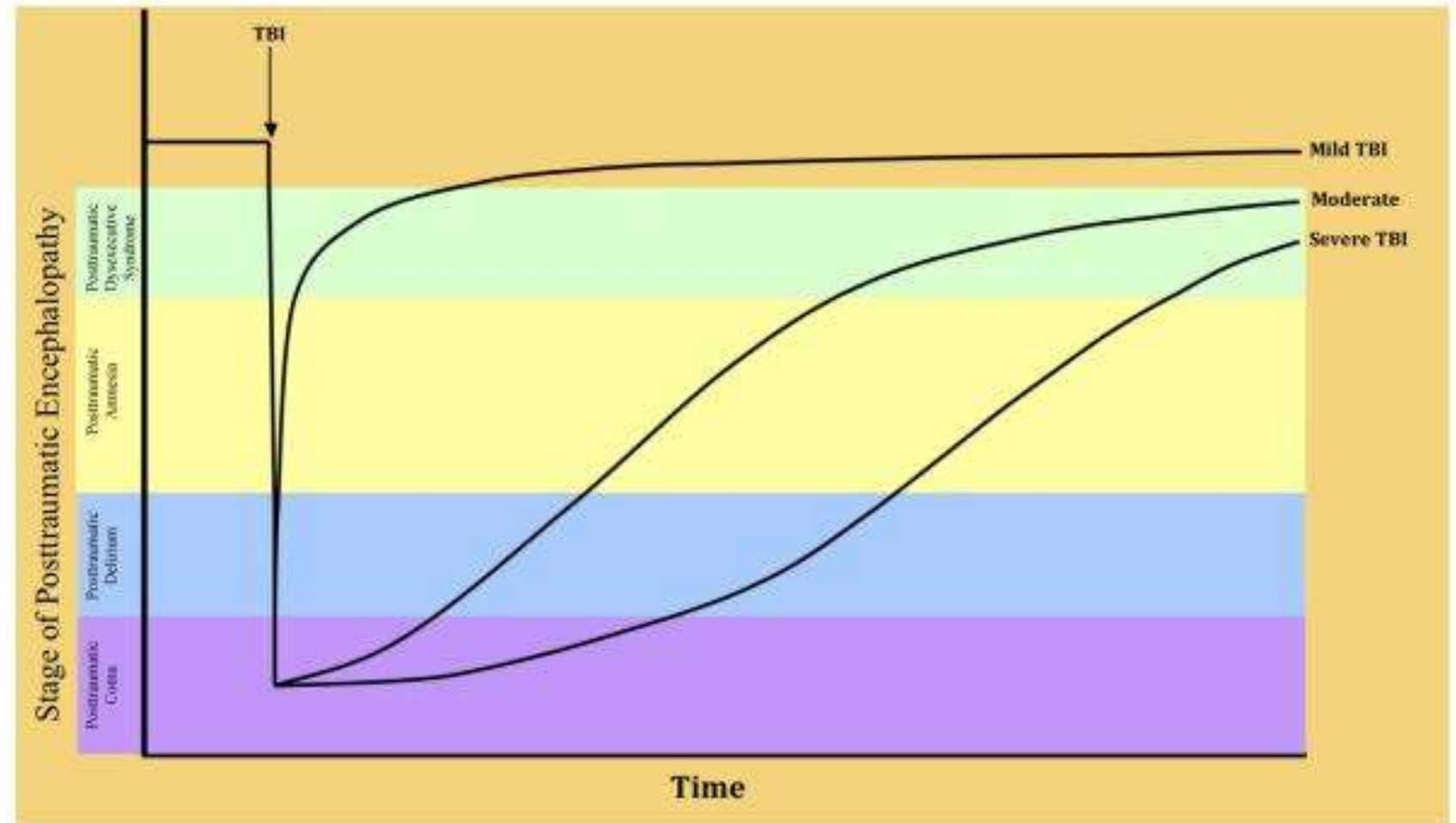
- Reliance on implicit memory tasks (OT/Physio/ns)
- Family visiting
- Re-orientation
- Behavioural management of agitation and find cause
- Less restraint/ attachments
- Hearing aids/Glasses
- Preserve sleep wake cycle

Coming together

It's no good giving conflicting advice

Same Same/Same Difference...A Spectrum? (Arcienagas et al., 2010)

Typical courses of progression through the stages of posttraumatic encephalopathy following mild, moderate, and severe TBI. The lines illustrating these courses for each level of injury severity are idealized; there is substantial variability in outcome at all levels of initial injury severity which, for the purpose of diagrammatic simplicity, is not illustrated here.



