

National Prisoner Healthcare Network

Brain Injury and Offending

Report to NPN Committee

National Prisoner Healthcare Network: Brain Injury and Offending

Executive Summary

Introduction: Following from evidence provided to the Justice Committee in Holyrood, there was recognition of a need to better understand the health needs and services required by people with brain injury who are involved in the Criminal Justice System (CJS). In October 2014, the Cabinet Secretary tasked the National Prison Healthcare Network (NPHN) to instigate a work stream to produce this report.

Impairments in cognitive functions (such as memory and solving problems) and in personality or emotional control (such as impulsivity, aggression, intolerance and lack of concern for others) are common after severe brain injury and are associated with neurobehavioural changes that can easily lead to rule breaking and involvement with the CJS. As persisting outward signs of brain injury are rare, antisocial behaviour is often not attributed to the brain injury and appropriate interventions that may reduce recidivism are not offered or the ability to benefit from prison treatments that address offending behaviour is compromised.

Methods: The recommendations of the Justice Committee and other issues arising during the deliberations of the Workstream were considered. In addition the Workstream undertook audits and literature reviews and a study of the prevalence of head injury in Scottish Prisons which led to the following outline of a service plan and recommendations.

Identification of people with brain injury: Individuals should be triaged to (i) no brain injury no action (ii) mild brain injury-information and advice (iii) moderate-severe brain injury or repeated mild brain injury-further assessment. This can be effected by a simple system of triage at various points in the CJS pathway, namely as part of police interview at custody reception, as part of assessment by Criminal Justice System Social Workers, as part of NHS interview at prison reception or admission to forensic mental health services. Brief assessments at these points have different functions and begin by asking a single simple question. The need for this varies in different settings. In police custody it is to identify recent brain injury that requires medical assessment/attention and/or which might affect ability to provide reliable information. For CJS social workers it is to consider whether there is 'hidden' disability that is relevant for Court reports, referral for treatment interventions or that needs to be taken into account in planning care or support. In prison reception it is to consider whether there needs to be detailed assessment of effects of brain injury, for management and provision of support or interventions in the prison setting, or interventions offered on release or (in rare cases) assessment for secure forensic placement.

Interventions: In most cases there will be no brain injury, or a mild brain injury identified and in the latter case, provision of information and advice about brain injury should be provided. There is potential to provide guidance on management in prisons or psychological interventions for more

severe cases. Intensive neurorehabilitation may be needed by a small number and this would need to be provided outwith a custodial setting but might be arranged by the NHS in time for release. There is a need for clear links between brain injury health services and the CJS.

Current Service Provision: The linkage between brain injury services and the CJS is currently poor. There are no specific service inputs other than a recent pilot neuropsychology service in NHS Grampian. There is a no secure provision that is specific for brain injury in Scotland and a need for 6-8 low secure beds, ideally situated on the same site as a neurorehabilitation unit.

Education and Training: The report outlines existing materials that may be of use to CJS staff who work with offenders with brain injury. There is a need for a training needs analysis which considers the modification or development of existing resources (including on-line).

Abridged Summary of Recommendations

R1: Further determine the prevalence of disability in prisoners arising from head injury including further investigation of head injury in women prisoners.

R2: Pilot an additional question on head injury in two or more custody centres in two NHS board areas

R3: Improve transfer of information on head injury between NHS staff in custody, A+E and prison

R4: A single question about brain injury added to NHS (Vision) interview in prison reception and triage to no action/ educational material provided or screening assessment

R5: A pilot study on the practicality/ validity of screening tools for head injury in prison

R6: Referral for neuropsychological assessment and management advice to be provided to SPS staff if significant head injury detected

R7: Should the number of neuropsychological assessments be large on the basis of R5, pilot the use of computerised assessments

R8: Pilot the two step screening for brain injury (as in prison reception) in the CJSW interview and establish links with local brain injury, neuropsychology and prison NHS services

R9: Develop an empirical basis for psychological interventions for people with brain injury

R10: Develop liaison between NHS services in prisons and local brain injury services

R11: Care pathways for brain injury in all Health Board areas need to accommodate services for prisoners. Third sector organisations should facilitate support for prisoners on release

R12: A 6-8 bed low secure brain injury rehabilitation unit in Scotland should be considered ideally as an adjunct to an existing neurorehabilitation facility

R13: Conduct a training (education) needs analysis, initially considering use and development of existing resources.

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1. Membership

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2. Introduction

The initiative for this report follows from a seminar at Holyrood in April 2014 that was organised by the British Psychological Society and chaired by a member of the Justice Committee. The Justice Committee then invited evidence on the matter at a meeting in Holyrood on the 12th August 2014, and on the basis of this made recommendations to the Cabinet Secretary for Justice on the 19th August 2014. There was recognition of a need to better understand the health needs and services required by people who have sustained a brain injury and who are involved in the Criminal Justice System. In October 2014, the Cabinet Secretary tasked this Brain Injury and Offenders work stream of the National Prison Healthcare Network (NPHN)¹ to give consideration to these recommendations and produce a report.

2.1 The Scope of this Report: The report considers the health needs of people with brain injury² in the Criminal Justice System. This includes consideration of the epidemiology and prevalence of brain injury in prisons, consideration of screening and identification of brain injury in prisoners, recommendations regarding decision making with regard to need for assessment and intervention, the need for secure healthcare provision for people with brain injury, education of relevant staff groups and linkage with specialist services for brain injury (see also Terms of Reference, Appendix 15.1). The report is concerned with acquired brain injury. This includes diagnoses of head injury (HI), stroke, cerebral hypoxia, cerebral infection or acute brain damage resulting from metabolic disorders or toxins. It does not include deteriorating neurological disorders such as dementia or deficits secondary to a diagnosis of mental illness or substance abuse. Head injury is used as a general model for acquired brain injury in this report for two reasons. First, it is by far the most common cause of brain damage in the typical offender age range and second it is much more frequently

¹ The National Prisoner Healthcare Network was created when responsibility and accountability for the delivery of primary and community healthcare to those in prison in Scotland transferred from the Scottish Prison Service (SPS) to the NHS on 1st November 2011

² The terms brain injury and head injury are used throughout the report. Head injury describes a traumatic injury involving the head but where there may not be definite evidence of damage to the brain. Brain injury describes a traumatic event where there is clear evidence for brain damage. 'Acquired brain injury' is a more general term that includes a range of causes of brain *damage* in addition to traumatic injury; for example stroke, brain infection, hypoxia, metabolic. Also included would be cases where there is brain damage or disruption resulting from cerebral tumour. Given that brain injury is by far the most common disabling condition in young adults where there is likely to be neurobehavioural disorder associated with antisocial behaviour – the report focusses on brain injury but is not intended to exclude other causes of brain damage that in relatively rare occasions may be relevant to offenders and offending

associated with antisocial behaviour than other conditions such as stroke. Although the report comments on prevention, and especially in relation to repeated head injury, the topic of prevention is largely beyond the scope of this report as it interfaces with more general health issues including social deprivation, accident prevention and alcohol and drug use.

2.2 Head Injury and Offending: The incidence of head injury is high, averaging around 235/100,000 in Europe (Tagliaferri et al 2006), and in Scotland is most commonly caused by falls and assaults (Thornhill et al 2000). The risk is higher in young children, young adults and older adults and in those who have backgrounds of social deprivation and alcohol abuse. Longitudinal research in Glasgow has shown high rates of disability and elevated rates of death for up to 15 years after head injury, with risk of late mortality being especially high in younger adults (McMillan et al 2012, 2013, 2015; Thornhill et al 2000; Whitnall et al 2006). Impairments that are common after head injury include cognitive deficits in concentration, memory, flexibility of thinking, solving problems and planning and personality or emotional changes reflected as impulsivity, irritability, aggression, impatience, intolerance, egocentricity, poor judgement, impaired insight and lack of concern for others. Of particular relevance in a Criminal Justice System context is the association between head injury and aggression, violence and more generally emotional deregulation (Wood 2001; Baguley 2006; Wood and Williams 2010). A Swedish population study found that the risk of violent crime was more than three times higher in people with a history of head injury than in the general population and twice as high as found in sibling controls (Fazel et al 2011). Tolerance to alcohol can be reduced after head injury, and the neurobehavioural effects are made worse by alcohol. These effects of head injury could easily lead to rule breaking and involvement with the Criminal Justice System. It is important to note that in the context of head injury persisting disability is commonly 'hidden' as it derives from these cognitive and emotional changes that impact on day to day life and more obvious physical disability is considerably less common. Hence, in most cases there is no obvious outward sign of the head injury within a few weeks or months of the injury and the individual with a head injury and those that they interact with may not attribute their behaviour or difficulties to the head injury. Hence, neither the head injured person nor those in contact with them make adjustments or allowances for the brain injury. About 90% of hospitalised head injuries are classified as 'mild' and from which a good recovery is expected in the vast majority. However, one of the most significant risk factors for having a head injury is already having sustained a head injury (Nordström et al 2013) and repeated head injury tends to have cumulative negative effects associated with long term functional deficits (McKee et al 2009). There is not only a need therefore to consider those with single incident severe head injury that is likely to have long

term effects on cognition, personality and behaviour, but also those with multiple mild head injuries where a single event is usually associated with a good recovery but where the cumulative effects of repeated mild injuries can have persisting effects. Another 'special case' might be made for those who have a brain injury in childhood; the brain and particularly the 'social brain', continues to develop until around the age of 25 and there is evidence to suggest that early damage can negatively affect social development (Lenroot et al 2006).

