Scottish Acquired Brain Injury Network (SABIN)

Traumatic Brain Injury in Adults

Service Mapping Report, 2019-20

Report published 14th July 2020

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1. Introduction

The Scottish Acquired Brain Injury Managed Clinical Network (SABIN) was set up in 2006, in response to recognition that services for brain injured patients in Scotland were 'patchy and in need of improvement'[1]. The responsibilities of managed clinical networks are set out in detail in government papers[2,3,] however, the main aim in setting up the SABIN network was to improve the quality of, and access to, care for patients with acquired brain injury across Scotland.

The work of the SABIN network was reviewed in 2017, and one of the recommendations of the review report[4] was that SABIN should repeat and update the 'service mapping' exercise, first carried out by the network in 2009[5]. Work on this started in 2018 and this report has been produced in response to that recommendation.

Brain injury is the most significant cause of disability in working-age adults in Scotland. Patients with the most severe brain injuries will often be under the care of many different departments and teams, and for patients in some areas, their care may be provided from across Scotland and through a number of different hospitals and care settings. One thing that this report has highlighted is the difficulties for both staff and patients and families in negotiating these complex pathways. The number and variety of different specialities and units involved means that creating a consensus for change and improvement can be challenging.

Ten years on from the original service mapping report, we are at a time of major financial investment into trauma services by Scottish Government. This second service mapping report aims to set out how services for a brain injured patient looked in 2018-19 across different NHS Boards. The report also notes some of the issues and areas for improvement that have been highlighted by staff delivering care in hospitals across Scotland. Section 3.6 provides a snapshot of the investment and some of the initiatives that are planned to improve NHS services as part of the major trauma work.

It is hoped that this significant investment, with the attendant recruitment, training, reconfiguration of patient pathways and new quality indicators associated with the Scottish Trauma network will go far to address the historical challenges that have faced brain injury care in Scotland. SABIN is delighted to welcome this initiative and SABIN members will continue to work with the trauma network and other stakeholders to improve the care of patients with Acquired Brain Injury across Scotland. A series of recommendations can be found in Section 2.

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Consultant Neurosurgeon
Lead Clinician and Chair, Scottish Acquired Brain Injury Network

2. Executive Summary and Recommendations

Patients with Acquired Brain Injury (ABI) in Scotland experience poor outcomes, with the prevalence of disability after Traumatic Brain Injury (TBI) particularly high[6]. Ten years on from the first service mapping exercise, and many changes to the services to TBI patients are underway in NHS Boards across Scotland. It is hoped that the significant and very welcome investment in the Scottish Trauma Network infrastructure will lead to better and more streamlined services for ABI patients.

For the purposes of this document, the terms 'head injury', 'acquired brain injury' and 'traumatic brain injury' are used synonymously although this is not strictly accurate, for example an abrasion or laceration to the scalp constitutes a head injury but may not be accompanied by any brain damage.

A number of key themes were repeatedly highlighted in interviews across Scotland.

1.1. The complex patient pathway

This mapping exercise investigated the journey some patients with an ABI may take from Accident & Emergency (A&E) through Neurosurgery, Acute Medicine and Rehabilitation. Interviews were held with only a small proportion of service providers in each NHS Board, and on occasion, interviewees in the same NHS Board area gave different views of the patient journey. This highlights the complexity of the patient pathway requiring to be negotiated both by staff, their patients and their carers and families, and the need for effective communication channels.

Trauma co-ordinators have, in some areas of Scotland, started working with patients as the identified point of contact for families and carers throughout the patient's journey of care. SABIN welcomes the introduction of a single contact for patients and families (whether trauma co-ordinator or specialist ABI nurse) and would seek similar arrangements for ABI patients with non-traumatic brain injuries. The need for improved communication flows between the different departments and environments was also highlighted.

1.2. Rehabilitation

Trauma monies have enabled additional, highly specialist rehabilitation facilities to be planned. Investment into major trauma services was seen as very positive for ABI patients, although the full effects of this investment will not be seen until 2023/24.

Clear patient pathways will be of key importance, as will the provision of local step-down facilities, adequately staffed with individuals trained in the management of patients with an ABI. These pathways and the associated service provision require to extend into the social care setting, where suitable provision is required for the many patients that will require long-term support. Without investment at the end of the patient pathway, there will be significant delays and blocks throughout the patient's journey, as seen at present. At the time of writing, there were close to 140 specialist rehabilitation beds for patients with an ABI in Scotland. Consideration should be given as to whether this should be increased to meet national demand, as set out in BSRM guidelines[7]. All specialist units noted difficulties moving patients on to a suitable care environment in their area.

There is no reliable data auditing the length of time between referral to, and admission to specialist units. Inter-departmental transfers are not subject to waiting times targets.

Staff also highlighted the difficulty of finding a suitable setting for young people with brain injuries, and the need for forensic secure rehabilitation facilities for ABI.

The importance of training and suitable provision was highlighted, including within a Community setting. It should be noted that while a multi-disciplinary team may include physiotherapists, occupational therapists, speech and language therapists and nurses, they may not have benefited from training that would help them manage a patient's needs, for example conditions such as

epilepsy, spasticity, movement disorder, bowel and bladder dysfunction, depression or psychosis, related to their ABI.

At the time of writing there was a reported headcount of five specialist ABI nurses employed in the NHS in Scotland for an estimated 2,458 people with the most severe disability one year post-injury[8] (45 per 100,000 of population), a ratio of 1:491. For comparison, there was a reported headcount of 16 specialist motor neuron disease nurses employed in Scotland for a population of people with MND estimated at 400[9], a ratio of 1:25. It should be noted that ABI nurses could help a much wider group of patients that only those who remain severely injured a year after their ABI.

1.3. Challenging Behaviour

In the mapping exercise, we asked about the management of the acutely behaviourally disturbed individual (scenario C) and those with more persisting challenging behaviour (scenario D). This group includes younger patients with acquired dementia.

As with the report from 2009, most interviewees described ad hoc arrangements; recruiting extra nursing staff whenever possible with limited or no access to Registered Mental Nursing staff and/or to Liaison Psychiatry. Brain injured patients can be a risk to themselves, other patients and staff caring for them. Suitable facilities, with access to specialist advice and support should be available to manage these patients. Respondents valued the advice and support available from the national specialist centre for challenging behaviour (the Robert Fergusson Unit at the Royal Edinburgh Hospital), however, more needs to be done to provide adequate ongoing support for this small number of patients with very specific needs, and both SABIN and the STN are working to highlight this issue. The majority of difficulties relating to accessing specialist rehabilitation for patients with challenging behaviour centre around the problems units have in finding suitable onward placements for patients. In addition, there is very limited provision for 24-hour community care, suitable nursing home placements or appropriate social care beds. This leads to an accordant delay throughout the system, as suitable beds are not free to take new patients.

It is worth noting the issued raised in the National Prisoners Healthcare Network (NPHN) study[10] regarding people with ABI and challenging behaviour in a forensic setting. There is no medium secure specialist provision for such patients. A prevalence study on the entire population of Scottish prisons indicated around a quarter had been admitted with a head injury.

2.4 Vegetative and Minimally Conscious states

Patients in a vegetative or minimally conscious state require access to expert assessment and reassessment on a multidisciplinary basis and careful planning for their continuing care. SABIN would be keen to see a national approach to ensure sufficient trained staff, and pathways, within the NHS Boards, which include suitable nursing homes and staff training.

2.5 Recommendations

1. DATA
   Data should be collected and audited to monitor the delays patients experience when moving between hospital departments (e.g. from acute inpatient status to rehabilitation and beyond).

2. SPECIALIST NEURO REHABILITATION
   A strategic approach to the planning of brain injury services is required across Scotland, ensuring national provision of specialist rehabilitation, and local step-down inpatient neurorehabilitation facilities.

3. COMMUNITY REHABILITATION & SOCIAL CARE PLACEMENTS
   Integrated Joint Boards require to provide sufficient and suitable 24-hour rehabilitation and social care placements for people who will not benefit from further hospital inpatient rehabilitation. Staff specifically trained in the management of patients with ABI should be involved in their care.

4. EARLY REHABILITATION
   Processes should be in place for the early identification of ABI and early access to hyper-acute, specialist rehabilitation.[26]

5. SPECIALIST TRAINING FOR STAFF
   Rehabilitation units should be resourced with appropriate numbers of staff trained specifically in the management of ABI. This includes sufficient training, with neuropsychology and neuropsychiatry input. A good role model would be the provision of Motor Neuron Disease nursing. Once medically stable, patients should come under the care of a specialist in rehabilitation medicine with specialist ABI nursing support.

6. CHALLENGING BEHAVIOUR
   Suitable environments should be provided for managing patients with challenging behaviour safely, with the potential for further developing the outreach service from the Robert Fergusson Unit (within the Royal Edinburgh Hospital) for Boards caring for patients with persisting challenging behaviour. This should extend to suitable forensic provision for patients with an ABI and challenging behaviour.

7. SOCIAL WORK PROVISION
   Social work staff trained in the needs of patients with an ABI should be in place in each Board, with clear lines of communication across health and social care partnerships.

8. EQUITY OF ACCESS
   There requires to be a recognition of the needs of patients with non-traumatic brain injury within NHS Board plans.

9. YOUNG ADULTS
   A suitable ward environment for adolescents and young adults with an ABI should be included in plans.

10. FOLLOW-UP
    Access to follow-up for non-surgical patients with mild to moderate ABI (incl. telephone follow-up) should be provided, as per SIGN Guideline[11].

11. CONTINUITY
    A single point of contact should be provided for families (e.g. specialist ABI nurse / care manager) in each NHS Board for patients with traumatic and non-traumatic brain injuries.

12. PATHWAYS OF CARE
    Clear patient pathways should be agreed for all aspects of patient care and NHS Boards should audit against these.

13. INTEGRATED SERVICES AND COST EFFICIENCY
    Consideration of a fully integrated ABI / stroke service for some NHS Boards could be given in rural, remote and less resourced areas.

14. INJURY PREVENTION
    Falls awareness and alcohol management programmes should be in place in all NHS Boards.

3. Background

3.1 The impact of acquired brain injury

Brain injury is the most significant cause of physical disability in working-age adults in Scotland. Following severe traumatic brain injury, a disproportionate number of Scottish patients fail to have a good clinical outcome[6]. Injuries typically affect patients in their physical functions, but also in their cognitive abilities, emotional responses and behaviour.

3.2 The complex patient pathway

The vast majority of patients with an acquired brain injury do not go forward to neurosurgery (approximately 1% of the patients presenting to emergency departments require surgical intervention)[12]. Most are discharged from the emergency department (see Figure 1 below), and some may re-present later with complications as a result of their injury.

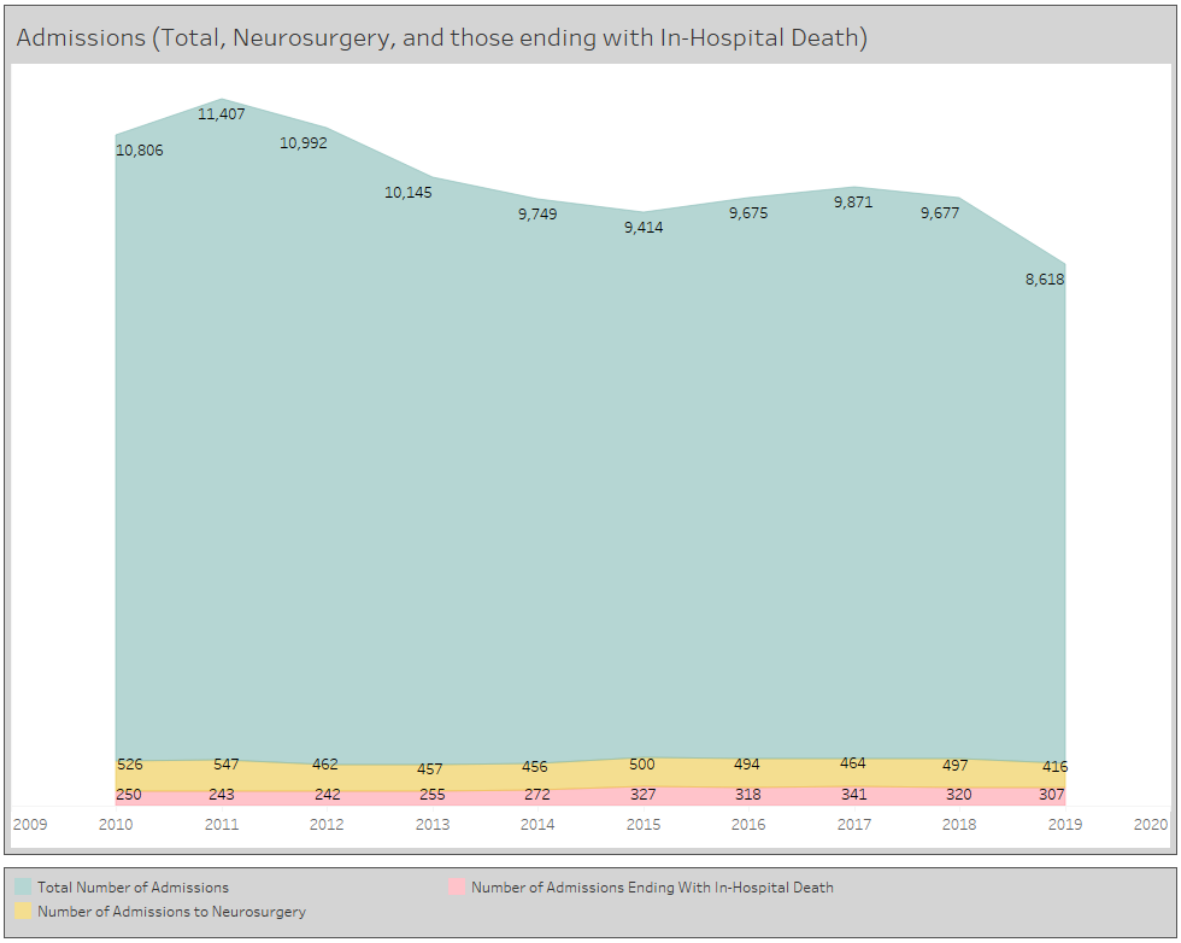


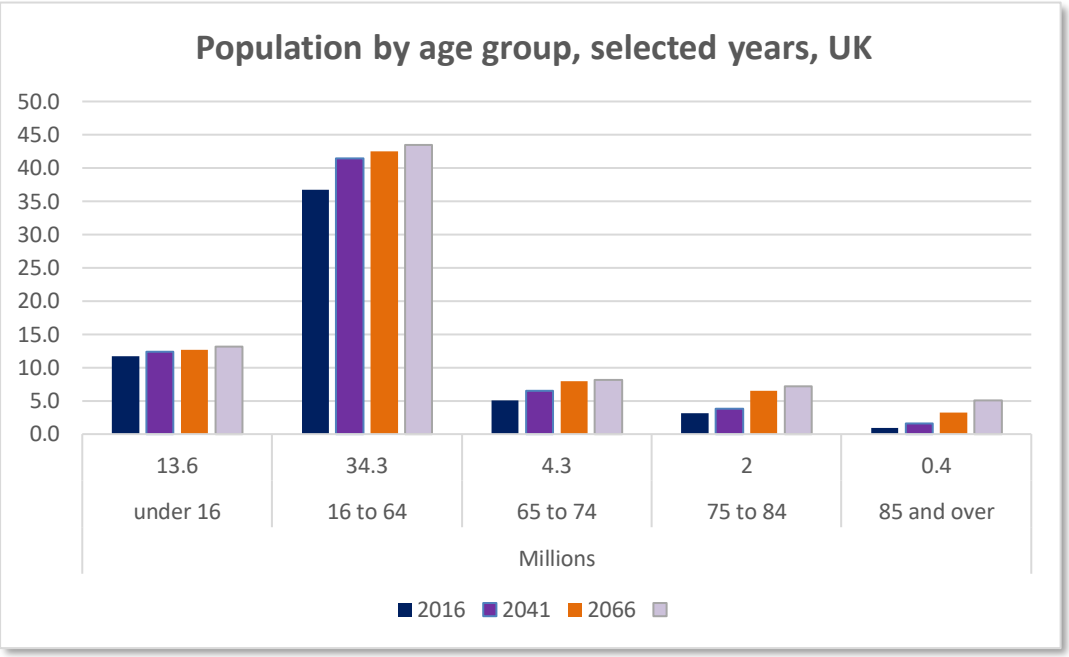
Figure 1 – Admissions to hospital and to neurosurgery, (2010-2019) and those ending in hospital deaths (source, Public Health Scotland data 2020)

However, for the patients that are admitted, the clinicians who care for a patient at the start of their journey (within emergency medicine, neurosurgery and Acute care) have a different specialist training, skill set and working environment to those in rehabilitation, and they often work on different hospital sites. This can introduce delays, and difficulties in communication and information flow for both patients and staff.

3.3 Changing demographics

Older people with co-morbidities and young men from disadvantaged social backgrounds are at particular risk of sustaining a brain injury, and in Scotland, as with the UK, alcohol has an involvement in over 60% of cases.[6,13]

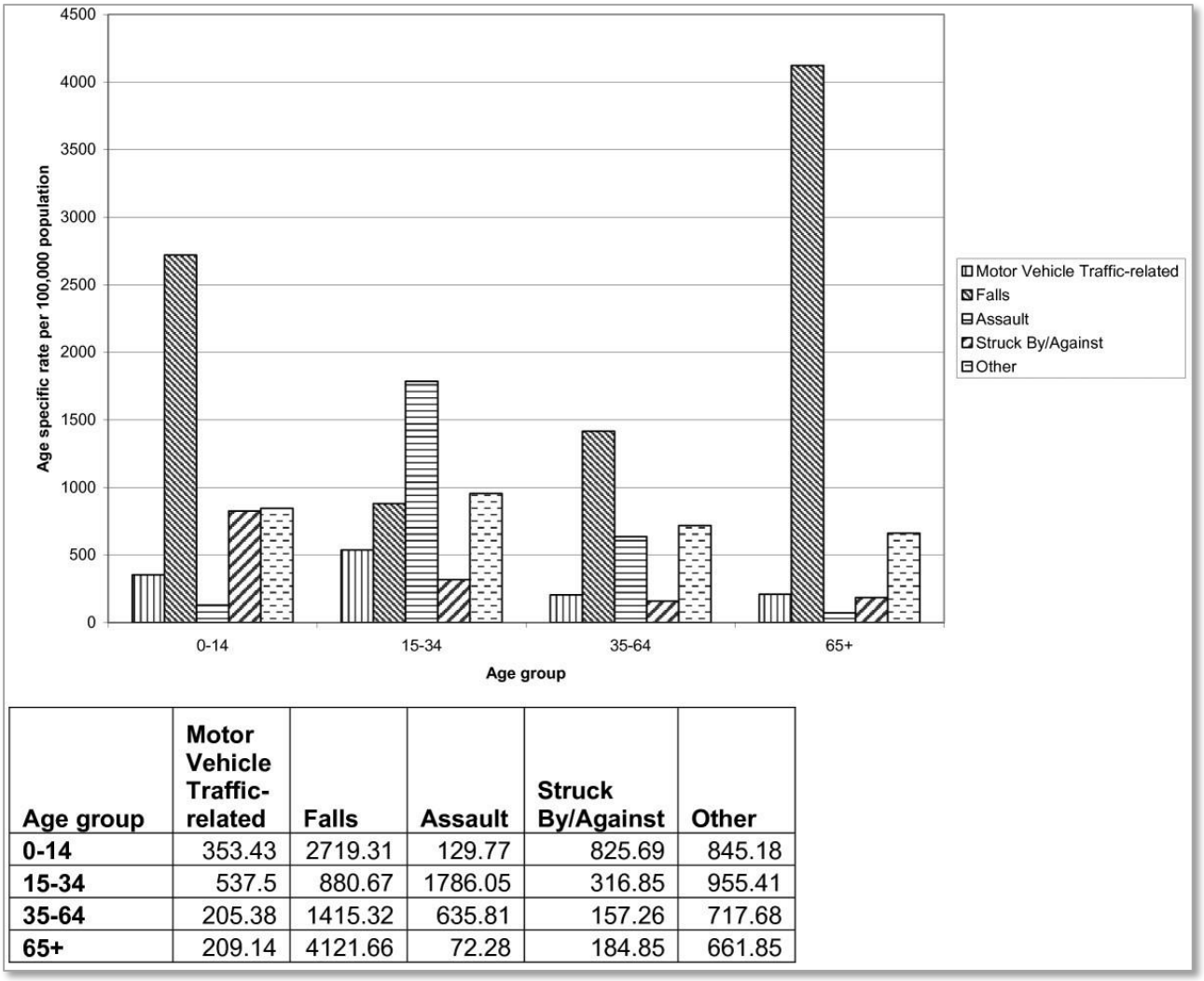
Figure 2 - Population Data from the Office for National Statistics (ONS), 2019



Source: Population estimates, Principal population projections, 2016-based, Office for National Statistics[14]

A twelve year study[15] published in 2014 noted that there were over 200,000 continuous stays in Scottish hospitals where the recorded diagnosis was compatible with the patient having sustained a traumatic brain injury. Hospitalisation rates were highest in two sets of people – those people aged less than 35 years and those aged over 65.

