NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Health and social care directorate

Quality standards and indicators

Briefing paper

Quality standard topic: Head injury

Output: Prioritised quality improvement areas for development.

Date of Quality Standards Advisory Committee meeting: 10 March 2014

Contents

1 Introduction

This briefing paper presents a structured overview of potential quality improvement areas for head injury. It provides the Committee with a basis for discussing and prioritising quality improvement areas for development into draft quality statements and measures for public consultation.

1.1 Structure

This briefing paper includes a brief description of the topic, a summary of each of the suggested quality improvement areas and supporting information.

If relevant, recommendations selected from the key development source below are included to help the Committee in considering potential statements and measures.

1.2 Development source

The key development sources referenced in this briefing paper are:

- Head injury. NICE clinical guideline 176 (2014)
- Brain injury rehabilitation in adults. SIGN guideline 130 (2013)

2 Overview

2.1 Focus of quality standard

This quality standard will cover triage, assessment, investigation and early management of head injury in infants, children and adults. The quality standard will also cover rehabilitation in adults (aged 16 years and older) with traumatic brain injury.

2.2 Definition

For the purpose of this quality standard head injury is defined as any trauma (external force) to the head other than superficial injuries to the face.

Traumatic brain injury may be defined as a traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force that is indicated by new onset or worsening of at least one of the following clinical signs, immediately following the event:

- any period of loss of or a decreased level of consciousness
- any loss of memory for events immediately before or after the injury

- any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc)
- neurological deficits (weakness, loss of balance, change in vision, praxis, paresis/plegia, sensory loss, aphasia, etc) that may or may not be transient
- intracranial lesion.

2.3 Incidence and prevalence

Head injury is the commonest cause of death and disability in people aged 1–40 years in the UK. Each year, 1.4 million people attend emergency departments in England and Wales with a recent head injury. Between 33% and 50% of these are children aged under 15 years. Annually, about 200,000 people are admitted to hospital with head injury. Of these, one-fifth have features suggesting skull fracture or have evidence of brain damage. The incidence of death from head injury is low, with as few as 0.2% of all patients attending emergency departments with a head injury dying as a result. 95% of people who have sustained a head injury present with a normal or minimally impaired conscious level (Glasgow Coma Scale [GCS] greater than 12) but the majority of fatal outcomes are in the moderate (GCS 9–12) or severe (GCS 8 or less) head injury groups, which account for only 5% of attenders.

2.4 Management

Most patients recover without specific or specialist intervention, but others experience long-term disability or even die from the effects of complications that could potentially be minimised or avoided with early detection and appropriate treatment. CT scanning is the primary imaging modality for assessing head injury. Emergency departments see a large number of patients with minor or mild head injuries and need to identify the very small number who will go on to have serious acute intracranial complications. Admission to a specialist centre may be required for continued observation and surgical intervention.

Longer term treatment after the acute period is necessary for some patients with cognitive difficulties and rehabilitation needs. This support can involve physical, vocational and cognitive rehabilitation and the management of eating and swallowing difficulties.

2.5 National Outcome Frameworks

Table 1 to 3 show the outcomes, overarching indicators and improvement areas from the national outcome frameworks that the quality standard could contribute to achieving.

Table 1 NHS Outcomes Framework 2014/15

Domain	Overarching indicators and improvement areas
1 Preventing people from dying prematurely	***Overarching indicator*** 2 Health-related quality of life for people with long-term conditions** ***Improvement areas*** **Ensuring people feel supported to manage their condition** 2.1 Proportion of people feeling supported to manage their condition**
3 Helping people to recover from episodes of ill health or following injury	***Overarching indicator*** 3b Emergency readmissions within 30 days of discharge from hospital* ***Improving recovery from injuries and trauma*** 3.3 Survival from major trauma ***Helping older people to recover their independence after illness or injury*** 3.6 i Proportion of older people (65 and over) who were still at home 91 days after discharge from hospital into reablement / rehabilitation service** ii Proportion offered rehabilitation following discharge from acute or community hospital **
4 Ensuring people have a positive experience of care	***Overarching indicator*** 4b Patient experience of hospital care ***Improving hospital's responsiveness to personal needs*** 4.2 Responsiveness to in-patients' personal needs ***Improving people's experience of accident and emergency services*** 4.3 Patient experience of A&E services ***Improving people's experience of integrated care*** 4.9 People's experience of integrated care **
Alignment across the health and social care system * Indicator shared with Public Health Outcomes Framework (PHOF) ** Indicator complementary with Adult Social Care Outcomes Framework (ASCOF)	

Table 2 The Adult Social Care Outcomes Framework 2013–14

Domain	Overarching and outcome measures
1 Enhancing quality of life for people with care and support needs	***Overarching measure*** 1A Social care-related quality of life* ***Outcome measures*** **People manage their own support as much as they wish, so that are in control of what, how and when support is delivered to match their needs.** 1B Proportion of people who use services who have control over their daily life **Carers can balance their caring roles and maintain their desired quality of life.** 1D Carer-reported quality of life
2 Delaying and reducing the need for care and support	***Overarching measure*** 2A Permanent admissions to residential and nursing care homes per 100,00 population* ***Outcome measures*** **Earlier diagnosis, intervention and reablement means that people and their carers are less dependent on intensive services.** 2B Proportion of older people (65 and over) who were still at home 91 days after discharge from hospital into reablement / rehabilitation service**
3 Ensuring that people have a positive experience of care and support	***Overarching measure*** **People who use social care and their carers are satisfied with their experience of care and support services** 3A Overall satisfaction of people who use services with their care and support 3B Overall satisfaction of carers with social services. 3E Improving people's experience of integrated care*
Aligning across the health and care system * Indicator complementary with the NHS Outcomes Framework	

Table 3 Public health outcomes framework for England, 2013–2016

Domain	Objectives and indicators
4 Healthcare public health and preventing premature mortality	***Objective*** Reduced numbers of people living with preventable ill health and people dying prematurely, while reducing the gap between communities ***Indicators*** 4.11 Emergency readmissions within 30 days of discharge from hospital*
Aligning across the health and care system * Indicator shared with the NHS Outcomes Framework	

3 Summary of suggestions

3.1 Responses

In total 18 stakeholders (including 5 specialist committee members) responded to the 2-week engagement exercise 13.01.14 to 27.01.14.

Stakeholders were asked to suggest up to 5 areas for quality improvement. Specialist committee members were also invited to provide suggestions. The responses have been merged and summarised in table 4 for further consideration by the Committee.

Full details on the suggestions provided are given in appendix 2 for information.

Table 4 Summary of suggested quality improvement areas

Suggested area for improvement	Stakeholders
Remote assessment (4.1) • Appropriate use of digital services	NHS Direct
CT scans (4.2) • 1 hour time windows • Older people • Scanning people on warfarin treatment	BSPR CEM SCM RCN
Specialist skills and services (4.3) • Access to specialists • Direct transport to neuroscience units	BOA BSPR CEM SCM NHSE
Mild traumatic brain injury (4.4) • Reassurance • Follow up	SCM
Acute phase provision of early neurological rehabilitation (4.5) • Early assessment and rehab for cognitive difficulties • Spinal cord prophylaxis	ACPIN WH CCG
In hospital management planning (4.6) • Management and discharge plans	ACPIN SCM WH CCG RCPCH
Information provision and support groups (4.7) • Verbal and written information • Support groups	ACPIN FSEM HW
Follow up (4.8) • Routine follow up	COT SCM SRR RCPCH

Post-acute phase rehabilitation (4.9) • Age appropriate services • Multidisciplinary services • Person-centred goals	ACPIN CEM COT HW UY RCN WH CCG SCM SRR
Pharmacological therapy (4.10) • Agitation and aggression • Minimal level of consciousness	SCM

ACPIN	Association of Charted Physiotherapists in Neurology
BOA	British Orthopaedic Association Patient Liaison Group
BSPR	British society of Paediatric Radiologists
CEM	College of Emergency Medicine
COM	College of Occupational Therapists
FSEM	Faculty of Sports and Exercise Medicine UK
HW	Headway
NHSE	NHS England
RCN	Royal College of Nursing
RCPCH	Royal College of Paediatrics and Child Health
SCM	Specialist committee member
SRR	Society for Research in Rehabilitation
UY	University of York
WH CCG	West Hampshire Clinical Commissioning Group

4 Suggested improvement areas

4.1 Remote assessment

4.1.1 Summary of suggestions

Remote assessment

Stakeholders highlighted that remote assessment can be used via digital services and this can ensure appropriate treatment and referral.

4.1.2 Selected recommendations from development source

Table 5 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 5 to help inform the Committee's discussion.

Table 5 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Remote assessment	**Telephone advice services** NICE CG176 1.1.2. and 1.1.3

Telephone advice services

NICE CG176 – Recommendation 1.1.2

Telephone advice services (for example, NHS 111, emergency department helplines) should refer patients who have sustained a head injury to the emergency ambulance services (that is, 999) for emergency transport to the emergency department if they have experienced any of the following:

- Unconsciousness or lack of full consciousness (for example, problems keeping eyes open).
- Any focal neurological deficit since the injury.
- Any suspicion of a skull fracture or penetrating head injury.
- Any seizure ('convulsion' or 'fit') since the injury.
- A high-energy head injury.
- The injured person or their carer is incapable of transporting the injured person safely to the hospital emergency department without the use of ambulance services (providing any other risk factor indicating emergency department referral is present; see recommendation 1.1.3).

NICE CG176 – Recommendation 1.1.3

Telephone advice services (for example, NHS 111 or emergency department helplines) should refer patients who have sustained a head injury to a hospital emergency department if they have any of the following risk factors:

- Any loss of consciousness ('knocked out') as a result of the injury, from which the person has now recovered.
- Amnesia for events before or after the injury ('problems with memory')[4].
- Persistent headache since the injury.
- Any vomiting episodes since the injury.
- Any previous brain surgery.
- Any history of bleeding or clotting disorders.
- Current anticoagulant therapy such as warfarin.
- Current drug or alcohol intoxication.
- There are any safeguarding concerns (for example, possible non-accidental injury or a vulnerable person is affected).
- Irritability or altered behaviour ('easily distracted', 'not themselves', 'no concentration', 'no interest in things around them'), particularly in infants and children aged under 5 years.
- Continuing concern by helpline staff about the diagnosis.

4.1.3 Current UK practice

No evidence of current practice has been identified on remote assessment of head injury and appropriate treatment or referral.

4.2 CT scans

4.2.1 Summary of suggestions

Time to CT scan and radiology report

Stakeholders highlight the need for CT scan to be undertaken within one hour of a risk factor for brain or spinal injury being identified. Stakeholders also highlighted that provisional reporting of the CT scans should be made within the following hour.

Stakeholders also suggest that CT cervical spine may be preferable to plain film X-rays in older people because of degenerative changes.

Patients having warfarin treatment

Stakeholders highlight that new guidance is included in the updated guideline on the CT scanning of patients on warfarin treatment.

4.2.2 Selected recommendations from development source

Table 6 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 6 to help inform the Committee's discussion.

Table 6 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Time to CT scan and radiology report	**Criteria for performing a CT head scan** **Adults** NICE CG176 1.4.7 (KPI) **Children** NICE CG176 1.4.9 (KPI) **Criteria for performing a CT cervical spine scan** **Adults** NICE CG176 1.5.8 (KPI) **Children** NICE CG176 1.5.11 (KPI)
Patients having warfarin treatment	**Patients having warfarin treatment** NICE CG176 1.4.12

Criteria for performing a CT head scan

<u>NICE CG176 – Recommendation 1.4.7 (key priority for implementation)</u>

For adults who have sustained a head injury and have any of the following risk factors, perform a CT head scan within 1 hour of the risk factor being identified:

- GCS less than 13 on initial assessment in the emergency department.
- GCS less than 15 at 2 hours after the injury on assessment in the emergency department.
- Suspected open or depressed skull fracture.
- Any sign of basal skull fracture (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).
- Post-traumatic seizure.
- Focal neurological deficit.
- More than 1 episode of vomiting.

A provisional written radiology report should be made available within 1 hour of the scan being performed.

NICE CG176 – Recommendation 1.4.9 (key priority for implementation)

For children who have sustained a head injury and have any of the following risk factors, perform a CT head scan within 1 hour of the risk factor being identified:

- Suspicion of non-accidental injury
- Post-traumatic seizure but no history of epilepsy.
- On initial emergency department assessment, GCS less than 14, or for children under 1 year GCS (paediatric) less than 15.
- At 2 hours after the injury, GCS less than 15.
- Suspected open or depressed skull fracture or tense fontanelle.
- Any sign of basal skull fracture (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).
- Focal neurological deficit.
- For children under 1 year, presence of bruise, swelling or laceration of more than 5 cm on the head.

A provisional written radiology report should be made available within 1 hour of the scan being performed.

Criteria for performing a CT cervical spine scan

NICE CG176 – Recommendation 1.5.8 (key priority for implementation)

For adults who have sustained a head injury and have any of the following risk factors, perform a CT cervical spine scan within 1 hour of the risk factor being identified:

- GCS less than 13 on initial assessment.
- The patient has been intubated.
- Plain X-rays are technically inadequate (for example, the desired view is unavailable).

- Plain X-rays are suspicious or definitely abnormal.
- A definitive diagnosis of cervical spine injury is needed urgently (for example, before surgery).
- The patient is having other body areas scanned for head injury or multi-region trauma.
- The patient is alert and stable, there is clinical suspicion of cervical spine injury and any of the following apply:
    - age 65 years or older
    - dangerous mechanism of injury (fall from a height of greater than 1 metre or 5 stairs; axial load to the head, for example, diving; high-speed motor vehicle collision; rollover motor accident; ejection from a motor vehicle; accident involving motorised recreational vehicles; bicycle collision)
    - focal peripheral neurological deficit
    - paraesthesia in the upper or lower limbs.

