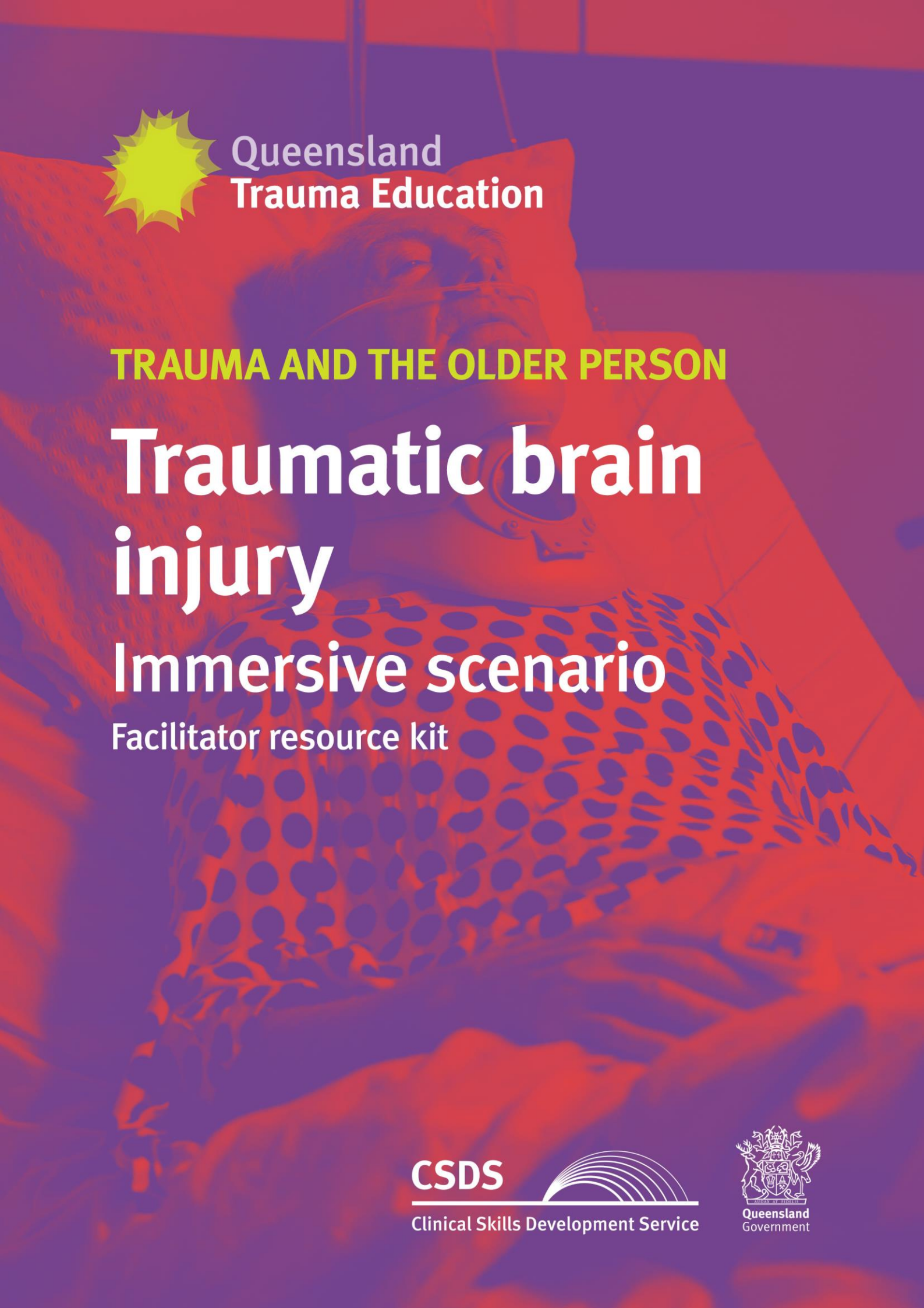

Queensland
Trauma Education

TRAUMA AND THE OLDER PERSON

Traumatic brain injury

Immersive scenario

Facilitator resource kit

CSDS
Clinical Skills Development Service

Queensland
Government

Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

Developed by
Dr Frances Williamson, Staff Specialist Emergency Physician – Metro North Health
Kimberly Ballinger, Simulation Educator – Clinical Skills Development Service