Figure 3 - Cause of injury for each continuous episode of care, age specific rates per 100,000 for men and women by age group covering the period from 1998–2009[15].



Age group	Motor Vehicle Traffic-related	Falls	Assault	Struck By/Against	Other
0-14	353.43	2719.31	129.77	825.69	845.18
15-34	537.5	880.67	1786.05	316.85	955.41
35-64	205.38	1415.32	635.81	157.26	717.68
65+	209.14	4121.66	72.28	184.85	661.85

Men accounted for the majority (70%) of recorded hospital episodes in the study time span. By far the leading cause was falls (47%), followed by assaults (accounting for 18% of continuous care episodes overall), however in the age groups 15–34, violent causes were the predominant cause of injury, accounting for 40% of hospitalisations. Violence reduction programmes such as Medics Against Violence[16] and the Navigator training[17] aim to tackle these issues. For the prevention of falls in the elderly, NHS Boards have a variety of pro-active and re-active falls reduction programmes, in line with the Falls and Fracture Prevention Strategy for Scotland 2019-2024.

Emergency departments in Scotland 'deal with over 70 alcohol-related assaults every day'[18] and research suggests that over 60% of head injuries involve alcohol[19]. In 2018 the number of people admitted to hospital in Scotland with alcohol-related brain damage reached a 10-year high[20], however, the recently implemented Minimum Unit Pricing will help tackle the use of cheap, high-strength alcohol, but wider multi-component strategies will be needed.

The structure of the UK's population is changing: people are living longer and having fewer children (in 1998, around one in six people were 65 years and over (15.9%), this increased to one in every five people in 2018 (18.3%) and is projected to reach around one in every four people by 2038[21]). Anecdotal evidence from clinicians has also supported this demographic change, with an increased incidence of falls in older adults with co-morbid conditions; and in this population the appropriate

use of anticoagulant drugs is a particular problem. As noted in the literature (Shivaji et al) [15] 'as the population ages the incidence of TBI sustained from falls is emerging as one of substantial public health importance. Falls prevention interventions could be of value in limiting this morbidity and mortality… a Cochrane review concluded that population-based interventions may be of value in preventing falls in people over 65'[22]. A study looking at deaths after head injury over four decades in Scotland,[23] showed a decline in RTA as a cause and a spike in mortality due to falls in older women. The changing demographics should be taken into account during the planning of future services.

Alcohol remains a major factor in brain injury, and there is a need for continued investment in alcohol prevention and support services, as well as a focus on the prevention and treatment for older people at risk of falls.

3.4 Supply, demand and the economic case for investment

A recurring theme in interviews with staff across Scotland was the need for additional rehabilitation beds and the ability to move recovering patients on to the next stage of their recovery when they were clinically ready. For inpatients, there are often long bed stays due to a lack of beds (often social care beds) and staffing 'further down' the patient pathway. Audit data from one Board suggested that the majority of patients with severe traumatic brain injuries had to wait, once medically stable, for a suitable inpatient rehabilitation bed – from a matter of days to several months – a situation that was reported by staff as common across Scotland. Intra-departmental transfers are not subject to waiting times targets and these data are not required by Government to be collected. However, specialist units all reported difficulties in moving patients on to suitable onward placements, and it is essential that work is done with the Integrated Joint Boards (IJBs) to highlight this issue.

There are currently c.140 beds for specialist rehabilitation, including for patients with an ABI across Scotland, whereas British Society of Rehabilitation Medicine (BSRM) expert guidance[7] suggests around 400 would be needed for all neurorehabilitation needs to be met. Consideration should be given to whether the current number of beds is adequate to serve the population and how to manage a more effective patient throughput.

Table 1 - Cost of rehabilitation and long term care

	total cost of rehabilitation	annual care costs
Good early recovery	19,575	0
Moderate disability	19,575	7,472
Severe disability	108,874	45,450
Vegetative state	0	45,450

Note - The National Institute for Health and Clinical Excellence24 examined the economics of brain injury care and treatment. They classified rehabilitation at three levels of initial impairment; good early recovery (GR), moderate disability (MD) and severe disability (SD). The table sets out the costs of rehabilitation and care. These costs are direct care costs and do not include loss of productivity, carer's costs etc.

It was found that rehabilitation shifted patients to a lower level of disability and resulted in cost savings. In the 'SD' group the nature of the cost reduction was such that rehabilitation paid for itself in 16.3 months. This is echoed by a number of studies that suggest that rehabilitation will pay for itself in terms of longterm cost savings.

In Scotland, there are an estimated 700 people who survive with severe head injuries per year. The median age of traumatic brain injury is 38, with a typical life expectancy post-injury of 30 years.

Studies provide a consistent message that early intensive inpatient rehabilitation can save £30,000 pa per patient. Adjusting for the percentage of patients who each year go on to make a good recovery (650 x £30,000 = £19,500,000 x 30 = £585,000,000)[25].

These are optimal figures but even 50% of this would equate to substantial annual savings for the patient cohort in Scotland, as these figures are direct care costs only, not indirect costs.

It is clear that additional investment in rehabilitation could save significant funds across the health and social care budget in Scotland.

3.5 Hyper Acute Rehabilitation and improved patient outcomes

There is published evidence that specialist hyper-acute inpatient rehabilitation services both improve patient outcomes[26] and save money overall[27]. Despite relatively high initial costs, it has been demonstrated that specialist hyper-acute rehabilitation can be cost efficient, producing substantial savings in ongoing care costs, and relieving pressure in the Acute care services. This model has influenced trauma planning in Scotland, more details of which are noted below.

3.6 Trauma planning and investment

Each year in Scotland, there are over 3000 generic trauma cases each year, of which around 800 - 1,000 cases are defined as 'major trauma'[28,29] and approximately 700 of these are severe head injuries. The Scottish Trauma Network (STN), involving the Scottish Ambulance Service (SAS), Scottish Trauma Audit Group, hospitals and other stakeholders across Scotland works to deliver high quality care to severely injured patients. There are four trauma centres, two of which (in Dundee and Aberdeen), have 'gone live', to be followed by centres in Glasgow and Edinburgh in the coming years. The STN brings with it very considerable investment and an opportunity to review and improve the care and management of patients with Acquired Brain Injury. There are significant government funds being invested in the trauma network; in May 2016 the Cabinet Secretary for Health and Sport set out a commitment to invest in four major trauma centres (MTCs) and an integrated network infrastructure. £41.6M ongoing revenue funding has been committed, with phased implementation from 2017-2023. Additional capital monies have been allocated to the project.

The following information was supplied by the Scottish trauma teams as a snapshot of progress at the time of writing.

The South East Scotland

In 2014, SABIN, with NHS National Services Division, asked Scottish Government for funding for a scoping study to look at how care for brain injured patients in the South East of Scotland might best be delivered. Funding was forthcoming and passes to NHS Lothian, and the scoping report was delivered to Scottish Government in 2017. This bid set out for trauma planning teams how patients with an ABI would be managed when the S.E. trauma centre was implemented. The model has been adopted as the NHS England's neuroscience commissioning groups' preferred approach, and endorsed by the Association of British Neurologists as their preferred model for acute brain injury care.

The South East of Scotland Network model will see a Major Trauma Centre for Adults at Royal Infirmary of Edinburgh (RIE) and for Paediatrics at Royal Hospital for Sick Children. The MTC will be supported by three Trauma Units (TUs) - Fife Victoria Hospital, Borders General Hospital & Forth Valley Royal Hospital and a Local Emergency Hospital (St John's). Based on STAG data, it is estimated that 600 Adult patients and 30-40 Paediatric patients will be admitted under the Major Trauma Service (this includes 200 Major trauma patients expected at the RIE) covering a population of

approximately 1.2million across the region. Care is currently provided for Major Trauma patients who are admitted under a variety of inpatient teams and a variety of wards. With the implementation of a Major Trauma Centre at the RIE, due to launch in April 2021/22, the pathway for major trauma patients will include care provided by a specialist major trauma ward, which includes, earlier, hyperacute rehabilitation services. Work has begun on the ward which will deliver specialist acute medical and acute rehabilitation services within this ward. The Department of Clinical neurosciences (DCN) is due to relocate to the RIE. The closed head injury service will be housed within one area.

The North of Scotland

The North of Scotland (NoS) Major Trauma Network was launched on October 1st 2018. The Network consists of the Major Trauma Centre at Aberdeen Royal Infirmary, Royal Aberdeen Children's Hospital, Trauma Unit at Raigmore Hospital, six local emergency hospitals and numerous local hospitals and community rehabilitation services across NHS Grampian, NHS Highland, NHS Orkney, NHS Shetland and NHS Western Isles.

The NoS Trauma Network has developed new ways of working to enable quicker access to major trauma care, clearer identification of patients, earlier and more frequent input from a specialist trauma team and improvements in the co-ordination of care throughout the patient pathway. Significant investment from the Scottish Government has enabled recruitment to new posts, specialist training and education for staff, provision of new equipment and IT resources.

The service to trauma patients, including those with an acquired brain injury has been enhanced by the use of the Scottish Ambulance Service trauma triage tool, 24/7 access to an Emergency Department consultant and a number of national standards for critical care. A specialist Consultant led trauma team has been appointed. Additional posts include specialist nurses, trauma case managers, a rehabilitation consultant, specialist physiotherapist, occupational therapist, speech therapist, dietician and clinical neuropsychologists as well as clinical leads for the Trauma Network, MTC and TU. Patients and families are supported by our rehabilitation coordinators in ARI, RACH and Raigmore Hospital. They will start a rehabilitation plan within three days of admission to hospital, along with the patient and the multidisciplinary team. This will record the individual's progress, rehabilitation goals and ongoing care and therapy requirements. It will accompany the patient from the Acute setting, through to rehabilitation units and onto discharge to community settings. This has enhanced communication between teams.

Investment in rehabilitation services has also focussed on additional clinical neuropsychology resource for patients and families throughout the pathway. Neuropsychology for adults and children is now available in the Acute setting, rehabilitation units and community services across the region. Further investment is planned over the next five years to support additional nursing and therapy resource in rehabilitation units and community teams.

Delivery and development of services has included patient, family and staff experience feedback so that services can be developed to optimise patient care and achieve the best possible outcomes.

The West of Scotland

Under West of Scotland major trauma network plans, the Queen Elizabeth University Hospital (QEUH) will be the Major Trauma Centre for West of Scotland Boards (NHS GG&C, NHS Ayrshire and Arran, NHS Lanarkshire, NHS Forth Valley, NHS Dumfries and Galloway, in addition to some patients from the Western Isles.) There is significant investment available to create the network which will

also support a new 24 bed major trauma ward as well as a new 12 bed hyper-Acute unit, which will care for patients with head injuries and other complex trauma, providing intensive rehabilitation. These wards will be co-located on QEUH along with neurosurgery, the spinal unit, Physical Disabilities Rehabilitation Unit (PDRU) and critical care. Following intensive rehabilitation, patients that require continued rehabilitation will be transferred back to their local Board area for this to continue. Part of the trauma investment is the allocation of monies for 'step down' rehabilitation services in local boards, and each local board will be enabled to work to level three BSRM standards. The West of Scotland major centre will open in March 2021 and it is envisaged that the full network including specialist rehabilitation services will be in place by 2024.

4. Service Mapping Process

Semi-structured interviews were held with staff in each NHS Board. Where possible, and where the Board offers these services, staff from emergency departments, neurosurgery and rehabilitation, plus any dedicated acquired brain injury community rehabilitation units, private and third sector organisations were contacted. The data supplied was sent back to interviewees for checking to ensure accuracy, although not all staff returned a corrected version.

The questions asked of the Boards were based on those asked during the previous exercise (2009), in order to enable a degree of consistency.

Scenarios

Case A - An individual in a vegetative state/minimally conscious state. Medically stable but requires nursing care for all needs and has been in this state for some weeks.

Case B – An individual who is medically stable but has mixed physical and cognitive impairment without major behavioural issues. They require physical assistance with transfers and all mobility activities and because of mixed cognitive and language difficulties and needs supervision in activities of daily living [at 3 months].

Case C - Acutely behaviourally disturbed person who is independently mobile, is confused and disorientated, is uncooperative with ward staff, attempts to leave hospital and can be aggressive to staff.

Case D - Challenging behaviour that has persisted for several months in a person who is aggressive and violent. They can be uncooperative and lack the capacity to be responsible for their own behaviour.

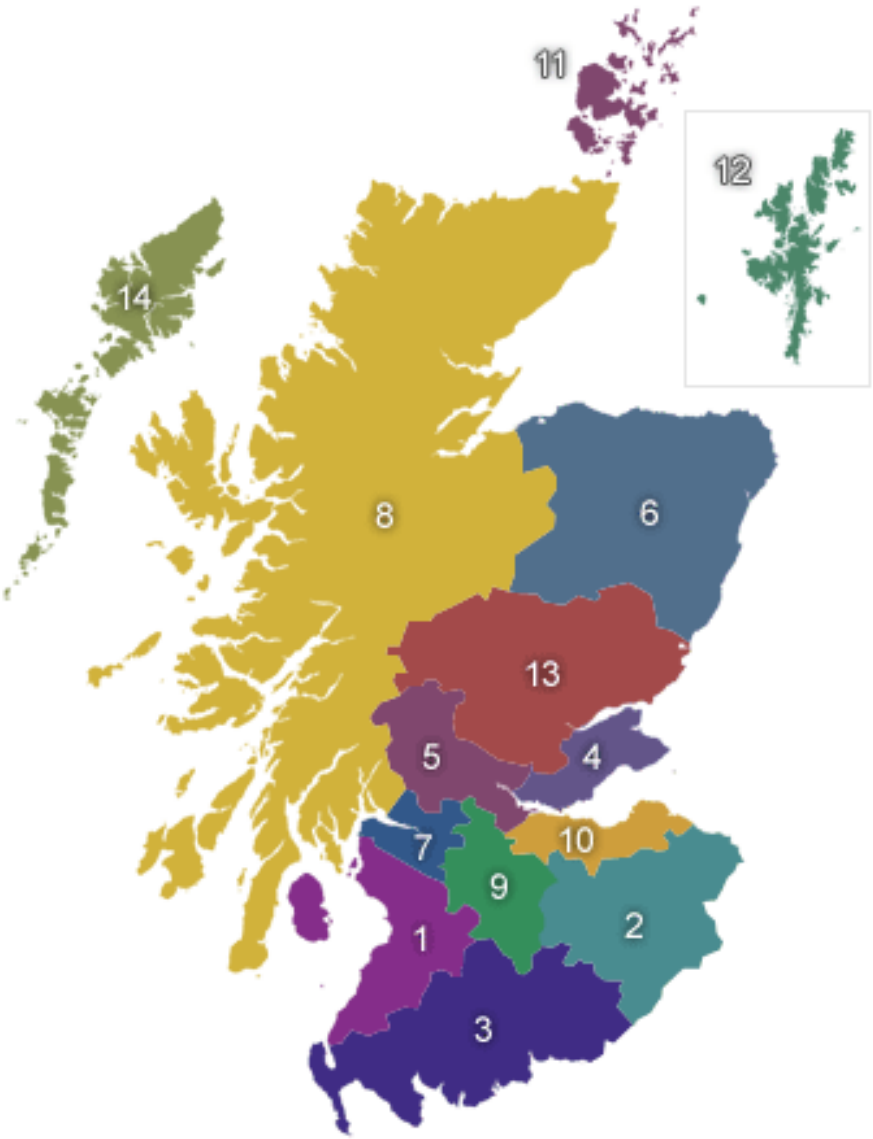
Case E - The individual who has no significant physical impairment and is sufficiently recovered to return home but has persisting cognitive impairment.

Case F - 'Silver trauma' (a colloquial term for care for elderly people who have suffered traumatic injuries); how do the rapid response teams work within each Board.

The scenario concerning the care for the elderly was included in response to a perception of changing demographic of head injury patients.

The report was shared with the Directors of Planning for the NHS Boards, for comments and action.

5. Information from NHS Boards



1 NHS Arran and Ayrshire
2 NHS Borders
3 NHS Dumfries and Galloway
4 NHS Fife
5 NHS Forth Valley
6 NHS Grampian
7 NHS Greater Glasgow and Clyde
8 NHS Highland
9 NHS Lanarkshire
10 NHS Lothian
11 NHS Orkney
12 NHS Shetland
13 NHS Tayside
14 NHS Western Isles

NHS AYRSHIRE & ARRAN

Land Area:	**3,370 km^2**
Population:	**370,410**
Population Density:	**110**
Local Authorities:	**East Ayrshire, North Ayrshire, South Ayrshire**
Principal Hospitals:	**Ayr University Hospital**
	Crosshouse Hospital

Ayr University Hospital

A&E

There are 6.7 whole time equivalent (wte) A&E consultants. Patients can present with multiple trauma, their treatment is overseen and specialities co-ordinated in the emergency department or resuscitation. There is an observation area where patients may stay up to 23 hours. Most patients do not require neurosurgery, the few with significant head injuries will be referred to the neurosurgeon for their opinion and a small number will be transferred to QEUH in Glasgow. If patients do not require neurosurgery, they may be admitted to general surgery (the Lime Zone combined assessment unit). Patients with a normal CT scan who cannot return home (e.g. if they live alone or are intoxicated), are admitted to the ambulatory care unit until the next day. For the vast majority of patients there is no routine follow-up. Very occasionally, after discussion with the neurosurgeon a further scan might be arranged, and the patient will always be seen if they deteriorate. Case C patients may be sedated to be scanned and then a decision will be made as to the best care. STAG data is collected.

Crosshouse Hospital, Kilmarnock

A&E

There are 12.5 (wte) A&E consultants. All head-injured patients, from the severely brain-injured to those with minor 'bumps to the head' are assessed at A&E. There is an observation ward, however, access to those observation beds can be difficult and patients are often managed in the surgical ward. Patients will stay under observation for up to 24 hours, after which they are transferred, generally to a surgical ward. Many of the head injuries involve alcohol.

On discharge, patients are provided with advice on what to do if they have continuing symptoms. There is no routine follow up or concussion review. Patients do re-present and are reviewed. There are not the resources currently to provide routine follow-up, and patients are managed in Primary Care. A large number of children with 'minor bumps to the head' are sent to A&E, suggesting a lack of understanding on the range of head injuries. STAG data is collected.

Post A&E

Patients are transferred to Queen Elizabeth University Hospital (QEUH) Glasgow for neurosurgery. Alternatively, patients may be admitted to local ITU at the request of West of Scotland neurosurgical services, to surgery or orthopaedics. Once the neurosurgery has been completed, if the patient is not going home, they may be readmitted to an Acute surgical bed or orthopaedics.

There is a Service Level Agreement with the neurosurgical department at QEUH, as per all the West of Scotland NHS Boards.

Case A patients are sometimes seen at A&E because of medical issues; they would come from a rehabilitation area or nursing home and they would tend to be seen because of infection, e.g. pneumonia. They are admitted to address medical need or discharged to their nursing home.

In ED and Acute medicine, for Case C patients an assessment would be made on why the patient was disturbed and whether they had capacity to look after themselves, if not, they would be treated 'under Common Law' for emergency treatment or using Adults With Incapacity legislation. If the behaviour is related to brain injury or intoxication, patients are typically aggressive, fighting, have no capacity to look after themselves and would require to be detained and / or sedated. Detention requires psychiatric input, so a psychiatric referral is made but the patient is not transferred to a psychiatric bed. Patients would be referred on to a psychiatrist only if a psychiatric illness was causing their behaviour. A registered mental health nurse would not be employed, although additional staff may be brought in.

Regarding Case F patients, the pathway works well, there is a local Consultant Geriatrician who leads on this. The focus is on MDT review and rapid response for the elderly and frail, with the aim of ensuring patients were able to go home as soon as possible. Often the individual's frailty is not related to head injury, though the patients can hit their heads as they fall. The ACE (Acute Care Enablement) practitioners see these patients.