PTE Stage	Neurobehavioral Feature	Description
Posttraumatic Coma	Impaired arousal	Complete impairment of arousal (wakefulness) with no response to sensory input or spontaneous behaviour (purposeful or non-purposeful).
Posttraumatic Delirium	Impaired attention	<p>Reduced clarity of awareness of the environment, as evidenced by a reduced ability to focus, sustain, or shift attention.</p> <p>Additional features may include: alterations of arousal, which may fluctuate over minutes, hours, or days; disturbances of sleep-wake cycle; motor restlessness; impairments of processing speed, working memory, episodic memory (including orientation), language/communication, and executive function; perceptual disturbances (i.e., illusions, hallucinations), emotional lability, verbally, physically, and/or sexually disinhibited behaviour, agitation, and/or aggression.</p>

PTE Stage	Neurobehavioral Feature	Description
Posttraumatic Amnesia	Impaired episodic memory	<p>A state characterised by impaired new learning of declarative information, including orientation to time, place, and situation as well as autobiographical information for the peri- and immediate post- injury period; these impairments are not attributable to disturbances of wakefulness (coma) or awareness (delirium).</p> <p>In this state, selective and sustained attention are relatively normal; impairments of higher-level (alternating, divided) attention, working memory, and executive function (including insight) are present; emotional and behavioural disturbances may persist (i.e., emotional lability, irritability, depression, anxiety, psychosis, apathy, aggression); based on the patient's cognitive status, these problems are not attributable to posttraumatic delirium, but instead represent the neuropsychiatric sequelae of focal injuries (i.e., orbitofrontal syndrome) or damage to neurobehaviourally salient networks.</p>

PTE Stage	Neurobehavioral Feature	Description
Posttraumatic Dysexecutive Syndrome	Executive dysfunction, including executive control of 'basic' cognitive abilities	<p>A state characterized by impaired intrinsic executive function (e.g., conceptualization, judgment, insight) and impaired executive control of other cognitive functions, including attention (i.e., alternating, divided), working memory, language (impaired word retrieval, not confrontation naming), motor planning, and declarative memory (impaired retrieval, not new learning).</p> <p>In this state, emotional and behavioural disturbances may persist (i.e., emotional lability, irritability, depression, anxiety, psychosis, apathy, aggression); based on the patient's cognitive status, these problems are not attributable to posttraumatic delirium, but instead represent the neuropsychiatric sequelae of focal injuries (i.e., orbitofrontal syndrome) or damage to neurobehaviourally salient networks.</p>

Recommendations for Management (Arcienagas et al. 2011)

- Post-traumatic Coma
 - Reduce/eliminate cognitively impairing medication (where possible)
 - Address neurological probs and medical comorbidities that could contribute to impaired wakefulness
 - psycho-education for families
 - Establishing sleep-wake cycle with lighting cues/silencing alarms during rest periods (if possible)
 - Establish appetite and feeding rhythms (if possible) with bolus rather than continuous
 - Avoid elective procedures (e.g. bloods) at odd hours
 - Optimise pain mgt whilst avoid sedation