A provisional written radiology report should be made available within 1 hour of the scan being performed.

<u>NICE CG176 – Recommendation 1.5.11(key priority for implementation)</u>

For children who have sustained a head injury, perform a CT cervical spine scan only if any of the following apply (because of the increased risk to the thyroid gland from ionising radiation and the generally lower risk of significant spinal injury):

- GCS less than 13 on initial assessment.
- The patient has been intubated.
- Focal peripheral neurological signs.
- Paraesthesia in the upper or lower limbs.
- A definitive diagnosis of cervical spine injury is needed urgently (for example, before surgery).
- The patient is having other body areas scanned for head injury or multi-region trauma.
- There is strong clinical suspicion of injury despite normal X-rays.
- Plain X-rays are technically difficult or inadequate.
- Plain X-rays identify a significant bony injury.

The scan should be performed within 1 hour of the risk factor being identified. A provisional written radiology report should be made available within 1 hour of the scan being performed.

Patients having warfarin treatment

NICE CG176 – Recommendation 1.4.12

For patients (adults and children) who have sustained a head injury with no other indications for a CT head scan and who are having warfarin treatment, perform a CT head scan within 8 hours of the injury. A provisional written radiology report should be made available within 1 hour of the scan being performed.

4.2.3 Current UK practice

A 2005 audit of 95 radiology departments in the UK[1] used a selected subset of the criteria in CG176 recommendations 1.4.7 and 1.5.11. The audit found that 60% of scans met the one hour target.

A local audit in 2007[2] examined CT scanning of children with a head injury before and after implementation of NICE guidelines. After implementation at a tertiary neuroscience centre, compliance with NICE guidelines on indications for CT scanning was 98.8% for adults and 68.7% for children. At a district general hospital, compliance with NICE guidelines on indications for CT scanning was 95.5% for adults and 77.1% for children.

A 2007 NCEPOD report into trauma services[3] found delays to CT scanning were present across all categories of head injury severity. Of the 493 head injury patients examined, 32 patients with severe head injuries had to wait more than two hours for this investigation to be performed. Reasons for delays to CT scan were reported as:

Reason	Number of patients	%
Patient not stable	22	29.3
Awaiting radiology staff	28	37.3
Awaiting access to CT	17	22.7
Awaiting suitable medical staff	3	4.4
Other	5	6.7

A National Audit Office 2010 report into major trauma care in England[4] examined the time to access CT scan for patients with a head injury. The report found that:

- Of people with a head injury who needed a CT scan, 77% received one.
- The median waiting time for CT scan was around 1.5 hours.
- 25% of people with a head injury had to wait in excess of two hours for a CT scan.

[1] Royal College of Radiologists (2005) CT in head injury audit
[2] Mooney JS, Yates A, Sellar L et al. (2011) Emergency head injury imaging: implementing NICE 2007 in a tertiary neurosciences centre and a busy district general hospital. Emergency Medicine Journal 28: 778-82.
[3] National Confidential Enquiry into Patient Outcome and Death (2007) Trauma: who cares?
[4] National Audit Office (2010) Major trauma care in England.

A retrospective audit in Cambridge[5] examined case notes of 394 children with a minor head injury presenting to the emergency department at Addenbrooke's hospital in 2007 and assessed adherence to NICE 2007 guidelines. The audit found that 25 (6.7%) of the 394 patients included in the study had head CT scans. 47 (12.7%) children would have been scanned had the hospital guidelines been rigidly followed and 74 (19.7%) children would have had head CT scans if the 2007 NICE guidelines had been adhered to.

A retrospective review of a CT scanning undertaken in University Hospital Coventry[6] concluded that 96% of 127 patients in 2010 and 97.1% of 173 in 2011 were scanned within 1 hour of arrival to the emergency department. With the introduction of a new protocol the mean time to first report reduced from 57 to 42 minutes, which has led to quicker decision making regarding ongoing management and the improved transit of patients through the emergency department.

The national Trauma Audit and Research Network[7] comparison figures show the 2013 national median time to CT scan is 0.70 hours (42 minutes).

No evidence of current practice was identified specific to people on warfarin.

[5] Ghosh R, Docherty E, Schickerling S et al. (2012) Application of the 2007 NICE guidelines in the management of paediatric minor head injuries in a UK emergency department. Emergency Medicine Journal 29: 197-200

[6] Salman B, Patel H, Christie-Large M (2012) Trauma CT scanning at University Hospital Coventry (UHCW): A retrospective review. Clinical Radiology 67: S19.

[7] Trauma Audit and Research Network www.tarn.ac.uk

4.3 Specialist skills and services

4.3.1 Summary of suggestions

Access to specialists

Stakeholders highlighted various specialists that should be accessible or available to give advice to trauma services, and primary care professionals in remote areas, in the immediate management of head injury particularly:

- Neurosurgical specialists.
- Paediatric specialists with skills in management of head injury
- Radiologists
- Paediatric neuro-radiologists

Stakeholders also highlighted that training programmes could be delivered to medical staff on the benefits of cognitive assessment and neuropsychological rehabilitation.

Direct transport to neuroscience units

Stakeholders highlighted that patients with serious head injuries should be transported directly to a specialist neuroscience unit because of rapid access to neurosurgery and neuro-critical care.

4.3.2 Selected recommendations from development source

Table 7 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 7 to help inform the Committee's discussion.

Table 7 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Access to specialists	**Involving the neurosurgical department** NICE CG176 1.3.13 and 1.3.14 **Transfer from hospital to a neuroscience unit - adults** NICE CG176 1.7.1 and 1.7.3 **Transfer from hospital to a neuroscience unit - children** NICE CG176 1.7.13

No recommendations have been identified on access radiological specialists.

Involving the neurosurgical department

NICE CG176 – Recommendation 1.3.13

Discuss with a neurosurgeon the care of all patients with new, surgically significant abnormalities on imaging. The definition of 'surgically significant' should be developed by local neurosurgical centres and agreed with referring hospitals, along with referral procedures.

NICE CG176 – Recommendation 1.3.14

Regardless of imaging, other reasons for discussing a patient's care plan with a neurosurgeon include:

- Persisting coma (GCS 8 or less) after initial resuscitation
- Unexplained confusion which persists for more than 4 hours.
- Deterioration in GCS score after admission (greater attention should be paid to motor response deterioration).
- Progressive focal neurological signs.
- A seizure without full recovery.
- Definite or suspected penetrating injury.
- A cerebrospinal fluid leak.

Transfer from hospital to a neuroscience unit - adults

NICE CG176 – Recommendation 1.7.1

Local guidelines on the transfer of patients with head injuries should be drawn up between the referring hospital trusts, the neuroscience unit and the local ambulance service, and should recognise that:

- transfer would benefit all patients with serious head injuries (GCS 8 or less) irrespective of the need for neurosurgery
- if transfer of those who do not require neurosurgery is not possible, ongoing liaison with the neuroscience unit over clinical management is essential.

NICE CG176 – Recommendation 1.7.3

There should be a designated consultant in the referring hospital with responsibility for establishing arrangements for the transfer of patients with head injuries to a neuroscience unit and another consultant at the neuroscience unit with responsibility for establishing arrangements for communication with referring hospitals and for receipt of patients transferred.

Transfer from hospital to a neuroscience unit - children

NICE CG176 – Recommendation 1.7.13

Recommendations 1.7.1–1.7.12 were written for adults, but apply these principles equally to children and infants, providing that the paediatric modification of the GCS is used.

4.3.3 Current UK practice

A 2007 NCEPOD report into trauma services[8] found that in the majority of cases where a patient suffered a head injury, a neurosurgical consultation was performed. However, it was noted that 44/271 (16.2%) patients with moderate or severe head injuries had no evidence of neurosurgical involvement. Within this group of 44 patients it is possible that consultation was not undertaken due to the extent of head and/or other injuries leading to the conclusion that death was inevitable. As part of the peer review process, advisors were asked whether a neurosurgical consultation was a necessary part of each individual case. Of the 155 cases where there was no evidence of neurosurgical involvement the advisors felt that this should have occurred in 28 cases (18.1%).

The NCEPOD report also found that data suggest that 197/365 (54.0%) patients who required neurosurgical involvement were taken to hospitals that may not have had the necessary infrastructure (on site neurosurgical expertise) to meet their needs.

The NCEPOD report examined patients undergoing neurosurgery. Only 6/43 (14.0%) patients who required a secondary transfer to access neurosurgical services had an operation within four hours of injury. There were delays to neurosurgery in 13/81 (16.0%) cases. Most of these cases were evacuation of traumatic space occupying lesions. Only 9/48 (18.8%) patients who had major neurosurgical procedures as a result of trauma were operated on by consultant surgeons.

The 2010 National Audit Office report into trauma services in England[9] showed that evidence proved having a consultant present in an emergency department produced quicker and more effective decision making in the care of patients. Evidence also concluded that care should be led by consultants, however major trauma occurs most frequently during evening and night hours or of a weekend when consultants are not present in emergency departments.

A 2013 local audit[10] assessed 31 children admitted to the Birmingham Children's Hospital PICU following a severe traumatic brain injury between January 2005 and

[8] National Confidential Enquiry into Patient Outcome and Death (2007) Trauma: who cares?
[9] National Audit Office (2010) Major trauma care in England.
[10] Fayeye O, Ushewokunze S, Stickley J et al. (2013) Does direct admission from an emergency department with on-site neurosurgical services facilitate time critical surgical intervention following a traumatic brain injury in children? British Journal of Neurosurgery 27: 326-9.

April 20103. 13 (42%) were admitted from an ED with on-site neurosurgical services with the remaining 18 (58%) transferred from regional ED. In the on-site group 10 of 13 (77%) craniotomies were performed within 4 hours compared to 3 of 18 (17%) in those transferred from regional ED. Eleven patients were transferred directly from ED to neurosurgical theatre for emergency craniotomies. Within this subgroup, seven patients came from the cohort of admissions to a hospital with on-site neurosurgery.

A cross-sectional survey undertaken in 2009-10 was undertaken to assess hospital provision of services in England and Wales for children with a head injury[11]. Responses were obtained from 230 of 245 hospitals. The audit found that 64% of hospitals have an established pathway for management of head injured children. Not infrequently hospitals asserting designation as specialist trauma or specialist neurosurgical centres do not offer an intensive care service for children. 82% of child ED attendances are to hospitals that would not care for a critically ill child on-site. Hospitals that do offer such care are much more likely to have children's trained staff available in the ED. They are also more likely to have access to surgical support beyond neurosurgery.

No evidence of current practice was identified about access to other specialist services.

[11] Houston R, Pearson GA (2012) Hospital facilities for head injured children: UK national survey. Emergency Medicine Journal 29: 309-15

4.4 Mild traumatic brain injury

4.4.1 Summary of suggestions

Information provision and follow up

Stakeholders emphasised that people with a mild head injury should be reassured that symptoms are benign and likely to settle within 3 months. However it was also suggested that people who have had a mild traumatic brain injury should be followed up within one month by a specialist in order to evaluate prognosis and increase recovery.

4.4.2 Selected recommendations from development source

Table 8 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 8 to help inform the Committee's discussion.

Table 8 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Information provision and scheduled follow up	**Mild traumatic brain injury** SIGN 130 3.3 and 3.4

Mild traumatic brain injury

SIGN guideline 130 – 3.3

Patients presenting with non-specific symptoms following mild traumatic brain injury should be reassured that the symptoms are benign and likely to settle within three months.

Referral for a cognitive (psychometric) assessment is not routinely recommended after mild traumatic brain injury.

SIGN guideline 130 – 3.4

All patients should be offered reassurance about the nature of their symptoms and advice on gradual return to normal activities after uncomplicated mild traumatic brain injury.

Referral for cognitive behavioral therapy following mild traumatic brain injury may be considered in patients with persistent symptoms who fail to respond to reassurance and encouragement form a general practitioner after three months.

4.4.3 Current UK practice

No evidence was identified on provision of information or scheduled follow up for people with mild traumatic brain injury.

4.5 Acute phase provision of early neurological rehabilitation

4.5.1 Summary of suggestions

Early assessment and rehabilitation for cognitive difficulties

Stakeholders highlighted that early assessment and rehabilitation of cognitive difficulties whilst in the acute period in hospital can improve outcomes and help support recovery. It was also reported that there is inconsistency in who is transferred to rehabilitation wards and units.

Spinal cord prophylaxis

Stakeholders highlighted that use of spinal cord injury prophylaxis such as collars and splinting in emergency departments and critical care settings can help prevent complications and support early recovery.

4.5.2 Selected recommendations from development source

Table 9 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 9 to help inform the Committee's discussion.

Table 9 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Early assessment and rehabilitation for cognitive difficulties	**Service delivery** SIGN 130 10.1
Spinal cord prophylaxis	**Immediate management at the scene and transport to hospital** NICE CG176 1.2.9 and 1.2.10

Service delivery

SIGN guide 130 – 10.1

For optimal outcomes, higher intensity rehabilitation featuring early intervention should be delivered by specialist multidisciplinary teams.

Immediate management at the scene and transport to hospital

NICE CG176 – Recommendation 1.2.9

Attempt full cervical spine immobilisation for patients who have sustained a head injury and present with any of the following risk factors unless other factors prevent this:

- GCS less than 15 on initial assessment by the healthcare professional.
- Neck pain or tenderness.
- Focal neurological deficit.
- Paraesthesia in the extremities.
- Any other clinical suspicion of cervical spine injury.