Rehabilitation

The Douglas Grant Rehabilitation Centre, Ayrshire Central Hospital

The Douglas Grant Rehabilitation Centre (DGRC) in Irvine is a purpose-built unit in the West of Scotland. The unit is not a dedicated brain injury service, but increasingly sees patients with brain injury. Within the unit there are currently 0.3 wte consultants, (for full staffing this should be 0.5 wte,) with medical responsibility for the neurorehabilitation outpatient service, and the 16 bed neurorehabilitation ward. Patients present in Acute units, and are transferred to the Douglas Grant Rehabilitation Ward (DGRW) or to another private or NHS unit such as the Astley Ainslie. Patients will be accepted if medically stable, unless extremely agitated and at a risk of absconding. There are delays to the provision of care; the centre runs full with a waiting list of two weeks to a month (in the past this may have taken up to six months). DGRW does not routinely collect outcome measures due to the large mix of patients.

Case A individuals can be seen at the DGRW. The team may offer Acute staff advice or assessment re. treatment planning. There is a hope that in future there will be SMART trained staff as part of Major Trauma development. Patients receive a multidisciplinary team assessment.

Case B patients would also be seen. The pathway is improving further due to collaborative work with Acute colleagues and neuropsychology. Outcomes can be variable dependent on the extent of injury and engagement with rehabilitation. The Board will try and accommodate patients locally where appropriate or refer out of Board for more specialist care. DGRW staff will support clinical decision-making regarding the most appropriate placements.

Case C patients are a challenge for the DGRW mainly due to the physical environment which has nine exits. In Acute, these patients are likely to have been seen by liaison psychiatry, however, liaison psychiatry has no in-patient beds (neuropsychiatry has been included in the Major Trauma funding bid). The Acute wards are not very suitable for these patients due to the level of noise and

activity. There is a mental health facility onsite, however, there are challenges referring patients there. The pathway is currently being developed, at present patients are admitted to the DGRW and additional nursing / supervision is arranged (e.g. 2-to-1) if the patient can be managed safely, or the patient is transferred to a mental health facility and the team from DGRW will see the patient there. There is a need for a clear pathway by which to accept and support patients.

If challenging behaviour persists (Case D), the patient may be referred to the Robert Fergusson Unit (RFU) a specialist NHS unit in Edinburgh. It was noted that there is currently a good deal of advice and support provided by RFU staff. Patients are referred to Graham Anderson House (GAH), Murdostoun Castle or the RFU, according to specialist rehabilitation need.

For high risk Case E patients, the Board will try and recommend the patient is referred to GAH in Glasgow. Others at less risk will attend DGRC as an outpatient and get access to therapies including psychology. There isn't a routine referral to social work for these patients, social work will be involved when there is an identified need.

Community Support

The **Dirrans Centre** in Kilwinning provides rehabilitation services for adults across North Ayrshire with a physical disability, brain injury, neurological or long-term condition. It is a slow-stream rehabilitation service, providing day services on Monday to Friday. The centre is registered to assist 25 people per day. It offers a variety of outcome-focused activities, including using a gym, a training kitchen, woodwork classes, music and an outdoor space. The centre helps people achieve their individual goals and reintegrate to the community. Staff can see people in their own homes, and serves North and East Ayrshire. It is funded by the Health & Social Care partnership and accepts referrals from GPs, social work, self-referral and the DGRW.

There is a **pan NHS Ayrshire & Arran Neuropsychology service** based at Ayrshire Central hospital – covering Acute and Neurorehabilitation. There are 3.8 wte clinical staff in total; 1.0 wte Consultant Neuropsychologist, 0.5 clinical psychologist in stroke and further 2.3 covering both Acute and Neurorehabilitation.

Psychological assessment and treatment is provided to identify and manage cognitive, behavioural and emotional problem post ABI within the Acute, rehabilitation and community setting. Services are provided for any adult over 16, with any severity of injury. The neuropsychology service provides direct 1:1 patient care or as part of a wider MDT. It also provides consultation to the wider health and social care partnership for patients with ABI. There is no limit to the timeframe for the duration of care, rather the assessment, intervention and duration is matched to patient need. General neuropsychology clinical services are also provided throughout Ayrshire further servicing this population. All patients in the scenarios would be seen.

Third Sector Support

Headway Ayrshire offers support, information and services (short term, long term or as required). Headway Ayrshire's trained staff and volunteers work together to improve knowledge and understanding of brain/head injury. The service is free of charge and available to anyone suffering from the effects of brain/head injury. Headway Ayrshire provides information, advice and support services at home and on the Headway premises, they also provide monthly advice sessions for North Ayrshire Clients within a local GP Practice. They offer advice and support for attending appointments and accessing benefits, and run weekly Community Rehabilitation groups, monthly

Carers Meetings, and provide Numeracy & Literacy Tuition and Carers Education. In addition, they also campaign to reduce incidents of head injury. At present Headway Ayrshire runs two Community Rehabilitation groups in Ayrshire.

Reviews, Plans and Strategies

Work is taking place around the Major Trauma Centres. The local major trauma centre will be QUEH. Ayr will be the local ED and Crosshouse will be a trauma unit. The trauma unit will feed in to the trauma centre, so the 'minor emergencies' will go to Ayr. This will change the current patient flow.

There will be additional beds as part of Major Trauma initiative – three will be dedicated for patients with a TBI, and there will be a need for specially trained staff to help support the pathway. It is expected this will take place in two years time.

Work with mental health colleagues and social work for a more streamlined approach is planned.

Information supplied by:

Alan Krichell, Emergency Medicine Consultant, Ayr University Hospital, NHS Ayrshire & Arran
Nanette Masterton, Unit Manager, The Dirrans Centre, Kilwinning
Jayne McClymont, Manager, Headway Ayrshire
Sharon Mulhearn, Neuropsychologist, Ayrshire Central Hospital, NHS Ayrshire & Arran
Jenny Preston, Consultant Occupational Therapist and non-medical clinical lead for Neurological Rehabilitation, NHS Ayrshire & Arran
Rossanna Ralston, Head of Unplanned Activity (UNPAC), NHS Ayrshire & Arran
James Stevenson, Consultant, Emergency Medicine, Crosshouse Hospital, NHS Ayrshire & Arran

NHS BORDERS

Land Area:	**4,732 km^2**
Population:	**115,020**
Population Density:	**24**
Local Authorities:	**Scottish Borders**
Principal Hospitals:	**Borders General Hospital**

Borders General Hospital

A&E

There is an A&E department at Borders General Hospital (BGH) which employs two (2.0 wte) consultants. The A&E department assesses all head-injured patients, from the severely brain-injured to those with minor 'bumps to the head'. The hospital has no observation area, with patients requiring admission for observation transferred to the Surgical Ward 7. There is a CT scanner in BGH. STAG data is collected.

Post A&E

Following discharge from A&E, patients may be sent to local 'cottage' hospitals and will receive a head injury leaflet re. concussion and returning should they experience ongoing problems.

Patients are transferred to the Western General Hospital Edinburgh (WGH) for neurosurgical interventions. If a patient does not require neurosurgery but requires admission they would remain at Surgical Ward 7 for up to 48 hours followed by referral to Neurology, if required.

Following neurosurgery, patients would be transferred to either the Astley Ainslie Hospital, BGH or home.

Rehabilitation

Rehabilitation takes place in the Borders Stroke Unit at BGH Ward 11. Historically the hospital has had 1.4 wte, predominantly for stroke but also neuro-rehabilitation, which was split between two consultants. As of March 2019 this changed to one consultant at 0.8 wte; though both a stroke and neurology review are underway which may result in additional staff / staff time.

The stroke / neurorehabilitation ward consists of up to 12 beds for stroke patients and up to two beds with a variety of neurology, if nurse staffing allows. The majority of these patients are referred via the surgical ward, after head injury assessments. Head injury patients are also received via Edinburgh's Astley Ainslie Hospital and via the emergency department (ED). If head injured patients come from the ED and stay at BGH, they may also be placed in the orthopaedic ward, if there is an orthopaedic element. There are no psychology or neuropsychology services at BGH.

Case A patients would stay at the Western General Hospital, Edinburgh for any further care. NHS Borders generally has one nursing home per town that can manage such patients, including PEG feeding and routine nursing / skincare.

Case B in the surgical ward and aged under 65 would be referred to neurology and follow a clear pathway for rehabilitation. If the patient sustained an obvious orthopaedic injury there is the potential for the focus to be on orthopaedic recovery with the brain injury undiscovered until the patient fails to recover as expected, or has cognitive or behavioural issues. Patients would receive access to Occupational Therapy, Physiotherapy and Speech & Language Therapy.

Case C patients would initially be seen by a junior doctor who would determine whether referral to liaison psychiatry was necessary. Transfer of patients to a mental health facility is rare and, though sectioning is possible, patients are generally managed on the ward. Additionally, a one-to-one assessment tool would be used. This assessment would be completed by the two senior psychiatric nurses within the liaison psychiatry team, although any additional staff utilised in one-to-one care would be a medical or surgical nurse.

If challenging behaviour persists (Case D) advice would be sought from the liaison psychiatry team, who may then decide to refer to the Robert Fergusson Unit, Edinburgh.

Provision for Case E patients to access NHS community services such as psychology or Occupational Therapy would be made at discharge. Signposting would be made to Momentum Skills and Headway Borders who are third sector providers within the area.

Re. Case F, Borders General Hospital has no specific services for 'silver trauma', though a rehabilitation needs assessment for over 65s is conducted three times a week on set days. Information is passed on to community hospitals or 'Medicine for the Elderly' if patients require prolonged rehabilitation. There are currently no specialist services available for head injury and, though consultants are confident in their ability to manage cases, there remains some variation in thresholds for ongoing referral. If the patient is over 65 and frail, they may be referred to the Dept. for Medicine for the Elderly (DME).

Community Services

There is a small amount of community rehabilitation available in the Borders; Kelso and Coldstream have Teviot Community Rehabilitation service (with Physiotherapy and Occupational Therapy input), central Borders have the 'Hospital to Home' Physiotherapy and Occupational Therapy services. Other areas do not have community rehabilitation services. Patients may also be seen as outpatients at the Astley Ainslie Hospital and are signposted to Momentum Borders.

Third sector services

Heads Together support adults in the Borders with brain injuries, offering day trips, entertainment evenings and advice. Meetings are held in Hawick. Heads Together also offer respite at their wheelchair friendly static caravan in Berwick-Upon-Tweed.

Headway Borders is a support group for people with brain injury, their families and carers. There is a support group and activities in Galashiels twice a month. At the support/activities group, refreshments are provided and users have access to contacts, therapists and activities, as well as informative talks and presentations. The group also organises day trips, lunches and an annual Christmas party.

The **Momentum Borders Brain Injury Rehabilitation Service** exists to support adults of working age (16 years or older) who have a brain injury, as well as their families and carers. The service aims to

help those living with brain injury to better understand, adjust to and manage the long term effects of brain injury. The service also works with other agencies involved in the provision of the person's health and social needs. Three support groups that meet monthly in Berwickshire, Central Borders & Peebles.

Momentums' 'Heads You Win' Course, delivered in partnership with Borders College, offers service users the opportunity to gain self-confidence, social integration and increase their skills through courses which include information technology, cookery and numeracy.

Reviews, Plans and Strategies

Trauma centre planning is ongoing and there is a Neurology and Stroke review. Additional staff sessions had been allocated to assist with trauma planning.

Information supplied by:

Susan Kerr, Stroke Consultant, Borders General Hospital
David Simpson, Neurology Consultant, Borders General Hospital

NHS DUMFRIES AND GALLOWAY

Land Area:	**6,427 km^2**
Population:	**149,200**
Population Density:	**23**
Local Authorities:	**Dumfries and Galloway**
Principal Hospitals:	**Dumfries and Galloway Royal Infirmary**
	Galloway Community Hospital

A&E

There are A&E departments at Dumfries and Galloway Royal Infirmary (DGRI) and at Galloway Community Hospital (GCH). There is an observation area in DGRI, or patients may be admitted to the medical and surgical combined assessment unit for 24 hours for observation. If more time is required, the patient will be admitted to the surgical ward or subsequently referred to rehabilitation. NHS D&G will be working on policies to ensure the correct patients are referred to rehabilitation and assessed in a timely manner.

If patients are discharged from A&E they are provided with a head injury information card. There are follow-up consultant clinics from A&E for selected concussion patients with further advice offered as needed. STAG data is collected in A&E.

Post A&E, Rehabilitation and Community Services

Traditionally patients are transferred to Edinburgh for neurosurgery, although this may change to Glasgow with trauma centre implementation. Arteriovenous Malformation (AVMs) and AV fistulas which bleed are transferred to Edinburgh at present.

Whole time equivalent of rehabilitation consultant staffing is 0.6 at DGRI (one consultant). There is one wte speciality doctor. There are seven inpatient rehabilitation and seven stroke beds on ward D7, and any patients that are sent to the central regions for neurosurgery come back directly to D7 as inpatients if they are not ready for discharge. In addition, patients who have been discharged but who have ongoing issues will be seen at out-patient clinic with the potential for onward referral to Compass[1] (formerly Headway). Rehabilitation patients are a mix of complex post-ICU patients (with or without tracheostomy), patients who are two to three days post Neuro-surgery or conservative intracranial bleed management, other acquired brain injuries (metabolic and traumatic), those with Acute neurological deterioration e.g. MS relapse, Guillain Barre syndrome, encephalitis, non-traumatic spinal injuries and complex amputees. There tend to be only one or two patients per year with very severe traumatic brain injuries, however, some patients are in the ward a considerable time, and bed numbers are an issue. If patients live near Compass and population hubs, there is better community rehabilitation available than in other areas. Geographical isolation for ABI patients who cannot drive is a barrier to accessing care for some patients. There are a small number of patients in a large area, and the provision of NHS outreach is a challenge.

Case A patients would be seen by the rehabilitation consultant, the patient would be stabilised, then assessed in a MDT assessment. The team will do the 'best interest' work, ensure guardianship is in place, and staff would carry out a Wessex Head Injury Matrix (WHIM) assessment. Wheelchairs would be sourced from Westmarc wheelchair service. The patient may be transferred to the Astley

[1] Since this report was written, it is understood the Compass services as described above have ceased and the organisation is under new management, offering self-directed support

Ainslie Hospital in Edinburgh if staff are unable to facilitate a full assessment, however families tend to prefer to keep their relatives nearer to home. No specific community placements are available for patients of this type, but some sites can provide round the clock care for independent living either in individual bungalows or in group houses with live in carers, although places are few and far between with significant placement delays. Patients may be discharged home, others, if over 65, may go to nursing homes.

Generally cross Board referrals work smoothly e.g. for a Patient from Langholm who has been sent to Carlisle and then Newcastle for Neurosurgery will tend to be repatriated without issue and have appropriate follow-up.

Case B patients would come to a rehabilitation bed in ward D7 under the care of the consultant if they had complex needs or social circumstances, and improve as far as possible with MDT care; discharge home is arranged if possible, with care as needed. Alternatively, after an assessment period and goal planning, patients are transferred to a community hospital for further home assessments and ongoing physiotherapy and OT in the community. On discharge, patients can be linked in with the local Compass support. Physiotherapy and OT staff are generic in the community and have other constraints on their time. Speech and Language teams are area-wide, so assessments can be started in hospital and continued in the community either at a community hub or in a patient's home.

Case C patients would be admitted initially to D7 with one-to-one support. Experienced nursing staff can manage these patients well with reassurance and re-orientating them, but newer staff have not been trained. There are gardens where people can walk with family or staff, but these are not secure. Patients who are aggressive and trying to leave without capacity may need to be sectioned and transferred over to the mental health team at Midpark Hospital (a mental health facility). Mental health nurses from Midpark may come to assist with the patient prior to transfer. Patients have achieved good outcomes there, with mental health nursing input and a safe environment. The rehabilitation consultant will continue to provide input into discharge planning and care. If patients cannot access Midpark, 1-2-1 support (healthcare assistants) would be put in place in the ward.

If challenging behaviour persists (Case D) advice would be sought from the Robert Fergusson Unit and the patient may be transferred to them. An outreach service could be useful, however, there is often an issue with when the patient's stay is over, due to the lack of resources at the next stage in the local community setting.

Case E patients may return to rehabilitation, often quite early after neurosurgery. Often patients are mobile but disorientated. They would receive a cognitive assessment either from OT / medical teams during their admission and kitchen safety check and then further Neuro-psychological assessment in the community. They would be referred to social work as part of the process and a safe discharge is planned as far as possible. There would be out-patient consultant follow up with the patient and family, and carer's support is offered.

Case F patients come in via A&E, mostly attending due to falls and subdural haemorrhages. Patients are managed dependent on needs, there is no upper age limit for the rehabilitation service – an individual assessment would decide if the patient is better managed on the Acute Neuro-rehab ward or under orthopaedics or the medicine for the elderly team. The same PT/ OT team for D7 also work with the Medicine for the Elderly team whose consultants have stroke and Neuro rehabilitation experience.

Voluntary sector support

Compass[2] provides an adult assessment service which covers the entire Dumfries & Galloway region. It provides non-residential slow-stream cognitive rehabilitation. This service is commissioned by the NHS to provide 56 client places each week from Monday to Thursday with an additional four private client placements available Monday to Thursday.

Information supplied by:

Alison McKendrick, Rehabilitation Consultant, NHS Dumfries and Galloway
Owen Fielding, Business Operations Manager, Compass

[2] Since this report was written, it is understood the Compass services as described above have ceased and the organisation is under new management, offering self-directed support

NHS FIFE

Land Area:	**1,325 km^2**
Population:	**371,410**
Population Density:	**280**
Local Authorities:	**Fife**
Principal Hospitals:	**Victoria Hospital, Kirkcaldy** **Queen Margaret Hospital, Dunfermline**

A&E

The A&E Department is sited within Victoria Hospital in Kirkcaldy. There are 11 wte consultant staff working in the Emergency Department. Patients who present at A&E are triaged (or undergo an assessment); depending on injury, they will be seen by a SHO, middle grade or consultant. Victoria Hospital has 24 hour CT head scanning, using the SIGN guidelines[30] for head injuries. Depending on scan results and age, the patient will be admitted to observation, discharged or discussed with neurosurgery colleagues at the Western General Hospital. Patients with minor head injuries may be kept in observation for up to 72 hours. There is a six bedded observation unit attached to ED and under the care of A&E staff. STAG data is collected, in addition to drugs and alcohol data.

For Case C patients, individual arrangements will be put in place according to need – including hospital security, staff will try and 'talk the patient down', and also try to contain patient in one area. Sedation may be used for scanning purposes. If the patients is under the influence of alcohol or drugs, psychiatry will not generally provide care, as there is a need to first exclude any organic cause. Additional staff may be employed, if possible.

Case F patients will be scanned if they fit the guidelines – either an immediate scan or within 8 hours depending on their risk factors. If they are not on anticoagulants and if there are no other concerns they may be discharged home or admitted to direct to a medical ward if appropriate, depending on the cause of the head injury. All older patients with a head injury would be scanned.

If the patient required follow up after discharge from A&E, this would be taken forward with the GP or the rehabilitation unit. On discharge they are provided with advice and information.

Neurosurgery

Neurosurgical care is provided from Edinburgh and those returning after neurosurgical care would be admitted to the Victoria Hospital if requiring ongoing Acute care management. There is no specific ward designated to admit such patients although the recent pathway has been generally to the Acute medical wards. If the patient is medically stable and a bed is available then the patient would be transferred direct to the Sir George Sharp Unit at the Cameron Hospital.

Rehabilitation

Patients requiring rehabilitation are transferred to the Sir George Sharp Unit at Cameron Hospital. This has 12 beds for acute/post acute neurorehabilitation, and acquired brain injury constitutes over 80% of admissions.

Patients are accepted from the Victoria Hospital in Kirkcaldy and the neurosurgical units in both Edinburgh and Dundee for patients resident in Fife. All patients are seen in the referring unit, the majority within one week of referral.

The average length of stay is in the order of 3 months. Case C patients would not be accepted into the rehabilitation ward as facilities are unsuitable. Advice would be offered and contact made with the Robert Fergusson Unit in Edinburgh. They would also be referred those with longer standing challenging behaviour (Case D). Individuals in a vegetative/low awareness state (Case A) would be accepted for a period of assessment incl. SMART assessment and may subsequently be transferred to a transitional placement prior to a community placement for long term care, or may be transferred directly to a community placement.

Community Services

The Sir George Sharp Unit provides assessment and rehabilitation on a community basis.

Third Sector Support

Fife Headway services cover Fife, and the charity encourages anyone interested in ABI to visit their group and chat to all or one of the volunteers who have had experience in this area.