Given this background, it is perhaps not surprising that there is limited awareness of the potential significance of a history of head injury in the Criminal Justice System (McMillan 2013). More generally, our knowledge about the prevalence of head injury, its severity and relationships with offending and reoffending is very limited and is largely based on self-report (Moynan and McMillan in preparation). A recent pilot study found that the prevalence of hospitalised head injury in prisoners in three prisons in the Glasgow area was estimated to be several times higher than expected in the NHS Greater Glasgow and Clyde population and many had sustained a head injury before the age of 16 (see 4.2 below). A study in Minnesota created three groups based on self-report with low moderate and high probability of significant head injury and found a more frequent drug dependency and greater use of psychological services in prison in those with moderate and high probability head injury. Also in the US, studies report that more time is needed to adapt to prison life, more major incidents in prison and higher rates of recidivism in those with a higher probability of having sustained a severe head injury on the basis of self-report (Morrell et al 1998; Piccolino and Sohlberg 2014).

A number of preventative measures have been introduced, which have reduced the risk of serious head injury from road traffic accidents although the same cannot be said for falls (now the commonest cause of head injury) or assaults (Hamill et al 2015) and further work on prevention, including in the use of alcohol is needed but is beyond the scope of this report. There is a need however, to recommend a service pathway that will identify those who are in contact with the Criminal Justice System and at risk of (further) head injury or where head injury is already having an impact on their social behaviour or mental health and to ensure that there is service provision and equity of service provision including appropriate links to brain injury services outwith the Criminal Justice System. Not only may this reduce the impact of repeated brain injury, but it may reduce the frequency of recidivism (Williams et al 2012; Piccolino and Sohlberg 2014; British Psychological Society 2015).

3. Aims and Methods

3.1 Aims: To produce a report on the health and associated service needs of people with brain injury in the Criminal Justice System and to recommend service developments and areas requiring further investigation.

3.2 Methods: The recommendations of the Justice Committee were considered via the creation of five sub-groups within the Workstream that focussed on Epidemiology; Screening Triage and Assessment; Awareness and Education of Staff Working with Offenders; Treatment Support and Service Linkage and Secure (Health) Provision (see Appendix 15.2). The Workstream did not restrict itself to these questions in the event of important issues arising during its deliberations.

A number of surveys and reviews were carried out by or provided to the Workstream (see also Appendix 15.3):

- Survey of NHS Heads of Neuropsychology Service (HoNS) in Scotland (Fiona Summers)
- Survey of SPS Forensic Psychology leads in Scotland (Fiona Summers)
- Survey of Health Board leads on links between brain injury services and prisons (John Porter)
- Telephone survey of leads for forensic secure units in Scotland (Andrew Wells)
- Observation at police custody centres in Glasgow (Tom McMillan)
- Forensic Network Census (Lindsay Thomson)
- Epidemiology studies by University of Glasgow on Scottish Prisons (Tom McMillan)
- Systematic review of literature on prevalence of brain injury in prisons (Claire Moynan/Tom McMillan)
- Review of literature on screening tools for brain injury (Brian O'Neill/Suzanne O'Rourke)

The report was made available for consultation prior to publication (see Appendix 15.4).

4. The Prevalence of Head Injury in Scottish Prisons

There are about 8,000 inmates in the Scottish Prison Service, at any one time, and the number that require intervention or support as a result of head injury are not known. There are two meta-analyses of the literature which suggest that the prevalence of head injury in offenders is 50% (Farrer and Hedges 2011) and 60% (Shiroma et al 2010). These figures suggest that head injury in prisoners is potentially a significant issue. However, most head injuries in the general population are mild, a good recovery is likely in most and hence if taken at face value, these estimates of prevalence could lead to an over-statement of service need. If taking moderate-severe head injury (defined as loss of consciousness for more than 30mins) as more likely to result in persisting disability (Caroll et al 2004); studies on the prevalence of brain injury in prison inmates estimate the prevalence in adults to range between 7% and 16%. However, a systematic review of prevalence studies shows that they have not directly assessed the impact of brain injury on day to day life and (i) all of the prevalence studies are based on self-report of the occurrence of head injury (ii) a 'gold standard' assessment of the occurrence of brain injury by self-report has not been established (iii) classification of the severity of brain injury, when reported, often does not utilise standard criteria and (iv) most studies present data on a sample of the prison population which is not or may not be representative of the population making generalisation difficult (Moynan and McMillan in preparation).

If even 10% of prisoners (ie about 800) require further specialist assessment the service implications are considerable and particularly so if taking into account the turnover in prisons given the significant number with short sentences.

4.2 The Prevalence of Head Injury in Scottish Prisons: To facilitate considerations about the likely service demand and need, a study on the prevalence of head injury in Scottish prisons is underway. The NPHN part funded the University of Glasgow to carry out this work. Preliminary findings are given below and a more detailed paper will be submitted for publication in an international journal (McMillan, MacKay, Graham and Pell in preparation). This study is unique in looking at recorded hospitalisations with head injury and is not therefore dependent on self-report, and provides a prevalence estimate of an entire prison population. The initial part of this study considers the following:

1. What is the prevalence of hospitalised head injury in prisoners?
2. Does the prevalence of hospitalised head injury in prisoners differ from that in the general population?

Methods: These questions are considered in relation to age, gender, social deprivation and frequency of injury. If data are available, a later phase of the study will be considered which would further consider head injury in the context of information on offending and reoffending. Information from the prison NHS Vision database will contextualise the population in prison with/without head injury in terms of factors that are of potential relevance when considering assessment and intervention including drug and alcohol use, seizure history and mental health.

Permission was obtained from the Caldicott Guardians and from the Privacy Advisory Committee to allow linkage of computerised data on the numbers of people in Scottish prisons on a census date (7th August 2015) with Scottish Morbidity Records-01 (SMR-01). SMR-01 codes hospital admissions using the International Classification of Diseases (ICD 9 and 10). This indicates how many prisoners had been admitted to hospital with a head injury since 1981. Data on prisoners were compared to control data from the general population that was matched for age, gender and social deprivation. The data linkage was carried out in the National Safe Haven by the eDRIS team of the Information Services Division and the data analysed there remotely by the University of Glasgow.

Results: On the census date there were 8,010 prisoners in Scottish prisons. Linkage between Community Health Index numbers and SMR-01 was achieved for 96% of prisoners; some could not be linked with confidence because the prisoner held the postcode for the prison and not their previous residence or there were matches with SMR-01 and more than one prisoner that were too close to distinguish with certainty. Hence data on 7681 prisoners were linked to SMR-01. A control group of 24,341 from the general population in Scotland was created from SMR-01 (ie 3 controls per prisoner). Controls were matched to the prisoner population by gender, age band and social deprivation (Scottish Index of Multiple Disability 2012 quintiles). Two thirds of the prison population were aged under 40 years and 95% were male. The majority were from the two highest deprivation quintiles (77%).

In the prisoner population, 26% had been admitted to hospital with a head injury and this was significantly more than the 7% found in the general population. The relative risk or odds ratio (OR) of having had a head injury was 4.5 times higher in prisoners than in the

demographically matched controls. Although risk of hospitalised head injury was higher for both genders, it was somewhat higher in women (OR 4.4 in males and 6.0 times in female prisoners). This is surprising given that epidemiological studies in the general population describe a higher incidence of head injury in men and is worthy of further investigation. Prisoners were more likely to have had several head injuries with 5% having three or more compared to 0.5% of the general population (OR: 2.7). There is concern that damage to the developing brain can have serious effects on social development and behaviour (Lenroot and Giedd 2006). A head injury before the age of 20 was found in 16% of prisoners, and they had a relative risk of a head injury this early in life that was 3.3 times higher than in controls. Severity of injury is difficult to ascertain with certainty from the ICD codes but if taking codes for intracranial injuries to indicate severe head injury, these were found in 9% of prisoners. If taking three or more head injuries not coded as 'severe' as potentially being significant this was found in 3% of prisoners. This overall estimate of the prevalence of more severe head injury as 12% is very tentative and requires validation.

Conclusions: What these preliminary data show, is that the prevalence of a history of admission to hospital with a head injury is significantly higher in prisoners than in a sample of the general population matched for age, gender and social deprivation. Although both genders are at greater risk of having had a head injury, the risk in women prisoners is much higher than expected and deserves specific investigation. The greater risk of head injury early in life and greater risk of repeated head injuries in prisoners has implications for prevention strategies (see Sections 5 and 8). What we do not know is the extent to which head injury in prisoners has caused persisting effects that are disabling or are associated with antisocial behaviour. It is generally accepted that more than 90% of head injuries are mild and that a good recovery is expected in most of these (Carroll et al 2004, Tagliaferri et al 2006). In our study identifying how many may have disabling effects of head injury is difficult. However as a very tentative estimate; 12% of prisoners may have had a more severe head injury on the basis of ICD codes or having had three or more, less severe head injuries. In terms of self-report, it should also be noted that some may not attend hospital after a head injury. Non-attendance at hospital is more likely to be associated with a mild or moderately severe head injury, but in some there will be multiple head injuries which can have a cumulative effect, and this is likely to increase the number needing a head injury screening assessment. We have little information on the relationship between prevalence, self-report and hospitalised head injury and the numbers that have persisting disability that require help. Further study that utilises the current prevalence findings and investigates disability associated with head injury and relationships between hospitalisation and self-report in prisoners is needed **(R1)**.