NICE CG176 – Recommendation 1.2.10

Maintain cervical spine immobilisation until full risk assessment including clinical assessment (and imaging if deemed necessary) indicates it is safe to remove the immobilisation device.

4.5.3 Current UK practice

A National Audit Office 2010 report into major trauma care in England[12] examined access to rehabilitation for patients with a head injury. The report found that during their visits to hospitals and strategic health authorities, a lack of capacity in rehabilitation services for major trauma was commonly highlighted. However, they state there is a scarcity of evidence upon which to effectively plan rehabilitation services.

[12] National Audit Office (2010) Major trauma care in England.

4.6 In hospital management planning

4.6.1 Summary of suggestions

In hospital management plans

Stakeholders highlight that management plans should include an assessment of whether a patient is clinically ready for discharge or referral for rehabilitation. In particular stakeholders highlight post traumatic amnesia as a specific diagnosis that contra-indicates self-discharge and rehabilitation.

Part of management and discharge planning should include good communication between head injury services and local (secondary and primary care services) to help ensure transfer back is effective.

4.6.2 Selected recommendations from development source

Table 10 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 10 to help inform the Committee's discussion.

Table 10 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
In hospital management plans	**Discharge after observation** NICE CG176 1.9.6 **Discharge planning** SIGN 130 10.4

Discharge after observation

NICE CG176 – Recommendation 1.9.6

Patients admitted after a head injury may be discharged after resolution of all significant symptoms and signs providing they have suitable supervision arrangements at home.

Discharge planning

SIGN guideline 130 – 10.4

Planned discharge from inpatient rehabilitation to home for patients who have experienced an ABI provides beneficial outcomes and should be an integrated part of treatment programmes.

At the time of discharge, the discharge document should be sent to all the relevant agencies and teams.

4.6.3 Current UK practice

A 2011 GAIN audit of paediatric brain injuries[13] reviewed the case notes of 67 children admitted to hospital in Northern Ireland with either acquired or traumatic brain injury. They assessed whether a single individual had been identified as responsible for their care and also the presence of discharge planning beyond the acute phase. In all cases, a single individual had been identified who was responsible for coordinating care. Only 59% of children had recorded information referring to a discharge plan in their case notes.

[13] Guidelines and Audit Implementation Network (2011) A retrospective regional audit of paediatric acquired brain injury 2003-2009

4.7 Information provision and support groups

4.7.1 Summary of suggestions

Information provision

Stakeholders highlighted that patients and families can benefit from being given verbal and written information about the impact of head injury. It was also suggested that specific content should be included about returning to school, work and sporting activity. This information should be tailored to the individual.

Support groups

Stakeholders highlighted that voluntary and charitable organisations can provide support and advice to people who have had a head injury and their families. This in turn can improve quality of life and health statuses.

4.7.2 Selected recommendations from development source

Table 11 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 11 to help inform the Committee's discussion.

Table 11 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Information provision	**Information and support for families and cares** NICE CG176 1.6.2 and 1.6.3
Support groups	**Information and support for families and cares** NICE CG176 1.6.5

Information and support for families and carers

NICE CG176 – Recommendation 1.6.2

Ensure that information sheets detailing the nature of head injury and any investigations likely to be used are made available in the emergency department. NICE's information for the public about this guideline may be helpful.

NICE CG176 – Recommendation 1.6.3

Staff should consider how best to share information with children and introduce them to the possibility of long-term complex changes in their parent or sibling. Literature produced by patient support groups may be helpful.

NICE CG176 – Recommendation 1.6.5

Ensure there is a board or area displaying leaflets or contact details for patient support organisations either locally or nationally to enable family members and carers to gather further information.

SIGN guide 130 – 10.2

Family and carers should be provided with access to ongoing support when the patient with brain injury is living within the community.

4.7.3 Current UK practice

A 2011 GAIN audit of paediatric brain injuries[14] reviewed the case notes of 67 children admitted to hospital in Northern Ireland with either acquired or traumatic brain injury. They found only one case note that included mention of provision of an information leaflet on brain injury.

A 2012 audit of UK emergency departments[15] aimed to evaluate the written information provided after minor head injury in children. It found that the majority of hospitals gave age specific information on discharge ab. 70.6% of hospitals had specific child leaflets, 22.7% had dual purpose leaflets and 6.6% had both.

[14] Guidelines and Audit Implementation Network (2011) A retrospective regional audit of paediatric acquired brain injury 2003-2009

[15] Hawley C, Unsworth L, Qureshi K et al. (2012) Discharge advice provided by UK emergency departments after minor head injury in children. Brain Injury 26: 649.

4.8 Follow up

4.8.1 Summary of suggestions

Follow up

Stakeholders highlighted that people who have had a head injury should have access to appropriate specialist follow up in case of continuing symptoms. The follow up should be routine and not dependent on patient initiation.

It was also suggested that this is of particular importance for people sustaining repeated brain injuries.

4.8.2 Selected recommendations from development source

Table 12 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 12 to help inform the Committee's discussion.

Table 12 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Follow up	**Follow up** NICE CG176 – 1.9.12

Follow up

NICE CG176 – Recommendation 1.9.12

When a patient who has undergone imaging of the head and/or been admitted to hospital experiences persisting problems, ensure that there is an opportunity available for referral from primary care to an outpatient appointment with a professional trained in assessment and management of sequelae of brain injury (for example, clinical psychologist, neurologist, neurosurgeon, specialist in rehabilitation medicine).

4.8.3 Current UK practice

No evidence was identified on regularity of follow up after head injury.

4.9 Post-acute phase rehabilitation

4.9.1 Summary of suggestions

Post-acute phase rehabilitation

Stakeholders highlighted the importance of access to age-appropriate services that can help promote recovery after discharge from hospital, including:

- Neuro-rehabilitation
- Physiotherapy
- Psychological support including cognitive behavioural therapies
- Speech and language therapy
- Vocational rehabilitation
- Occupational therapy
- Social services

Stakeholders also highlighted these services should be provided in a multi-disciplinary model, with effective communication between the specialists. Rehabilitation should be person-centred and goal orientated, with involvement of the patients and families in setting those goals.

4.9.2 Selected recommendations from development source

Table 13 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 13 to help inform the Committee's discussion.

Table 13 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Community rehabilitation	**Cognitive rehabilitation** SIGN 130 5.3, 5.4, 5.5 and 5.8 **Rehab of behavioural and emotional disorders** SIGN 130 6.2 **Communication and swallowing** SIGN 130 7.1 **Vocational rehabilitation** SIGN 130 8.2 **Community rehabilitation** SIGN 130 10.2 and 10.3

Cognitive rehabilitation

SIGN guide 130 – 5.3

Patients with memory impairment after TBI should be trained in the use of compensatory memory strategies with a clear focus on improving everyday functioning rather than underlying memory impairment.

- For patients with mild-moderate memory impairment both external aids and internal strategies (eg use of visual imagery) may be used.
- For those with severe memory impairment external compensations with a clear focus on functional activities is recommended.

SIGN guide 130 – 5.4

Patients with attention impairment in the post-acute phase after TBI should be given strategy training relating to the management of attention problems in personally relevant functional situations.

SIGN guide 130 – 5.5

Patients with TBI and deficits in executive functioning should be trained in meta-cognitive strategies relating to the management of difficulties with planning, problem solving and goal management in personally relevant functional situations.

SIGN guide 130 – 5.8

In the post-acute setting interventions for cognitive deficits should be applied in the context of a comprehensive/holistic neuropsychological rehabilitation programme. This would involve an interdisciplinary team using a goal-focused programme which has the capacity to address cognitive, emotional and behavioural difficulties with the aim of improving functioning in meaningful everyday activities.

Rehab of behavioural and emotional disorders

SIGN guide 130 – 6.2.

Cognitive behavioural therapy should be considered for the treatment of acute stress disorder following mild TBI.

Cognitive behavioural therapy should be considered for the treatment of anxiety symptoms following mild to moderate TBI, as part of a broader neuro-rehabilitation programme.

Communication and swallowing

SIGN guide 130 – 7.1

Patients with communication deficits post TBI should be referred to speech and language therapy for assessment and management of their communication impairments.

Vocational rehabilitation

SIGN guide 130 – 8.2

Early in the rehabilitation pathway patients should be asked about vocational activities and liaison initiated with employers. Once work requirements are established patients should have appropriate assessments made of their ability to meet the needs of their current or potential employment.

Community rehabilitation

SIGN guide 130 – 10.2

Community rehabilitation services for patients with brain injuries should include a wide range of disciplines working within a coordinated interdisciplinary model/framework and direct access to generic services through patient pathways.

SIGN guide 130 – 10.3

Where further rehabilitation is indicated for patients with brain injury who are discharged from inpatient care, it may be offered by telephone or face-to-face methods to alleviate long term burdens due to depression, behavioural and cognitive consequences.

4.9.3 Current UK practice

A report in 2011 by the Research Initiative for Neurological Conditions[16] examined provision of vocational rehabilitation in the UK. In total, 142 services providing vocational rehabilitation for long term neurological conditions were identified. Thirty-three (23%) were dedicated vocational rehabilitation services and 108 (76%) offered vocational rehabilitation as a component of a generic or neurological rehabilitation service. Most of the services (71.2%) saw fewer than 25 people with long-term neurological conditions each year. Only 13 (9%) of the identified services saw more than 50 people with long-term neurological conditions each year (Table 3-1 in Appendix 2). Almost two thirds of the services (n=85) were well established (had been running for at least 5 years) and only 22 (15.5%) were new or emerging services; set up in the last 2 years.

The average waiting time for clients to access vocational rehabilitation services varied. Forty-three percent of the services identified saw people within one month of

[16] Research Initiative for Long term Neurological Conditions (2011) Mapping vocational rehabilitation services for long term neurological conditions.

referral (10% within one week), 22% between 1 and 2 months, 19% between 2 and 4 months and 7% (10 services) stated that the waiting time for clients to access their services was in excess of 4 months.

No further evidence was identified on access to specific types of rehabilitation services.

4.10 Post-acute phase pharmacological therapies

4.10.1 Summary of suggestions

Pharmacological management

Stakeholders have highlighted a need for improved pharmacological management in patients with minimally conscious state and for those with agitation or aggression following a head injury.

4.10.2 Selected recommendations from development source

Table 14 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 14 to help inform the Committee's discussion.

Table 14 Specific areas for quality improvement

Suggested quality improvement area	Selected source guidance recommendations
Post-acute phase pharmacological therapies	**Challenging or aggressive behaviour** SIGN 130 6.1 **Management of the patient in the minimally conscious or vegetative state** SIGN 130 9.3

Challenging or aggressive behaviour

SIGN guideline 130 – 6.2

Propranolol or pindolol may be considered as a first line treatment option for moderate levels of agitation/aggression.

Drug treatments should be individually tailored and commenced in very low doses. The patient's progress should be monitored with surveillance for possible adverse effects.

Management of the patient in the minimally conscious or vegetative state

SIGN guideline 130 – 9.3

Amantadine may be considered as a means of facilitating recovery of consciousness in patients following severe brain injury

4.10.3 Current UK practice

No evidence was identified on pharmacological therapies for either minimal consciousness or agitation/aggression.

Appendix 1: Glossary

Head injury – For the purposes of the quality standard, head injury is defined as any trauma to the head other than superficial injuries to the face.

Traumatic brain injury - traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force that is indicated by new onset or worsening of at least one of the following clinical signs, immediately following the event:

- any period of loss of or a decreased level of consciousness
- any loss of memory for events immediately before or after the injury
- any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc)
- neurological deficits (weakness, loss of balance, change in vision, praxis, paresis/plegia, sensory loss, aphasia, etc) that may or may not be transient
- intracranial lesion.

Acquired brain injury - An acquired brain injury can result from:

- traumatic injury such as a road traffic accident,
- a fall, an assault or a sporting injury
- stroke
- brain tumour
- haemorrhage
- viral infection e.g. meningitis, encephalitis or septicaemia
- lack of oxygen to the brain e.g. as a result of a heart attack (anoxia/hypoxia)

Severity of brain injury – commonly grouped into categories based on level of consciousness post injury (GCS); mild GCS 13-15, moderate GCS 9-12, severe GCS 8 or less.

CT scan - A computerised tomography (CT) scan uses X-rays and a computer to create detailed images of the inside of the body.

Glasgow Coma Scale (GCS) - A standardised system used to assess the degree of brain impairment and to identify the seriousness of injury in relation to outcome. The system involves three determinants: eye opening, verbal responses and motor response all of which are evaluated independently according to a numerical value that indicates the level of consciousness and degree of dysfunction.

Rehabilitation – A programme of clinical and vocational services with the goal of returning brain injured patients to a satisfying occupation.

Paraesthesia - Abnormal sensation such as burning or tingling due to a disorder of the sensory nervous system.

X-Ray - A radiograph made by projecting X-rays through organs or structures of the body onto a photographic film. Structures that are relatively radiopaque (allow few X-rays to pass through), such as bones and cavities filled with a radiopaque contrast medium, cast a shadow on the film.