In addition to monthly meetings they have been running Tai Chi sessions fortnightly.

Activities for members:

- Regular monthly meetings
- Ten pin bowling trophy competition
- Visits to theatre
- Meals out
- Guest speakers and facilitators for special activities such as ceramic painting
- Tai Chi

Headway Fife groups and committee are managed by brain injury survivors and carers.

Reviews, Plans and Strategies

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Information supplied by:

Ben Sutherland, Nurse Consultant, Fife Rehabilitation Service
Lorna Jackson, Consultant in Emergency Medicine, NHS Fife
Andy Kinnon, Consultant in Emergency Medicine, NHS Fife

NHS FORTH VALLEY

Land Area:	**2,643 km^2**
Population:	**305,580**
Population Density:	**116**
Local Authorities:	**Clackmannanshire, Falkirk, Stirling**
Principal Hospital(s):	**Forth Valley Royal Hospital, Larbert**

A&E

Forth Valley Royal Hospital (FVRH) provides A&E for the area. Patients are assessed in resuscitation, with initial tests in the emergency department (ED) including a CT scan, after which the pathway is via the Department of Clinical Neurosciences in Edinburgh. With the new trauma pathway, patients will go both West and East, depending on the agreed emergency services algorithm. There is out-of-hours cover. STAG data is collected.

There is an observation area, not linked to ED. Patients stay in Medicine or a general ward (AU 1, 2 and 3) under the care of an ED consultant. If a patient requires to stay more than 24 hours, they are moved to a medical ward for care, or to ITU.

Case A patients generally come to ED from a care home, or they might be a young adult with significant disability and would probably be transferred to a medical ward. The complex care team may be involved.

Case C patients are seen by liaison psychiatry and, if deemed medically stable and there is an underlying need for psychiatric assistance, might be transferred to a mental health facility. If the patients are very challenging for ED staff, there is security onsite and mental health colleagues can sometimes assist. This is not, however, a formalised arrangement.

Re. Case F patients, there isn't a rapid response team, but there is an assessment tool for use within the ED, recently work has been done on a 'frailty link' with the hope to set up frailty hub in the Acute receiving unit in the future. The work is at an early stage.

Post A&E

If a patient requires neurosurgery, they are transferred to the DCN in Edinburgh. After neurosurgery, the patient would be transferred to rehabilitation at Unit 1, Falkirk Community Hospital (8 beds in Unit 1 for neurorehabilitation), and to REACH (Rehabilitation and assessment in the community and home).

Rehabilitation

The consultant in rehabilitation medicine is asked by staff in Acute to review patients as they arrive from QEUH or the Western General Hospital, so patients tend to be in the post-Acute stage of pathway, typically after neurosurgery. Advice and treatment recommendations are provided for patients, also a judgement as to whether they would benefit from inpatient rehabilitation, and admission to the rehabilitation unit on a longer-term basis. Referral data is collected, and all patients get Barthel index scores. If staff resources increase, data collected would include

rehabilitation complexity scores, Functional Independence Measure and Functional Assessment Measure (FIM & FAM).

Marchglen is a local private provider. There is a high tariff, and it takes patients with complex needs (patients in Marchglen may need intensive nursing care, suctioning, PEG feeding, catheterising etc.,) as an alternative to providing 24 hour care at home / supervision. Marchglen does not take patients with challenging behaviour, who may go to RFU (Case D)

There is no designated ward in FVRH for brain injured patients. Often they have ongoing medical needs. Also, it is not clear what criteria are used when a patient is ready to be 'stepped down' for ongoing Acute rehabilitation. This requires to be addressed with the trauma centres coming online. Patients may come back to the care of physicians or surgeons in Forth Valley. Clarity is required on this pathway, and ideally these patients should go to an Acute ward with 'brain injury' beds.

Case A patients would not be referred to rehabilitation; they would be referred to a care home, there are two or three with the appropriate pecialist skills, such as Marchglen and Glenbervie care home in Larbert (an independent centre that offers complex care). Sometimes patients are discharged straight to home, e.g. a 'locked-in syndrome' patient, but instances are infrequent. There is no structured step-down in place from Unit One. If a patient has an ABI – e.g. encephalitis – they may go from ITU to Marchglen with a REACH package. If patients do not fit the criteria for Glenbervie, there may be a delayed discharge.

Case B patients would be seen in Unit One. Rehabilitation has limited psychology resources, and no access to psychiatry. There would be access to OT, physiotherapy and a part time speech and language therapist. Neuro. referrals take precedence over the frail elderly – eight beds are earmarked for Neuro. for ABI and there is the potential to utilise the additional 'frail elderly' beds.

In Case C, at present 50% of beds have patients who are agitated and disorientated, though rarely aggressive. These patients are managed by nurses with behavioural skills training, use of pharmacology and / or single rooms. If a patient is very disturbed, with the limited psychology available it is likely there would be an application made to transfer the patients to the Robert Fergusson Unit or to Graham Anderson House. Funding is decided by the Complex Care Panel. Referrals have also been made to Murdostoun in the past. If the patient is still in FVRH, they will be seen by liaison psychiatry and by the rehabilitation consultant. There is access to psychiatry for two sessions per week for c.80 patients. They would be unlikely to be transferred to a mental health facility. Adults with incapacity legislation may be used and additional staff employed. The mixed ward of 24 beds, where the eight brain injured patients are mixed with patients with dementia and patients waiting for social work assessments makes care for these patients difficult. Some senior specialist nurses have experience of working with brain injured patients. 1-2-1 nursing is put in place when individuals are very agitated.

Case D patients may be referred to the RFU or GAH, if funding is available. If the patient stays within Board, dialogue takes place with social services re. future care e.g. a community placement, a mental health supported facility in the community or a nursing home.

For Case E patients there is a long wait (typically 3-9 months) for the psychology assessment. Occupational Therapists will see the patient whilst in the unit, and social work will be involved with the family to try and see if a return home is realistic.

There is an all-age frailty approach, with a completely redesigned 'front door' for Case F patients, assessing patients by their level of need, not age, e.g. fit older people could be under the care of

medicine, and this is since February 2019. The rehabilitation unit will see patients generally age 16 and above, and increasingly sees older patients, where previously there had been an age distinction.

Community Support

REACH provide assistance for people under 65 in Forth Valley in recovery programmes due to physical disability or brain injury.

Marchglen is a local private provider, is noted above, as is Glenbervie, in Larbert.

Voluntary sector support

There isn't a working NHS link with the third sector services at present. **Neurocentral** provides some assistance, based in Stirling and Auchterarder.

Headway Falkirk provides services throughout the Falkirk area and this provides an opportunity to talk to others in a similar situation. People with Traumatic / Acquired Brain Injury can access one to one help from other survivors. Regular activities include a weekly Memory group, a Music group, and a Craft group.

Reviews, Plans and Strategies

Currently, a business case is with Forth Valley management on a specialist area for rehabilitation. The focus is to move away from medical diagnoses and look at a functional approach.

Information supplied by:
Judith Rooney, Service Manager, Emergency Medicine, Forth Valley Royal Hospital, NHS Forth Valley
Robert Simpson, Consultant in Rehabilitative Medicine, NHS Forth Valley, (plus Consultation liaison role at Western General, Edinburgh)
Donald Mclean, AHP Co-ordinator, REACH, NHS Forth Valley
Margaret Gallacher, Complex Care Sister, (Local and Community) based at Stenhousemuir Health Centre, NHS Forth Valley
Samantha Johnstone, Infection Prevention Control Support Officer, NHS Forth Valley
Joe McGhee, Senior Planning Manager, NHS Forth Valley
Craig Finlayson, Senior Charge Nurse, (inpatient ward, Unit 1, Falkirk Community Hospital), NHS Forth Valley.

NHS GRAMPIAN

Land Area:	**8,736 km^2**
Population:	**586,380**
Population Density:	**67**
Local Authorities:	**Aberdeen City, Aberdeenshire, Moray**
Principal Hospitals:	**Aberdeen Royal Infirmary**
	Dr Gray's, Elgin
	Woodend Hospital

Aberdeen Royal Infirmary

A&E

There are 14 consultants in Emergency Medicine at Aberdeen Royal Infirmary, plus three locum practitioners. Patients are taken into resuscitation, and assessed using the trauma protocol. Depending on the mechanism of injury, the patient may meet the criteria for a trauma call which ensures all the specialties attend at resuscitation. A GCS score and full assessment will determine immediate treatment and where the patient goes next - theatre, ward or ITU. Trauma co-ordinators will be involved if appropriate and direct the patient, and the team will follow the patient. Alternatively, the patient may be admitted to ward 101 for observation for up to 24 hours, or to a general medical ward. There is no longer a dedicated observation ward.

Patients discharged from A&E are provided with a head injury advice sheet and advised to return if any symptoms occur. STAG data is collected.

Post A&E

Five neurosurgeons provide care for patients from Grampian and surrounding Boards. Patients may occasionally be transferred from the Western Isles. Once neurosurgery is complete, patients may be discharged home, others may go to intermediate rehabilitation at Craig Court, or the Neuro-rehabilitation (NRU) unit. A rehabilitation consultant attends ARI once a week to see patients who will later be referred on to the NRU. Two to three moderate to severe traumatic brain injuries are seen on average each week, most of which are managed non-operatively. The flow coordinator, in conjunction with bed managers at Raigmore hospital, are working to improve repatriation back to Highlands. Patients from Highland sometimes stay longer than necessary in Ward 205 due to bed and ambulance availability at NHS Highland, which results in further impact on neurosurgery, ED and neurology.

The Department of Clinical Neuropsychology provides neuropsychological assessment and rehabilitation to assist with cognitive, emotional and behavioural difficulties. Following referral, patients are seen for a screening appointment to discuss available services, suitable interventions and to give advice. Following this, patients may be seen for cognitive assessment, offered group intervention or placed on waiting list for individual sessions. There is no neuropsychologist in Ward 205 at present.

Case A patients will undergo a MDT assessment (including ITU, physiotherapy and OT), which will help inform where the patient will access care. Some patients have gone to Murdostoun if there was a need for SMART testing, as this is not currently available in Grampian. Patients are generally moved to one of a variety of care homes, but there is a lack of suitable facilities.

Case B patients would be transferred to the NRU and then Craigcourt, however, the length of time waiting for a bed in NRU is a significant problem. Now that the MTC has opened, there is some neuropsychology input, and there is a plan to have a business case involving neuropsychology, to have the same service in the NRU in future. Currently Ward 205 has a neuropsychologist for MTC patients only.

The patient may be discharged home and have community based rehabilitation at 'Horizons' rehabilitation centre, or for low intensity rehabilitation further afield. Horizons are a NHS and social work hybrid service.

Case C patients could access liaison psychiatry support, and may be housed in wards that can be secured, depending on need. A low number (one in the last four years) of patients are transferred to Cornhill Hospital. Case E patients (no significant physical impairment but persisting cognitive impairments) would be referred to Craig Court. Craig Court will not receive patients if they pose a risk of leaving, and some patients remain for long periods in Ward 205.

Rehabilitation

Neurorehabilitation takes place at the Neuro-rehabilitation (NRU) unit in Woodend Hospital. At the time of writing, there were 2.6 wte consultants in rehabilitation medicine. There are currently 13 beds in neurorehabilitation, and ABI patients may sometimes be placed in the stroke unit. There is a waiting list for the NRU, which provides inpatient assessment and neuro-rehabilitation for adults aged 16-65 (or older if clinically appropriate). Patients are also occasionally admitted from Orkney and Shetland. The team includes dietician, medical staff, nurses, occupational therapists, physiotherapists, speech and language therapy and some (limited) neuropsychology input.

Rehabilitation is coordinated via a consultant in Rehabilitation Medicine. Most patients are admitted from the acute neurology and neurosurgery ward at Aberdeen Royal Infirmary. Clear goals are set with patients. Outpatient or community based follow-up is arranged as necessary. There is a weekly relatives' meeting, where the consultants update on progress if the patient is in agreement with this. Most patients have a neurological disorder or deteriorating chronic neurological disorder such as multiple sclerosis. Very occasionally other rehabilitation patients can be accommodated. In general, patients who require complex multidisciplinary inpatient neuro-rehabilitation are given higher priority, as they cannot access this anywhere else in Grampian. It was noted that a flow Coordinator in NRU, as in ward 205, would be advantageous, as discharges from NRU can be complex.

Case C and D patients (Acutely behaviourally disturbed) are sometimes referred to NRU, and sometimes patients become aggressive. If physical aggression is limited the NRU can manage these patients, otherwise they are referred to liaison psychiatry, who would give advice on changing medication and there would potentially be additional supervision put in place from Cornhill Hospital (the Dunnottar ward), or liaison with Cornhill hospital. Patients have in the past been referred to Graham Anderson House, or the Robert Fergusson Unit. The Dunnottar ward is a secure ten-bedded mixed sex inpatient unit for patients with psychiatric or behavioural problems. Patients must be medically stable prior to acceptance. Specialist services are available e.g. occupational therapy, pharmacy, physiotherapy. There is a waiting list, sometimes of six months and patients are not often transferred there from the NRU. The majority of patients at the ward have had an ABI (currently 70%), patients also include those with alcohol-related brain damage and Huntingdons. Patients are linked in with social work.

Dr Gray's Hospital

There is a consultant-led service for ED with two consultants, one Associate Specialist and two vacancies, with 24/7 on-call and access to CT. Head injured patients are managed according to NICE guidance. They are discussed with Neurosurgery or more recently most often via the Major Trauma Single Point of Contact. Guidelines are on the Clinical Guidance Intranet.

Patients may be admitted to CDU (24 hours) if they meet the criteria or under the care of a General Surgeon if they are not transferred as trauma or neurosurgery cases.

Patients returning from neurosurgery in Aberdeen are usually admitted to the General Medical Ward or Stroke Rehabilitation Ward. Dr Gray's does not have specific ABI rehabilitation beds, any severe traumatic brain injury and polytrauma would go to the NRU at Woodend.

Community Services

Craig Court provides a care home service to 16 people with physical and sensory impairments in Milltimber. Six of these places are used for people requiring long-term care and up to 10 are used for intermediate rehabilitation or respite, e.g. as part of a recovery from an ABI. The home is operated by Living Ambitions. The service is funded by, and works with, the NHS. There is a specialist health care team in place on site and they work with Living Ambitions staff to provide a comprehensive multidisciplinary rehabilitation service. Craig Court would typically take Case E patients.

Patients may be discharged home and access community-based rehabilitation at the Horizons centre, or community based therapy services for further afield low intensity rehabilitation. Horizons are a hybrid service combining NHS and social work. It provides a multi-disciplinary, multi-agency approach to the rehabilitation needs of service users aged 16 to 65 with complex physical disability, mainly neurological in nature. Horizons also provides advice and support to families and carers. They work closely with colleagues throughout neurological rehabilitation services and have support from Rehabilitation Consultants.

Horizons accepts referrals from professional colleagues in health and social care within the Grampian area, and aim to provide community-based, multi-disciplinary programmes of rehabilitation, based on service users' own goals.

Services:

- Vocational Rehabilitation
- Cognitive rehabilitation
- Hydrotherapy
- Fatigue management
- Functional Electrical Stimulation
- Swallowing/speech difficulties
- Home adaptations
- Weight management
- Care at home

Third sector support

The Brain Injury Grampian Group provides help with the following:

- A full social and support programme including group meetings, social outings, exercise classes and speakers evenings.
- Supports carers and make it possible for them to meet, share their experiences and attend outings and weekend breaks.
- Helps promote partnership working between health services, social services and voluntary organisations.
- Raises awareness of what it's like to live with a brain injury.

Momentum's Pathways Programme in Aberdeen offers a dedicated vocational rehabilitation programme for people with acquired brain injury. Pathways help those with acquired brain injury progress towards and into sustained employment. The programme is funded by Aberdeen City Council and Aberdeenshire Council. It is open to any adult (16 years or older) with an acquired brain injury who lives within the Aberdeen City and Aberdeenshire areas.

Reviews, Plans and Strategies

There have been a good deal of improvements since 2016 - there had been lots of ICP monitoring systems – now rationalised down and compatible with monitors – so there is improved equipment, closer working in conjunction with ITU and improved management of spinal trauma. There is, however, a real need for more NRU beds i.e nursing resources to support the beds. There are difficulties in attracting trained staff.

A new initiative is the trauma teams. The CT scanner is now next door to the Emergency Department.

Information supplied by:

David Anderson, Senior Charge Nurse, Dunnoter Ward, Cornhill hospital
Helen Gooday, Consultant in Rehabilitation Medicine, Woodend Hospital, Woodend
Pamela J Hardy, Lead Consultant in Emergency Care, Dr Gray's Hospital, Elgin
Jackie Sutherland, Flow Coordinator, Neurosciences, Aberdeen Royal Infirmary
Rosemary Thomson, Senior Staff nurse, Emergency Department
James Walkden, Consultant Neurosurgeon, Aberdeen Royal Infirmary

NHS GREATER GLASGOW AND CLYDE

Land Area:	**1,104 km^2**
Population:	**1,169,110**
Population Density:	**1059**
Local Authorities:	**East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, Renfrewshire, West Dunbartonshire**
Principal Hospitals:	**Gartnavel General Hospital** **Glasgow Royal Infirmary** **Inverclyde Royal Hospital, Greenock** **Queen Elizabeth University Hospital (QEUH)** **Royal Alexandra Hospital, Paisley (RAH)** **Vale of Leven District General Hospital**

A&E

There are A&E departments at the following hospitals:

- Royal Hospital for Children
- Glasgow Royal Infirmary
- Inverclyde Royal Hospital in Greenock
- Royal Alexandra Hospital (RAH) in Paisley
- Queen Elizabeth University Hospital

Glasgow Royal Infirmary

A&E

There are 17 wte consultant staff in the Emergency Department (ED). Brain injured patients are admitted to ward 46, which takes patients from ED if they do not require surgery. It also accepts them after neurosurgery and manages them medically in conjunction with the MDT, after which the patient is discharged home or to rehabilitation. There is no observation ward, ward 46 acts as an observation area and is managed by Emergency Medicine consultants (it is also a medical short stay admissions ward). Medical wards are not involved with the head injury patients. There is no time limit on the admission of head injured patients despite the 23 hour rule for medical admissions. Transfer to Neurosurgery in Queen Elizabeth University Hospital (QEUH) would occur from Ward 46. The head injury clinic, run as a virtual service by a Specialist Head Injury Nurse, would follow up anyone with a positive CT scan. Staff follow the SIGN guideline. There is no routine follow up from A&E, however, staff provide a head injury advice card. Patients infrequently present back at a later date. STAG data is collected.

Case A patients would be assessed and then seen by the Extra Contractual Referral Service (ECRS), after which they may be transferred to Murdostoun depending on family input and suitability, or to an appropriate nursing home.

Case B patients may be referred to the Physical Disabilities Rehabilitation Unit (PDRU) if their issues were predominantly physical, or to Graham Anderson House (GAH) or Murdostoun if need be. Case D patients would be seen by the ECRS, after which there may be further transfer to GAH or Murdostoun.

Case D patients would be seen by the ECRS, after which there may be further transfer to GAH or the Robert Fergusson Unit (RFU).

Case C patients would remain in ward 46 with the support of liaison psychiatry. Sometimes the ward would overstaff to manage those needs e.g. with an extra auxiliary who would sit with the patient. There is a defined pathway to manage these patients using AWI and sedation protocol, ward 46 is used to managing these individuals with an experienced head injury nurse specialist leading other nurses.

Case E patients with a Glasgow postcode would be referred automatically to the Community Treatment Service.

Case F patients would be admitted. There is no upper age limit for head injury care, and referral to Medicine for the Elderly for their involvement in rehabilitation would also be made. There may be referral to ECRS if appropriate.

Royal Alexandria Hospital, Paisley (RAH)

A&E

The ED staffing establishment is between 11 and 12 wte, split between Inverclyde and RAH.

When arriving at A&E, the patient would be registered, triaged and would go to the resuscitation room if their injuries were serious. Otherwise they may be sent to the waiting room if there is limited bed availability, or to a cubicle. Additional assessments would be made by nursing staff, and the patients seen by a medic or senior doctor if an emergency. If it is less urgent, then the next available doctor will see them. If it is a recurrent presentation they will see a senior doctor.

There is an observation area managed by A&E, with six beds (ward 22). Patients would remain there typically for overnight observation, if it were unsafe for them to go home due to intoxication / substance misuse, or if they were frail, elderly, or lived alone. There is no time limit to the duration of stay. Patients are only managed in ward 22 and are looked after by a dedicated team of orthopedic nurses with training in management of head injuries. Before 2007, many more patients were admitted, but increased CT scanning means that more patients can be discharged from the Emergency Department.