Reviewed by

Angelka Opie, Nurse Educator – CSDS, MNHHS

Education Working Group, Statewide Trauma Clinical Network – Clinical Excellence Queensland

Queensland Trauma Education
Trauma and the Older Person – Traumatic brain injury: Immersive scenario – Facilitator resource kit, Version 2.0

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About this training resource kit

This resource kit provides healthcare workers with the knowledge and skills for the assessment and management of traumatic brain injury in the geriatric population.

National Safety and Quality Health Service (NSQHS) Standards

Target audience

- Emergency department medical and nursing clinicians.
- Allied health – pharmacists.

Duration

45-60 minutes (including setup, scenario, debrief).

Group size

4-6 participants (or team composition applicable to local area).

Learning objectives

By the end of this session the participant will be able to:

- Perform a structured assessment and recognise severe traumatic brain injury (TBI).
- Implement neuroprotective management strategies and perform anticoagulant reversal.

Facilitation guide

1. Facilitator to use resource guide and attached documents to deliver immersive scenario.

Supporting resources

1. Pre-simulation briefing poster
2. Primary survey: Structured assessment in trauma – infographic
3. Reversal of oral anticoagulation in patients with acute intracerebral haemorrhage
4. Warfarin reversal: Victorian Agency for Health Information/ Safer Care Victoria
5. Guidelines for Anticoagulation using Warfarin – Adult
6. CT brain: L SDH + Oedema and mass effect, L extra-axial collection
7. CT brain: (axial slice/bony recon): BOS and facial #s
8. CXR 1: NAD
9. CXR 2: Post ETT and OGT
10. VBG
11. FBC
12. Coagulation profile
13. Chem20

Specific management

1. Institution of neuroprotective measures for traumatic brain injury.
2. Reversal of anti-coagulant therapy in life threatening haemorrhage.

Simulation event

This section contains the following:

1. Immersive scenario
2. Resource requirements
3. Handover card
4. Scenario progression
    a. State 1: Initial assessment
    b. State 2: Ongoing management / secondary assessment
    c. State 3: RSI / Intubation for neuroprotection
5. Debriefing guide

Immersive scenario

Type	Immersive scenario
Target audience	• Emergency department medical and nursing clinicians • Pharmacists
Overview	This resource is for facilitators to explore the management of severe TBI with warfarin reversal after initial assessment.
Learning objectives	• Perform a structured assessment and recognise severe Traumatic Brain Injury (TBI). • Implement neuroprotective management strategies and perform anticoagulant reversal.
Duration	45-60 minutes including debrief.

Resource requirements

Physical resources

Room setup	Resus bay in emergency
Simulator/s	1 manikin - SimMan3G / ALS Simulator
Simulator set up	• Street clothes lying supine (drops of blood on shirt and pants). • Cervical collar insitu. • Moulage: bruising/wound L scalp(bandaged and blood-soaked), haematoma L orbit, blood from L ear.
Clinical equipment	• Standard precautions PPE. • Resus/trauma bay role identification stickers (if applicable to local area). • Standard Resus bay equipment: Monitors, Resus trolley, infusion pumps, blood warmers. • Fluids/blood products: N/saline, Hartmann's, Packed Red blood cells/blood components, Prothrombinex/FFP (if applicable to local area). • Medications: IV analgesia/sedation, Vitamin K 5-10mg, Prothrombinex/FFP (if applicable to local area).
Access	2 x IVC setups with ‘NO’ IV stickers attached
Other	ED chart & relevant paperwork (optional)

Human resources

Faculty	2 facilitators (Dr/Nurse with debriefing experience) to take on roles of scenario commander and primary debrief.
Simulation coordinators	1 for manikin set up and control
Confederates	• QAS officer for handover (optional) • 1 nurse and 1 doctor in room

Handover card

Handover from ambulance officer

Thank you for your ongoing care of Simon. He is a 78yo man who was found by his daughter this morning when he didn't answer the phone. On our arrival he was unconscious, responding to painful stimuli only and groaning. During assessment he has been seen to move all limbs to painful stimuli. He is hypertensive with a BP 180/100mmHg with HR 70 in AF.