Appendix 2: Suggestions from stakeholder engagement exercise

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
1	Remote assessment	NHS Direct	Include remote assessment via digital services when advising on the initial triage and assessment of those with Head injury.	Ensure appropriate treatment and or referral following remote assessment/triage.	The popularity and volume of users used this method.	
2	CT scans	British Society of Paediatric Radiologists	Ensuring sufficient radiology resources available at Trust level to comply with requirement for CT head scans to have a written report available within 1hour of scan being performed	For many radiological investigations there is a disconnect between the time taken for an investigation to be performed (which is often target driven) and the output (i.e. the reporting of that examination by an appropriate consultant radiologist). The maximal time between scan and report may or may not be specified by Commissioners or Guidelines	The clear implication of the NICE Head Injury Guidelines 2014 CG 176 is an expectation that all CT head scans performed in infants and children will reported within 1 hour of the scan having been performed. Whilst this will be being achieved in many centres already, with current radiology resources it is unlikely to be achievable 24/7 in most centres. Compliance with the Guideline will therefore need to be monitored and reasons for non-compliance identified.	www.nice.org.uk/CG176 Intercollegiate Paediatric Trauma Protocols RCR / RCPCH forthcoming
3	CT scans	College of Emergency Medicine	24 hr radiologist rapid (hot) reporting of all CT scan	Rapid reporting by a radiologist would lead to early diagnosis and earlier management, especially if require intervention	There is variability in reporting and the time frame in which this is completed between trusts and there is a clinical standard for this set by the College of Emergency Medicine www.collemergencymed.ac.uk/code/document.asp?ID=4688	Please see the standard set by the College of Emergency Medicine: www.collemergencymed.ac.uk/code/document.asp?ID=4688

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
4	CT scans	SCM – FL	Key area for quality improvement 1	Access to Imaging for patients with head injury	Head injury is the commonest cause of death and disability in UK citizens aged < 44. I.4 million patients every year attend the Emergency Departments with head injury but only a small proportion have brain injuries. Rational selection for imaging expedites life saving neurosurgery and declutters overstretched emergency departments however there is evidence that access to imaging is variable for emergency departments across the country	Recent NICE guidance and papers suggesting benefit from implementation (Fuller) but evidence that implementation is variable (Mooney).CG 176 and Mooney et al EMJ 2011, Fuller et al BJNS 2011
5	CT scans	Royal College of Nursing	Key area for quality improvement 2 Clarity on CT scan timescale	Head injuries occur frequently among children. The criterion for CT scanning needs more clarity as currently we risk over scanning.	More is needed on when, who and time scale for CT scans for children.	http://pediatrics.aappublications.org/content/early/2011/05/05/peds.2010-3373.abstract
6	CT scans	College of Emergency Medicine	Access to CT imaging	It is vital that patients that require scans of the head and neck are performed rapidly and without delay.	There is still variability in CT scans being performed and not readily available as require agreement by radiologist. This may be more difficult out of hours when a radiologist may not be onsite.	See head injury standard set by the College of Emergency Medicine www.collemergencymed.ac.uk/code/document.asp?ID=4688
7	CT scans	SCM – KH	Key area for quality improvement 1 Written radiology report available within 1 hour of the scan being performed.	For the radiology report to be meaningful in an acute setting, the report must be issued in a timely manner.	Currently there is perceived to be variation in how radiology reporting services are delivered across the UK. Modern radiology information systems make transmission of written reports easier than in the past. A written	CG 167

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					report (even if 'provisional') is better than a verbal report.	
8	CT scans	SCM – KH	Key area for quality improvement 2 Adults over 65 on warfarin who sustain head injuries should now be scanned.	The updated guidelines reduced the threshold for scanning adults over 65 who are on warfarin.	Patients over 65 on warfarin are more prone to intracranial bleeds, some of which may have been missed on the previous iteration of the guidelines. This was a significant change so it is important that clinicians are encouraged to change practice to reflect this.	pp.120 CG167
9	CT scans	SCM – VV	Key area for quality improvement 3	All patients with severe head injury (GCS < 8/15) should have CT scan of the brain with in 1 hour of presentation.	NICE guidelines suggest CT Scan should be performed within 1 hour of identification of listed risk factors. This should be followed by a provisional report in 1 hour. While this may be the standard in most specialist centre, may not be the case in non-specialist centre. This situation may be further complicated by lack of expertise to interpret the CT scan and initiate further action. An audit of CT scan in head injury done by Royal college of radiologist and published in 2005, showed only 69% of scan reached the standard.	The audit is available online.
10	CT scans	SCM – KH	Key area for quality improvement 5 CT cervical spine scan for patients over 65 instead of plain X-rays	Patients over 65 often have considerable degenerative changes, which can limit the interpretation of the X-rays.	There is perceived to be variation across the UK in the approach to cervical spine imaging in this patient group. This may reflect to some extent local variation in	pp. 64 CG 167

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					access to CT scanning.	
11	Specialist skills and services	SCM – VV	Key area for quality improvement 2	Pre hospital care and direct transportation of patients with severe traumatic brain injury to a specialist neuroscience centre, bypassing nearby non-specialist hospital. There is some evidence that direct transfer to specialist centre is advantageous to patients because of rapid access to neurosurgery and neuro-critical care.	A recent study from English National Trauma Registry of more than 7000 patients reported that there was similarity between prehospital and ED vital signs, and lack of association between EMS interval and physiological deterioration. This may support the strategy of direct transportation of patients to specialist centres. Direct transfer to distant specialist centre may result in good outcome of severe traumatic brain injury patients, because of rapid access to decision-making, neurosurgery and neuro-critical care. But this has to be balanced with the deterioration in physiology during the transfer. Patients with time critical injuries with mass lesion such as with extradural hemorrhage may benefit from this approach.	http://informahealthcare.com/doi/abs/10.3109/10903127.2013.831507
12	Specialist skills and services	SCM - VV	Key area for quality improvement 1	Currently patients are taken nearest acute hospital after traumatic brain injury, which may or may not be a neuroscience centre. There is good evidence that early transfer to neuroscience centre of patients with severe TBI is associated with gains in survival.	Risk assessment in neuro-critical care a recent prospective cohort study published in June 2013, concluded that patients presenting at non neuroscience centre after risk adjustment early transfer was associated with gains in survival. Early' transfer (within 18 hours) group reported higher lifetime QALYs. There is	Please see health technology assessment website. http://www.journalslibrary.nihr.ac.uk/hta/volume-17/issue-23.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				Recently published NICE guidelines recommend that all patients irrespective of the need of neurosurgery would benefit from transfer to neuroscience centre	wide variation in practice depending on geographical location.	
13	Specialist skills and services	SCM – KH	Key area for quality improvement 4 Decision to transport patients to the most appropriate facility	Head injured patients often have a better outcome when treated at specialist units.	With the advent of major trauma centres, there is more variation between hospitals in ability to care for the head injured patient. Geographic considerations also play a major part in the transport decision making process and vary widely across the UK.	pp. 62 CG 167
14	Specialist skills and services	SCM – SC	Key area for quality improvement 5; GP's and other community staff should have access to bespoke advice and information from brain injury rehabilitation specialist centres for complex cases, who are not recovering as predicted. Easily accessed advice from specialist practitioners might provide effective clinical information and solutions to more isolated practitioners,	Often neuropsychological Advice regarding assessment of possible emotional disturbance, memory disturbance, behavioural or personality changes is often helpful to practitioners. . Information about access to brain injury rehabilitation services, using anything from telemedicine to local service involvement, could be to the patient's benefit. There could be effective improvement in the clinical support offered by specialist centres to those working in the community or in General practice with less access to specialist help for brain injury.	. Those in isolated communities, or those will poor access to specialist centres should have access to high quality, effective brain rehabilitation advice, at least..	This idea for quality improvement is based on my clinical experience rather than scientific studies.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
15	Specialist skills and services	SCM – SC	Key area for quality improvement 3 Training programs regarding the basic principles of cognitive assessment and neuropsychological rehabilitation should be made more available to medical and other members of the multi disciplinary team., More should be commonly known about assessment of cognitive impairment and 'personality changes' following brain injury. Such information should also help people with brain injury access appropriate rehabilitation services.	Formulating reasons for symptoms and difficulties will lead to improved management and help for people with brain injury. Improved information should lead to more appropriate use of rehabilitation services. The teams need to understand more about 'executive function', what sort of brain function that is, how to assess it and how to manage it if there are deficits discovered. Problems such as difficulties multi tasking, impulsivity, bad/irritable mood, fatigue and sleep disorder need to be picked up and treated to maximise support to people with a brain injury.	We want people with brain injury to be enabled to get back to living their lives, as they would chose.. Delivery of high quality, effective training to the team regarding basic neuropsychological rehab principles, and training in early identification of mood and executive function problems, would enhance treatment efficiency and effectiveness..	There is research showing that support, cognitive rehabilitation and psychological therapies are can effectively help people. Logically, people cannot be helped if their symptoms are not picked up. The training would expand basic knowledge to help professionals pick up subtle cognitive and mood problems that can affect behaviour and ability. SIGN guidelines support the notion that patients with brain injury are assessed and supported effectively through recovery,. SIGN guidelines for symptoms associated with brain injury, such as epilepsy, also support the notion that better assessed and informed people manage the condition better.
16	Specialist skills and services	British Orthopaedic Association Patient Liaison Group	Management of infants, children and adolescents	Different age groups (neo-nates, Children, adolescents and adults) need different management skills.	Not all major trauma centres have paediatric skills: not all paediatric hospital A&Es have head injury management skills. Appropriate triage from site of injury, and clear communication channels between appropriately skilled teams must be built into the guidance.	As a lay representative who attends both NICE Major Trauma GDG and NHS England Major Trauma CRG meetings I have had discussions with a range of Paediatric and Adult Trauma Specialists about this issue.
17	Specialist	British Society of	Availability of specialist	Although many paediatric scans	Accurate interpretation	

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
	skills and services	Paediatric Radiologists	neuroradiology opinion for interpretation of paediatric CT head scans	in the context of major trauma will be dealt with at trauma centres, many scans are performed at DGH level where there may be no radiologist with an interest in paediatrics available.	(particularly of subtle abnormalities) requires experience. Paediatric neuroradiology expertise concentrated in regional centres. Paediatric neuroscience networks (in which neuroradiology will be integral) are recognised as a key area for development at regional and national level (e.g. Paediatric Neurosciences CRG 5 year strategy)	
18	Specialist skills and services	British Society of Paediatric Radiologists	Specialist review (by radiologists) of scans in people with possible non-accidental head injury	Radiological signs of NAHI can be subtle and are easily overlooked by radiologists who see small numbers of such cases. Failure to recognise such signs may lead to missed diagnosis and the possibility of a child being discharged back into an abusive environment. Imaging networks (as discussed above) would allow remote reviewing of images by more experienced radiologists	NAHI associated with high morbidity and mortality	www.nice.org.uk/CG176 Standards for the Radiological Investigation of Non-Accidental Injury Royal College of Radiologists / Royal College of Paediatrics and Child Health March 2008
19	Specialist skills and services	College of Emergency Medicine	Access and timely response for neurosurgical opinion	Early neurosurgical opinion is vital for the severely head injured patients that may need transfer as time critical for interventions e.g. extradural haematoma	The London Trauma Network has identified that there are immense capacity issues with neurosurgical beds and can lead to patients being transferred out of the network	The Trauma Audit and Research Network (TARN) www.tarn.ac.uk collects data on transfers to neurosurgical centres, including timing.
20	Specialist skills and services	SCM – VV	Key area for quality improvement 5	On rare occasions patients may need urgent transfer to neuroscience specialist centre for	Critical care capacity is a common problem in specialist centre. Most head injured	Report of the working party on the management of patients with head injuries. Royal College of

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				time critical, life saving, decompressive surgery for haematoma. Lack of critical care bed capacity at the referral centre should not be the reason to delay the transfer. Patient should be transferred promptly to the centre and bed found post operatively.	patients who need life saving, decompressive surgery will also need critical care bed post op. Availability of bed should not be the deciding factor when time critical surgery is needed. Patients should be transferred nevertheless and bed found after the surgery either in the same unit or in a different specialist centre.	surgeons 1999 also states this one key area of improvement. There is no formal evidence in support of this area for quality improvement. But it makes logical sense to avoid delay.
21	Specialist skills and services	College of Emergency Medicine	Preparation for transfer to neurosurgical centres	Patients with adequate skills in transferring patients should be involved with transfer of a head injured patient, including a nurse and doctor. This should also include adequate equipment and communication between centres. This would ensure safe transfer of all head injured patients	A patient with head injury may deteriorate during transfer and may need intervention on route. Therefore, a clear protocol/guidance is required for the transfer of the head injured patient.	Please see the recommendations for safe transfer of patients with brain injury the Association of Anaesthetists. www.aagbi.org/sites/default/files/braininjury.pdf
22	Specialist skills and services	NHS England	Separately list each key area for quality improvement that you would want to see covered by this quality standard.	All patients with significant head injuries to be managed in a neurosciences centre Consultant neurosurgeons involved in all critical treatment decisions Seniority of surgeon involved in neurosurgical operation Guidance on which outcome measure should be used e.g. GOS Availablility of neur-rehab. What		

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				percentage of beds should be for neurorehab. What level of reabb available. These could be based upon population statistics Define key members and specialties required for comprehensive neurorehab Clear time-lines for key parts of patient journey e.g. time to CT; time to craniotomy Clear guidance on anaesthetic drugs for induction / intubation		
23	Mild traumatic brain injury	SCM – SC	Key area for quality improvement 2: Patients with minor traumatic brain injuries should have an interview with a brain injury specialist within one month of their injury. At these times people should be aware of prognosis, with assessment and advice on management of symptoms of mood, fatigue and attention/learning/executive function, should they occur.	We know from literature on 'post concussion syndrome' that some with minor traumatic brain injuries have disabling symptoms which last many years. We know that some people who have suffered inflammatory disorders affecting the brain can be left with memory and executive cognitive problems. These people need to access services and information in a timely manner, before occupation and other aspects of daily life might be adversely affected.	Minor or mild brain jury represents the majority of brain injuries. We have a duty to ensure people have the right support and information about their specific brain injury to maximise their chances of making a good recovery and return to their normal life. Minor injuries can occur to disadvantaged populations who are at increased risk of falls, for example. We need to support these people as they recover. Other brain injured populations, such as those having suffered from encephalitis, or specific types of vascular disorder would be included in this group	SIGN 130 suggests that the majority of people with mild head injury should recover within 3-6 months of the injury. Other research has shown that psychological factors such as anxiety or trauma at the time of the blow to the head prolongs recovery time (King 2002).