If a patient does not require neurosurgery but requires admission, they may stay in Ward 22 in the short-term, however, if they are frail / elderly with multiple co-morbidities and polypharmacy, they will be transferred to Medicine and / or Care of the Elderly. If a patient had a severe TBI but would not benefit from neurosurgery, they would be referred to Stroke Medicine. The hospital is currently considering a direct admissions pathway for older adults.

Patients are repatriated to the general surgeons after neurosurgery. Patients are also admitted to the ICU/HDU if their condition merits it.

On discharge from A&E there is no routine follow up. Services available are primary care, and referral on to ECRS assessment and other services where appropriate. The RES/ASERT team (early supported discharge) are also available for rehabilitation at home. All patients are discharged with written head injury advice. STAG data is collected.

Patients would undergo a full MDT assessment. The neurosurgical EU referral service is now operational. The patient would be seen, assessed, CT scanned if appropriate, and staff would speak to the neurosurgeons for advice. If they had a condition that required neurosurgery, the patient

would go to QEUH. If not, they would be admitted to Ward 22, unless very frail / elderly. Depending on age and rehab potential, the patient may go to care of elderly, if younger, would access head injury rehabilitation services, as appropriate.

Case A patients would be admitted acutely under Emergency Medicine after which they may be transferred to PDRU depending on family input and suitability, or to an appropriate nursing home.

Case C patients would be managed by Emergency Medicine in the acute phase and staff would ask for advice from liaison psychiatry. Additional staffing may be put in place, but not RMN, unless the patient is held under the Mental Health Act. If required, they have one-to-one care from a health care assistant.

Re. Case F patients, there is currently work on trying to streamline the pathway, so rather than the patient staying in under ED then waiting until a bed in Care of the Elderly is available, it will enable a referral to be made and the patient can go straight to them after initial ED management as long as this is appropriate, unless patient has sustained major trauma (rare, usually injuries to elderly patients are due to falls and anticoagulants). They are assessed by the ward physiotherapists and occupational therapists and referred for ongoing care in the community as required. Social work is involved if home care is required or if it is felt that the patient can no longer return home. Upon discharge patients would be referred to the Community Brain Injury team and Tom McMillan's team as appropriate. There is no voluntary Headway provision.

Inverclyde Royal Hospital, Greenock

A&E

For patients in A&E at IRH the initial resuscitation and presentation is the same as takes place at RAH in Paisley, thereafter, there are no ring-fenced beds for in-patients with brain injuries, patients are under the care of general surgeons, in the general surgery ward. Their admission to the surgical ward is not time limited. Neurosurgery patients are transferred to the QEUH. Post neurosurgery, patients are repatriated to the general surgeons for rehabilitation.

There is no routine follow-up after head injury however all patients are discharged with written advice. Follow up services are available from ASERT (early supported discharge) Larkfield Unit, PDRU and GP services.

Case A patients would usually be under the care of the surgeons at Inverclyde (or a medical ward if atraumatic).

Case C patients might be referred to a psychiatrist if detained under the MHA, but would not be transferred to a mental health facility if TBI was the sole problem. Additional staff would be employed, which would be a mental health nurse depending on patient / detention status.

Case F patients are managed in the same way as other patients. Cross border referrals can on occasion cause issues with rehabilitation for those from Ayrshire and Arran. STAG data is collected.

Queen Elizabeth University Hospital (QEUH)

A&E

It was not possible to gain a submission from ED staff.

Post A&E

Neurosurgery is provided at QEUH in Glasgow, after which patients are repatriated to local centres. The patient will then undergo an assessment for suitability for rehabilitation, carried out by Dr Marie Laurie and Prof. Tom McMillan (of the ECRS). If appropriate, patients may be signposted to the Community Treatment Centre or other local community services.

When patients admitted for neurosurgical care are stable and required to be transferred back to referring units, significant delays can occur due to a lack of capacity in these units.

Only a small number of patients require neurosurgical admission, and it was reported that finding accommodation and appropriate medical advice for the remainder was a challenge. Many patients are not fit for transfer home but may be homelessness or have addiction issues.

Rehabilitation

The **Physical Disabilities Rehabilitation Unit (PDRU)** is a purpose built specialist unit in the grounds of QEUH, and links with the Inverclyde Physical Disability Rehabilitation Service. At the time of interview there were two wte Consultants in Rehabilitation Medicine at the QEUH (now one wte). The service aims to rehabilitate people with physical disabilities using a patient-centred goal setting approach. PDRU comprises physiotherapy, occupational therapy, speech and language therapy, clinical neuropsychology, nursing and rehabilitation medical staffing. Referrals come from Acute and Community settings. The majority of patients have neurological issues with physical impairments, (tumours, spontaneous cranial bleeds, subarachnoid haemorrhages etc). The rehabilitation unit has not been resourced to deal with cognitive rehabilitation and staff would require training to look after cognitively impaired patients with challenging behaviour. If patients improve physically and still have cognitive needs PDRU will refer them back to the health board and, if deemed appropriate, the ECRS will refer them on the GAH or Murdostoun, otherwise they will be referred on to the Community for other services. There is one full-time neuropsychologist at PDRU QEUH. PDSRU manages only some of the patients with significant impairment, who do not advance physically. There are 11 inpatient beds at present.

There is the facility to provide Sensory Modality Assessment and Rehabilitation Technique (SMART) assessment for Case A patients at the PDRU.

For Case B patients**,** if the patient plateaus, there is onward referral via MDT; if the patient has cognitive rehabilitation needs and can benefit, they can be referred. If accepted they are transferred for rehabilitation, if not, there is discharge planning involving a social worker, the family and the patient, depending on capacity. When the patient's needs cannot be met at home, social work will be involved and will seek an interim placement. PDRU has discharged people with significant care packages to home and some progress well, alternatively, people will go to a care facility.

PDRU has limited skills to look after Case C patients, so this is an exclusion criteria. Sometimes a patient can become challenging, so in those cases PDRU would ensure safeguards were in place, comply with Adults with Incapacity legislation, ensure appropriate cover, look at pharmacological and psychiatry support and an independent sector assessment. The team would access input from the Robert Fergusson Unit, OT, pharmacology, and provide additional staffing. The team require upskilling in this area.

Case D patients are likely to be sent to the RFU via the ECRS team.

Re. Case F patients, there is no upper age limit for patients.

Extra Contractual Referrals Service (ECRS)

The ECRS provides an assessment of the rehabilitation requirements of GG&C patients with an ABI regarding the suitability for intensive inpatient neurorehabilitation, independent placements or referral to the Robert Fergusson Unit (RFU), otherwise facilitating signposting and linking with the Community Treatment Team for Brain Injury. Staffing comprises Prof. Tom McMillan (0.4 wte), 0.8 wte specialist liaison nurse and 0.4 wte Consultant in Public Health. There are c.120 referrals per year overall, from Acute, Community and care homes. The specialist nurse helps to identify potential cases for neurorehabilitation and advises ward staff. The ECRS also carries out a six month follow up to see if patients with a prolonged disorder of consciousness (PCD) would gain further benefit from rehabilitation following discharge. Patients are referred to Murdostoun Castle, Graham Anderson House or the RFU, or very occasionally to England or to the Ayr clinic in Dalmellington road - a low secure hospital for people with mental illness and/or personality disorders.) TBI affects one third to one half of patients reviewed, others have hypoxic brain injury. Stroke physicians refer people who may benefit from more intensive rehabilitation than can be provided by Acute wards.

Case A individuals would be assessed using the Wessex head injury matrix, and if they were in a minimally conscious state would go to Murdostoun for SMART assessment and to investigate communication or rehabilitation options. If the patient remained in a vegetative state, there would be follow up on discharge to check for improvement.

Case B patients would be likely to be referred to Murdostoun castle.

Case C and Case D; additional staff may be employed. There would be a referral to liaison psychiatry. If the behaviour was persisting, patients would be referred to RFU, Ayr Clinic or GAH (there are three beds 'bought in' at the RFU).

Case E patients would be referred to the Community Treatment Centre for Brain Injury if they were NHS Greater Glasgow patients. There would be a social work referral if appropriate. There is no Clyde community service, the Larkfield unit in Greenock is without psychology input. Referrals are made to the West Dumbarton Service, Quarriers head injury support in Renfrew and Headway Glasgow support is available for these patients.

Referrals are made for Case F patients and there is liaison with older adult specialists at QEUH and GRI. If patients are fit and can benefit from rehabilitation they will be referred.

Graham Anderson House (GAH) is a specialist neurobehavioural assessment and post-Acute rehabilitation hospital within the NHS GG&C Board area, for people with a non-progressive acquired brain injury (ABI). The centre is run by the Disabilities Trust. See Other Centres for further details.

Patients may also be referred to the **Murdostoun Brain Injury Rehabilitation and Neurological Care Centre**, a private centre in Lanarkshire run by the Huntercombe group. The centre provides treatment, care and support for individuals with physical and some cognitive impairments as a result of a brain injury or other progressive neurological conditions. See National centres for further details.

The **Community Treatment Centre for Brain Injury** (CTCBI) provides person-centred goal-focused community rehabilitation for adults living with non-progressive cognitive, psychological and communication difficulties because of an acquired brain injury. The service covers the old Greater Glasgow NHS Board area and accepts referrals for people aged 16 and older. Referrals are accepted for rehabilitation after traumatic brain injury, vascular events (not including stroke), hypoxic brain injury, encephalitis and meningitis, and after surgery for non-malignant brain tumours and other non-progressive space-occupying lesions.

CTCBI delivers rehabilitation within a holistic neuropsychological framework. Goals focus on return to pre-injury function and roles wherever possible. Client-centred interventions aim to reduce the impact of any impairment, thereby reducing disability and handicap as a result of brain injury. Rehabilitation sessions are delivered within the centre, in clients' homes and within other relevant community environments. The service has a strong vocational rehabilitation focus. CTCBI has an open referral system. The service receives 350 referrals per annum of which approximately 250 are accepted. Reasons for non-acceptance include age, diagnosis and postcode. The service is provided by an interdisciplinary team consisting of occupational therapists, clinical psychologists, a speech and language therapist and a rehabilitation assistant.

CTCBI is not appropriate for Case B patients who need physiotherapy. When people have reached their physical rehabilitation potential, further cognitive rehabilitation from CTCBI may be indicated. The numbers for whom this pathway is appropriate are small. The benefit of referral from one rehabilitation service to another is considered on a case by case basis.

CTCBI accepts referrals for Case C patients with behavioural changes who may benefit from community rehabilitation. It does not accept referrals for people who are confused or disorientated.

Most referrals to CTCBI are Case E patients.

Re. Case F patients, CTCBI accepts referrals for people who need cognitive and psychological rehabilitation after ABI aged 16 and older.

The **Acquired Brain Injury Liaison Service** (ABILS) is a nurse liaison service which provides early contact, information, advice and signposting service for patients with an acquired brain injury in hospitals in the Greater Glasgow and Clyde area. ABILS has a professional open referral system.

The **West Dunbartonshire Acquired Brain Injury Service (WD)** provides individualised rehabilitation services to adults aged 16 and over living within the West Dunbartonshire HSCP area with acquired brain injury (ABI). This community based service provides psychosocial rehabilitation, care management, specialist assessment, support, education and advice. This interdisciplinary team works collaboratively with individuals to agree and work towards their personal goals and outcomes.

- Psychosocial rehabilitation and Information, support and advice to service users, carers and professionals.
- Assessment and Care Management to individuals where Brain Injury is the primary issue in their life.

- Specialist assessment and goal-based rehabilitation based on ABI Assessment of needs, and delivery of training to assist individuals with daily living e.g. Memory aids techniques.
- Relevant training for other professionals involved in the support of individuals with ABI.

The ABI Team consists of an ABI Service Co-ordinator, Social Worker, Consultant Neuropsychologist, and Rehabilitation Worker.

Case A patients would come through hospital discharge where an assessment would be made with an OT leading to ensure the patient was moved into a supportive environment. WD would review history and cognitive status and link in with practitioners and carers regarding any training needs. If there were changes in the person's consciousness level they would then refer to WD and a neuropsychological review could be arranged. Care management would sit with physical disabilities team. Potentially the service social worker may act as Guardianship Supervisor.

Case B patients would come through hospital discharge processes. The Adult Care Physical Disability Team would care manage the case, and WD would be involved in the cognitive rehabilitation. The WD Neuropsychologist would be involved and the Rehabilitation worker would be joint lead worker with someone on Adult Physical Disabilities Team, working directly with the person and their carers.

For Case C patients living within the community, WD would be the care managers. The Neuropsychologist and Rehabilitation Worker would work with the person, with Social Worker as the care manager. The service would work with the carers towards a whole support package to suit the person's needs. WD would consider legislation, guardianship, POA, as appropriate, and organise self directed support, and care manage this. If there were other health issues, WD would consider need for inpatient rehabilitation and coordinating with Primary Care to facilitate this.

Case D patients would be care managed via WD. This would include risk assessment & management, consideration of legislation such as guardianship, and the developing of person-centred support plans. The service would also consider the patient's suitability for inpatient rehabilitation in consultation with the GP.

Re. Case E patients, WD would care manage in this scenario. The patient would receive a neuro-psychology assessment and if appropriate psychological therapies. The service would complete a rehabilitation assessment and intervention, with agreed goals, working towards achieving person's outcomes. Self-directed supports would be arranged through the social worker. Support required would be put in place and care managed via WD. Activities and return to work options would be individual-led.

For Case F patients, there is no cut off for older people, care from WD is provided to patients from age 16.

The service can provide Extra Contractual Referrals for Neuropsychology assessment and formulation. This to be arranged on a case by case basis through NHS Boards.

The **Inverclyde Physical Disability Rehabilitation Service** is an eight bed unit for people who have a complex physical disability including brain injury, aged 16-64 years, living within Inverclyde and who are registered with a GP. Rehabilitation consultant staff at QEUH cover sessions at PDRU IRH. The hospital team at IRH also looks after community rehabilitation in the catchment area. There is no psychologist at IRH, but the OT carry out baseline assessment, and, if they feel they need more rehabilitation will highlight this and make a referral to the NHS Board.

Inverclyde physical disability rehabilitation service aims to:

- offer individual time-limited treatment and support to enable people to live in the community as independently as possible
- offer support, advice and guidance to carers or families
- work closely with other staff and agencies already involved, supplementing their input
- provide information and advice on community services available to people with physical disabilities

The team includes:

- Team Leader
- Physiotherapists
- Occupational Therapists
- Clinical Psychologist (though none in post for some years)
- Dietitians
- Speech and Language Therapist
- Secretary
- Support Workers

Inverclyde physical disability rehabilitation service can offer help, advice and specialist therapy in a variety of areas:

- mobility
- day-to-day activities
- speech and communication
- skin breakdown
- continence
- weight loss
- swallowing
- memory problems
- mood problems

Glasgow City Community Rehabilitation Team and East Dunbartonshire Community Rehabilitation Team provides physical rehabilitation for housebound patients within their own homes who are unable to access outpatient services. This service covers patient who are resident within Glasgow City / East Dunbartonshire respectively and are registered with a GP in the respective area. The service will accept patients age 16 plus who are able to actively engage with the rehabilitation process.

Glasgow City Rehabilitation Team is split into three teams/localities: North East, North West and South

East Dunbartonshire has one team.

Patient accepted onto the service generally require and receive multidisciplinary input and the team is made up of:

- Team lead
- Physiotherapists
- Occupational therapist
- Rehabilitation nurses
- Speech and language therapist

- Podiatrist
- Dietician
- Pharmacist
- Generic support workers

The rehabilitation service works with patient to achieve patient centred goals, with the ethos to prompt independence within the patient home and community.

Third Sector Support

Quarriers Renfrewshire Head Injury Service provides support for 17 – 64 years old living in the Renfrewshire area who have experienced an acquired brain injury (ABI) and/or their carers. People eligible for the service are those who have experienced an ABI as a result of a:

- sporting accident
- road traffic accident
- assault
- industrial injury
- fall
- infection, e.g encephalitis, meningitis.

Headway Glasgow works with people with acquired brain injury, their families and carers in the Glasgow area. They aim to provide:

- information on brain injury, its effects, and on practical help available
- support for people affected by the condition
- services including an art group, writers group, walking group and weekly drop in groups.

Headway Glasgow is a Scottish charity which is affiliated to the wider Headway movement. It offers long term peer support via a user-led service.

Ceartas Advocacy joined forces with Headway Glasgow in 2011 to open an **ABI Café,** which now takes place on the first Thursday of the month at the Kirkintilloch Baptist Church. It is a place where people with an ABI can meet regularly for vital information and support in East Dunbartonshire. Ceartas provides advocacy and operational support to co-ordinate, promote and organise the café whilst Headway offers the specialist support and training required in ABI: together they answer questions on ABI, local services, rehabilitation, benefits, and respite care.

The **Brain Injury Experience Network (BIEN),** is a user-led group. It meets once a month and in addition arranges group activities, such as fishing trips and bus trips. Members of BIEN connect with each other through a common understanding. BIEN is open to adults living in the West Dunbartonshire area who have experienced an Acquired Brain Injury (ABI). Anyone who has an ABI is invited to attend the meeting as it offers a supportive and safe environment for people to talk about their own experiences.

Reviews, Plans and Strategies

The trauma pathway planning was noted by most parties as the work ongoing at present. There was a question mark as to where the planned rehabilitation would take place, and at the time of writing this had not been answered. It is not yet settled as to whether ward 46 at GRI will see more patients and how or if this will be resourced.

Information supplied by:

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Caroline Davidson, Clinical Lead and Speech and Language Therapist, Community Treatment Centre for Brain Injury, NHS Greater Glasgow and Clyde
Dr Tadhg Kelliher, Consultant in Emergency Medicine, Glasgow Royal Infirmary, NHS Greater Glasgow and Clyde
Dr Zafar Mahmood, Consultant in Rehabilitation Medicine, Queen Elizabeth University Hospital, NHS Greater Glasgow and Clyde
Prof Tom McMillan, Professor of Clinical Neuropsychology, NHS Greater Glasgow and Clyde
Dr Neil Mukherjee, Consultant in Emergency Medicine, Royal Alexandria Hospital Paisley and Inverclyde Royal Hospital, NHS Greater Glasgow and Clyde
Angela Sprott, ABI Service Co-ordinator, West Dumbarton Health and Social Care Partnership

NHS HIGHLAND

Land Area:	**32,566 km^2**
Population:	**321,990**
Population Density:	**10**
Local Authorities:	**Argyll and Bute, Highland**
Principal Hospitals:	**Belford Hospital, Fort William**
	Caithness General Hospital, Wick
	Raigmore Hospital, Inverness

There are A&E departments at all of the above, and at Lorne Hospital, Oban. A&E department at all of the above hospitals collect STAG data, with the exception of Lorne Hospital, Oban, at present.

Belford Hospital, Fort William

Belford Hospital has 3wte medical staff (3 wte physicians, 3 anaesthetists, 3 surgeons). The hospital has a consultant-led 24 hour A&E, and on-call out of hours. It is run by FY2 staff during the day with consultant support. Patients with a TBI would be clinically managed, assessed and treated, and transferred as appropriate, normally to QEUH Glasgow. Minor head injuries would go to neuro-observation (the combined assessment unit) at Belford as per SIGN guidelines, for up to 24 hours. There is no separate observation area. In some situations where clinical staff may have concerns, patient will have a CT scan and staff will consult with colleagues at QEUH, and if no surgical intervention is required staff will keep a watch on the patient and stay in touch with the neurosurgical staff.

Once the neurosurgical episode of care has been completed, the patient would be transferred back to Belford or their local hospital. Many of the patients who suffer TBIs are holidaymakers.

There have been no Case A patients in recent memory.

Case B patients would be seen in the general rehabilitation ward. If they were from the area and needed rehabilitation to improve their physical and cognitive ability, the OTs would be involved for cognitive rehabilitation. Such patients, however, would likely to been referred to a dedicated neuro. unit. Young patients with a head injury have in the past been sent to Raigmore to the rehabilitation team there or to the Astley Ainslie in Edinburgh. If the patient is affected cognitively, there is limited local support.

Case C and D patients would require a MDT case review and onward referral would be likely. Additional nursing staff may be employed.

Case E patients would be referred to community OT and physiotherapist. This would depend on their level of cognitive ability, whether they lived alone, their environment and familial support.

Case F patients would be admitted to A&E and under the care of the general physicians and surgeons. Patients would be assessed and treated irrespective of their age, but an attempt would be made to limit the time in A&E for the elderly, however, if a minor head injury was observed, the patient would be fast-tracked to the to ward.