5. Prevention of Brain Injury and Reducing the Risk of Offending and Re-Offending

Head injury is the most common cause of death and disability after injury in young adults (Tagliaferri et al 2006). In the general population, the most common causes in Scotland are falls and assaults (Thornhill et al 2000). The incidence of falls has increased in recent years, largely associated with falls in older adults (Shivali et al 2014). Recent research in Scotland shows that early mortality after head injury fell for two decades after 1974 and then stabilised, and this largely reflects a reduction in deaths from transport accidents and not by a drop in deaths from falls or assaults. In younger adults both falls and assaults are often found in the context of alcohol intoxication and long term alcohol abuse and measures are required (as for example seems to be likely to have been the case regarding legislation and safety on the roads) to have impact on these causes of severe head injury (Hamill et al 2014; Thornhill et al 2000). If considering this specifically in the context of brain injury and offending, the case has been made in section 2.2 regarding this association. It is more generally understood that intoxication by alcohol or drugs has a disinhibiting effect and that judgement can be impaired, resulting in greater likelihood of aggression and other antisocial acts. Following a brain injury it is further recognised that intoxicants generally have greater effects, that individuals may not be aware of this and may make no allowance for it. Together with the impulsivity and disinhibition that accompany head injury it is simple to predict that the likelihood of antisocial behaviour in offenders is likely to be greater if they have a brain injury and further increased if intoxicated. There is therefore an important consideration in terms of prevention of repeat brain injury and of offending/reoffending and the associated use of alcohol and drugs.

A second consideration is lack of awareness; specifically of the reduced tolerance to intoxicants after brain injury, of the impact of 'head knocks' including over the longer term and of repeated head knocks even if seeming minor and the link between intoxicants brain injury and offending. There is an important role here for education of offenders and of people close to them (see section 10). There is little research on women prisoners with head injury (see 4.2). What is known in other disadvantaged groups is that the cause of head injury can more commonly be domestic violence and not falls or road traffic accidents (Craig et al

2014); there is a potential role here for education and for linkage to support groups for women.

6. Brain Injury Services and Criminal Justice Service Pathways

The results of surveys of the current service provision for offenders with brain injury are as follows:

6.1 NHS Provision: (i) Healthcare managers for Scottish prisons in all Health Board areas were surveyed in the autumn of 2015 regarding service links between prisons and brain injury services. No systematic links with services were indicated. Grampian indicated that they have weekly part-time clinical neuropsychology input but not links with brain injury services more generally. NHS Dumfries and Galloway have links with Headway, (which is a third sector community based organisation). Prison health services indicated that they would use neurology, mental health services (neither are specialist for head injury) or 'local hospitals' if thought appropriate.

(ii) An e-mail survey of NHS Clinical Neuropsychology services by the Heads of Neuropsychology Services in Scotland (HoNS) in 2015 indicated that specific service provision for offenders with a brain injury is sporadic and uncoordinated. No NHS Board had a clear pathway with only NHS Grampian having a (limited) service provision.

Most health boards in Scotland provide assessment and treatment for patients with head injury although in some geographical areas this is very limited (Scottish Acquired Brain Injury Network Standards Report 2012). Providing adequate services for patients with head injury continues to be a challenge for the NHS and it is widely accepted that demand outstrips supply with the HoNS reporting long waiting times for both assessment and rehabilitation.

In most Health Board areas, referrals to clinical neuropsychology are accepted for assessment of offenders with head injury. The number of referrals received is small. Heads of Neuropsychology service respondents were uncertain regarding what is offered in terms of rehabilitation and management by other services (for example mental health teams, forensic psychologists and substance misuse services).

6.2 SPS Provision: Respondents to a questionnaire sent to managers of SPS psychology services in prisons in June 2015, indicated that there were no specific services for brain injury. There is a need for greater links and collaboration with NHS colleagues, support with the identification and screening of those with a brain injury, training to develop knowledge and skills within the SPS and resources for intervention were highlighted as needs.

In summary, although prisoners and those in the criminal justice system more generally, are entitled to the same assessment and rehabilitation services by the NHS as the general population, these surveys suggest that there is not systematic availability or provision and that there may be a shortfall.

6.3 CJS Pathway Action and: Brain Injury & Offending: The pathway for the criminal justice system is given in figure 1. There are a number of key action points at which brain injury might be assessed and may be relevant in terms of investigation of an incident, management in police custody and in prison, rehabilitation of offenders and reducing the likelihood of reoffending (see table 6.1). Further information and discussion is found in Sections 7-11.

[INSERT FIGURE 1 ABOUT HERE]

Actions listed below should be adhered to by relevant agencies throughout the pathway (figure 1). Staff groups within those agencies should receive training and awareness (section 10)

Action 1.	Response & Community Police	<ol style="list-style-type: none"> 1. Potential Acute Brain Injury (BI): Requires immediate clinical care; take straight to A&E. 2. BI: If aware, notify Bar Sergeant.
Action 2.	Bar Sergeant	BI – Health Risk Assessment undertaken. Refer to Health Care Professional for further assessment if required.
Action 3.	Police Custody Health Care Professional	<ol style="list-style-type: none"> 1. BI: Clinical assessment and refer to A&E if potential acute BI. 2. BI: Screening and onward referral to BI services
Action 4.	Sheriff	Social Work reports on BI should be made available to allow them to be considered; raise awareness of how BI can affect offending and inform proceedings and disposal.
Action 5.	Social Work (Criminal Justice)	<ol style="list-style-type: none"> 1. Consider whether BI may have contributed to offending 2. Obtain specialist BI report if needed
Action 6.	Prison	<p>Reception/Operational Staff:</p> <ol style="list-style-type: none"> 1. Relevant reports should be made available to prison staff and through the sharing of this information it can be included and contribute to Integrated Case Management 2. BI: Needs screening, triage and clinical assessment and NHS acute care referral if appropriate 3. BI: Refer to Health Care Professional
Action 7.	Social Work (Criminal Justice)	Prison staff trained to general awareness raising

Table 6.1: Action Points: Brain Injury & Offending and Criminal Justice System Pathway

6.3 Brain Injury Services in Scotland: A survey that mapped services for people with acquired brain injury in Scotland was carried out by the National Managed Clinical Network for ABI in 2007-2008 (ABI NMCN 2009). This investigated the patient journey from accident and emergency to the community in each Health Board area. It concluded (p65) that although there are several examples of effective delivery of a service, no NHS Board offered a fully comprehensive service; overall services were patchy and poorly organised. Although there are examples of service development since then, the overall conclusion is likely to be similar should the survey be repeated now.

In most cases (about 90%) admission is brief, for up to 48 hours with discharge to home with a head injury information card which indicates that symptoms are likely to resolve in the next week or so. There are specific guidelines for management and follow-up in this early period (SIGN 110, 2009). If the head injury is more severe there may be admission to intensive care and/or to neurosurgery and historically from there (or directly from A+E), to a general surgical or orthopaedic bed for convalescence. At this point rehabilitation services may be invited to consider rehabilitation needs but this does not occur in all cases. The patient may be admitted to a generic rehabilitation bed under a Rehabilitation Medicine Consultant or to a neurorehabilitation bed or otherwise discharged to home with referral to a community brain injury team and/or a third sector organisation such as Headway or Momentum (voluntary charitable organisations which specialise in brain injury) if available in that locality and to social work if deemed appropriate. An example of a pathway for brain injury services is given in the figure in Appendix 15.6.

In terms of the linkage between the Criminal Justice System and brain injury services, this should be developed in each locale. It has been recommended by the National Managed Clinical Network for Acquired Brain Injury that there is a lead clinician in each health board area with responsibility for people with brain injury and this should be the initial point of contact when developing links and referral routes; however lead clinicians are not to be found in every board area and the contact point may need to be sought via the Health Board lead for prisons.

7. Screening, Triage and Assessment

7.1 Background: It is accepted that for some the effects of head injury are minor and many make a good recovery from a serious brain injury (Carroll et al 2004). As the prevalence of head injury is high, there is therefore a need to screen offenders and to triage those that may require advice or information, assessment, intervention or support. For example, those with mild head injury or who have recovered well may benefit from education about head injury as a preventative strategy, given that the occurrence of a head injury is a significant risk factor for future head injury (Nordström et al 2013). Screening is best integrated into routine health checks at reception in each of the following: Police Custody Suites, Criminal Justice Social Work Reports, Prison Reception and the Forensic Network.

Screening and Triage needs to take account of the following:

- Not all brain injuries lead to residual disability
- There may be cumulative effects of repeated mild brain injury which are disabling (see 8.2 below)
- Most people who have suffered a brain injury do not have persisting physical disability; the brain injury is essentially 'hidden'
- Existing admission procedures are already time demanding and additions need to be brief
- Resources for detailed assessment and specialist treatment of offenders with disability are limited
- The absence of an effective system to identify those with disability after brain injury (eg associated with a compromised ability to learn new skills or inhibit behavior) is likely to reduce the efficacy of prison rehabilitation and compromise the validity of risk assessments

Screening needs to be cost-effective and careful consideration must be given to balance the staff resource required against the ability of potential approaches to identify disability and have an acceptable balance between the rates of true positive and false positive screens (the latter detected after more detailed assessment) and minimising the risk of false negatives. It should be noted that in this context, disability most commonly arises from cognitive and emotional impairments resulting after a brain injury and overtly noticeable physical limitations are less common, making the potential risk of false positives greater.