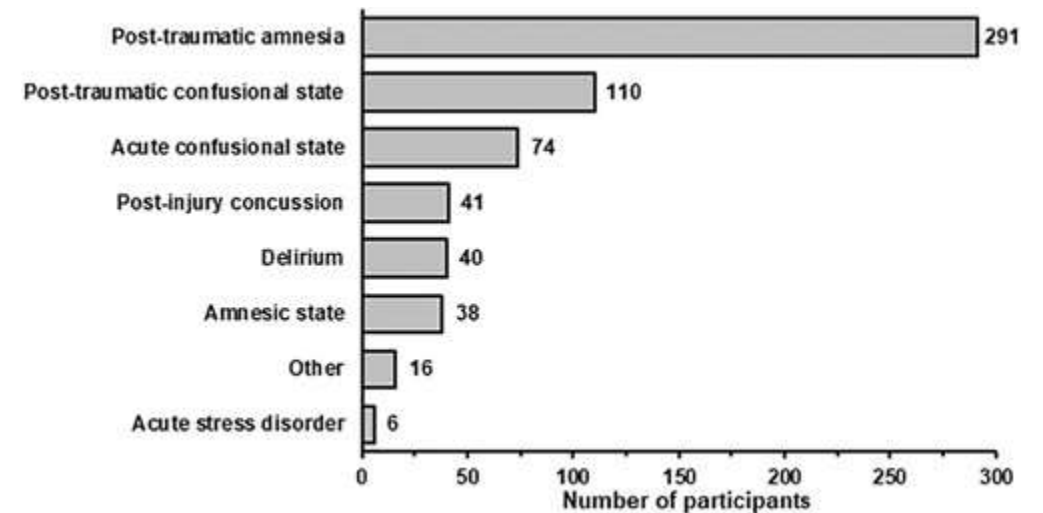
- Post-traumatic Delirium
 - Environmental and behavioural interventions to help reduce agitation
 - Family and staff education
 - Frequent orientation
 - 1:1 in lieu of restraints
 - (plus recommendations above)
- Post-traumatic Amnesia
 - Errorless learning
 - Provision of cuing and direction on daily tasks (maximise implicit memory)
 - (plus recommendations above)

Ponsford et al. (2021) Assessment and Management of patients in the acute stages of recovery after TBI in Adults: A worldwide survey.

Table 1. Term Used to Describe the Acute Recovery Phase as a Function of Region

Term	Oceania	Europe	North America	Other
	(n = 125)	(n = 124)	(n = 84)	(n = 42)
Post-traumatic amnesia	94.4%	66.9%	76.2%	61.9%
Post-traumatic confusional state	12.8%	41.1%	33.3%	35.7%
Acute confusional state	15.2%	16.9%	26.2%	28.6%
Post-injury concussion	11.2%	9.7%	6.0%	23.8%
Delirium	7.2%	8.9%	16.7%	14.3%
Amnesic state	9.6%	8.1%	10.7%	16.7%
Other	4.8%	4.8%	3.6%	2.4%
Acute stress disorder	0.8%	0.0%	1.2%	9.5%

FIG. 3. Terms used to describe the acute recovery phase.



INCOG (2014) recommendations

- Provides some guidance and discussion of the overlap
- Suggests term “post-traumatic delirium”
- Suggests use of both PTA and Delirium screening tools should be used concurrently.



79 year
old man

- HI from fall in July 2022.
GCS=12.
- CT head= L.FP haematoma,
R.Periorbital haemotoma and
L.Parietal SDH
- Prior HI in 2019 from RTA
resulting in difficulties with:
 - Short-term recall
 - Spatial awareness
 - Speed of processing