Caithness General Hospital, Wick

Caithness General Hospital (CGH) is configured to deliver consultant/senior clinician led care with 24 hour A&E services, and on call out of hours. The rotational consultant model is supported by three substantive Consultants, Rural Practitioners and Advanced Nurse Practitioners. A&E is staffed by Rural Practitioners and FY2 doctors in hours with consultant input as required.

Patients with an ABI would be assessed by a senior consultant, as per NICE guidelines. The patient would be assessed, managed, treated and referred as appropriate via the single point of contact to access the trauma network. There would be liaison with the trauma consultant at Aberdeen Royal Infirmary (ARI) and the Scotstar retrieval team. Multidisciplinary decisions are made regards managing the patient on-site or retrieval. There is a 24/7 on-call anaesthetic service to support the patient until retrieval.

CT facilities are available on site, minor injuries patients may be admitted for a period of observation as per SIGN Guidelines. If neurosurgery is required, the patient would be transferred to ARI or another neurological unit as required. If clinically stable the patient can be managed in CGH under the care of a physician. Any moderate to severe brain injuries would be transferred to the appropriate neurosurgical unit unless clinically inappropriate, or where palliative care was required.

Patients may be transferred from ARI after neurosurgery to Raigmore Hospital, CGH or the Community to continue rehabilitation as appropriate. Patients may also be referred to a specialist rehabilitation unit within Scotland e.g. Astley Ainslie Unit, Edinburgh. The distance of travel and associated expense can prove difficult for families. Allied Health Professional (AHP) provision includes Physiotherapy, Occupational Therapy (OT) and Speech & Language Therapy (SALT) in primary and secondary care. Case A patients would be managed by the multidisciplinary team (MDT) on the rehabilitation ward and aim to improve function to the point where nursing care at home could be provided.

Broadford Hospital, Skye

At the A&E Acute ward at Broadford Hospital, patients would be reviewed with the doctor on duty. There may be videoconferencing contact with Raigmore for immediate care. Patients are under the care of Rural Practitioners. If patients are intubated, they are sent to Aberdeen, Glasgow or Edinburgh. There is no CT scanner at Broadford, patients may be scanned at Raigmore or Belford Hospital. There is a rapid access clinic at Raigmore for quick scanning. At Broadford there is no dedicated head injury rehabilitation. Many patients are holiday makers with no requirement to return to the local hospital. Local patients may access specialist rehabilitation elsewhere then come back for community-based enablement. There is local OT and physiotherapy based in the hospital (week days) and speech and language therapists can be called in – these staff also support the Community services covering Portree, Skye and Lochalsh. Advice is available from Raigmore.

If patients are disturbed and un-cooperative (Case C), there is the option for 1-2-1 nursing. There would be a MDT review of care, with individual care plan. Staff might consult the violence and aggression team for advice, and involve mental health officers. Some liaison psychiatry is available. There is a consultant who provides psychiatry services for the elderly, and on-call psychiatry in Newcraigs in Inverness. If required, a mental health team will come with the retrieval team.

For Case F patients, Frailty tools and delirium teams are available, and ‘falls bundles;’ accessing OT and physiotherapy input to prevent falls.

Raigmore Hospital

There are seven Emergency Medicine Consultants (5.5 wte). There is no Emergency Department observation ward, this facility is provided by the general surgical team. The department follows the NICE guidelines and has 24 hour access to CT imaging. All head injuries with pathology on CT scans are discussed with Neurosurgery colleagues (mostly at Aberdeen Royal Infirmary) and transfer arranged when required, with anaesthetic support if needed. If no neurosurgery is required, patients may be admitted to the Intensive Care Unit in Raigmore, the surgery HDU or in the general surgical ward.

Patients discharged from the Emergency Department following minor head injury are provided with a head injury advice sheet (separate Adult and Paediatric advice). In addition, sport related concussions receive written advice in line with the Sport Scotland 'graduated return to play' concussion guidance. A letter is sent to GP within 24 hours detailing the attendance. Highland GPs also receive a letter detailing all patients who have attended with a head injury and that if any patient were to have persisting post-concussion syndrome symptoms (>3 months) the availability of the Traumatic Brain Injury Clinic for cognitive assessment and rehabilitation is emphasised. Furthermore, for patients who may re-present to the Emergency Department with troublesome post-concussion symptoms, there is the ability to refer these patients directly to the Traumatic Brain Injury Clinic from the Emergency Department, with a standardised referral sheet.

NHS Highland will manage patients with cranial and spinal trauma (except patients in Fort William, who link with NHS GG&C). Patients with a traumatic brain injury will be transferred to ARI ICU / Ward 205, where neurosurgery is provided (also the Children's hospitals in Glasgow or Edinburgh), after which patients are repatriated to the neuro-rehabilitation / stroke ward at Raigmore, before transfer home or to local community hospitals such as Nairn, Golspie or Boardford, that are staffed by non-specialist medical staff. A problem in the past has been that sometimes when a patient was due to be repatriated after neurosurgery they have been discharged home. As there is a bed manager in the neurosurgery ward, and a trauma co-ordinator, patients usually get comprehensive rehabilitation plan; this is now routine. STAG data is collected, as is major trauma data.

Rehabilitation

Two wte consultants in rehabilitation medicine work in the eight bed rehabilitation unit (Ward 2a) as well as a Major Trauma (MT) coordinator to manage repatriation. The MT Coordinator is supported by one Stroke and Rehabilitation Medicine Consultant, for inpatient and outpatients, as well as another Rehabilitation Medicine Consultant for outpatient and community rehabilitation. The MT Coordinator has strong links with A&E and Orthopaedics in Raigmore as well as their equivalent counterpart within Raigmore's ARI.

To further support rehabilitation, the Brain Injury Clinic is held weekly in Raigmore Hospital. There is in-patient access to liaison psychiatry, occupational therapy, speech and language therapy and physiotherapy. The rehabilitation unit is shared with Stroke. There are waiting lists of four to six weeks for outpatient referrals. The waiting list for neuropsychology is nearly three years, however, staff attempt to see trauma patients within 12 months. Investment following the Major Trauma Centre has initially resulted in two-part time MT Neuropsychologist in-reach with follow up for patients in the community supported by a specialist MT Occupational therapist.

Case A patients would be referred for MDT assessment, there would be a six week assessment period. Patients with a prolonged disorder of consciousness can be difficult to place, referral may be made to the Astley Ainslie in Edinburgh (subject funding approval for out of area), following BSRM guidelines. A decision would then be made with the family as to the next steps.

Case B patients would be managed within the rehabilitation unit at Raigmore. Occupational Therapy and physiotherapy are available, although the unit can be very short staffed and 30 minutes of appropriate therapy is not always available for all rehabilitation therapies. Vocational and OT/ psychology in the community is available through the MT specialist team for MT cases only - and so excludes other ABI cases. Specialist physiotherapy is not available although the service is currently awaiting funding approval and recruitment for a MT physiotherapist to support. Following discharge overall community physiotherapy support is patchy with patients mainly receiving generalist support. There has historically been a lack of social workers within the community (commented upon in a recent mental health tribunal hearing). The funded post for social work is vacant due to staff shortages. Long term nursing staff shortages are expected from August 2019 for at least a year. There are, however, experienced nursing staff.

A protocol has been developed for the management of Case C patients. Nurses can observe the patients directly in a small area, and the patient would be accompanied by a trained nursing assistant. One to one care is often unavailable as NHS Highland does not have a nurse bank and psychiatry nurses are not able to support medical nursing service. In Case C, as well as observation, security would be alerted and overnight doors are alarmed but not secured (as the ward is part of a general medical ward). Staff are experienced but they are not trained in managing challenging behaviour. It would be helpful to have that training – and a more suitable environment, as it is not designed for such patients. Psychiatrists do not assist in the case of a TBI. However, they are available through the duty MHO for certification of short term detention. Liaison psychiatry are supportive, but there is no access to the psychiatric hospital.

Case D patients are occasionally referred to the RFU or Murdostoun. Otherwise, these patients have been held in the Acute medical rehabilitation ward; though this space has been deemed inappropriate with significant concerns expressed as to patient and staff safety. Only in the most extreme of cases are patients transferable to the Psychiatry hospital's secure unit.

Re. Case F, the majority of trauma patients are elderly. There is a pathway, but no rapid response team for ABI as there might be for hip fractures. The rehabilitation unit will take anyone who will benefit from rehabilitation, irrespective of age. Care of Elderly are generally unable to accept elderly patients with neurorehabilitation potential.

Community Services

Once the specialist care is completed, patients may be transferred to Community hospitals for discharge planning and integration into local social work. There is outpatient follow up for patients in Raigmore's weekly brain injury clinic.

Third Sector Support

Headway Highland offers free support, advice and information to individuals, families and carers affected by acquired brain injury. Their services throughout the Highlands provide an opportunity to talk to others in a similar situation.

Headway Highland also offer a number of social events and outings including bowling, boat trips, lunches, family events or trips to the cinema or theatre.

Monthly social groups meet in Inverness, Fort William, Nairn, Dingwall, Dornoch and Caithness (alternate months between Wick and Thurso).

A weekly social group meet in Inverness and a walking group meet at various locations around Inverness. The groups are all members led and the activities vary based on the requirements and wishes of the people attending but often include the attendance of speakers, games nights or arts and crafts.

Reviews, Plans and Strategies

NHS Highland had an ABI service improvement group, a MDT with representation from the patient group and voluntary sector and staff, but it now no longer takes place. Trauma planning is the main focus at present.

There is the hope to integrate the services for Stroke and ABI, via combined clinics including outpatient clinics, there is the hope to use funding from Trauma and Stroke to establish an integrated service. Patient numbers justify sharing the services, and managers are supportive.

Information supplied by:

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Pamela Garbe, Rural General Hospital Manager, Caithness General Hospital
Ashish Macadan, Consultant in Rehabilitation Medicine and Stroke, Raigmore Hospital
Anne Boyd Mackay, Rural General Hospital Manager, Belford Hospital, Fort William
Rachael Robertson, Senior Staff Nurse, Broadford Hospital, Skye
Catherine White, Ward Clerk, Broadford Hospital, Skye
Additional Information from: Dr Mike Rennie, Consultant, Raigmore Hospital

NHS LANARKSHIRE

Land Area:	**2,242 km^2**
Population:	**658,130**
Population Density:	**294**
Local Authorities:	**North Lanarkshire, South Lanarkshire**
Principal Hospitals:	**University Hospital Hairmyres, East Kilbride** **University Hospital Monklands, Airdrie** **University Hospital Wishaw,**

There are A&E departments at all three of the above hospitals.

University Hospital Hairmyres

There are 13 wte consultants working in the emergency department at Hairmyres. There are approximately 31 patients with a significant TBI seen in Hairmyres each year. STAG data is collected.

Patients with a TBI will go to Intensive Care (if ventilated), and to Queen Elizabeth University Hospital (QEUH) if they require neurosurgery.

Once the neurosurgical episode of care had been completed, the patient may be transferred to Hairmyres, if that was their base hospital. There is no routine follow up from A&E, although advice is provided on discharge.

University Hospital Monklands

There are 11.6 wte consultant staff in the emergency department at Monklands.

From an EM perspective, there is reception, assessment and ED management of head injury, including decisions around imaging, referral, or for admission and/or observation. From an EMRS perspective, there is primary assessment at the scene for severe head injury, often resuscitation and transfer to specialist centres (Western General in Edinburgh or QEUH). Head Injury is common; approximately 20-30 per day, mostly minor. The demographic is changing from violence and alcohol related injuries amongst young people, increasingly to older patients with head injuries related to anticoagulant use, so the use of CT scanning is much higher, due to the demographic and co-morbidities. There are also many more active older people with activity-related head injuries.

The head injury observation unit is to be continued under the new Major Trauma configuration of services, however, it is likely there will be a rationalisation of units looking after patients and there may be changes in future. The average length of stay in the observation area is 14 hours, but it may be up to72 hours, after which the patient will be transferred to services with inpatient wards, such as medicine for the elderly. Young patients may have a longer length of stay. Patients will be transferred to QEUH for neurosurgery, unless neuroradiology is required; neuro interventional radiology for non-traumatic brain injured patients is a current issue. There is a need for a clear pathway.

If a patient does not require neurosurgery, they may be admitted to the Medical Assessment Unit or ward 26 (HDU / Critical Care), or Medical High Dependency. Once the neurosurgical episode of care is completed, the patient will go back to a medical ward. For older patients the pathway is more

streamlined, generally to a hyper-Acute stroke ward, or to Medicine for the Elderly. Younger patients are likely to go back to a medical bed when there is one available, however, local 'front door' cases will take precedence. There are good links with AHP services for front door cases (e.g. access to OT, physio), but 'downstream' cases can experience a delay for physiotherapy and other services. Repatriation back after neurosurgery can be delayed due to lack of medical beds.

On discharge from A&E the patient will receive an advice leaflet.

Case A patients might present to ED but are likely then to be sent to neurosurgery or intensive care.

If Case C patients attend ED or are inpatients, there is an attempt to rule out other issues or causes of the behaviour, and try and manage the patient in a safe side room in the ward, with medical sedation if required. Often non-medication interventions are employed, including the presence of family, and 1-2-1 nursing care. There is the option to involve the psychiatric liaison team, but there are currently no psychiatric inpatient beds in Lanarkshire. The liaison psychiatry team would see the patient if there were questions re. capacity.

Case E patients would be able to access the 'front door' OT and physio 24/7. There are also adaptations for home to support patients; the Community Acute Rehab Services (CARS). Referrals would be made to social work as needed, if there were significant psychological / cognitive impact / child protection or adult support and protection requirements.

Re. case F patients, 'Hospital at home' is a consultant-led medicine for the elderly service, that will see patients referred by paramedics, GPs etc, the team see patients in their own homes. This helps to avoid admission, or patients are admitted direct to cottage hospitals. The service is run by Prof. Graeme Ellis. The pathway works well for older patients who can be referred direct, and there is a comprehensive geriatric assessment and early plans for rehabilitation, including early discharge planning.

University Hospital Wishaw

There are 9.5 wte Emergency Doctors in the Emergency Department at Wishaw. Patients are assessed in A&E and imaged via CT scanner, and referred on as appropriate. There is no dedicated observation area, if patients require simple observation they are transferred to the surgical ward, under the care of the surgeon, for up to 24 hours (or depending on patient need). Patients requiring neurosurgery would be sent to QEUH, or very occasionally to Edinburgh. After neurosurgery is completed, patients would be referred to the Community Brain Injury Team.

STAG data is collected. There is no routine follow up of head injuries from A&E.

Case A patients would not be seen in A&E.

Case B patients would be admitted if in any way problematic, and then sent on to specialist rehabilitation.

For Case C patients it would be important to exclude any physical cause such as contusion, prior to referral to psychiatry. If there was a question of a head injury as well as an underlying psychiatric illness, the patient would be admitted to a surgical ward for a dual assessment and on-site psychiatry. It can be difficult to resource additional nursing staff.

Case D and E would not be an A&E referral.

Re. Case F patients, there is a 'falls' team based in Wishaw General, incorporates care of the elderly, OT / PT – who can assess a patient in the community or in hospital. These patients would be managed the same as other people in A&E, if they had co-morbidities, they might be admitted to medicine depending on individual need.

Post A&E

Neurosurgery, if required, will take place at Queen Elizabeth University Hospital in Glasgow, however, very occasionally, a patient may go to Edinburgh.

Rehabilitation

NHS Lanarkshire Community Brain Injury Team is a pan-Lanarkshire service and the single point of referral for all adult in-patients and community patients who require rehabilitation following a brain injury. The team provide specialist brain injury assessment and rehabilitation from Occupational Therapy, Physiotherapy, Speech and Language Therapy and Clinical Psychology. Rehabilitation goals and plans are made and reviewed in partnership with the patient. There is no time limit to the service and the duration of rehabilitation is tailored to the patient's needs.

In-patient care is provided in the three Acute general hospitals - University Hospitals Hairmryres, Monklands and Wishaw and neurosurgical care in the Queen Elizabeth Hospital in Glasgow. The Lanarkshire Community Brain Injury Team will assess patients in the acute sites and work with the ward and hospital AHP staff to provide support, advice and education on rehabilitation and management of the patient until discharge. They will also assess the need for transfer to any other unit NHS or private. Referrals come from Acute, from GPs and social work. There are approximately 170-180 individuals that require rehabilitation per year. Data is collected: patient numbers and clinical data, assessments on admission and discharge, ACE-III (Adenbrooks cognitive examination III), Qolibri quality of life indicator (WHO outcome measure) Barthel ADL index and HADS questionnaire on admission and discharge.

Rehabilitation is provided in the community in the patient's home, workplace, school, university. The team will work wherever the patient needs them to be. The team work in partnership with North and South Lanarkshire Health and Social Care Partnerships and many third sector organisations utilising and establishing links for patients to use in their local communities during and beyond their rehabilitation. The service provides assessment and rehabilitation for adults with traumatic and acquired brain injury (typically Case E patients). The team offers occupational therapy, physiotherapy, speech and language therapy and clinical psychology. Rehabilitation is mainly provided in the community e.g. in patient's own home, work place, school or college or community venue, however the team will also assess and support patients with brain injury during their admission to the Acute hospital sites.

Staff members have completed Sensory Modality Assessment and Rehabilitation Technique (SMART) assessment specialist training for patients in vegetative and minimally conscious states, so can assess Case A patients, and do this on behalf of Boards to inform diagnosis. Staff will then meet with the family and if there is rehabilitation potential will provide a programme, with support for family and liaison with social work in terms of longer term placements.

Case B patients may require a significant care package and intense community brain injury specialist rehabilitation from the community team. If the patient does not go home, then they may go to GAH or Murdostoun.

Case C patients are challenging. Staff would decide on assessment as to whether the patient was in post traumatic amnesia (PTA). If so, they would have no ability to participate in rehabilitation at that time, so it would be key to establish this. The Board would then have challenges; the patient could go into a general hospital with 2-1 support, transfer to mental health bed in locked ward, (sometimes a referral might be made to the Robert Fergusson Unit (RFU) if the patient was very aggressive, for specialist neuropsychiatrist and medication support to manage behaviours). There would be referral to psychiatry, although those departments are often reluctant to be involved, but will advise on suitable medication and the need for a compulsory treatment order ('section') and sometimes they will take patients on. Case D patients would be managed in the same way, or referred to the RFU in Edinburgh.

North Lanarkshire Council offers a range of community care support services for people with an acquired brain injury. These include a community care assessment, access to day care, respite care or short breaks and home care. It also offers a specialist service for people aged 16-65 years old whose brain injury is a result of trauma (for example a fall, accident or infection).

South Lanarkshire Council Brain Injury Service aims to enable people to become as independent as possible in their home, workplace and community. The rehabilitation service focuses on the assessment and management of cognitive difficulties and their impact on daily activity. Goals are set with the person with the ultimate aim of maximising independence.

Types of support available includes:

- setting and working toward personal goals.
- information and advice about brain injury for the person and their carers.
- supporting emotional needs following injury.
- management of cognitive skills.
- help to relearn skills or new ways of completing tasks.
- advice for returning to work.
- signposting to local support groups and activities

Third Sector Support

Headway North Lanarkshire is a therapeutic peer support group for anyone in the North Lanarkshire area who has suffered an acquired brain injury.

The group also welcomes anyone caring for a family member, relative or friend who has a brain injury to come along and share their experiences, or to take some time out from their caring responsibilities. Headway North Lanarkshire meets once a week on Thursday between 12 noon and 3.00pm in The Volunteer Centre's Church Building, Kenilworth Avenue, Wishaw.

The group offer recreational activities including:

- arts and crafts
- IT tutoring

- snooker or pool table
- a fortnightly therapeutic massage service
- social events including outings to places of interest
- a friendly ear to talk over issues causing upset or concern

The drop-in groups are run on an informal basis and provide an opportunity to meet and talk to others facing similar situations.

Headway South Lanarkshire is a therapeutic peer support group for anyone in the South Lanarkshire area who has suffered an acquired brain injury.

The group also welcomes anyone caring for a family member, relative or friend who has a brain injury, to come along and share their experiences, or to take some time out from their caring responsibilities. Headway South Lanarkshire meets once a week on Tuesdays between 6.00pm and 8.00pm in the Burnbank Centre, Burnbank, Hamilton, ML3 0NA.

The group offers recreational activities including:

- arts and crafts
- memory games
- snooker or pool table
- social events including outings to places of interest
- a friendly ear to talk over issues causing upset or concern
- an opportunity to talk through issues that are causing upset, worry or stress.

The drop-in groups are run on an informal basis and provide an opportunity to meet and talk to others facing similar situations.