We think he slipped off the step ladder in the kitchen, but it is unclear how long he was on the floor. He has a large haematoma and laceration to his L scalp, we have placed a cervical collar and spinal precautions have been maintained.

His daughter confirms his PMHx is AF on warfarin and metoprolol 25mg mane, hypertension which has been managed with the b-blocker and he is an ex-smoker. He has no allergies.

He lives alone and is independent with his ADLs.

Thank you for looking after Simon.

Scenario progression

<table>
<tr><th colspan="4">STATE 1: INITIAL ASSESSMENT</th></tr>
<tr><th colspan="2">Vital signs</th><th>Script</th><th>Details</th><th>Expected actions</th></tr>
<tr><td>ECG</td><td>AF</td><td rowspan="9">Simon
Moaning to any stimuli</td><td rowspan="9">Primary survey results
A: patent, cx collar in-situ, anterior neck normal.
B: equal BS, nil crepitus/subcutaneous emphysema.
C: warm and well perfused peripherally.
D: GCS 9, pupils small and reactive, moving all limbs to stimuli.
E: nil extra.</td><td rowspan="9">Commence primary survey
❑ Assess airway including cervical spine and anterior neck.
❑ Assess Breathing: optimise oxygenation/ventilation.
❑ Assess circulation: hypertensive (from TBI and PMHx).
❑ Assess Disability: recognise low GCS as significant TBI.
❑ Expose patient.</td></tr>
<tr><td>HR</td><td>70</td></tr>
<tr><td>SpO₂</td><td>98% RA</td></tr>
<tr><td>BP/ART</td><td>190/100mmHg</td></tr>
<tr><td>RR</td><td>22</td></tr>
<tr><td>Temp</td><td>36</td></tr>
<tr><td>BGL</td><td>5</td></tr>
<tr><td>GCS</td><td>E2 V2 M5</td></tr>
<tr><td>Pupils</td><td>L 2mm
R 2mm</td></tr>
</table>

STATE 2: ONGOING MANAGEMENT / SECONDARY ASSESSMENT				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	AF	**Simon** Unresponsive **Confederate** Prompt if failure to recognise deterioration of GCS – "He doesn't seem to be moaning anymore… has he got worse?"	**Secondary survey results** Improvement in saturations to 98% if oxygen is applied. **Secondary survey results** **Head**: large haematoma/laceration to L boggy mass felt. **Face**: blood from L ear noted, hemotympanum, L orbit haematoma, L sided facial bruising/deformity/crepitus. **Chest**: nil bruising/wounds. **Abdomen**: soft, no wounds/abrasions. **Pelvis**: aligned, no wounds/abrasions. **Long bones and limbs**: nil injury. **Log roll**: nil injury. **Results**: **CXR:** NAD **Pelvic Xray:** NAD **EFAST:** negative **INR:** 3.2	**Secondary survey** ❑ Perform top to toe assessment. ❑ Manage bleeding head wound: expose, stable/suture/reinforce bandaging. ❑ Identification of severe TBI. ❑ Recognise risk of ongoing bleeding with anticoagulants. **Initiate investigations** ❑ Urgent CT brain and cervical spine. ❑ CXR and Pelvic Xray. ❑ VBG. ❑ Bloods: FBE, Coags, crossmatch or Point of Care Test INR, hemocue, chem8/CG4. **Management** ❑ Recognition of severe TBI. ❑ Apply oxygen - optimise oxygenation/ventilation. ❑ Requirement for RSI to facilitate further Ix and institute neuroprotection ❑ Discuss INR 3.2 - Initiate early reversal of warfarin therapy. - Vit K 5mg IV - Prothrombinex 50units/kg IV - FFP 150-300mL (2 units) ❑ Call for help early (communication and liaison with neurosurgical services / RSQ as applicable).
HR	50			
SpO_2	95% RA			
BP/ART	200/90 mmHg			
RR	22			
Temp	36			
BGL	5			
GCS	E1 V1 M3			
Pupils	L 6mm R 2mm			