7.2 Custody Suites: There were 170,000 admissions to Police Custody Suites in Scotland in 2014. Health Care and Forensic Medical Services have been provided to custody suites by the NHS since 2014. The delivery model in each area is determined by the NHS Boards; some base nurses at specific custody units, some provide peripatetic nurses and others have a medically led model. A recent head injury may be missed in custodial settings, especially given the frequent association with acute alcohol or drug intoxication, which may present behaviourally in a similar way to concussion (disorientation, confusion, poor memory and attention). It is understood that arresting officers and the custody suite are directed to have a low threshold for seeking medical assessment with detainees. All custody suites in Scotland have access to on-call medical staff and many have dedicated nursing staff that are available by telephone and increasingly on site³; when there is a significant health concern, detainees are taken to Accident and Emergency. Staff in custody reception routinely ask fifteen questions to identify any immediate risk to themselves or others. The first of these concerns the identification of ‘injury’:

‘Are you suffering from any injury?’

Observations in Police Custody Suites and discussion with their staff for the purposes of this report, suggest that the addition of a further single question would not be onerous and could facilitate appropriate referral to nursing/medical staff. It is recommended that a single question is added about head injury:

‘Have you had any knocks to your head in the past 48 hours?’

Should the answer to this question be affirmative, the individual should be discussed with a nurse (by telephone if not on site) who can advise or assess whether the knock to the head may result in potential medical risk (eg of chronic cerebral haematoma) and necessitate being checked in Accident and Emergency, or is otherwise significant (eg have an impact on the ability to give a reliable account of recent events as a result of post traumatic amnesia, confusion or persisting cognitive impairment) and may require further assessment by NHS staff. The issue is therefore to detect a recent head injury which might have an acute impact

³ In the East of Scotland, custody nurses are based at St Leonards, Falkirk and Dunfermline Police Stations from where they provide cover to other stations in the NHS Fife, NHS Forth Valley, NHS Lothian and NHS Borders. In the West CFNs in NHS Greater Glasgow and Clyde are based at Cathcart and also cover Govan, London Rd, Stewart St, Maryhill, Baird St, Partick, Greenock, Paisley and Clydebank. In NHS Lanarkshire the service is led by Forensic Physicians with nurses providing cover during peak periods. In NHS Ayrshire and Arran, the service is provided exclusively by Forensic Physicians. In Dumfries and Galloway the service is provided by Forensic Physicians and Out of Hours GPs. In the North nurses are based at Inverness and nurses in Dundee also provide cover for Arbroath and Perth Custody suites. There is no dedicated nursing cover for custody suites in the Aberdeen, NHS Western Isles, NHS Orkney or NHS Shetland.

on the behaviour and presentation of the detained. This system should ideally be piloted in a number of custody centres, perhaps in two Health Board areas initially **(R2)**.

Medical information gained in police custody is not passed to the Prison Reception and from A+E is not routinely passed to the police /custody NHS staff if the individual is later held in custody. It is recommended that information that may be relevant to future care is passed to the NHS staff working in custody and by them to NHS staff in Prison reception **(R3)**.

7.3 Prison Reception: In prison, there is a need to know, not only whether an individual has had a recent head injury that is or could be potentially significant (subacute or disabling), but in addition whether there is any earlier history of head injury and if this has resulted in disability. Clearly there are large numbers who pass through prison reception each day and initial screening needs to be brief, but with availability of increasingly more detailed assessment (for increasingly smaller numbers) when the potential for significant persisting impact is greater. Current practice in prison reception is for a screen using the electronically recorded NHS Vision interview tool that is conducted by prison healthcare nurses. This takes approximately ten minutes and includes questions about physical health problems, any pending hospital appointments and any history of blackouts; information collected during previous stays in prison is also available but data on head injury is not gathered.

A large number of detainees are processed through prison receptions (about 20,000 per year), and the considerable speed at which this process is completed and the frequency with which prisoners may be transferred precludes a common time point post reception when a formal screening assessment could take place. The review of screening tools (below) indicates that use of a validated screening tool for head injury would double the Vision interview time and this may be difficult to justify for a single diagnostic group. It is instead recommended that a single question about head injury is added to the Vision interview that would take only seconds to ask. If the individual answers in the affirmative, the likelihood that further assessment is needed becomes higher and to ascertain this a further short series of 'drop down' questions would enable triage into an outcome of 'no head injury–no further action'; 'head injury is not disabling-provide information only' or 'head injury may be disabling-screening required'. This system should be piloted in two or more prisons initially **(R4)**.

The initial question and follow-on in Vision would be:

Have you ever had an injury or knock to your head that caused you to be knocked out and dazed or confused or where you did not have any memory for what happened for more than a few minutes?

Are there any childhood injuries like this that you remember or were told about?

If the answer is 'yes' to either of these the drop down questions would be:

What is the longest period of time that you have no memory for after a head injury?

[If more than 24 hours triage to screening assessment; if no to education/advice]

Were you ever kept in a hospital bed for more than one night after one of these events?

If yes how many nights...

[If more than two nights triage to screening assessment; if no to education/advice]

When was the most recent of these?

[If in the past week prioritise as urgent]

If assessment in Vision suggested that there might have been a significant head injury, a more detailed screening would take place. The screening measure would take about 10 minutes and could triage to a more lengthy neuropsychological assessment. Details of the review of screening measures are given in Appendix 15.5. Although there are a number of potential screening measures, the same tool should be used throughout the Criminal Justice System in Scotland to facilitate audit and comparison in the same individual across time and settings.

Although several screening tools elicit a reliable history of head injuries and their severity in an offending population, few have been measured against a suitable reference standard and all are of a length that has considerable resource implications were they to be incorporated into routine health screening on Vision. In terms of clinical utility there is also a concern about their potentially low rates of specificity which means that they may have high rates of false positive results, leading to inefficiency of staff time as a result of triage to more detailed assessment. For the purposes of this report a systematic review of studies that investigated the use of screening measures for the detection of head injury in offenders was undertaken in April 2015 (see Appendix 15.5). The briefest interview formats that also had high

methodological quality ratings and good reliability were the Ohio State University-Traumatic Brain Injury-ID-Short form and the Brain Injury Screening Instrument (BISI). No study compared assessments using these tools with the presence or absence of evidence for brain injury and hence information on sensitivity (the proportion of cases with brain injury detected) and specificity (the proportion of cases without brain injury correctly categorised) is absent. A pilot study is recommended to further consider the practicality and validity (in terms of detecting disability) of the OSU-TBI-ID-Short form and the BISI before a final decision is reached (**R5**).

Screening tools merely identify those who, as a result of a brain injury, are at an increased likelihood of residual impairment, and who may require neurorehabilitation or adaptations. Hence, only a proportion of those identified will need such interventions and the nature of the intervention if required also needs to be specified. Identifying this subgroup will require a triage process comprising additional specialist assessments. Should the screening be positive, there should be referral for a detailed neuropsychological assessment (**R6**) that has two purposes:

1. To identify disability after a head injury that requires treatment or adaptations in order to:
 - Improve ability to manage the prison environment; such as self-care, engagement and adherence, behavioural control or ability to engage in prison programmes
 - Reduce the likelihood of re-offending. Knowledge about effects of the head injury would inform their future care and management.

OR

2. They are more appropriately placed in a secure hospital with specialist knowledge of brain injury (ie if cognitive impairment secondary to brain injury was missed at the time of sentencing). This circumstance is however likely to be rare (see Secure Provision, Section 9 below).

In terms of provision of neuropsychological assessment for those triaged to this service after screening, there are likely to be logistical issues if the numbers are great. The further pilot work detailed in recommendations will allow estimation of numbers. If the numbers are great, a partial solution may be to administer cognitive tests and questionnaires via laptop or tablet computers by trained nurses or support workers (e.g. Cogstate, Impact, Cantab Research).

Results can then be interpreted by a clinical neuropsychologist. This is not ideal as much can be learned from observing a client carrying out the tests and there is a need for interview as a part of the assessment. However, computerised self-assessment offers standardized administration and scoring with greater efficiency than lengthy paper based assessments. A preliminary review of these test batteries against the criterion cognitive domains of interest (memory, problem solving and social cognition), indicated the need for piloting to ascertain cutoffs for disabling cognitive impairment in the brain injury population **(R7)**.

Following the neuropsychological assessment, recommendations need to be fed back to NHS staff in prisons and facility for management advice needs to be provided to SPS staff.

7.4 Criminal Justice Social Work (CJSW) pre-sentencing reports: The same questions that are to be asked in prison reception should also be asked as part of the CJSW interview. This is to ensure that the potentially significant impact of head injury is considered. If there is indication of significant head injury CJSWs could administer the 10 minute screening assessment that would also be used in prisons. If disability was thought likely a more detailed assessment could be sought from brain injury specialist services or to a recommendation for a pre-sentencing report that includes a neuropsychological assessment that would inform decisions regarding appropriate disposal. Where brain injury is identified then it should appear as a heading for discussion around discharge planning at Parole Planning in formal review/planning meetings. In this context, MAPPA (Multi-Agency Public Protection Arrangements) applies to violence and sexual offending in England but only to the latter in Scotland, but should this extend to violent offending in Scotland brain injury should be included as a potential area for screening and assessment. MAPPA (2012) guidance for England and Wales does not currently mention brain injury.