Patients can also be signposted to Headway Glasgow.

Reviews, Plans and Strategies

There is a great deal of ongoing planning work in tandem with the trauma network around how brain injured patients are managed within the NHS Board. Because there is no inpatient unit, and with the trauma centre planning, there are early discussions about the creation of inpatient unit for early care and rehabilitation of patients with an ABI.

Wishaw will be the Trauma Unit for Lanark, and many more patients will go to the major trauma centre and Trauma Unit so will go to different services, so there will be more patient travel, therefore a big impact on ambulance services.

If someone has a significant brain injury they go to QEUH, this pathway is unlikely to change.

Information supplied by:

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NHS LOTHIAN

Land Area:	**1724 km^2**
Population:	**889,450**
Population Density:	**516**
Local Authorities:	**East Lothian, Edinburgh City, MidLothian, West Lothian**
Principal Hospitals:	**Royal Infirmary of Edinburgh (RIE)**
	St John's Hospital, Livingston
	The Western General Hospital, Edinburgh

Both RIE and St John's hospitals have an A&E Department.

The Royal Infirmary of Edinburgh and St John's Hospital, Livingston

A&E

There are an approximate 35 wte Emergency Medicine consultants split across the NHS Lothian departments, including paediatric and adult emergency medicine.

St Johns has an observation ward, and the Royal Infirmary of Edinburgh has a surgical observation unit, where patients with a TBI can be admitted. Patients would tend to remain in the observation area 6-12 hours (average), but there are sometimes prolonged admissions under neurosurgical supervision. Neurosurgery is managed at the Western General Hospital, usually ward 32-33 or in the Intensive care Unit (ITU). If patients do not require neurosurgery, they will be admitted to the surgical ward at RIE, or the emergency medicine observation ward at St John's. STAG data is collected, in addition to other data (time taken to CT, numbers of CT scans, head injury observation admissions and neurosurgical and IT transfers).

Case A patients would be seen within the medical inpatient ward.

Re. Case F patients, rapid response teams comprise emergency medics, OT and psychiatrists working in the emergency department.

Neurosurgery

Neurosurgery takes place at the **Western General Hospital**, Edinburgh. There are 11.5 wte neurosurgeons in post. In Acute, there is a 24/7 provision of emergency advice and treatment, covering district general hospitals in Lothian, Borders, Forth Valley, Dumfries and Galloway, Victoria Hospital Kirkcaldy and Queen Margaret Dunfermline, in addition to the three main NHS Lothian hospitals. Patients come in to the Western General, St John's and the Sick Kids; patients with severe injuries are transferred to the Western General Hospital (WGH).

After the neurosurgical episode of care is complete, the patient may stay at the WGH, may go home or be referred to rehabilitation, or transferred to a long-term care home depending on social care requirements. An MDT meeting will decide if the patient is suitable for outpatient follow up, referred to community support such as CRABIS in West Lothian, or for inpatient rehabilitation at Astley Ainslie Hospital. If the patient is exhibiting challenging behaviour as a result of their ABI, they may be referred to the Robert Fergusson unit in Edinburgh, Case D.

It is anticipated that Neurosciences services will move from Western General Hospital to the Royal infirmary site in mid 2020, and this will coincide to some extent with development of major trauma services in the Royal Infirmary

Rehabilitation

The **Astley Ainslie Hospital** provides rehabilitation services for adults with acquired brain injury, stroke, orthopaedic injuries, limb amputation, and progressive (degenerative) neurological disorders such as multiple sclerosis (MS).

The post acute neuro rehabilitation team provides neurorehabilitation, for non-progressive neurological conditions, including acquired brain injury inpatient, outpatient and acute hospital in-reach roles. This service is provided by a multidisciplinary rehabilitation team in a three ward, 46 bed unit at the Charles Bell Pavilion. This includes the Scottish Brain Injury Rehabilitation Service (SBIRS) which provides a tertiary referral services for patients in those health board regions that do not have local access to inpatient brain injury rehabilitation, typically two to five patients at any one time. The inpatient team includes medical consultants, physiotherapy, occupational therapy, speech therapy and neuropsychology in addition to specialist nursing. The unit also provides assessment of Disorders of Consciousness.

Though the service is predominantly targeted at the 16-65 year age group, patients in older age groups are frequently admitted. In addition to managing patients with ABI, the unit has also developed expertise in inpatient rehabilitation for stroke; recent onset progressive neurological disorders; neurological cancers; non-traumatic spinal disorders and polyneuropathies. Of the 180 or so total admissions, approximately one third are brain injured patients, of which c. 30 are traumatic brain injuries. The average length of stay is 78 days.

Case A patients would be transferred to the Charles Bell for assessment and care, although assessments are sometimes carried out while the patient is still in Acute, and the patient would be transferred to the Charles Bell when medically stable. Patients may then be discharged to a suitable nursing home or home with a supporting care package.

Case B patients would be seen at the Charles Bell. They would have daily access to OT, physiotherapy, speech and language therapy and twice weekly neuropsychology input.

It is likely that Case C or D patients would be referred to the RFU.

There is limited community support for Case E patients, so the patient so may return to the Charles Bell or be referred to CRABIS, however, there can be a waiting time of up to six weeks and longer for CRABIS. There would be outpatient follow-up offered at the Charles Bell. The outreach nurse specialist would see the patient within two weeks of discharge and the patient would also be seen for follow up by occupational therapy and neuropsychology. Almost all patients receive follow up from a rehabilitation consultant, to check discharge has gone as planned. Patients would be referred to social work if required.

For Case F patients the age limits at the Charles Bell are technically 14 to 65, however, 18% of admissions are over 65.

The service is the principal inpatient provider for Borders region in addition to Lothian and frequently admits patients from Ayrshire. Tertiary referrals from other regions are less frequent.

The **Robert Fergusson Unit at the Royal Edinburgh Hospital** is a purpose built 20-bed unit, (currently with 18 beds staffed). The unit provides a national service for the assessment and rehabilitation of patients with complex needs following an ABI, it specialises in the assessment and treatment of behavioural and neuropsychiatric sequelae of ABI, in particular significant/severe behavioural difficulties and aggression. It is a national NHS neurorehabilitation service for patients (18-65 years). If, following initial assessment, it is felt that the patient would benefit from a period of assessment and rehabilitation in the unit, then the referring clinician would seek approval from the host Health Board responsible for the funding. The RFU also provides advice and support to other services in Scotland working with individuals who have sustained a brain injury, including to community and hospital settings, nursing homes and psychiatric hospitals. The RFU outreach nurse provides training and support to community services when patients are being discharged from the RFU. The RFU can also provide training for other services on request.

Staff noted that, at any one time, at least 50% of beds at the RFU are occupied by patients who are medically ready for onward transfer with an average wait time for placement of over 12 months.

Case A patients would be managed in a medical inpatient ward until medically stable, after which they may be referred to the Astley Ainslie. The RFU does occasionally take patients with progressive neurological disorders, e.g Huntingdon's, where appropriate, and where beds are available. These are not, however, the core patients group which would comprise Case D and Case C patients. The RFU also treats patients who may have a history of severe and enduring mental health problems (which may include psychosis or bipolar disorder or depression), who then have a brain injury. Patients may be detained under the Mental Health Act.

Re. Case E patients, the upper age limit for the RFU is technically 65, although patients above the age of 65 with no other co-morbidities would be accepted.

Community Support

The Community Rehabilitation and Brain Injury Service (CRABIS) provides multi-disciplinary assessment and rehabilitation within the home or community setting to individuals over the age of 16 who live in West Lothian and who have a physical disability and/or acquired brain injury. The service also provides follow up and early intervention as required to individuals who have suffered a mild head injury. They must also have a diagnosed neurological condition. The service's core aim is to improve the individual's independence, level of function, participation and quality of life.

CRABIS is funded by Lothian Health and West Lothian Council and the service is delivered by an experienced, multi-disciplinary team, including:

- Occupational therapists
- Physiotherapists
- Clinical psychologists
- Speech and language therapists
- Rehabilitation assistants

Out-patient / Community services at the Astley Ainslie Hospital

The Neurorehabilitation Outpatient Service aims to provide a specialist interdisciplinary neurorehabilitation outpatient service for patients with complex neurological needs and their families. The service aims to provide timely access to specialist, flexible, coordinated and effective

interdisciplinary outpatient services for adults with neurological rehabilitation needs within Lothian. Patients may be seen on a 1:1 basis, for joint assessment/treatment or in a group. The service also provides specialist interventions in the following areas: spasticity management, neurological splinting, functional electrical stimulation, vocational rehabilitation, cognitive assessment and rehabilitation and assessment of motor processing skills. Patients may be seen in clinics, at home, at work or in community settings.

The Astley Ainslie Hospital is in preparatory discussions with local integrated joint boards through a forum called the Integrated Rehabilitation Collaborative, the purpose of which is to redesign community pathways for patients with neurological impairments to enable more effective management in the community

Third Sector Support

Edinburgh Headway Group is the specialist organisation in Edinburgh which supports people with a brain injury when they have returned to the community after discharge from hospital.

They provide a range of specialist services in a **Rehabilitation Day Service**, which are specifically tailored to meet the individual needs of those who have suffered a brain injury and their carers, with a clear focus on improving everyday functioning.

They continue to have strong links with health and social care professionals and the rehabilitation team works closely with social workers, speech and language therapists, physiotherapists, neuropsychologists, occupational therapists and general practitioners to ensure that people with a brain injury access services to aid their rehabilitation at an early stage. Information is also collected on local services to enable members and their families to access other day services, outpatient services, advocacy, welfare, foodbanks and housing services.

Projects include:

- Independent living skills e.g. cookery classes, managing money, computer skills;
- Physical activity fitness classes e.g. Zumba, Tai Chi;
- One to one gym programmes to provide personalised rehabilitative exercise programmes;
- Art, Music and Creative Writing Therapy to offer the opportunity for expression and communication;
- Social opportunities to develop social and cognitive skills;
- Complementary Therapies to reduce stress, tension and anxiety;
- Respite services for carers to provide a valuable short break from caring;
- Matching service offering a one to one service for adults with an ABI to be assisted in the community with the aid of trained and matched volunteers.

The Physical Rehabilitation programme provides members with the opportunity to participate in physical exercises. Interventions can be personalized for the patient, selecting from a variety of fitness activities (e.g., aerobic, strength, and flexibility training) which accommodates the patient's abilities and functional goals.

The Carers Programme provides support to carers via monthly social events, peer groups and our training and information service. Our day service also continues to provide valuable respite, which is essential for carers to maintain their caring role. The Edinburgh Brain Injury Carers Project matches adults with an acquired brain injury with a trained volunteer. This one to one service enables individuals with an acquired brain injury to be supported and encouraged to take part in social activities in the community, thereby reducing social isolation, increasing independence as well as offering flexible respite for Carers.

There is a new Social Club for Young Adults with an acquired brain injury was launched in November 2018 and provides services for young adults aged between 18 and 30 years of age. Additionally, there are Welfare Sessions, supported by Digby Brown, to provide access to specialist welfare and benefit information.

Edinburgh Headway Group also provides a weekly person-centred rehabilitation and carer support service to inpatients and their relatives directly from the Astley Ainslie Hospital. Their EHG Hospital Hub offers - specialist services to inpatients who have acquired a brain injury, as part of their preparation for discharge; a source of support, information and assistance to relatives/families; and works directly with multi-disciplinary allied health professionals on-site to support a seamless rehabilitation pathway for patients with following discharge from hospital.

Headway East Lothian aims to support and improve the quality of life for people in East Lothian with acquired brain injuries, their families and carers. They provide adults with acquired brain injury (ABI), their families and carers opportunities to access advice and information, and resources to help them cope with challenges and remain together as families.

Headway East Lothian encourages members to socialise, support each other and share experiences and advice. This involves regular meetings, activity sessions, social events and outings. They offer access to therapeutic activities and workshops aimed at enhancing physical and mental wellbeing. These include music and arts and crafts activities. They also help members build coping strategies to help deal with financial stresses.

Through a range of activities, Headway East Lothian strive to empower members to manage their own condition and develop confidence in their own abilities. The service is entirely led by members, each with unique experiences of living with ABI, which they can offer to the group.

Reviews, Plans and Strategies

- Submissions are being made to the trauma network re. planning, and the regions are in different stages of development. All areas are required to put in place rehabilitation plans / a national rehabilitation prescription model.

Information supplied by:

Andreas Demetriades, Neurosurgeon, Department of Clinical Neurosciences, the Western General Hospital, Edinburgh
Dr Martin McKechnie, Consultant in Emergency Medicine, Royal Infirmary of Edinburgh and St John's Hospital, Livingston
Dr Lorna Langrell, Associate Specialist, the Robert Fergusson Unit, Royal Edinburgh Hospital
Michelle Keenan, Chief Executive Officer, the Edinburgh Headway Group
Dr Alasdair Fitzgerald, Consultant in Neurorehabilitation & Clinical Lead Astley Ainslie Hospital, Edinburgh

NHS ORKNEY

Land Area: **989 km^2**

Population: **22,000**
Population Density: **22**
Local Authorities: **Orkney Islands**
Principal Hospitals: **Balfour Hospital, Kirkwall**

Balfour Hospital, Kirkwall, has six wards, comprising an Acute ward, a surgical ward, an A&E department, a maternity ward, a Macmillan ward, and an assessment and rehabilitation ward.

The A&E Department is sited within the Balfour Hospital. There is no specific A&E consultant, although there are a range of consultant staff. There are very small numbers of ABI patients each year that are cared for at Balfour hospital. The hospital has a CT scanner and all moderate or severe head injury cases would be transferred from Orkney. Neurosurgical care would be provided by the Aberdeen Royal Infirmary (ARI). The patient would arrive at A&E, undergo observation and then be transferred to Acute care or to ARI for neurosurgery. Once the neurosurgical episode of care was complete, the patient would be transferred back to the Balfour Hospital. There is inpatient rehabilitation with physiotherapy support, and an outpatient / day hospital rehabilitation unit, offering physiotherapy, nursing and OT assessment, goal setting, health promotion and treatment plans.

Balfour Hospital does not currently collect STAG data.

Case A patients would be managed in Aberdeen.

Case B patients would return to Balfour Hospital, where they could access OT, physiotherapy and SALT, but not neuropsychology.

On discharge, a community referral for physiotherapy, speech and language therapy or occupational therapy, (as appropriate), would be arranged by the hospital. (Case E) There is also a community-based Intermediate Health Care Team, which aims to:

- prevent admissions into hospital if people can be looked after at home
- try and get people home from hospital sooner and
- continue supporting rehabilitation programmes.

Case C patients would be managed as well as possible via a MDT.

Case D patients would be required to be cared for in Aberdeen.

Case F patients would be managed as per other patients from A&E onwards, irrespective of their age at injury.

Reviews, Plans and Strategies

There were no known reviews, however, it was noted that the Board was linked in with the Trauma Network, with the pathway agreed that patients would be seen at the Balfour Hospital, then transfer South by air ambulance, or boat / coastguard as appropriate.

Information supplied by:

Marthinus Roos, Medical Director, NHS Orkney

NHS SHETLAND

Land Area:	**1,468 km^2**
Population:	**23,080**
Population Density:	**16**
Local Authorities:	**Shetland Islands**
Principal Hospitals:	**Gilbert Bain Hospital, Lerwick**

The A&E Department is sited within the **Gilbert Bain Hospital**. When fully staffed, the hospital employs four anaesthetists, four physicians, four surgeons and 1 SAS doctor.

The patient would be admitted to A&E for stabilisation prior to a CT scan, which is usually done in the resuscitation bay. After this, there would be retrieval by SAS Air Ambulance to a tertiary centre for neurosurgical care. If the patient was admitted at Gilbert Bain for observation, this would be within the Acute surgical ward. Generally, up to five patients with a TBI are seen per annum. STAG data is collected.

If an adult patient with a TBI requires level three ICU care for management and/or transfer, then the patient would be transferred by the emergency medical retrieval team (EMRS), usually to Aberdeen Royal Infirmary (ARI), depending on ICU bed availability. Patients may also be transferred to Edinburgh, Glasgow or Inverness.

A paediatric patient with TBI requiring level three care for transfer would usually be transferred by the Paediatric Intensive Care Unit (PICU) team to either Edinburgh or Glasgow for their neurosurgical procedures and PICU. In time-critical situations the local anaesthetic team might need to carry out the transfer.

Once the neurosurgical episode of care was complete, the patient would be transferred back to the Gilbert Bain Hospital. There would be a consultant-led outpatient review. Community Occupational Therapy or Physiotherapy rehabilitation will be arranged, if required, through the hospital.

Support provided via Direct Payments (DP) can be very person-centred but staff employed via DP will not necessarily have training in working with people with ABI, which could mean they are not equipped to help the person reach their full potential.

Case A patients would have an MDT assessment, after which they would be managed in a local care home in Shetland with available bed. They may be transferred to ARI for specialist care, depending on circumstances.

Case B patients would be supported at home, or in specific supported accommodation or care home. There are no ABI-specialist services e.g. nursing homes or specific rehabilitation on the island.

Cases C and D patients would undergo an Assessment of Capacity, under the Adults with Incapacity Act (Scotland) 2000 policy. The management of Acute or potential aggression (MAPA) team would assist if necessary for the management of the patient. There would be a referral to social work and a 'With You, For You' Assessment for ongoing care needs. The consultant psychiatrist would be available for consultation and advice if necessary but not direct involvement unless mental disorder is queried and formal psychiatric assessment requested. Consideration would be made for off-island care. Case D patients are very infrequent (estimated one in every ten years).

Case F patients are managed in the same way as any other patients, irrespective of age.

Reviews, Plans and Strategies

Work currently taking place by the North of Scotland Trauma Network (NoSTN). As part of the NoSTN, the following financial assistance is available:

> Funding specifically for NHS Shetland: Band 8a neuropsychologist, 0.1WTE, provided from NHS Grampian – contained in bid.

NHS Grampian, Orkney, Shetland Community Enablement & AHP Trauma Bank Budget, held within NHS Grampian, is available as needed

Information supplied by:

Hazel Sutherland, Head of Planning and Modernisation, NHS Shetland
Kim Govier, Public Health Secretary & PA to Director of Pharmacy, NHS Shetland

NHS TAYSIDE

Land Area:	**7,527 km^2**
Population:	**416,090**
Population Density:	**55**
Local Authorities:	**Angus, Dundee City, Perth and Kinross**
Principal Hospitals:	Ninewells Hospital, Dundee Perth Royal Infirmary

Perth Royal Infirmary and Ninewells have an A&E Department.

Ninewells Hospital

A&E

There are 16.7 wte emergency medics working across the emergency departments at PRI and Ninewells. An initial assessment takes place including a CT scan, with onward referral to neurosurgery if required. There are approx. 5-6 significant brain injuries for both sites per month, and many more patients are admitted to observation, include contusions. STAG data, trauma CT, head KPIs, and outcomes data are collected.

There is an observation area at Ninewells, where patients would remain for up to 24 hours. If patients do not require neurosurgery, frail elderly patients would then go to Acute medicine in PRI and other patients would remain in Ninewells.

There is no routine follow-up from A&E, patients will receive post-concussion advice, head injury advice, or if the patient has a small subdural that does not need intervention it may be arranged that they will be called back for a scan.

The Acute Frailty Team will see elderly complex patients with co-morbidities; they can come and assess them, and there is the ability to admit direct to acute frailty ward if there is an available bed. A pathway is being developed at present.

'Transforming Tayside – shaping urgent and emergency services' review is a 'front door' review which started in Autumn 2019 in NHS Tayside.

Neurosurgery

Neurosurgery, if required, is likely to take place at Ninewells Hospital, Dundee. There are four neurosurgeons working in NHS Tayside.

Patients will be assessed and monitored in terms of Glasgow Coma Scale (GCS) and associated systemic status (including alcohol status). Depending on injury, the department will provide nursing and medical intervention for patients with TBI, including provision of a Neuro HDU. Patients can be looked after in ITU with ICP monitoring if required, and will tend to be put under observation or sent on to the neurosurgery unit. The ward supports the trauma unit and works with them. The ward would sometimes admit minor, and more usually moderate to severe head injury. Patients would be scanned in A&E, and rescanned if there is a change.

If a patient requires neurosurgical intervention, they are referred to Ward 23b. For minor head injuries with other e.g. orthopaedic complications, the patient may be transferred to a medical or orthopaedic ward. If they have a moderate to severe head injury – they will go to ward 23b, alternatively – they may be under the care of the trauma team. Elderly patients with minor head injuries are likely to be placed in a medical ward.