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					(AcomAA's for example). Such people sometimes will have to cope with lasting cognitive impairment, for example.	
24	Mild traumatic brain injury	SCM – AW	Rehabilitation for Mild Head Injury, dissemination of understanding in health care professionals.	There are relatively large numbers of people who suffer a mild head injury and have non-specific symptoms.	Increased awareness that they may be reassured that the symptoms are benign and likely to settle within three months.	SIGN 130 Brain Injury Rehabilitation in Adults.
25	Acute phase provision of early neurological rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Neuro screening for people admitted to hospital with traumatic brain injuries who have changes on CT scan (Traumatic brain injuries screened in A & E need to be given appropriate advice regarding potential higher level cognitive deficits)	There is good evidence to show that an individual with even small higher level cognitive changes will have difficulties managing complex tasks, relationships, return to work etc	At present there are inconsistencies re: the management and assessment of cognitive difficulties post traumatic brain injury. There is a lack of resources to support the treatment on discharge of this patient group.	Consensus opinion College of Occupational Therapy Communicating Quality 3 – RCSLTs guidance on best practice in service organisation and provision Early management of patients with a head injury, SIGN 2009 Research conducted by Headway Recall of discharge advice given to patients with minor head injury presenting to a Singapore emergency department (2007) Heng KW, Tham KY, How KY, Foo JS, Lau YH, Li AY A survey of information given to head-injured patients on direct discharge from emergency departments in Scotland (May 2007) Kerr, J., Swann, I. & Pentland, B. A proposal for an evidenced-based emergency department discharge form for mild traumatic brain injury (August 2006) Fung M, Willer B, Moreland D, Leddy

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						JJ. Summary and agreement statement of the second international conference on concussion in sport (April 2005) McCrory P, Johnston K, Meeuwisse W, Aubry M, Cantu R, Dvorak J, Graf-Baumann T, Kelly J, Lovell M, Schamasch P. Information provision after mild traumatic brain injury (MTBI): a survey of general practitioners and hospitals in New Zealand (September 2004), Moore C, Leathem
26	Acute phase provision of early neurological rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to SCI prophylaxis in people with traumatic brain injury	Many of these patients will have associated other injuries as a result of trauma and many will not have a cleared spine thus this would need to be linked with any work on trauma and management of the patients with potential/diagnosed spinal injury. This should also consider use of collars as this can potentially adversely affect ICP.	Early neurorehabilitation in Critical care settings is suggested as beneficial to patients esp avoiding secondary complications and supporting early recovery. Positioning of the patient is affected by the use of collars etc which can adversely affect ICP.	Consensus opinion NSF for long term conditions
27	Acute phase provision of early neurological rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to neurotherapy input on intensive care unit/critical care in people with traumatic brain injury	Mobilisation when appropriate when their clinical condition permits as part of an active management programme	Minimises complications and optimises the long term recovery of individuals with traumatic brain injuries	NICE critical care and NICE for stroke (comparisons can be made) BSRM for trauma Consensus opinion OT/SLT/PT guidelines NSF for long term conditions
28	Acute phase	West Hampshire	Key area for quality	Referral/Transfer to	Inconsistency in when and where	National Definition Set for

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
	provision of early neurological rehab	Clinical Commissioning Group	improvement 3	Rehabilitation Ward or a Specialised Rehabilitation Unit: Criteria and timelines for referral and admission Supported by a Consultant in Rehabilitation Medicine Make up of MDT and availability Staffing levels Frequency of goal planning, MDT, family meetings MDT care plans initiated within 7 days Nursing care plans initiated within 24 hours Key Worker/advocacy role 24 rehabilitation	patients are rehabilitated	Specialised Services No 7: 'complex specialised rehabilitation for brain injury and complex disability (adult)'. Third Edition. London: Department of Health 2009 Turner-Stokes L, Nair A, Disler P, et al. Cochrane Database of Systematic Reviews. Oxford: Update software 2005; Issue 3 Turner-Stokes L. Evidence for the effectiveness of multi-disciplinary rehabilitation following acquired brain injury; a synthesis of two systematic approaches. J Rehabil Med 2008;40 (9):691-701 Turner-Stokes L (2010) Levels of specialisation in rehabilitation services. Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs British Society of Rehabilitation Medicine (2009) Standards for Rehabilitation Services Mapped on to the National Service Framework for Long Term Conditions British Society of Rehabilitation Medicine and Royal College of Physicians (2003) Rehabilitation

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						following Acquired Brain Injury National Clinical Guidelines
29	Acute phase provision of early neurological rehab	West Hampshire Clinical Commissioning Group	Key area for quality improvement 2	Screening for Rehabilitation/ Identification of Rehabilitation Needs Identification of rehabilitation needs, categorisation of patient according to need to determine commissioning responsibility (CCG or NHS England) if patient is eligible for transfer to a specialised rehabilitation unit	Inconsistency in when and where patients are rehabilitated	National Definition Set for Specialised Services No 7: 'complex specialised rehabilitation for brain injury and complex disability (adult)'. Third Edition. London: Department of Health 2009 Turner-Stokes L, Nair A, Disler P, et al. Cochrane Database of Systematic Reviews. Oxford: Update software 2005; Issue 3 Turner-Stokes L. Evidence for the effectiveness of multi-disciplinary rehabilitation following acquired brain injury; a synthesis of two systematic approaches. J Rehabil Med 2008;40 (9):691-701 Turner-Stokes L (2010) Levels of specialisation in rehabilitation services. Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs British Society of Rehabilitation Medicine (2009) Standards for Rehabilitation Services Mapped on to the National Service Framework for Long Term Conditions

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						British Society of Rehabilitation Medicine and Royal College of Physicians (2003) Rehabilitation following Acquired Brain Injury National Clinical Guidelines
30	Acute phase provision of early neurological rehab	West Hampshire Clinical Commissioning Group	Key area for quality improvement 1	Acute Management/Medical Interventions in the first 7 days Medical management (scans, drugs, surgical interventions) Start of rehabilitation MDT assessment guidance	From evidence presented to WHCCG hospitals vary in acute management, if you have had a stroke there are specific acute stroke guidelines, there are no updated guidelines (BSRM 2003) for this group of patients (that I am aware of). This group of patients may be managed on a general medical/surgical ward where staff do not have the experience of neurological conditions. Variability in initiation of rehabilitation – stroke guidelines are clearer and give direction and best practice	Acute Stroke RCP NICE guidelines British Society of Rehabilitation Medicine (2009) Standards for Rehabilitation Services Mapped on to the National Service Framework for Long Term Conditions British Society of Rehabilitation Medicine and Royal College of Physicians (2003) Rehabilitation following Acquired Brain Injury National Clinical Guidelines
31	Acute phase provision of early neurological rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to early rehabilitation in people with traumatic brain injuries	There is sparse evidence for the utilisation of prophylactic chest physiotherapy in this group of patients Although there is evidence for Rehabilitation within the first week there is little evidence of what this rehabilitation entails. For instance should prophylactic splinting also be considered? Many of these patients will have	Early neurorehabilitation in Critical care settings is suggested as beneficial to patients esp avoiding secondary complications and supporting early recovery. Guidance is needed.	NICE critical care and NICE for stroke (comparisons can be made) BSRM for trauma Consensus opinion OT/SLT/PT guidelines NSF for long term conditions

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				associated other injuries as a result of trauma and many will not have a cleared spine thus this would need to be linked with any work on trauma and management of the patients with potential/diagnosed spinal injury should this also consider use of collars as this can potentially adversely affect ICP.		
32	Acute phase provision of early neurological rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to ongoing inpatient rehabilitation (if indicated) in people with traumatic brain injuries	There is good evidence that appropriate and effective inpatient neurorehabilitation can drive significant improvements in the quality of life and health status of people with traumatic brain injuries – including returning to work. The threshold for referral should be when an individual is emerging from post-traumatic amnesia	Access to neurorehabilitation has improved but there are national inconsistencies in referral criteria for those individuals who sustained a traumatic brain injury, especially about the role of PTA in an individuals rehabilitation potential.	London consortium referral criteria BSRM for acquired brain injury and trauma Consensus opinion NSF for long term conditions
33	In hospital management planning	Association of Chartered Physiotherapists in Neurology (ACPIN)	Management of post-traumatic amnesia (PTA)	It is important to establish and determine whether an individual has capacity to self discharge Need to establish if in PTA as it means they are not “fit for rehabilitation” as they are unable to lay down new memories	To ensure safe discharge To identify ongoing cognitive deficits which require further management and treatment	BSRM for trauma and acquired brain injury OT/ SLT and PT standards and guidelines NSF for long term conditions
34	In hospital management planning	SCM – SC	Key area for quality improvement 1: Those with moderate to severe brain injury should have	Lack of knowledge, anxiety regarding management of cognitive, emotional and physical problems following moderate to severe brain injury can cause distress which is often alleviated	Different hospitals and Neuroscience centres have different access rehabilitation services for those with moderate to severe traumatic brain injury differently. While being aware of	SIGN 130 suggests that cognitive rehabilitation, for example, is effective in helping those with memory or executive function problems. Carney et al (1999),

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			assessment of rehabilitation needs with a care plan discussed and agreed before they are discharged from hospital. The assessment of need should be carried out by a doctor or member of the MDT who has specific knowledge of brain injury and rehabilitation (including cognitive rehabilitation in addition to physical rehabilitation) across a spectrum of injuries. High quality, effective Information on brain functions and brain injury rehabilitation should be readily available for people and family members as part of this process.. It would allow information about brain injury services to be given to people and their families, for consideration.	by appropriate support and rehabilitation treatments. Patient involvement, family involvement and careful consideration of each individual brain injury using, for example, neuropsychological assessments, would lead to better use of often scarce resources. Early identification of cognitive and emotional disturbance, social issues or other needs would allow problems to be assessed and managed at the earliest time.	the dangers of adding to administrative burdens, improved assessment might allow targeted referral onward to services that will be most effective in allowing people the best chance of recovery following brain injury. Lack of detailed discharge care plans can lead to a gap in time for people with a brain injury getting follow up rehab services. Research also points to the effectiveness of early intervention in brain injury, and the transition from hospital to community should be managed as well as possible to minimise distress and support rapid recovery of life style and ability. A National Standard for quality care would ensure more equality in people accessing services, perhaps. Less chance of a ‘post code lottery’, occurring regarding access to services.	fore example provided a systematic review of the literature and found two randomised controlled trials that found cognitive rehabilitation to be effective with brain injured populations who reported memory and executive problems.
35	In hospital managemen	West Hampshire Clinical	Key area for quality improvement 4	Discharge Planning Involve patient, family, MDT	Delays in discharge from rehabilitation	National Definition Set for Specialised Services No 7:

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
	t planning	Commissioning Group		This must be initiated at the start of rehabilitation Completion of SMART goals Integration of health and social care Signposting to voluntary organsations		'complex specialised rehabilitation for brain injury and complex disability (adult)'. Third Edition. London: Department of Health 2009 Turner-Stokes L, Nair A, Disler P, et al. Cochrane Database of Systematic Reviews. Oxford: Update software 2005; Issue 3 Turner-Stokes L. Evidence for the effectiveness of multi-disciplinary rehabilitation following acquired brain injury; a synthesis of two systematic approaches. J Rehabil Med 2008;40 (9):691-701 Turner-Stokes L (2010) Levels of specialisation in rehabilitation services. Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs British Society of Rehabilitation Medicine (2009) Standards for Rehabilitation Services Mapped on to the National Service Framework for Long Term Conditions British Society of Rehabilitation Medicine and Royal College of Physicians (2003) Rehabilitation following Acquired Brain Injury

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						National Clinical Guidelines
36	In hospital management planning	Association of Chartered Physiotherapists in Neurology (ACPIN)	Behavioural management plans for people in PTA	Individual can be increasingly agitated and restless secondary to being in PTA. Various strategies exist to exist in the management of this e.g. 1:1 nursing, low stimulus environment (ie a side room), appropriate pharmological management, optimal nutrition and fluid intake, monitor sleep/wake cycle, education & support for family, alert safeguarding/vulnerable adult staff member in the Trust. Where practicable allow for wandering in the environment (ie a locked ward)	An individual in PTA cannot be sectioned but detained under the mental capacity act (as it is a temporary state) Prevent harm to the individual and others	Consensus opinion Mental Capacity Act Deprivation of Liberties (DOLs) BSRM acquired brain injury Early management of patients with a head injury, SIGN 2009
37	In hospital management planning	Royal College of Paediatrics and Child Health	Key area for quality improvement 1 Good communication between tertiary head injury service and local secondary (and primary) care services prior to a head injured child or young person being transferred back to their local area.	Regular communication between a tertiary head injury service and local services facilitates transfer back to local services. This also allows local services to consider barriers to eventual discharge home and return to school well in advance since these barriers can take time to overcome and may require discussion with local commissioners. Lack of liaison until transfer back from a tertiary service to local services delays that transfer, fails to allow local services to consider the resources required to provide quality care to the child/young person after transfer and delays	Facilitating transfer from tertiary back to local services, improves the quality of care offered by local services after transfer and reduces the delay until eventual discharge home (and return to school for school aged children/young people).	Although published evidence is lacking, it is a common experience that poor communication between tertiary head injury services and secondary care services compromises transfer back from tertiary to secondary health services. The value of key-working in order to improve communication between health (and education/social care) professionals is well recognised as a means to improve the quality of support of children and young people with disabilities - Greco, V. & Department for Education and Skills (2005) *An Exploration*