STATE 3: RSI / INTUBATION FOR NEUROPROTECTION				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	AF	**Simon** Unresponsive **Confederate** If team fail to administer Warfarin reversal therapy confederate to ask, "I thought this patient was on Warfarin. Should we do anything about that?"	**Perform RSI** Prioritisation of avoiding hypoxia and maintaining blood pressure. **Examination results post-intubation:** **A**: ETT. **B**: equal BS, EtCO2 45 **C**: HR 80 AF, BP 160/80, well perfused. **D**: GCS 3 E1V1M1, pupils remain unequal. **E**: kept warm.	**Management** ❑ Perform RSI - Use of appropriate sedative and muscle relaxant agents. - Avoidance of hypotension and hypoxia. - Post RSI head up 30deg, loose ties - Clinical and radiological. confirmation of ETT placement, OGT. ❑ Consideration of hyperosmotic therapy - Hypertonic saline. - Mannitol. ❑ Notification to ICU and neurosurgical team for ongoing care and consideration of urgent decompression. ❑ (Referral to RSQ if appropriate) ❑ If not performed in State 2: Discuss INR 3.2 - Initiate early reversal of warfarin therapy. - Vit K 5mg IV - Prothrombinex 50units/kg IV - FFP 150-300mL (2 units) ❑ Scenario can end with transfer to CT (use CT images to discuss further management) ***or*** discuss patient disposition and transfer preparation (rural/regional/remote sites)
HR	80			
SpO_2	100%			
FiO_2	1.0			
BP/ART	160/90 mmHg			
RR	18			
Temp	36			
BGL	5			
GCS	3			
$ETCO_2$	55			
Pupils	L 6mm R 2mm			

Debriefing guide

Scenario objectives

- Recognition and management of severe TBI.
- Reversal strategy for anticoagulant therapy with TBI.
- Neuroprotective measures in TBI.

Example questions

Exploring diagnosis

- What clinical features were suggestive that intracranial pathology was present?
- What blood tests are useful to detect presence and effect of anticoagulants?
- Can discuss use of INR/PT, TT, aPTT, ECT, factor Xa levels.
- How does timing of dose affect management strategy? (If anticoagulant taken orally < 2 hours and patient able to swallow, may be a role for activated charcoal.)

Exploring management

- What are the indications for hypertonic therapy?
- What targets for blood pressure should be maintained in this scenario (BP 120-140mmHg)
- What specific reversal agents are available for Vitamin K antagonists (VKA) or DOACs (Direct Oral Anticoagulant)?
    - VKA- warfarin: Vitamin K, 4 factor Prothrombin complex concentrate (PCC) 50units/kg IV aiming INR <1.3 within 4 hours
    - DOAC: Rivaroxaban/Apixaban: Prothrombin complex concentrate (PCC) 25-50units/kg IV
    - DOAC: Dabigatran: Idarucizumab (Praxbind®) 2 x 2.5g IV bolus dose/ haemodialysis
    - Role of TXA less clear (Crash3), DDAVP may be helpful for platelet dysfunction
    - No role for Factor VII

Discussing teamwork / crisis resource management

- How was the decision regarding intubation made?
- What team members did you utilise for this process? How did you assign roles?
- What management priories/targets did you address with the team prior to intubation?

Acronyms and abbreviations

Term	Definition
TBI	Traumatic brain injury
VKA	Vitamin K antagonist
DOAC	Direct oral anticoagulant
RSI	Rapid sequence induction
INR	International normalised ratio
PT	Prothrombin time
TT	Thrombin time
aPTT	Activated partial thromboplastin time
ECT	Ecarin clotting time
FFP	Fresh frozen plasma
QAS	Queensland ambulance officer
AF	Atrial fibrillation
ADL	Activities of daily living
PMHx	Past medical history
ETT	Endotracheal tube
TXA	Tranexamic acid

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Visit csds.qld.edu.au/qte
Email CSDS-Admin@health.qld.gov.au
Phone +61 7 3646 6500

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