After the neurosurgical episode of care is complete, depending on the severity of the injury and the age of the patient, they may go to the Sir George Sharp Unit in Fife or CBIR at the Royal Victoria Hospital, if they are unable to go home. There are opportunities for care of the elderly rehabilitation at PRI via the 'Tay' ward, Royal Victoria Hospital and in addition to the Angus rehabilitation unit in Stracathro Hospital. Waiting times, however, can be up to two months or longer. Length of stay could be 48 hours to three months.

In first instance Case A patients would go to the Seven Arches unit in Monifieth, if a NHS Tayside patient. If a NHS Fife patient, they will go to their local hospital to have their long-term care needs arranged, and from there to a nursing home, or sometimes to rehabilitation if this would be of benefit.

Case B patients would be managed according to their ability. Community rehabilitation services are available or they may benefit from the neuro rehabilitation services, but this will depend on whether there is support for the patient at home. In most cases there is the need for patients to go to a nursing home if there is deemed to be little scope for rehabilitation from the rehabilitation team.

For Case C patients, there would be an assessment of patient and of the cause of the agitation. Staff try to manage such patients in house using de-escalation techniques, although they may require to be managed medically. If it was persistent, staff would ask rehabilitation colleagues for help. There may be liaison psychiatry input or crisis team involvement. Registered mental health nurses may be employed.

NHS Tayside would try and manage Case D patients (some have anxiety and alcohol issues) with assistance from neuropsychology and psychiatry. Medically sedating the patients would not be the preferred option. If there was significant agitation and aggression, some nurses are trained in managing aggressive patients, using restraint techniques. Propranolol may work, although many patients have pre-existing drug issues. Staff would try and address the medical causes of agitation. It would be rare for patients to be transferred to a mental health facility if they have an organic cause of head injury. Such patients may need short term detention to keep them safe.

Case D patients may be referred to Graham Anderson House.

In terms of support for Case E patients, in Dundee there is the physical disabilities team, community rehabilitation team. In Angus there is an ABI worker to refer patients on to, who can refer patients on to services. In Perth and Kinross there is no specific brain injury team, however, there are local physiotherapy and OT services across Tayside.

Rehabilitation

The **Centre for Brain Injury Rehabilitation (CBIR)** is situated at the Royal Victoria Hospital in Dundee, with 2 wte consultants.

This is an area-wide service, admitting people from across the whole of Tayside. They provide in-patient rehabilitation to adults aged 16-65 with the latter being loosely interpreted who have complex disability following a brain injury, stroke or major trauma and who will benefit from a period of interdisciplinary rehabilitation before being discharged from hospital.

All patients have an individual, goal orientated programme tailored to their own needs (two outcome measures are used - goal attainment scoring and therapy outcome measures: 'GAS' and 'TOMS'). The team work with patients and their families to achieve the patient's goals in areas of health, activity and wellbeing. The team comprises nurses, doctors, occupational therapists, clinical neuropsychologists, physiotherapists, speech and language therapists, a dietician, technical instructors, a clinical co-ordinator, locality manager and artist. They also work closely with colleagues in the acute hospital services and in the community based services. Student training is provided across the team.

Case B patients would be admitted to the CBIR. There are 16 beds, and patients are admitted from neurosciences, the acute stroke ward, the major trauma ward and other wards across Ninewells hospital . With only 16 beds there is pressure on the unit as it is a Tayside-wide service. There is currently a waiting list. Since the Major Trauma Unit was launched in Ninewells, major trauma patients without a brain injury but who require a period of specialist in patient rehabilitation are now admitted.

Case C patients would be admitted to the CBIR. Additional staffing would be employed if required. The patient would be referred to liaison psychiatry if required, and they would work with the unit but not admit the patient to psychiatry. If the neurorehabilitation unit is unable to manage the patient's behaviour there may be the option to refer the patient to BIRT (Graham Anderson House) in Glasgow. All staff are trained in "Using positive behaviour support to understand and manage challenging behaviour" and undertake violence and aggression training.

Case D patients are not admitted to CBIR, but may be referred on to BIRT (Graham Anderson House), or the Robert Fergusson Unit.

Case E patients would tend to be discharged home from the acute hospital with follow up from neuropsychology services. There is a routine referral to social work, and patients are signposted to third sector support, and other services if required

For Case F patients. The pathway depends on patient and injury, most are not appropriate for neurosurgery. Some come with rehabilitation needs and for head injury management. A single pathway could be inappropriate due to the wide variation in patient cohort.

At present CBIR at RVH admits patients aged 16-65, but are testing a change to include a slightly older age group, in dialogue with MFE. At present such cases go to the MFE wards – but the test of change is looking at older patients who are physically active and may still be working being referred to the CBIR if they are likely to benefit from a period specialist in patient rehabilitation. The 'silver trauma' group is also a rapidly increasing patient group.

Third sector Support

Headway Dundee & Angus provide an opportunity to talk and socialise with others in a similar situation. Headway Dundee and Angus fortnightly social groups meet in Dundee. The groups are all member led and the activities vary based on the requirements of the people attending.

The charity offers social outings, activities and on occasion, complimentary therapies.

- Fortnightly social group in Dundee
- Recreational activities including arts and crafts and games
- Quizzes and Bingo
- Social events and outings.

Headway Perth and Kinross services provide an opportunity to talk to others in a similar situation. Everyone responds differently to the realities of life after an ABI and Headway Perth and Kinross understand this.

The charities brain injured members and their carers offer each other a tremendous amount of practical and emotional support at their fortnightly meetings, group outings and via the links with Headway UK.

- A fortnightly meeting of the group (every second Wednesday evening)
- Recreational activities including arts and crafts and games nights
- Social events and group outings.

Chest, Heart and Stroke Scotland

The CBIR are currently undertaking a pilot project with CHSS whereby CHSS staff and volunteers support patients with their rehabilitation journey

Dundee Leisure and Culture

The CBIR are currently undertaking a pilot patient walking group project with Dundee Leisure and Culture which is evaluating very positively.

Reviews, Plans and Strategies

Major Trauma implementation is underway.

Information supplied by:

Avril Beattie, Clinical Co-ordinator, Centre for Brain Injury Rehabilitation and Stroke Liaison Service, NHS Tayside
David Bennett, Neurosurgeon, NHS Tayside
June Finnie, Advanced Nurse Practitioner, Neurosurgery, NHS Tayside
Julie Ronald, Clinical Lead & Consultant in Emergency Medicine,

NHS WESTERN ISLES

Land Area:	**3,059 km^2**
Population:	**26,950**
Population Density:	**9**
Local Authorities:	**Comhairle nan Eilean Siar (Western Isles)**
Principal Hospitals:	Western Isles Hospital, Stornoway, Isle of Lewis

The main A&E Department for the Western Isles is sited within the **Western Isles Hospital** (WIH) in Stornoway.

There is also an A&E department in Uist Community Hospital that may initially receive some head-injured patients, but patients will require onward transfer if they have a reduced Glasgow Coma score, most likely to Glasgow as there is no CT scanner on Uist, however occasionally patients will be transferred to the WIH.

The A&E at Western Isles Hospital is not consultant led, all the speciality consultants; surgical, medical, orthopaedic and paediatric consultants see patients as per speciality.

Patients at A&E with a TBI will be seen by a junior doctor and referred to a consultant surgeon for review. A CT scan would be carried out at WIH, if intubation is required an anaesthetist will attend. If no brain trauma is seen on the initial CT and the patient is neurologically stable they will be admitted to the Acute Assessment Unit (AAU) or the surgical ward for observation (up to 24 hours). Depending on severity, referral will be made to neuro unit at the Queen Elizabeth University Hospital in Glasgow for advice and onward management. Any unstable or intubated patients will involve liaison with or transfer by the SCOTSTAR retrieval service.

If the patient's needs cannot be met by the local team, neurosurgical care would be provided from the Queen Elizabeth University Hospital in Glasgow.

Those returning after neurosurgery may be transferred to Raigmore Hospital, Inverness, if requiring ongoing acute care management, or repatriated back to Western Isles Hospital. There is no specific neuro-rehabilitation ward designated to admit such patients at the hospital, however, patients would be transferred to the rehabilitation ward (Erisort ward).

A community referral for speech and language therapy or physiotherapy (as appropriate) would be arranged by Western Isles Hospital.

Case A patients would likely be transferred back to the islands once medically stable, and as long as they did not require ventilation. Ultimately they would be likely to be placed in a care home depending on the wishes of the family.

There is no specialist neurosurgical rehabilitation, or dedicated neuro rehabilitation on the islands with which to manage Case B patients. Rehabilitation staff with mixed skills are employed as generalists at WIH. There are pressures associated with prolonged rehabilitation support on the mainland, and families who are often keen to have patients discharged home as soon as possible. Patients are managed in WIH in the orthopaedic rehabilitation / stroke unit.

Staff would try and manage Case C patients locally, with input from psychiatry and additional staff.

Case D patients are difficult to manage in WIH. Outreach from the RFU would be helpful.

Social work, community OT and rehabilitation would help manage Case E patients, until they met their rehabilitation potential.

Re. Case F patients, if they had a small bleed staff would wish to get them closer to neurosurgical ward, then observe these patients and manage them conservatively.

Third Sector Support

Neuro Hebridies supports neurological patients and their carers by promoting positive health and well being in the Outer Hebrides. There are no ABI specific third-sector support groups.

Reviews, Plans and Strategies

The Major Trauma centre planning work has been taking place.

Information supplied by:

Susan Macaulay, SCN A&E, Western Isles Hospital
Jimmy Myles, Lead Nurse, WIH Acute services, Western Isles Hospital

NATIONAL CENTRES

There are three centres that offer nationally commissioned services specifically tailored to patients with an Acquired Brain Injury. One is privately-run, and noted below. The remaining two NHS centres – the Robert Fergusson Unit at the Royal Edinburgh Hospital which cares for patients with challenging behaviour, and the Charles Bell Unit at the Astley Ainslie Hospital in Edinburgh which offers multidisciplinary neurorehabilitation are noted under the pages relating to NHS Lothian. In addition, Graham Anderson House is a private centre, that takes patients from across Scotland. It is included under Other Centres below.

The Central Scotland Brain Injury Rehabilitation Centre (CSBIRC), or '**Murdostoun**' is a private hospital operated by the Huntercombe Group, and is located at Murdostoun Castle, Bonkle, Newmains, Lanarkshire. One of the three units comprising the national brain injury rehabilitation service since 1991, it originally had 30 beds but now has 20. The majority of patients are funded by the NHS.

The centre offers multidisciplinary rehabilitation with nursing, occupational therapy, physiotherapy, speech & language therapy, neuropsychology and dietician advice, supplemented by support from rehabilitation assistants. There are sessional commitments from a consultant in rehabilitation medicine, GP and psychiatry staff. The majority of patients are from Glasgow and Lanarkshire areas, but the centre will take referrals from any Board.

The demographics of patients has changed over time. With the development of community-based input – with the Lanarkshire team and Community Treatment Centre in Glasgow, some patients who would have come in past with cognitive issues are now are seen in the community. Murdostoun now sees more people with multiple issues, more physical and more mixed complex issues, arguably less able individuals than in the past.

If a patient has medical needs they will attend Murdostoun, as opposed to Graham Anderson House (GAH). There are no other dedicated national units of this kind in the West of Scotland.

Patients are accepted from all NHS Boards or on rare occasions from private referrals, and accepted according to highest need. There is a pre-admission assessment for patients by the consultant or senior team member, however, no-one with a progressive condition or who doesn't have a rehabilitative need that will benefit from rehabilitation will be accepted. A patient is referred, staff assess suitability, then a document is sent to the referrer re. suitability, with goals identified and what could be done to help the patient reach them, then the decision is left with the referrer / patient.

Generally the centre will take 30-40 patients per year, average length of stay is 4-6 months, (this is increasing due to discharge difficulties). The minimum length of stay is two weeks. Stays of nine to 12 months are common for the most serious patients and those with Prolonged Disorders of Consciousness.

Repatriation is difficult. In the past there was an excellent ABI trained social work team in the old Southern General and Royal. The centre has done some in-service training with social work teams in the past.

The centre is linked in to the local NHS team, so hear of local initiatives via the Complex Injury Network and the Brain Injury Network Group (BING), and information on the STN. Joint supervision and clinical support with GAH is sometimes arranged.

Case A patients are accepted by the centre, after which they are sent on to the most suitable environment (the most recent four patients went home with support / home alterations, and the prospective care team may work alongside staff in the centre for a while). There are two staff who are SMART assessors and there are tracheotomy-trained nurses. The centre accepted three people who were in a minimally conscious / vegetative state referred within a few months, but this level of referrals hasn't continued. Someone in a minimally conscious state can be seen and can benefit from rehabilitation.

Case C patients would be likely to go to the RFU. If a patient develops challenging behaviour, then staff will manage this, and often seek advice from Dr Lorna Langrell from the Robert Fergusson Unit. If behaviour interrupts the rest of therapy for the patient – they may move to the RFU.

Re. Case E patients, very occasionally the centre will provide a local outpatient service – e.g. a patient may come back for a month, prior to being seen by the community service. Psychology staff will sometimes see people in their homes – referrals often via Case Management teams – often psychologists might say there is a need for neuro/OT support and this is put in place.

Re. Case F patients, there is no upper age limit, and patients are accepted from 16. There are other good services for the elderly, however, the oldest patient seen at the centre was about 85.

Information supplied by:

Kay Forbes, Head of Therapy, Murdostoun Brain Injury Rehabilitation and Neurological Care Centre

OTHER CENTRES

Graham Anderson House (GAH) is an independent hospital in Glasgow that enables people with a brain injury to regain meaningful social lives. It is part of the Brain Injury Rehabilitation Trust, within the Disabilities Trust, and referrals are made from across Scotland. The specialist assessment and rehabilitation offered meets the complex behavioural, cognitive and physical needs that often limit activity and participation. Service users have recent, or distant histories of traumatic brain injury, stroke, infection, tumours, poisoning and hypoxia. The centre supports informal service users, as well as those requiring detention under the Mental Health (Care and Treatment)(Scotland) Act 2003. They accept and address co-morbidities such as mental health difficulties, substance misuse, forensic issues, and social difficulties. Individuals are accepted from all across Scotland – NHS, local authority and medico-legal requests. Exclusion criteria are those actively at risk of suicide, acute mental health problems and neurodegenerative conditions. Rehabilitation uses a neuro-behavioural ethos to enable service users to act independently and participate in personally meaningful activities, whilst developing their lives with dignity.

Accommodation comprises 24 single bedrooms and one transitional living flat within the main hospital (five beds are in a smaller unit to support individuals with complex behavioural needs). There is also a detached bungalow which provides a step-down unit to prepare service users for moving on from the hospital. Outpatient and outreach services are also provided.

Eastfields is a registered care home on the GAH site that delivers health and social care to adults with an acquired/traumatic brain injury. The service consists of three separate four bedded bungalows. 'Bluebell' provides specialist long term support for individuals who have complex challenging behaviour and nursing needs. 'Thistle' and 'Hawthorn' each have four self-contained studio flats, offering individuals the support and clinical input for them to reach their full potential in domestic life, vocation and psychological wellbeing. The units offer both long term placements, and transitional rehabilitation before individuals move on to their own tenancy. Work is underway to double the size of each bungalow and will be completed in 2020.

Community Services – The continuum of care provision from GAH supporting people in the community or in their own homes also includes a supported living house in the local community. There is a detached, four-bedroom house with three en-suites (one wheelchair accessible) and one room with a separate wet room. There is a communal kitchen and public spaces. The service is suitable for individuals with acquired brain injury who demonstrate good participation potential, and are likely to benefit from supervision and support to increase independence in community settings.

BIRT Scotland services are committed to offering high quality services to individuals with acquired brain injury, within a framework of innovation to meet complex needs.

Information supplied by:

Pamela Brown, Clinical psychologist, Graham Anderson House
Lauren O'Neill, Occupational Therapist, Graham Anderson House

Appendix 1 – Glossary and Notes

ABI	Acquired Brain Injury	Damage to the brain, which occurs after birth and is not related to a congenital or a degenerative disease. (e.g. subarachnoid haemorrhage, brain damage after cardiorespiratory arrest etc.
Acute	Acute care	Acute care is the early and specialist management of adult patients suffering from a wide range of medical conditions requiring urgent or emergency care usually within 48 hours of admission or referral from other specialties
A&E	Accident and Emergency Department	'ED' and 'A&E' are used interchangeably
CT scan	Computed tomography scan	A test that uses x-rays and a computer to create detailed 3D images of the body
ED	Emergency Department	'ED' and 'A&E' are used interchangeably
GAH	Graham Anderson House	See Other Centres
ICU	Intensive Care Unit	An intensive care unit (ICU), also known as an intensive therapy unit or intensive treatment unit (ITU) or critical care unit (CCU), is a special department of a hospital or health care facility that provides intensive treatment medicine
ITU	Intensive Therapy Unit	See 'ICU' above
HDU	High Dependency Unit	A high-dependency unit is an area in a hospital, usually located close to the intensive care unit, where patients can be cared for more extensively than on a normal ward, but not to the point of intensive care
IJB	Integration Joint Board	The Integration Joint Board is a joint board of the local Council and the local NHS Board. It oversees the relevant Health and Social Care Partnership(s). The IJBs manage Social Care and Health services in the region
MDT	Multi Disciplinary Team	A Multidisciplinary Team is a group of professionals from two or more clinical disciplines who together make decisions regarding recommended treatment of individual patients
MTC	Major Trauma Centre	A major trauma centre (MTC) is a specialist unit within the National Health Service of the United Kingdom, set up to provide specialised trauma care and rehabilitation. They are usually found within larger hospitals in major cities which have the necessary infrastructure and staff to deal with major trauma cases
Murdostoun	The Central Scotland Brain Injury Rehabilitation Centre	See 'National Centres'

NICE	National Institute for Health and Care Excellence	NICE produces Evidence-based recommendations developed by independent committees, including professionals and lay members, and consulted on by stakeholders
Non-traumatic Acquired Brain Injuries		Non-traumatic Acquired Brain Injuries are injuries to the brain which have occurred since birth (but exclude traumatic brain injuries such as those caused by accidents, falls or assaults). These may include brain injuries caused by medical conditions such as encephalitis and meningitis, or substance abuse, brain tumours and oxygen deprivation from cardiac arrest or other causes
OT	Occupational Therapist/Therapy	Occupational Therapists (OTs) are health care professionals who utilise evidence-based practice, research, scientific evidence, and a holistic perspective to promote independence, meaningful occupations, and patients' functional ability to fulfil their daily routines and roles
Pathway		A clinical pathway, also known as care pathway, is a multidisciplinary management tool based on evidence-based practice for a specific group of patients with a predictable clinical course, in which the different tasks by the professionals involved in the patient care are defined, optimised and sequenced
PT / Physio	Physiotherapist/ Physiotherapy	Physiotherapy is one of the allied health professions that treats conditions such as chronic or acute pain, soft tissue injuries, cartilage damage, arthritis, gait disorders and physical impairments typically of musculoskeletal, cardiopulmonary, neurological and endocrinological origins. Physical therapy is used to improve a patient's physical functions through physical examination, diagnosis, prognosis, physical intervention, rehabilitation and patient education. It is practiced by physiotherapists
RFU	Robert Fergusson Unit	See 'National Centres'
SABIN	Scottish Acquired Brain Injury Network	A managed clinical network set up in 2006 to improve the care of patients with ABI across Scotland
SALT	Speech and Language Therapist	Speech and Language Therapists specialise in the evaluation, diagnosis, and treatment of communication disorders (speech disorders and language disorders), cognitive-communication disorders, voice disorders, and swallowing disorders
SIGN	Scottish Intercollegiate Guidelines Network	The Scottish Intercollegiate Guidelines Network (SIGN) develops evidence based clinical practice guidelines for the National Health Service (NHS) in Scotland.
STAG	Scottish Trauma Audit Group	The Scottish Trauma Audit Group is a national audit within the Scottish Healthcare Audits programme at the Information Services Division (ISD) of NHS National Services Scotland (NSS). https://www.stag.scot.nhs.uk/
STN	Scottish Trauma Network	The Scottish Trauma Network (STN) involves the Scottish Ambulance Service (SAS) and hospitals across Scotland – including 4 major trauma

		centres – working collaboratively, to deliver high quality integrated, multi-specialty care to severely injured patients
TBI	Traumatic Brain Injury	Traumatic brain injury is a nondegenerative, noncongenital insult to the brain from an external mechanical force
Wte	Whole Time Equivalent	Number of sessions, to a maximum of ten, worked by a NHS staff member per week

Appendix 2 – References

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