A mechanism needs to be put in place to allow the results of specialist NHS assessments that are carried out during the compilation of CJSW reports to be available via the VISION system to prevent duplication of resources should the subject become a prison inmate **(R8)**.

8. Intervention, Support and Linking Prison Health and Brain Injury Services

8.1 Background: Further information on the prevalence of head injury in prisoners and its effects will inform the potential demand for services. From what we know currently, it is likely that many who have a history of head injury will benefit from education and advice and most can be targeted for this via the initial categorisation in the NHS Prison Reception interview. More specifically education and advice should inform about: (i) Prevention-the factors associated with risk of head injury (as these are modifiable eg alcohol and drug use, falls and violence). (ii) The impact of head injury in the acute and longer term, emphasising effects on cognitive and emotional function and the relationship with behaviour (including offending behaviour and risk of reoffending) and (iii) Sources of support and where to obtain these now (in the Criminal Justice System) and at future times (see Section 10 below). In terms of more severe and disabling effects of brain injury, the needs and potential for neurorehabilitation would become evident after more detailed assessment. Educational material should be made available to all prisons and at other relevant points in the Criminal Justice System (see section 9). The facility for interventions needs to be considered locally in relation to the local care pathway for brain injury. There should however be access to neuropsychological assessment for people with brain injury in all prisons. **(R7)**.

8.2 Mild head injury: Following a mild head injury, which is typically associated with loss of consciousness for less than 30 minutes and a period of confusion, disorientation and very severe impairment of memory for new information (post traumatic amnesia) for less than 24 hours, most recover and are symptom free within a few days or a few weeks and the vast majority within 3 months (Carroll et al 2004). A key issue is the enhanced risk of sustaining further head injuries. Statistically, having had a head injury is a risk factor for future head injury. It is recognised that repeated head injuries can have cumulative effects, even in those that have seemingly recovered, resulting in greater impairment than would occur from a single head injury (Guskiewicz et al 2005). This increased risk is likely to reflect the fact that people who sustain a head injury are not representative of the demographics of the general population. They are more often male (and hence more likely to be risk takers or aggressive), more often from socially deprived backgrounds and more often have a history of alcohol abuse and use of alcohol at the time of their injury. If not taking account of this enhanced risk it is obvious why repeat head injury is more likely. Intervention should involve education about these risk factors, about the effects of cumulative mild head injury and

about the life changing effects of more severe head injury. This can be via video, online learning and booklets and should be linked to education and advice on alcohol and drug use. Involvement of family and peers is likely to enhance a desired change in behaviour.

8.3 Moderate-Severe brain injury: Here, the definition includes loss of consciousness for more than 30 minutes and confusion, disorientation and very severe impairment of memory for new information lasts for 24 hours or more. Outcome is variable and dependent on a number of pre-injury, injury and post-injury factors (Whitnall et al 2006; Ponsford et al 2008). Some recover, with any persisting symptoms having little impact on their daily life. For many however there are cognitive, emotional (sometimes physical) and behavioural changes, which in some improve (often within 2 years) and in other persist, or may even worsen late after injury (Hammond et al 2004; Whitnall et al 2006). A small number (5-10%) require care and the majority live independently but are socially disabled. Recent evidence also indicates greater risk of death years after injury particularly in younger adults (McMillan et al 2011).

Given the differences in time course of recovery and the heterogeneity of outcome, there is no single pathway for intervention and support, and the need for a more detailed assessment of need is clear. As with less severe brain injury, the involvement of family in neurorehabilitation is recognised as being important (Willmer et al 2001).

Specialist Neuropsychology Assessment: This should be provided by either a clinical neuropsychologist or clinical psychologist with specialist knowledge of brain injury. The benefit of a detailed assessment is to provide information to help prison staff with management and recognition of needs, the awareness of offenders with regard to difficulties and to recommend rehabilitation and support services if required. The assessment can provide the following:

- (i) Determination of cognitive strengths and weaknesses
- (ii) A review of other aspects of functioning (eg mental health, behaviour, daily functioning)
- (iii) Make recommendations regarding neurorehabilitation needs and potential to achieve goals
- (iv) Give feedback to offenders on their functioning including strategies they may find beneficial

- (v) Provide information/ recommendations on adaptations to others working with the offender, with a strong emphasis on working collaboratively, for example on appropriate work groups, education and training programmes and offending behaviour groups
- (vi) Make onward referrals if necessary for example to the mental health team or neurorehabilitation services

Neurorehabilitation: This is a collaborative process whereby the person and family (where possible) work with an interdisciplinary team to maximise the person's ability and opportunity to participate in everyday life and to develop the skills needed for optimal physical, psychological and social function. Several reviews on the efficacy of brain injury rehabilitation point towards better outcomes if it takes place nearer to the time of injury, and if embracing the 'holistic' concepts of neurorehabilitation (Catellani 2010; Cicerone et al 2011, McMillan 2013; SIGN 130, 2013). Holistic neurorehabilitation is intensive and is provided on a day patient basis, or in the UK more commonly as an inpatient. It incorporates psychological therapy, work with the family, often group work and utilizes the environment as a 'milieu' to facilitate therapy to the extent that behavior is responded to following principles from neurobehavioural rehabilitation throughout the day and not only in 'treatment sessions'. Several studies show that neurorehabilitation can significantly reduce aggressive behavior, (Alderman 2001) improve employment outcome (Malec & Basford 1996; Wehman 2003) and can be cost effective in terms of reducing care needs in those with greater disability (Wood et al 1999; Oddy and da Silva Ramos 2013). At present, there is no evidence base on the effectiveness of neurorehabilitation in reducing offending behaviour (**R9**).

Rehabilitation of cognitive impairment can reduce attentional problems and strategies can reduce the impact of memory and executive difficulties (Kennedy et al 2008; Catellani 2010; Cicerone 2011; SIGN 130, 2013)

Neurorehabilitation is most effective if delivered by a multidisciplinary team comprising a range of clinicians and professionals who have knowledge and skills in brain injury and programmes for neurobehavioural disorders are often led by clinical neuropsychologists (see Wood 2001); many others are involved including Consultants in Rehabilitation Medicine and in Psychiatry, Allied Health Professionals, social workers, trained brain injury workers and job coaches with training in brain injury.

Individual Psychological Therapy: Although it is likely that cognitive behavioral therapy and its third wave developments (eg Acceptance and Commitment Therapy, Compassion Focused therapy, Mindfulness) will be of benefit to some with severe brain injury, a recent

review of the evidence base in the Matrix of Psychological Therapies for Neurological Disorders (Davison et al 2015) indicates that the evidence base is currently thin (no research on offenders with brain injury) and further research is needed (**R9**).

Support and Care: Professionals in the SPS and the NHS and social services in addition to staff from third sector organisations such as Headway and Momentum will be important contributors to the delivery of brain injury rehabilitation to offenders.

Interagency working in the NHS: Brain Injury rehabilitation does not sit within the scope of mental health teams as brain injury is not regarded as a mental health diagnosis. However secondary effects of brain injury can fall within the domain of mental health including anxiety, depression and substance misuse; (these can predate the brain injury in some cases). Restrictions under the Mental Health (Care & Treatment) (Scotland) Act 2003 can be required in a small number of cases. Hence joint working between any brain injury rehabilitation programme and mental health is often essential. There may also be persisting neurological effects which require liaison with neurology such as management of epilepsy.

8.4 Linkage between Prison Health and Brain Injury Services: Production of local pathways is likely to highlight gaps in service provision. Each service should consider a pathway that includes screening, specialist neuropsychological assessment, inpatient and community based neurorehabilitation, with support and linkage to generic community based services (with a view to reducing reoffending). An example of a service pathway for brain injury is given in Appendix 15.6. Managing and facilitating integration into the community for those who have been in prison is of particular importance (**R10**).

For those offenders who are not incarcerated, attending outpatient appointments, neurorehabilitation groups and accessing community services may not be overly problematic; however any pathway needs to consider the logistical difficulties of prisoners accessing inpatient or community services particularly for regular rehabilitation including when long geographical distances are involved. The benefits of inpatient rehabilitation in cases of severe brain injury might be a consideration in pre-sentencing reports. Developing therapeutic relationships is often problematic if prison/security staff are required to be present. It may seem more efficient and effective for treatment and neurorehabilitation to take place in prison particularly for those with longer sentences. Whereas this may be effective in some cases where problems are less severe or not pervasive, the evidence base indicates that effective change for neurobehavioral disorders that are more severe requires intensive neurorehabilitation over many months (McMillan 2013) and this may be difficult to

achieve in a prison setting. For those close to release rehabilitation in the community is likely to be an important part of any neurorehabilitation programme or there may be options for inpatient rehabilitation in the small number of cases where this is likely to be appropriate.

Community based neurorehabilitation is provided by NHS brain injury teams in some Health Board areas and in some by NHS clinical neuropsychology services. Inpatient neuro rehabilitation services are provided by the NHS for some Boards (for example Grampian, Tayside and Lothian) and by others eg NHS Greater Glasgow and Clyde) via the independent sector (for example the Brain Injury Rehabilitation Trust or Huntercombe Brain Injury Rehabilitation); the number requiring this level of service is likely to be small. Access to NHS services needs to be negotiated via referral to the clinical lead on a case-by-case basis and logistical difficulties in terms of sentencing resolved. Non-NHS inpatient neurorehabilitation needs to be negotiated via the extra contractual referral system for the NHS Board that has responsibility for healthcare of that individual. A National NHS service is available at the Robert Fergusson Unit in Edinburgh, which provides inpatient rehabilitation for severe challenging behaviour after brain injury (see 9.2).