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				the eventual discharge home. As part of the tertiary head injury service there should be an individual responsible for regular communication with local health services (and evidence that such communication has taken place well in advance of transfer back to secondary care services could be an auditable standard).		*of Different Models Multi-agency Partnerships in Key Worker Services for Disabled Children: Effectiveness and Costs,* DfES Publications. The importance of communication between critical care, community and primary care services is emphasised in NICE CG 83 – Critical illness rehabilitation (although this guideline does not cover children nor the particular situation of liaison between a tertiary service and local secondary care services, the principles of good communication apply to all forms of rehabilitation following critical illness).
38	Information provision and support groups	Association of Chartered Physiotherapists in Neurology (ACPIN)	Information for patients and families taking into account socio-cultural differences	It is widely recognised that patients and families benefit from information (through verbal and non-verbal methods) to support the recovery of the individual. It is important that this information is based on the individual and is not generic	It has been recognised that anyone with a long term condition needs appropriate and timely information. The service is currently inequitable across the country.	NSF for long term conditions NICE critical care guidelines Headway charitable organisation BSRM for acquired brain injury and trauma
39	Information provision and support groups	Headway – the brain injury association	Family support (ABI education / information to support decision making, as well as practical advice such as benefits / signposting to voluntary sector)	It is vitally important that standards such as this recognise the needs of close family members/carers. Headway's own research shows the strain that carers are under, and the damage caused by a lack	At present guidelines do not take adequate account of the needs of family members and carers	Acquired brain injury – the psychological and physical health effects on carers: https://www.headway.org.uk/research/acquired-brain-injury-the-psychological-and-physical-health-effects-on-carers.aspx

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			needs to be a focus throughout the care pathway from acute onwards	of support. The Headway Acute Trauma Specialists (HATS) project is aimed at providing support to family members and carers of people in the early stages after severe brain injury. They are based in neurological units across the West Midlands and North West, and are an invaluable service to the 500+ families they support each year. This type of specialist nurse support is common among other conditions, and is vital in a complex area such as ABI. We ask that the early management aspects of this quality standard make provision for specialist support nurses.		Headway Acute Trauma Support Nurse (HATS) North West: https://www.headway.org.uk/headway-acute-trauma-support-nurse-north-west.aspx West Midlands: https://www.headway.org.uk/headway-acute-trauma-support-nurse-west-midlands.aspx
40	Information provision and support groups	Association of Chartered Physiotherapists in Neurology (ACPIN)	Offer of support for patients and their families from voluntary and social care services	There is good evidence that appropriate and effective support from social care and the voluntart sector can help with the quality of life and health status of people with traumatic brain injury	Headway exists to provide essential voluntary care support which cannot be fulfilled by the current NHS service provision. There is currently an inconsistent service provision in the service of social care for this patient group	Headway – charitable Patient/ family satisfaction questionnaires NSF for long term conditions BSRM for acquired brain injury and trauma Consensus opinion Individual case examples (can be provided on request)
41	Information provision and support groups	Headway – the brain injury association	At all stages of rehabilitation and beyond (e.g. longer term residential care), there is a need to ensure all staff working	SIGN cites need at rehab level for attention training and use of compensatory strategies – these can only be effective when the workforce understands the rationale for this approach, and is		http://www.sign.ac.uk/guidelines/fulltext/130/index.html Need for adequate training highlighted by recent Newsnight programme:

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			directly with service users who have sustained ABI have had ABI awareness training as a minimum requirement.	able to undertake a consistent approach based on this knowledge. Headway Groups and Branches already provide a vital, expert resource and many offer outreach/community rehabilitation services. This should be taken into account in the new guidance.		https://www.headway.org.uk/news/newsnight-exposes-varying-levels-of-brain-injury-care.aspx Headway Groups and Branches: https://www.headway.org.uk/in-your-area.aspx
42	Information provision and support groups	Headway – the brain injury association	Units should be able to demonstrate ability to work with ABI e.g. via non-mandatory accreditation specific to ABI such as the Headway Approved Provider scheme.	The Headway Approved Provider scheme looks specifically at 33 core standards in regard of ABI – robust system Contact via Headway Helpline regarding families concerned about placements / ability of unit to work with ABI shows that this is a problem area.	Ensuring rehabilitation services have appropriate knowledge of the condition is key to providing the best care for the patient, and support to their families.	Headway Approved Provider scheme: https://www.headway.org.uk/approved-provider-scheme.aspx
43	Information provision and support groups	Faculty of Sports and Exercise Medicine UK	Advice for returning to work/school and/or sporting participation following concussive head injury	There is no published evidence that advice given to patients after an initial head injury assessment in an emergency department who are discharged with a diagnosis of concussion or minor/mild TBI is sufficiently detailed or always consistent with best practice advice contained in the Consensus statement on Concussion in Sport. In particular the detail around the need for physical and cognitive rest until asymptomatic and then a graded return to activity/return to work	The cornerstone of sports concussion management is physical and cognitive rest until the acute symptoms resolve and then a graded programme of exertion (that does not re-provoke symptoms) prior to medical clearance and return to play. This is an area expanded on in the Consensus statement and is evidence based and material to outcome The advice given on discharge should inform the patient (and or	Please see the Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012 for an overview. Br J Sports Med2013;47:250-258 doi:10.1136/bjsports-2013-092313. The April 2013 Volume 47 Issue 5 of the British Journal of Sports Medicine contains 12 review articles that form the basis of the evidence for the Consensus

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				and/or sport do not form part of the Jan 2014 Head injury guidelines. This guidance is evidence based and material to outcome. The experience of the Faculty and Sports Medicine specialists working in this field is that advice given is variable and lacking in detail.	his/her carers, parents/guardians) of the principles underpinning the recommended pathway to return to work/school and/or sport, the key stages in the pathway (the need to return to a symptom-free state and the model graduated return to play), anticipated timelines and the criteria to seek further contact with Healthcare professionals. There is emerging evidence that return to scholastic/other cognitive activity and physical activity whilst still symptomatic is associated with a prolonged recovery from the initial injury (ref Consensus statement). This can be addressed with clear advice at the time of discharge from the emergency department.	statement. The Faculty believes that this paper is not currently accredited by Nice and that data collection processes and quality indicators would need to be developed but would urge NICE to include the Consensus statement in its accredited documents and develop guidance, quality standards and data collection in this area. The Faculty believes that the development and dissemination of detailed advice to Healthcare professionals and audit of delivery is eminently achievable Fung M, Willer B, Moreland D, Leddy JJ. (2006). A proposal for an evidenced based emergency department dischsrge form for mTBI. Brain Injury, 20(9): 889-94 Kerr J, Swann I, Pentland B. (2007) A survey of information given to head injured patients on direct discharge from Emergency Departments. Emergency Medicine Journal, 24;330-332.
44	Information provision and support groups	Faculty of Sports and Exercise Medicine UK	Active management of the pathway to return to work/school and/or sport where recovery is	The principles of the return to work/school and/or sport pathway defined in the Consensus statement involve the active	It is estimated that 85% of concussions require no active medical intervention other than clinical assessment and	Please see the Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			within expected parameters	management of the pathway by healthcare professionals – key stages involve the clinical confirmation of the resolution of the acute symptoms and the monitoring of the graded return to play prior to a final medical clearance. The experience of the Faculty and Sports Medicine specialists working in the this field is that the involvement of healthcare professionals in this area in the UK (outside of elite sport) is very limited with limited understanding of the principles of best practice and their specific role in the pathway. Sporting National Governing Bodies are starting to set clear standards in this area.	appropriate advice – which cases will comprise the 85% cannot be predicted at initial presentation. Children and Adolescents should be viewed as special populations where the return to school and/or sport pathway should be more conservative and school attendance may need to be modified to avoid prolongation/provocation of symptoms. Whilst the advice given on discharge from emergency departments can inform the patient (and or his/her carers, parents/guardians) of the principles underpinning the recommended pathway to return to work/school and/or sport, each patient's recovery is accepted to be unique to the individual requiring follow up assessment and individualised advice from health care professionals. Our detailed knowledge of the risks of return to sport (and exposure to further head impacts) before full recovery is still developing but subsequent injury to a brain that is not fully recovered appears to be associated with a more prolonged recovery from the acute injury	Zurich, November 2012 for an overview of this area. Br J Sports Med2013;47:250-258 doi:10.1136/bjsports-2013-092313. The Faculty recognises the logistical challenge of implementing best practice in this area and the workload consequences of delivering against a currently un-serviced clinical need but believes that a review of current clinical practice in this area is needed.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					and/or an increased risk of developing neurodegenerative disease. This is an increasing concern in populations who have been exposed to frequent head impact injuries during sporting careers. Research into the long term consequences of such injuries is underway. Effective active management of the return to work/school and/or sport pathway will reduce the length of time a patient is symptomatic, shorten the return to work/school time, ensure that patients who are not fully recovered are not exposed to the risk of further head injury and is likely to mitigate the risk of longer term consequences of head injury.	
45	Follow up	College of Occupational Therapists	Support following discharge	Research shows this is a critical phase for recovery and understanding of the effects of the injury. Good understanding and management may reduce or minimise any long term problems for both the person with the brain injury and their family.	Patients should be followed up routinely by a specialist team and not asked to opt in to a service only if they have problems. Many people do not fully realise the extent of their problems at this stage.	Prospective longitudinal study of 26 patients and family members with data collected at 3-months post-discharge showed levels of depression and stress reported by participants with ABI were observed to increase over time. They concluded that the first 3 months after hospital discharge is a critical transition phase for psychosocial reintegration and emotional adjustment and demonstrated the need for holistic approaches to transition-

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						specific interventions (Turner et al. 2009).
46	Follow up	SCM – SC	Key area for quality improvement 4 People with more than one traumatic brain injury, should automatically be monitored for a specific period of time to ensure maximum recovery from each injury. People should be made aware of the risks of multiple brain injuries being cumulative in effect, for many cases.	The effects of multiple concussions (sorry for using the term!) can be cumulative. People with multiple brain injuries have a higher mortality rate.	The significance of Repeat Brain injuries can be overlooked, each brain injury treated, as it were, as the first one. People with repeat brain injuries often have certain lifestyles and risks associated with these lifestyles. Accessing these people with repeat brain injuries as they go through our hospitals offers a point of contact with vulnerable populations. An opportunity for providing more support, if these people would like it.	I have ongoing, unpublished research which suggests that people with 2-17 brain injuries in a 10 year period have a higher mortality rate than those with one brain injury in a similar period.
47	Follow up	Society for Research in Rehabilitation	Key area for quality improvement 3 Support as soon as the person leaves hospital	Research shows this is a critical phase for recovery and understanding of the effects of the injury. Good understanding and management may reduce or minimize any long term problems	Patients should be followed up routinely by a specialist team and not asked to opt in to a service only if they have problems. Many people fail to realise the full extent of their problems early after injury and particularly while they are still in hospital. It is only when they attempt to resume life roles that the true impact of the injury on work and social lives and relationships comes to light.	In a prospective longitudinal study off 26 ABI people and family members with data collected at 3-months post-discharge Turner et al. (2009) showed levels of depression and stress reported by participants with ABI were observed to increase over time. They concluded that the first 3 months after hospital discharge is a critical transition phase for psychosocial reintegration and emotional adjustment.(Turner, Fleming et al. 2009)

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
48	Follow up	Royal College of Paediatrics and Child Health	Key area for quality improvement 2 A review by the specialist, tertiary head injury team should take place 3 to 6 months after a child or young person has been discharged from the tertiary service	The extent of long-term complications following head injury (especially psychological, learning and emotional issues), only become apparent over time.	In the long-term, secondary and primary health services (with local educational and social care services), are responsible for supporting children and young people who have had severe head injuries. However, severe head injuries are relatively uncommon and so a review by the specialist, tertiary head injury team would help to identify issues that local services need to address. This review should be part of the tertiary package of care for head injuries.	Although not aimed at children, NICE CG 83 – Critical illness rehabilitation recommends a functional reassessment 2 – 3 months after discharge from critical care (but for a head injured child, a reassessment at around 3 – 6 months would be more appropriate to allow complications of that injury to become apparent).
49	Follow up	College of Occupational Therapists	Access to services to support fatigue management following TBI	There is growing evidence that appropriate treatment of factors associated with fatigue following TBI (e.g. poor sleep, anxiety and Vitamin D deficiency) may help reduce incidence of fatigue and impact on levels of social participation, carer burden and QOL. Fatigue management guidance is required where treatment to remediate underlying symptoms is unavailable.	Fatigue is one of the most common sequelae following TBI (incidence of fatigue up to 70%) yet management advice remains limited because the aetiology is complex, there is no agreed operational definition nor measurement tools. No documents currently exist to guide clinicians in supporting people with TBI to manage their fatigue more effectively.	Schnieders J et al (2012) Factors contributing to Chronic fatigue after TBI in JHTR 27(6)404-412 Cantor JB et al (2013) What is post TBI fatigue? Neurorehabilitation 32:875-883 Ponsford JL et al (2012) Fatigue and Sleep disturbance following TBI- their nature, causes and potential treatments JHTR 27(3)224-233
50	Follow up	College of Occupational Therapists	Specialist management of complex cases where return to work/school and/or sport is delayed beyond expected parameters	Persistent symptoms (>10 days) are generally reported in 10-15% of concussions. These symptoms are not specific to concussion and other pathologies should be considered. It is recommended that cases of concussion where clinical recovery falls outside the	Specialist clinical input is needed where clinical recovery falls outside the expected window – key components are a diagnostic review and review of management to include therapies such as cognitive, vestibular, psychological and physical	Please see the Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012 for an overview. Br J Sports Med2013;47:250-258 doi:10.1136/bjsports-2013-