79 year old man

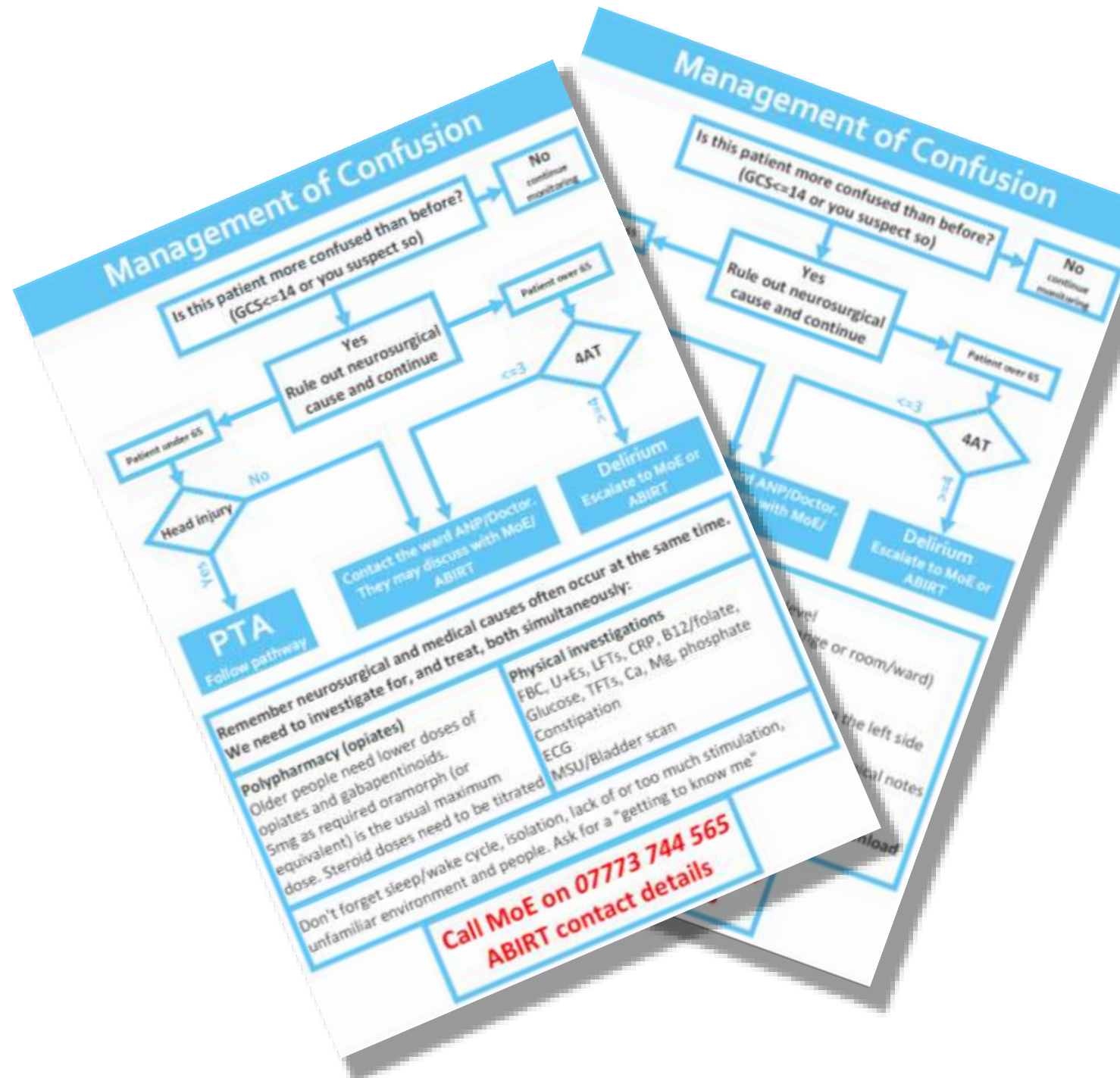
- 'very confused' 'disorientated' 'bizarre behaviours'
- Neuropsychology used A-WPTA & 4AT (on admission), monitored fluctuations in orientation daily with O-Log and held off on other tests
- MoE team took collateral: gradual decline in cognition since last TBI
- Treated UTI

79 year
old man

- Had to move ward due to bed pressures
- Having been quite settled here he became more confused, fluctuating and distressed in new setting

Local guidance

- Developed collaboratively between psychiatry, psychology and MoE initially
- Currently in draft format and being reviewed after discussion with DCN colleagues.
- Accompanied by longer form guidance
- Currently completing:
 - both AWPTA/4AT concurrently for over 65s with HI,
 - AWPTA for under 65s HI
 - 4AT for over and under 65 non HI



Reflections

- Different approaches to the same patients but little difference in management:
 - Rule out physical causes
 - Manage distress non-pharmacologically
- Are they separate conditions? Is the distinction related to professional silos?

Improving management of confusion post head injury

- **New guidance with further discussion with neurology and neurosurgery**
 - **Should age be a discriminating factor? Can we apply similar protocols to under 65s?**
 - **Training and psycho-education for staff and families on non-pharma interventions as first line of tx?**
- **Increased awareness and advocacy**

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