NHS services in prisons should establish contact with local NHS leads for brain injury and determine referral routes. The Criminal Justice Service more generally should engage with local third sector agencies that already provide services for those with brain injury with a view to possibly providing in-reach services. This is with a view towards providing a visiting service to prisons (as described below with Link-workers) or providing support services on release, including potentially as part of a resettlement process (R11). Attendance to some of these services could potentially be part of a probation order linked in with the criminal justice service (for example the return to work brain injury programme run by Momentum in Aberdeenshire). This also facilitates community reintegration.

8.5 Examples of relevant practice developments

- **Neuropsychology:** NHS Grampian has set up a clinical neuropsychology service for brain injury to HMP Grampian two days a month. The neuropsychologist attends the prison providing assessment (as described above), support and consultation for others in the MTD team including the forensic psychologists, meets with members of the mental health team and plans to provide training on the common consequences of brain injury. The focus is on a multi-disciplinary team approach to develop services already within prison and to increase awareness and understanding of TBI.
- **Neurorehabilitation Group:** NHS Grampian has presented a proposal to SPS to run a Brain Injury Rehabilitation group similar to one already run in the community. If approved it is envisaged this group would run for one day a week for twelve weeks followed by four weeks of analysing outcome data and screening for the commencement of a new group. For a year

this would equate to three groups with approximately 8-12 prisoners per group. Priority would be given to prisoners close to release with a view to linking in with the existing community neurorehabilitation service. Topics covered include Understanding Brain Injury, Attention, Memory, Managing Emotions, Organising & Planning and Social Behaviour. As well as clinical psychologists, staff would include one prison officer. The cost to fund this group (excluding the cost of the prison officer) for one year is £37,000. As yet this pilot has not been approved.

- **Brain Injury Link-worker:** The Disabilities Trust Foundation Brain Injury Link-worker Service in Leeds was set up to specifically address the needs of young offenders with brain injuries with a view to supporting them with the consequences of their brain injury including memory, anger and possibly challenging behaviours that may lead to further offending. The link workers have helped offenders to engage with existing programmes within the prison such as education, training and addiction programmes. Within the first two years of this service at HMP Leeds the service received 510 referrals (11% severe, 22% moderate and 67% mild head injuries) and it supported an active caseload of 15 young offenders at one time. The length of time offenders were supported ranged from four days to 13 months. Evaluation of the service has been positive with encouraging support from HM Chief Inspector of Prisons, the Prison Governor and young offenders. The link-worker service has a unit cost of £1,308 per young offender fully supported.

9. Secure Healthcare Provision for People with Brain Injury

9.1 Background: Brain injury can result in antisocial behaviour which is challenging and can lead to violence and other acts that may put self or others at risk. In Scotland there is a 'locked ward' specialist brain injury service provision for people with brain injury but no specialist low, medium or high secure healthcare (NHS or independent sector) provision. The issues are therefore (i) is there a need for specialist secure provision in Scotland, and (ii) is there a need for education and training on brain injury in non-specialist low, medium and high secure provision.

9.2 Brain Injury in Specialist 'Locked Unit' and Low Secure Provision: The Robert Ferguson Unit in Edinburgh is a specialist 19 bedded unit for treatment of people with challenging behaviour following brain injury. It has a National remit for Scotland and in addition to inpatient services offers assessment and advice, including on medication. It has a locked ward, but falls short of forensic low secure standards of security.

Graham Anderson House (Brain Injury Rehabilitation Trust) in Glasgow is an independent sector neurorehabilitation unit registered as a hospital. It admits adults with brain injury and has 25 beds of which 5 are designated for 'severe' challenging behaviour. It has locked ward provision. It has in addition medium-long stay provision in four bedded bungalows.

There is no specialist low secure provision for brain injury in Scotland.

9.3 Forensic Medium Secure Provision: In Scotland, there are forensic medium secure units in Edinburgh (Orchard Clinic 45 beds), Glasgow (Rowanbank 70-73 beds) and Perth (Rohallion Clinic, 24-32 beds). These units do not usually accept patients with a primary diagnosis of brain injury.

9.4 Forensic High Secure Provision: Provision for Scotland is at the State Hospital. This is a 144 bed hospital. In the past it has accepted patients with a primary diagnosis of brain injury or where brain injury is known to be a significant feature of their presentation. In recent years, 2 patients have moved from the State Hospital to specialist-brain injury medium secure care in Warrington, England (one of these was later transferred to low secure provision). As a result of appeals against excessive security afforded by the Mental

Health Act, in May 2015 the State Hospital did not have any patients with a primary diagnosis of brain injury.

9.5 Long Term Care Facilities: There are several care homes in Scotland that accept younger adults with brain injury and antisocial behaviour. These can have a level of security (eg keypad entry/exit) and tend to be staffed by care assistants with nursing supervision.

9.6 The Need for Secure Provision

9.6.1 Medium or High Secure Provision: This circumstance will arise when the level of risk is beyond that which can be safely managed in a locked 'unit' because of dangerous behaviour. The rehabilitation needs of the patient and security issues have to be carefully considered when identifying the most suitable placement for such patients.

A survey of lead clinicians in the medium and high secure units in Scotland in May 2015 (Andrew Wells personal communication) indicated that there were no patients with a primary diagnosis of brain injury in high secure provision in Scotland. Two patients who were recently in NHS high secure care and one who was in medium secure care in Scotland were receiving specialist brain injury care in the independent sector in England (all initially in medium secure) paid for by from NHS GGC (one) and NHS Lothian (two).

Although there is no specialist medium or high secure provision for brain injury patients in Scotland, these modest numbers do not seem sufficient to make the commissioning of a specialist Scottish medium secure unit for brain injury financially viable and the small numbers and relatively static population may make it difficult to attract and retain staff with specialist skills in brain injury. Patients with brain injury who require specialist neurorehabilitation or care in conditions of medium security should not be denied specialist care due to the low numbers, and can receive such specialist care in England if this is indicated.

9.6.2 Low Secure and 'Locked' Unit Provision: Four cases with a primary diagnosis of brain injury were found across the entire Forensic Network in the 2013 Forensic Network Census; all were in low secure care (Professor Lindsay Thomson personal communication to Andrew Wells, 2015). In low secure forensic care in the independent sector, there are 2 patients with a primary diagnosis of brain injury, and one with a secondary diagnosis of brain injury in independent sector facilities in the Ayr Clinic and one patient with a secondary diagnosis of brain injury in the Surehaven in Glasgow. It should be noted that several of

these cases are long standing having sustained their brain injury decades ago and the overall number represents an accumulation of cases where the outcome has not resulted in a return to the community, and largely where their exposure to specialist neurorehabilitation has been limited or non-existent.

In May 2015 there were 28 patients with a primary diagnosis of brain injury who require 'locked unit' provision for specialist neurorehabilitation in Graham Anderson House (9) and the Robert Fergusson Unit (19). Approximately half of these were detained under section of the mental health act (personal communication to Tom McMillan from these units). The number in care homes that require locked provision is unknown.

It is possible that there are further cases where the brain injury is a primary driver of dangerous behaviour and who are presently unidentified. These might for example be in secure provision in the Criminal Justice System and may benefit from neurorehabilitation. As discussed elsewhere in this report, the numbers are not known. In future investigations of these numbers, there is a clear need to identify the level of secure provision they would require if transferred to brain injury services for neurorehabilitation treatment.

9.7 Overview of Requirements for Secure Provision in Scotland: There would seem to be a low prevalence of cases requiring medium secure provision and no current or recent need for high secure provision. A small number of cases are in low secure forensic provision, some of which have accrued historically. There is a larger number who require locked 'unit' provision where there is a likelihood of a need for low secure provision for some of these at times. Currently some are transferred temporarily to low secure mental health settings (eg in NHS GGC three over the years 2010-2014; typically from brain injury locked 'unit' and returning on average two years later, and thereafter with discharge to the community). Hence if low secure provision is required for less than two 'new' (recently) brain injured NHS GGC patients per annum, this suggests that 6-8 beds may be required for Scotland as a whole, (excluding those that are as yet unknown in the prison system). This estimate relies on the principle that these patients will improve and return to the community, allowing patient turnover in the unit(s) and that these patients will not remain in long term low secure care.

There is a case to be made for 'locked' brain injury neurorehabilitation units having a low secure capacity as a part of the unit to prevent disruption of rehabilitation treatments to other

services users who are less dangerous or disruptive. This would also optimise ease of transfer between different levels of security within these units in a flexible fashion.

9.8 Education and Training Needs: This is covered in greater depth in Section 10, including current availability of brain injury training and education. Given that the low, medium and high secure units in Scotland are not specialist for brain injury but may admit cases (even if temporarily, or cases where brain injury is not the primary diagnosis the brain injury may be relevant to management; eg impaired learning and memory, rigid thinking or disinhibition) there is a need to ensure that educational information is made available and that there are links to brain injury services who may provide advice and contribute to assessment.

9.9 Summary: There is a need for secure provision for people with brain injury from Scotland. Currently this is mainly provided in specialist brain injury locked units in Scotland, and to a lesser extent in non-specialist forensic low secure units. A very small number require high or medium secure provision; these need to be considered on a case by case basis, and depending on their presentation and needs may be best cared for in specialist brain injury Medium Secure Unit provision in England.