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				expected window should be managed by healthcare providers with expertise in sports-related concussion. The experience of the Faculty and Sports Medicine specialists working in this field is that current NHS service provision is underdeveloped in this area and that patients with delayed recovery are often unable to access specialist expertise.	therapies as well as consideration of a graded exercise programme that does not exacerbate symptoms. Inability to access specialist expertise and associated appropriate therapies is likely to be associated with an increased length of time a patient is symptomatic, lengthen the time to return to work/school and/or sport. This will impact negatively on outcome in the short, medium and long term.	092313 Please also see Br J Sports Med2013;47:308-313 doi:10.1136/bjsports-2013-092255 for a review of this area.
51	Post-acute phase rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to neuro occupational therapy, speech and language therapy, physiotherapy, neuropsychology and social services in people with traumatic brain injury	There is good evidence to show that MDT assessment and treatment and those with specific neuro experience ensure better long term management of patients with traumatic head injuries (same theory as anyone with a neurological diagnosis)	Identified that you need specialist input to optimise patient outcomes e.g. survival rates, quality of life, return to function and return to work	BSRM for trauma and acquired brain injury OT/ SLT and PT standards and guidelines NICE critical care guidelines NSF for long term conditions
52	Post-acute phase rehab	Headway – the brain injury association	To support emotional wellbeing, all rehab provision needs to ensure access to personalised and meaningful activities as part of therapy / alongside such provision	Feedback from family members of residents in Headway Approved Providers shows the importance of providing additional, meaningful activities that are personalised to the individual.	Increase quality of life and engagement in the rehabilitation process. Ensuring individuals receive tailored rehabilitation programmes can help to increase independence.	Work to increase meaningful activity in long-term care settings (including rehabilitation) is being promoted by Scotland's Care Inspectorate. For example: http://www.careinspectorate.com/index.php?option=com_content&view=article&id=7890:rehabilitation&catid=320&Itemid=594

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
53	Post-acute phase rehab	Headway – the brain injury association	Placement must be made in facilities that match the specific care needs of the individual, e.g. complex care / altered states of consciousness / specialist outreach rehab.		Feedback from our helpline shows that patients are often placed in settings that are inappropriate to their needs. This can occur from early acute stages to community hospitals further down the rehabilitation pathway. It can even occur with patients in a reduced consciousness state, such as MCS/VS. Feedback from our Approved Providers who have taken tertiary referrals from a prior inappropriate setting that has failed to meet service user needs. As stated above, in the longer term, Headway Groups and Branches often provide an excellent service for further rehabilitation and support, and their activities should be taken into account in this new quality standard.	
54	Post-acute phase rehab	University of York	Assessment of long-term rehabilitation needs for adults with brain injury	1. It is important to assess the full range of needs (including health, social, economic, etc.) that service users may have and the outcomes they want to achieve. 2. Rehabilitation teams need to be able to demonstrate their effectiveness to commissioners and service users.	1a. Our research suggests that the full range of service users' needs are not always assessed. 1b. Assessing all of the outcomes important to service users ensures that key issues are covered and reflects that achieving one outcome could be dependent on achieving another. (Service user defined outcomes	Please see NIHR commissioned research (09/1816/1004) 'Outcomes Assessment for People with Long-Term Neurological Conditions: a qualitative approach to developing and testing a checklist in integrated care'* Further information is available at: bit.ly/LTNCoutcomes

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					are inter-related.) 2. Current assessment tools may not adequately capture the broad range of activity of rehabilitation teams. This limits their ability to demonstrate their impact and quality to commissioners.	**Please note that this research is not brain injury specific, It focused on five neuro-rehabilitation team, two of which worked with people following a brain injury.*
55	Post-acute phase rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Access to community rehabilitation (including vocational rehabilitation and cognitive rehabilitation) in people with traumatic brain injuries	There is good evidence that appropriate and effective community rehabilitation can drive significant improvements in the quality of life and health status of people with traumatic brain injuries – including returning to work.	At present there is a gap in provision of community rehabilitation for individuals who sustained a traumatic brain injury. Waiting lists currently exist which is not ideal to support the transition from hospital to community. This can impact on an individuals ability to maintain a satisfactory quality of life and can detrimentally affect the health status of patients	Gap analysis data being collected through TARN (trauma audit research network) NSF for long term conditions Consensus opinion and individual case examples (3 years data being reviewed by a major trauma centre) BSRM for Acquired Brain Injury and trauma
56	Post-acute phase rehab	Royal College of Nursing	Key area for quality improvement 3 Level and availability of facilities for post paediatric head injury rehabilitation	Currently this is very limited. Only two? Facilities are usually far from the child's home and family.	More investment for paediatric rehabilitation nearer to localities. Development of rehabilitation spokes to manage ongoing care following initial intervention at specialist centres. More resources needed towards prevention.	
57	Post-acute phase rehab	West Hampshire Clinical Commissioning Group	Key area for quality improvement 5	Follow up Rehabilitation Referral for community rehabilitation via the most appropriate team – generic rehab team, out patient services, neuro rehab teams Vocational rehabilitation	Inconsistencies in service provision available	British Society of Rehabilitation Medicine (2009) Standards for Rehabilitation Services Mapped on to the National Service Framework for Long Term Conditions

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
						British Society of Rehabilitation Medicine and Royal College of Physicians (2003) Rehabilitation following Acquired Brain Injury National Clinical Guidelines
58	Post-acute phase rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Goal setting throughout the patient pathway	Goal setting has been identified as a key component in the rehabilitation of any individual with a long term neurological condition. Using goals it can drive improvements in the quality of life and health status of people with traumatic brain injuries	Goal setting in traumatic brain injury patients is inconsistent. It is difficult to establish goals whilst a patient is in post-traumatic amnesia but more individual goal setting approach needs to be considered.	Comparisons can be made with stroke guidelines Bridges goal setting training in stroke care BSRM for trauma and acquired brain injury NSF for long term conditions Consensus opinion
59	Post-acute phase rehab	SCM – AW	Efficient, targeted use of Botulinum Toxin in focal spasticity management.	To improve clear understanding of clinical and/or cost effectiveness.	Improvements in joint position or spasticity may be clinically important or cost effective, benefits of greater understanding of this and the importance of the role of the MDT when considering use of this treatment.	SIGN 130.
60	Post-acute phase rehab	Association of Chartered Physiotherapists in Neurology (ACPIN)	Community follow-up	Community follow-up is required to provide lifelong support and avoid escalation of service need. Patients with ABI can have instability in their physical and psychological presentation. Escalation of the presentation often will need specialist MDT advice and input to de-escalate	This will affect their personal circumstances which should be possible to be managed locally effectively without taking them out of their supported environment. If escalation intervention at home or in community setting is delayed. These escalations can become much worse leading to breakdown of the home or community support mechanism and ultimately leading to re-admission on social or other grounds	Mid and South Wales Neuroscience review Community models (October 2010)

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
61	Post-acute phase rehab	College of Emergency Medicine	Rehabilitation following head injury	Patients who have sustained a head injury may suffer with cognitive impairment and other morbidities that require a multi-disciplinary approach to care	There is a scarcity of neuro-rehabilitation centres dedicated specifically for the head injured patient. Dedicated services are essential for improving patient outcome.	The London Trauma Network has noted the limited rehabilitation services available.
62	Post-acute phase rehab	College of Occupational Therapists	Unlimited ABI specialist community rehabilitation following discharge	The effects of ABI are often complex, long term and affect both the injured person and their family. It may take many years for a person to gain insight and fully adjust to their new altered self. A flexible access to services is required due to patients evolving needs.	The multidisciplinary team should consist of a rehabilitation consultant, case manager, occupational therapist, a vocational occupational therapist, neuro-physiotherapist, speech and language therapist and a social worker, TBI specialist cognitive behavioural therapist, neuropsychologist.	A Cochrane review of multidisciplinary rehabilitation following ABI suggested that patients discharged from in-patient rehabilitation should have access to outpatient or community-based services appropriate to their needs. Those with milder brain injury benefit from follow-up and appropriate information and advice (Turner-Stokes et al. 2005). This multidisciplinary working party recognise that the effects of ABI are long lasting and both patients and families need ongoing support and supervision for those patients that require it (British Society of Rehabilitation Medicine et al. 2003).
63	Post-acute phase rehab	College of Occupational Therapists	Specialist TBI vocational support for i) job retention ii) re-training	A systematic review showed that only 40% of people with ABI who were in work before their injury, returned to work at one and two years after their injury (van Velzen et al 2009b). The fact that the common age group to sustain a TBI is 15- 35 years	Provision of: specialist TBI vocational rehabilitation aimed at job retention ideally provided by an NHS TBI community team similar the Nottingham model (Radford et al 2013). Provision of a specialist unit to	A UK cohort comparison study of the Nottingham model showed 27% more people with moderate or severe TBI who received specialist TBI rehabilitation returned to work compared to those who received usual care. Additionally, the health and social

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				suggests this population faces a life time on benefits if they do not return to work (Maconochie et al. 2010).	aimed at helping people find new work based on the Aylesbury model (Tyerman et al 2008).	care costs of the specialist team were only £75 (£2007) more per person over 12 months than the usual care group (Radford et al. 2013). Vocational rehabilitation is recommended for people with TBI (British Society of Rehabilitation Medicine et al. 2004). Vocational rehabilitation is recommended for people with long term neurological conditions (British Society of Rehabilitation Medicine 2010).
64	Post-acute phase rehab	College of Occupational Therapists	Uniform services throughout the country	There is currently a postcode lottery as to whether you receive community rehabilitation following an ABI.		Post code lottery (Irwin Mitchell Solicitors 2013).
65	Post-acute phase rehab	Society for Research in Rehabilitation	Key area for quality improvement 2 Specialist Traumatic Brain Injury (TBI) vocational rehabilitation. Two models of vocational rehabilitation support for people with TBI are required:- One aimed at job retention for TBI	In a systematic review showed that only 40% of people with Acquired Brain Injury who were working before their injury, returned to work at one and two years after their injury (van Velzen, van Bennekom et al. 2009). The fact that the predominant age for sustaining a TBI is between 15- 35 years suggests this population faces a life time on benefits if they do not return to work (Maconochie and Ross 2010) Economical reasons	Provision of:- specialist TBI vocational rehabilitation aimed at both job retention and return to work ideally provided by an NHS community team similar to the Nottingham model (Radford, Phillips et al. 2013) Provision of a specialist unit aimed at helping people find new work based on the Aylesbury model (Tyerman. and Tyerman. 2008)	A UK cohort comparison study showed 27% more people with moderate or severe TBI who received specialist TBI rehabilitation returned to work compared to those who received usual care. Additionally, the health and social care costs of the specialist team were only £75 (£2007) more per person over 12 months than the usual care group (Radford, Phillips et al. 2013). Vocational rehabilitation is recommended for people with TBI (British Society of

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
			people who have a job to return to and can do so with support. The other targeted at helping those who cannot return to their previous work or employer or who require retraining or support to find new work.		Getting disabled people off benefits and back to work has been high on the UK Government agenda for more than 10 years (e.g. Building Capacity to Work (DWP, 2004) Health, Work and Well Being (DWP, 2005) Working for a Healthier Tomorrow (DH and DWP, 2008, Black and Frost, 2011) . Local and national policy support the establishment of vocational rehabilitation (VR) services and identify need for the NHS' role in providing vocational rehabilitation to be developed. (Black and Frost, 2011, Black, 2008, Quality Requirement 6 of the NSF for LTNC) Supporting people with long term conditions to remain in work is a UK Government priority and a health outcome (NHS Outcomes Framework, 2010, Health, Work and Well-being Programme, 2008) Work is a recognised Health Outcome NHS Outcomes Framework (NHS Outcomes Framework, 2010, Health, Work and Well-	Rehabilitation Medicine, Jobcentre Plus et al. 2004) Vocational rehabilitation is recommended for people with long term neurological conditions (British Society of Rehabilitation Medicine 2010) Quality requirement 6 of the National service framework for people with LTNCs is concerned with Vocational Rehabilitation. It states that people with LTNCs should have access to appropriate vocational assessment, rehabilitation and ongoing support, to enable them to find, regain or remain in work and access other occupational and educational opportunities. The Department of Health. The National Service Framework for Long Term Conditions. 2005. Co-ordinated, integrated and fit for purpose, A Delivery Framework for Adult Rehabilitation in Scotland Scottish Executive, 2007 NHS Outcomes Framework, 2010, Health, Work and Well-being Programme, 2008)

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					being Programme, 2008, Black 2008)	Better Heart Disease And Stroke Care Action Plan, The Scottish Government, 2009
66	Post-acute phase rehab	Society for Research in Rehabilitation	Key area for quality improvement 2a Improved mechanisms for inter-agency working to support a return to work following ABI/TBI	Whole systems approach Vocational Rehabilitation is a complex, multi-professional service spanning health, community and work settings. It interfaces with a wide variety of statutory services and schemes such as primary care, Department for Work and Pensions, and Access to Work, and with employers. Our case studies have uncovered some strategies that limit the potential for fragmentation that this complexity produces. These include the co-location of vocational rehabilitation and clinical staff in job retention services, and early engagement with employers, both of which raise the profile of work within packages of care for individual service users. The role of health services in funding vocational rehabilitation is specified more clearly. A whole systems approach to commissioning is also required, engaging with the full range of service stakeholders, to ensure coherence and stability	Policy calls for partnership working between NHS health care professionals and employment related services	Playford ED, Radford K, Burton C, Gibson A, Jellie B, Sweetland J, Watkins C. Mapping Vocational Rehabilitation Services for people with Long term neurological conditions: Summary report. Department of Health. March 2011. Available from: http://www.ltnc.org.uk. Co-ordinated, integrated and fit for purpose, A Delivery Framework for Adult Rehabilitation in Scotland Scottish Executive, 2007 Workforce Plus: An Employability Framework for Scotland, 2006 BSRM/RCP Inter-agency Guidelines, 2004