There should be consideration of the development of a 6-8 bed low secure brain injury rehabilitation bed unit in Scotland to meet estimates of existing need. This could be developed in the NHS or by the independent sector, potentially as an adjunct to an existing neurorehabilitation facility and links should be required to be established with local brain injury services (**R12**). Educational material on brain injury should be made available as an electronic resource (see section 10). NHS brain injury service contacts need to be linked via local brain injury clinical leads to Medium and High secure clinical leads.

10. Education and Training of Staff who Work with Offenders

10.1 Background and Rationale: Given that the estimates of prevalence of brain injury in the offender population are high, and many in prison are not likely to have been identified as having a brain injury they will not have had advice, support or neurorehabilitation. There is a need to enhance the awareness and education of the needs of those with brain injury for all staff working in the Criminal Justice System and to make information readily available to those in the Forensic Network. Specialised training in the assessment and management of brain injury is determined by respective professional bodies and is beyond the scope of this report. Staff groups in a range of settings are illustrated in table 10.1.

Table 10.1: Criminal Justice System Settings and Examples of Staff Groups that may Require Training or Education

Setting	Staff Group
Police Custody	Police custody officers; NHS staff
Prison	Prison officers; healthcare staff; clinical psychologists; forensic psychologists
Transport	G4S staff
Court services	Criminal Justice Social Workers; court staff
Other partners	3 rd sector

It is recognised that staff in the Criminal Justice System employ skills in observation and intuition and may recognise needs but may not be aware of the potential cause or of relationships between cognitive impairment, emotional difficulties and behaviour after a head injury. Training would build on these assets and skills. Dependent on job role, there may be learning needs that range from a basic awareness about brain injury and its effects to a more in-depth understanding of the biopsychosocial consequences. Education and training needs could be met via a variety of routes ranging from online education resources and information, seminars and formal training events.

10.2 Available educational resources: NHS Education Scotland funded courses are available in part (as days or specific modules) or whole as continuing professional

development to a wide range of professionals such as the Masters in Clinical Neuropsychology at the University of Glasgow. The third sector provide a range of booklets on head injury (Headway), stroke (Stroke Association), brain infection (Encephalitis Society) and epilepsy (Epilepsy Society) and web links are given in Appendix 15.7 and some provide training events. An example which would be helpful for NHS staff in the Criminal Justice System (and could be modified for other staff groups) is the *Headway Charity Factsheet for GPs*. It would need to be adapted for Scottish/local use (e.g. specifying local services). There is a similar Headway fact sheet for hospital based nurses. More generally, guidance for adult social care services on the *Needs of Vulnerable Adults* makes mention of and is relevant to those with brain injury and could provide a framework for development of Scottish material. The *Brain Injury Linkworker Service* in HMP Leeds includes training for staff (see Appendix 15.7).

10.3 Conclusions: There is a need to conduct a training needs analysis (consultation required with the wider NHS and others) to allow the development of Scottish specific educational materials for a range of CJS staff. This may initially consider use and development of existing resources. These should be web based possibly using the NHS Education Scotland portal for access (**R13**).

11. Proposed Service Outline

Facility	Initial Triage	Initial Action	Outcome
Custody	Brief HI question	Attend Accident and Emergency Advice/ assessment from custody nurse/medic	Make information available to NHS prison reception
CJSW	Brief HI question and screening if appropriate	Referral for neuropsychological report and/or to BI services to assess neurorehabilitation potential and/or to third sector for support	Make information available to Courts/ NHS prison reception if appropriate Neurorehabilitation Facilitate referral transition/referral to adult services if juvenile Referral for assessment of forensic secure provision
Prison Reception	Brief HI question and screening if appropriate	Referral for neuropsychological report and/or to BI services to assess neurorehabilitation potential and/or to third sector for support	Information/education to prisoner In prison psychology intervention including management advice to prison staff Neurorehabilitation arranged to start after leaving prison Referral for assessment of forensic secure provision

12. Summary of Recommendations

R1 (Research): To examine the relationship between prevalence of head injury in prisoners by self-report and by record of hospitalisation in relation to symptom complaint and disability outcome and to repeat offending. To also specifically investigate head injury in women prisoners in terms of epidemiology and outcome (see section 4.2)

R2 (Research): A pilot of the use of an additional question in two or more custody centres in two health board areas (see section 7.1)

R3 (Administrative/Clinical): Information that may be relevant to future care is passed to the NHS staff working in custody from A+E and by them to NHS staff in Prison reception (see section 7.1).

R4 (Clinical): A single question about brain injury is added to the NHS (Vision) interview in prison reception. Should this suggest that the prisoner has had a brain injury there would follow brief further questioning-and triage to no action/ educational material or screening assessment; (see section 7.3).

R5 (Research/Clinical): A pilot study should consider the practicality and validity (in terms of detecting disability) of the OSU-TBI-ID-Short form and the BISI to decide which should be recommended as a screening tool to be used when indicated by initial triage. Providing the pilot study confirms the usefulness of one of these tools, it should be used by NHS staff in prisons (R4); (see section 7.3).

R6 (Clinical): Should the screening for head injury be positive there should be referral for a detailed neuropsychological assessment; the recommendations need to be fed back to NHS staff in prisons and facility for management advice to be provided to SPS staff; (see section 7.3).

R7 (Clinical): Access to neuropsychological assessment is required in all prisons; (see section 8.1). Should the number of assessments be estimated to be large on the basis of **R5**, the use of computerised assessments should be piloted including the establishment of cut-offs for impairment after brain injury.

R8 (Social services): Pilot the two step screening for brain injury (as in prison reception) in the CJSW interview; to establish links with local brain injury and neuropsychology services

which can offer a more detailed assessment if required. Explore informing health of CJSW reports to prevent duplication of resources should a subject who has a disabling head injury become a prison inmate (see section 7.4).

R9 (Research): There is a need to develop an empirical basis for psychological interventions for people with brain injury in general and in offender populations specifically.

R10 (Clinical): There needs to be liaison between NHS services in prisons and brain injury services to specify referral routes and care pathways for those in prison who are found to have a significant brain injury. The facility for interventions needs to be developed locally in relation to the local care pathway for brain injury while taking account of the diversity of clinical needs and integration into the community.

R11 (Administrative): Care pathways for brain injury in all Health Board areas need to accommodate a service for prisoners. Third sector organisations should facilitate support for prisoners with brain injury on release; (see section 8.4).

R12 (Clinical): There should be consideration of the development of a 6-8 bed low secure brain injury rehabilitation unit in Scotland to meet estimates of existing need. This should be developed in the NHS or by the independent sector, ideally as an adjunct to an existing neurorehabilitation facility and links should be required to be established with local brain injury service; (see section 9.9).

R13 (Training): There is a need to conduct a training needs analysis (consultation required with wider NHS and others) to allow the development of Scottish specific educational materials for a range of staff. This may initially consider use and development of existing resources. These should be web based possibly using the NES portal; (see section 10.2).

13. Dissemination

The report was disseminated to the Justice Committee at Holyrood and to the bodies during consultation in Appendix 15.4 and is available on the following website [tba]. There will be a launch event at Holyrood in late Spring 2016.

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15. APPENDICES

15.1: Terms of Reference



NATIONAL PRISONER HEALTHCARE NETWORK BRAIN INJURY AND OFFENDING WORKSTREAM

TERMS OF REFERENCE

1. Introduction

This initiative follows from a seminar at Holyrood in April 2014 which was organised by the British Psychological Society and chaired by a member of the Justice Committee. The Justice Committee then invited evidence on the matter at a meeting in Holyrood on the 29th July 2014, and made recommendations to the Cabinet Secretary for Justice on the 19th August. The Cabinet Secretary subsequently asked this work stream to give consideration to these recommendations and to produce a draft report by the summer of 2015.

The recommendations listed in the Justice Committee report are as follows:

1. That a comprehensive epidemiological study be developed, to provide high quality information about head injuries throughout prisons in Scotland and the relationship to offending;
2. That a greater focus be placed on preventative action, to ensure that people with severe brain injuries do not develop an offending profile;
3. That teaching and training to increase staff awareness within the Criminal Justice System of these issues be improved;
4. That more link workers be provided to go into prisons to train and help people to identify vulnerable offenders;
5. That consideration be given to the introduction of routine screening for traumatic brain injury along with existing assessments that help identify mental health problems, substance misuse and potential learning disability ;
6. That thought be given to how to deal with issues around the containment of prisoners with brain injury. The participant who made this point advised that there are currently very few forensic beds in Scotland for brain-injured offenders and that the majority of the medium-secure forensic psychiatry facilities do not take people with brain injury as a matter of policy;
7. That resourcing for the resettlement of offenders in the community be improved, to reduce the risk of reoffending and provide them with a better quality of life;
8. That additional funding be provided for mental health services once people have been identified as requiring it, for example the provision of such services in custody (an issue also highlighted by HM Inspector of Constabulary in a recent report);
9. That there be an increased focus on preventative action in relation to childhood brain injuries to identify those injuries more effectively by improving links between accident and emergency departments, GP practices and schools that would enable better reintegration into school of children who are at risk;
10. That steps be taken to improve awareness of other risk factors such as alcohol misuse.