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				in service planning and provision. Greater clarity needs to be developed at a local level about the shared responsibilities between health and DWP. There is a need for shared understanding, shared goals, shared working and shared language around clear pathways. These need to be supported by shared management structures and accountability		
67	Post-acute phase rehab	Society for Research in Rehabilitation	Key area for quality improvement 1 ABI Specialist community rehabilitation once a person has left hospital, which is not time limited.	The effects of ABI are often complex, long term and affect both the injured person and their family.	The multi-disciplinary team should consist of a rehabilitation consultant, occupational therapist, a vocational occupational therapist, neuro-physiotherapist, speech and language therapist and a social worker	A Cochrane review of multidisciplinary rehabilitation following ABI suggested that patients discharged from in-patient rehabilitation should have access to outpatient or community-based services appropriate to their needs. Those with milder brain injury benefit from follow-up and appropriate information and advice. (Turner-Stokes, Disler et al. 2005) This multidisciplinary working party recognised that the effects of ABI are long lasting and both patients and families need ongoing support and supervision for those patients that require it (British Society of Rehabilitation Medicine and Royal College of Physicians 2003)

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
68	Post-acute phase rehab	College of Occupational Therapists	Effective communication between agencies from different sectors throughout rehabilitation	Given the heterogeneity of needs following TBI in adults, and the ages at which injuries can occur, there is a likelihood that multiple agencies from different providers will be involved with the person at different stages across the life course of the condition. It is essential that there is timely communication of services available and needs between these organisations with the injured person and their families as/when they need it throughout the life course of the condition.	Rehabilitation following TBI is recognised as a complex area requiring close liaison between different agencies involved and management of transitions. There should be recognition of the need for life-long contact to meet the changing clinical, social and psychological needs of patients and carers. As a consequence of significant changes to the structure, organisation and commissioning of healthcare services in the UK, rehab services for adults with TBI are now delivered by multiple agencies from statutory, independent and third sector organisations. There is a risk that people will fail to access needed services due to differences in service criteria, policies and procedures amongst different agencies. This risk increases when contracts for service delivery require renegotiation, providers may change and existing pathways are no longer effective.	Department of Health (2005) *National Service Framework for Long-term Conditions*. London: DH. UKABIF (2012) Life After Brain Injury – a way forward Royal College of Physicians & British Society of Rehabilitation Medicine (Turner Stokes, L. ed.) (2003) *Rehabilitation following acquired brain injury: national clinical guidelines.* London: RCP; BSRM.
69	Post-acute phase rehab	College of Occupational Therapists	Access to specialist rehabilitation services for people with 'hidden' neuropsychological disability & mental health comorbidity	Fair and equitable access to specialist rehabilitation services is required to improve psychosocial outcomes and reduce morbidity for people living in the community with hidden	Healthcare systems may be underestimating prevalence of people with cognitive and psychological/behavioural problems and funding for such services is sparse. It has been	Department of Health (2005) *National Service Framework for Long-term Conditions*. London: DH. Gladman J, Radford KA, Edmans

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				neuropsychological disability and mental health co-morbidity following TBI. There is emerging evidence for the effectiveness of this approach in terms of improved psychosocial and vocational outcomes, with evidence strongest for 'day programmes' (Geurtsen et al., 2010).	suggested that specialist community neurorehabilitation services are the exception rather than the rule, with needs of community dwelling people with 'hidden disabilities' following TBI especially poorly served. National specialist commissioning only occurs for in-patient settings and these people may not require in-patient services. Exclusion criteria within community services means people with hidden disability (cognitive, communication and emotional consequences) following TBI and mental health difficulties may not meet eligibility criteria for services and their needs may be left unmet. This may contribute to incidence of relationship breakdown, poor mental health and suicide rates post TBI.	JA et al (2007) Specialist rehabilitation for neurological conditions. Literature review and mapping study. Report for the NIHR Service Delivery and Organisation Programme. *In:* PROGRAMME , N. S. D. A. O. (ed) London: NCCSDO. Clinical Advisory Group (2010) *Regional Networks for Major Trauma.* NHS. http://www.excellence.eastmidlands.nhs.uk/EasysiteWeb/getresource.axd?AssetID=36224 Geursten GJ, Van Heugten CM, Martina JD, Guerts AC (2010) Comprehensive rehabilitation programmes in the chronic phase after severe brain injury: a systematic review. *J Rehabil Med, 42,* 97-110. Kim E et al (2007) Neuropsychiatric complications of traumatic brain injury: a critical review of the literature (A report by the ANPA committee on research). *Journal of Neuropsychiatry and clinical neuroscience, 19(2),* 106-127. UKABIF (2012) Life After Brain Injury – a way forward.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
70	Post-acute phase rehab	Society for Research in Rehabilitation	Key area for quality improvement 5 Uniform service provision throughout the UK.	There is currently a postcode lottery as to whether you receive community rehabilitation following ABI The vocational needs of people with acquired brain injury are estimated to be met in only 10% of cases (Playford et al, 2011, Deshpande and Turner Stokes, 2004)		Post code lottery (Solicitors 2013) Deshpande, P and Turner-Stokes L (2004) Survey of vocational rehabilitation services available to people with acquired brain injury in the UK. M. M. In Tyerman A, editors Vocational assessment and rehabilitation after acquired brain injury: Inter-agency guidelines. Playford ED, Radford K, Burton C, Gibson A, Jellie B, Sweetland J, Watkins C. Mapping Vocational Rehabilitation Services for people with Long term neurological conditions: Summary report. Department of Health. March 2011. Available from: http://www.ltnc.org.uk.
71	Post-acute phase rehab	College of Occupational Therapists	Vocational Rehabilitation	There is consistent evidence that specialist brain injury programmes for vocational rehabilitation are effective, and that the initial investment in rehabilitation is repaid in cost benefits. Specialist brain injury programmes offering vocational rehabilitation should be routinely provided for those individuals	TBI affects adults of working age. Concern based on clinical experience that current time limited and process driven DWP schemes are not effective for this population.	Royal College of Physicians & British Society of Rehabilitation Medicine (Turner Stokes, L. ed) (2003) *Rehabilitation following acquired brain injury: national clinical guidelines.* London: RCP; BSRM. Department of Health (2005) *National Service Framework for Long-term Conditions*. London: DH.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				who have the potential to return to paid employment.		BSRM (2010) Vocational Assessment and rehabilitation for people with LTNC: Recommendations for best practice.
72	Post-acute phase rehab	SCM – FL	Key area for quality improvement 3	Rehabilitation of patients with traumatic brain injury	Rates of disability are substantial post TBI – there is evidence that high quality rehab can improve this but an impression that access varies substantially across the country	See DH documents for regional trauma networks for adults and children and RCp guidance on rehabilitation
73	Pharmacological therapy	SCM – AW	Management of agitation/aggression following head injury.	This may impact adversely on the ability of the MDT to deliver rehabilitation input and the ability of the patient to take part.	Improve pharmacological management, with MDT input, allowing better rehabilitation outcomes for the patient. Consider use of propranolol or pindolol.	SIGN 130.
74	Pharmacological therapy	SCM – AW	Pharmacological therapy for patients in minimally conscious state, to permit involvement in assessment and rehabilitation.	The improvement of conscious levels possibly related to use of amantadine (or other agents) may allow further assessment and involvement in rehabilitation.	Improved conscious levels.	SIGN 130.
75	Out of scope / suggestion incomplete	British Orthopaedic Association Patient Liaison Group	Continuity of patient management pathways for transitional adolescent to adult units	A <16 year old who is badly injured should be treated in a paediatric unit – but transferred to an adult unit at 16.	The psychological impact of being transferred to an adult unit can be very disconcerting. As an <16 year old the responsibility of agreeing procedures and management has been the parent/carer's province. Quite suddenly the responsibility it transferred to the now 16-year-	“Making the transition from paediatric to adult services: a parent’s and young adult’s perspective on a long-term patient’s experience”. http://tinyurl.com/o88g7pk (www.boa.ac.uk)

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
					old. This should be carefully and empathetically managed	
76	Out of scope / suggestion incomplete	British Orthopaedic Association Patient Liaison Group	Assessment of head injury in older patients particularly those in care/care homes	Falls are very common with such patients and many have their balance affected by medication.		
77	Out of scope / suggestion incomplete	Royal College of Nursing	Key area for quality improvement 4 Investment into prevention	Reducing the cost to treat both acute and long term. Reducing risk of loss of life potential.	At present investment into preventing or reducing level of brain injury is limited. More resources are needed to allow implementation of education programmes and support for use of head protection such as cycle helmets can help reduce injury levels.	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2598379/ http://adc.bmj.com/content/90/11/1182
78	Out of scope / suggestion incomplete	College of Occupational Therapists	Research into what is effective for this patient group	A systematic review of multi-disciplinary rehabilitation for moderate to severe TBI in adults highlighted the limited evidence of the effectiveness of different MDT approaches (Brasure et al 2013). A systematic review of return to work after brain injury also highlighted the need for further research into this area (Saltychev et al.2013).	Evidence for what works for whom and when.	OUT OF SCOPE
79	Out of scope / suggestion incomplete	Elcena Jeffers Foundation		Living with this and related illness and access to plain statement of Rehabilitation and quality of life.	A better quality of life could be have if sick people would take the opportunity to start to think about buying back the NHS	It is time to Buy back the Health Services.
80	Out of scope / suggestion incomplete	Society for Research in Rehabilitation	Transitions from children to adult services			

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
81	Out of scope / suggestion incomplete	Society for Research in Rehabilitation	Patient centred care			
82	Out of scope / suggestion incomplete	Society for Research in Rehabilitation	Shared philosophy of care	There needs to be a shared philosophy of care and a recognised rehabilitation code to ensure equity of care for all		Best practice solicitors/ rehab code Association of Personal Injury Lawyers. Think Rehab: Best Practice Guide on Rehabilitation, 2nd Edition, APIL, Nottingham 2008, files.apil.org.uk/members/pdf/ApilDocuments/965.pdf, Accessed 15 Feb 2013.
83	Out of scope / suggestion incomplete	Society for Research in Rehabilitation	Key area for quality improvement 4 Research into what is effective for this patient group	A systematic review of multi-disciplinary rehabilitation for moderate to severe TBI in adults highlighted the limited evidence of the effectiveness of the different MDT approaches (Brasure, Lamberty et al. 2013) A systematic review of return to work after brain injury also highlighted the need for further research into this area (Saltychev, Eskola et al. 2013)		
84	Out of scope / suggestion incomplete	SCM – VV	Key area for quality improvement 4	Timing of surgery after diagnosis of mass lesions such as extradural and subdural haematomas. The effect of timing could be relevant in patients where compression of brain structures with time, could cause poor	There is no consensus as to what is the right time interval between the injury and surgery where it is indicated. Generally it is accepted that patients with mass lesion should be operated within 4 hours of sustaining injury.	Brain Trauma foundation published surgical guidelines for management of traumatic brain injury 2006 provide a useful resource and commentary on the evidence supporting this area for quality improvement.

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				outcome.	A subset of patients who suffer neurological deterioration such as “blown pupil” or sudden lowering of consciousness may need surgery earlier than 4 hours. Time from neurological deterioration to surgery is more important than time between trauma and surgery. In these patients, surgical decompression should be done possibly within an hour of deterioration. Every hour delay in surgery is associated with progressively worse outcome.	https://www.braintrauma.org/pdf/protected/Surgical_Guidelines_article_2.pdf.
85	Out of scope / suggestion incomplete	SCM – FL	Key area for quality improvement 2	Indications for neurosurgery for patients with traumatic brain injury	There are no UK guidelines for this but the impression is that practice is widely variable across the country. Practice could be harmonized for patient benefit	See Brain Trauma Foundation guidance for indications for neurosurgery on various types of traumatic brain injury
86	Out of scope / suggestion incomplete	Royal College of Nursing	Key area for quality improvement 1 Use of inflammatory marker S100B	The potential use of inflammatory marker S100B in decision making for CT scanning where there is equivocation or potential risk of over scanning particularly in children	Where CT scanning is advocated within a delayed fashion - i.e. > the current one hour recommendation for ALL patients who fit clinical criteria the estimation of S100B during the intervening period (S100B peaks at around 3 hours) may negate the link for CT scanning altogether or conversely reinforce the need for scanning where its levels are elevated	Clinical validation of S100B use in management of mild head injury Calcagnile et al 2012 BioMed Central journal http://www.biomedcentral.com/1471-227X/12/13

ID	Cat	Stakeholder	Suggested key area	Why is this important?	Why is this a key area for quality improvement?	Supporting information
87	Out of scope / suggestion incomplete	SCM – KH	Key area for quality improvement 3 Pre-injury baseline for dementia patients with head injury should be assessed.	This was underemphasised in previous guidelines. The rising rates of dementia among our increasingly ageing population make this a significant area for emphasis.	The contribution that elderly patients who may have dementia make to the numbers of head injuries is becoming more significant.	pp. 61 CG 167