2. Background

The responsibility and accountability for the delivery of primary and community healthcare to those in prison in Scotland transferred from the Scottish Prison Service (SPS) to the NHS on 1st November 2011 and there is recognition of a need to better understand the needs and services required by people who have sustained a head injury and are involved in the Criminal Justice System.

The incidence of head injury is high and in Scotland is most commonly caused by falls and assaults. The risk is highest in children, young adults and older adults and in those who have backgrounds of social deprivation and alcohol abuse.

Longitudinal research in Glasgow has shown high rates of disability and elevated rates of death for up to 15 years after head injury, with risk of late mortality being especially high in younger adults. Impairments that are common after head injury include cognitive deficits in concentration, memory, flexibility of thinking, solve problems and planning and personality or emotional changes reflected as impulsivity, irritability, aggression, impatience, intolerance, egocentricity, poor judgement, impaired insight and lack of concern (for others). Tolerance to alcohol is often reduced, and these impairments are made worse by alcohol. These changes could easily lead to rule breaking and involvement with the Criminal Justice System. In most cases there is no obvious outward sign of the head injury within a few weeks or months of the injury; the individual with a head injury may not attribute their difficulties to the head injury and hence neither they nor those in contact with them make adjustments or allowances for it. Of interest, one of the most significant risk factors for having a head injury is already having sustained a head injury and repeated head injury tends to have cumulatively negative effects.

Given this background, it is perhaps not surprising that there is little awareness of the potential significance of a history of head injury in the Criminal Justice System. Knowledge about the prevalence of head injury, its severity and relationships with offending and reoffending is very limited and is largely based on self-report. A recent pilot study found that the prevalence of hospitalised head injury in prisoners in three prisons in the Glasgow area was estimated to be about 8 times higher than expected in the NHS GGC population and 40% sustained a head injury before the age of 16. The brain and particularly the 'social brain', continues to develop until around the age of 25 and there is a good deal of evidence to suggest that early damage can negatively affect social development.

A number of preventative measures have been introduced, which have reduced the risk of serious head injury for example in road traffic accidents. There is a need however, to recommend a service pathway that will identify those who are in contact with the Criminal Justice System and at risk of (further) head injury or where head injury is having an impact on their social behaviour or mental health and to ensure that there is service provision and equity of service provision including appropriate links to brain injury services outwith the Criminal Justice System.

3. Strategic Statement

The purpose of the Brain Injury and Offending work stream is to ensure that the treatment of people with brain injury in the offender population positively impacts upon Health and Justice Outcomes and contributes to the evidence base.

4. Remit of the Work stream

To consider the recommendations of the Justice Committee with regard to brain injury and offending and produce a draft report by the Summer of 2015.

5. Chair

Chair Professor Tom McMillan University of Glasgow

6. Membership

Oliver Aldridge		The Howard League
Andrew Allan	Superintendent	Police Service of Scotland
Tom Byrne	National Prisons Pharmacy Adviser	Prison Healthcare
Alan Carson	Chair SBRAIN INJURY and Consultant Neuropsychiatrist	Scottish Acquired Brain Injury Network
Lesley Graham	Associate Specialist, Public Health	ISD, NHS National Services Scotland
Gaille Gray	Scotland West Coordinator	Headway
Jean McFarlane	Consultant Clinical Psychologist	Division of Neuropsychology (Scotland), British Psychological Society
Tom McMillan	Professor of Clinical Neuropsychology	University of Glasgow and NHS GGC
Brian O'Neill	Clinical Director	Brain Injury Rehabilitation Trust
Ruth Roper (tbc)	Consultant Forensic Psychologist	Division of Forensic Psychology, British Psychological Society and SPS
Suzanne O'Rourke	Consultant Clinical Psychologist	The State Hospital
Ruth Parker	Acting Assistant Director of Health & Care	Scottish Prison Service
John Porter	Prison Healthcare Lead Nurse	Prison Healthcare
Mark Ramm (tbc)	Consultant Clinical Psychologist	NHS Psychology Services; Forensic Services
Darline Reekie	Healthcare Manager	HM YOI Polmont
Ruth Stocks/Judi Bolton	Consultant Clinical Psychologist	Division of Clinical Psychology (Scotland) British Psychological Society
Fiona Summers	Consultant Clinical Neuropsychologist	NHS Grampian
Andrew Wells	Consultant Forensic Psychiatrist	Royal College of Psychiatrists

7. Quorate Membership

A quorum will consist of at least 25% of the membership.

8. Frequency of Meetings

Brain injury and offending work stream is a short life group anticipated to be in existence for 6-8 months. The frequency of group meetings will be agreed with the membership.

9. Location of Meetings

The venue of meetings will be alternate between Glasgow and Edinburgh.

10. Administration Support

Administrative support is to be provided by the Prison Healthcare Administrator.

11. Communication

The agenda and associated papers will be circulated approximately 7 days prior to each meeting.

Agenda items will be sought from the membership by the administrator supporting the workstream and agreed with the Chair for inclusion.

An action list and note of each meeting will be disseminated to all members of the work stream within 10 working days of the meeting.

The Prison Healthcare Administrator will create and maintain a membership email distribution list.

12. Accountability and Governance

The Brain Injury and Offending work stream will report to the NPHN and will work collaboratively with other NPHN work streams and agencies to improve the management of and outcomes associated with brain injury in the offender population. Minutes will be forwarded to the Chair of the NPHN.

Monthly highlight reports will be submitted for inclusion within the NPHN work plan.

13. Reading and background material

Supporting Legislation (All legislation available from <http://www.legislation.gov.uk/>)

Data Protection Act 1998 - <http://www.legislation.gov.uk/ukpga/1998/29/contents>.

Human Rights Act 1998 - <http://www.legislation.gov.uk/ukpga/1998/42/contents>.

Patient's Rights (Scotland) Act 2011 - <http://www.legislation.gov.uk/asp/2011/5/contents>.

Social Care (Self-Direct Support) (Scotland) Act 2013 - <http://www.legislation.gov.uk/asp/2013/1/contents/enacted>.

Regulation of Care (Scotland) Act 2001 - <http://www.legislation.gov.uk/asp/2001/8/contents>.

Existing Standards and Best Practice Guidance

Matrix Guide to Psychological Therapies in Scotland

<http://nes.scot.nhs.uk/education-and-training/by-discipline/psychology/matrix.aspx>

SIGN Guidelines (eg 110 and 130): <http://sign.ac.uk/>

Useful Links

Headway: <https://www.headway.org.uk/home.aspx>

Healthcare Improvement Scotland - <http://www.healthcareimprovementscotland.org/home.aspx>.

Howard League for Penal Reform: <http://www.howardleague.org/>

NHS Scotland Information Services Division (ISD) - <http://www.isdscotland.org/>

Scottish Prison Service: <http://www.sps.gov.uk/home/home.aspx>

Scottish Government Prison Statistics <http://www.scotland.gov.uk/Topics/Statistics/Browse/Crime-Justice/Datasets/PrisonsDatasets>

SBRAIN INJURYN : <http://www.sbrain.injury.scot.nhs.uk/>

SBRAIN INJURYN Service Mapping Report (2009)

<http://www.sbrain.injury.scot.nhs.uk/files/service-mapping-report2.pdf>

15.2: Workstream Subgroups

Sub Group	Some key bullet points	Justice Committee Recommendations
1. Epidemiology	Nature and scale of head injury in prison population	1: that a comprehensive epidemiological study be developed, to provide high quality information about head injuries throughout prisons in Scotland and the relationship to offending
2. Screening, triage and assessment	Acute head injury Disability from head injury Decision making re need for further assessment Decision making re referral to brain injury services	5: that consideration be given to the introduction of routine screening for traumatic brain injury along with existing assessments that help identify mental health problems, substance misuse and potential learning disability
3. Treatment and support; service linkage	NHS specialist services and SPS settings Forensic mental health cases with BI Rehabilitation on release	4: that more link workers be provided to go into prisons to train and help people to identify vulnerable offenders 7: that resourcing for the resettlement of offenders in the community be improved, to reduce the risk of reoffending and provide them with a better quality of life 8: that additional funding be provided for mental health services once people have been identified as requiring it, for example the provision of such services in custody (an issue also highlighted by HM Inspector of Constabulary in a recent report
4. Awareness and education of staff who work with offenders	Police custody; HCPs; SPS; NHS	3: that teaching and training to increase staff awareness within the Criminal Justice System of these issues be improved 4: that more link workers be provided to go into prisons to train and help people to identify vulnerable offenders 10: that steps be taken to improve awareness of other risk factors such as alcohol misuse
5. Medium/high secure provision	Plan for severe challenging behaviour not suitable for low secure provision	6: that thought be given to how to deal with issues around the containment of prisoners with brain injury. The participant who made this point advised that there are currently very few forensic beds in Scotland for brain-injured offenders and that the majority of the medium-secure forensic psychiatry facilities do not take people with brain injury as a matter of policy
(All members) Prevention and risk of offending after BI	To refer to Guidelines/literature in report	2: that a greater focus be placed on preventative action, to ensure that people with severe brain injuries do not develop an offending profile 9: that there be an increased focus on preventative action in relation to childhood brain injuries to identify those injuries more effectively by improving links between accident and emergency departments, GP practices and schools that would enable better reintegration into school of children who are at risk

15.3 Surveys of Service Provision for Brain Injury to Offenders

(i) **Survey of Service Links between Specialist Brain Injury Services and Health Boards:**

Health Board representatives to the National Prison Healthcare Network were approached by e-mail in August 2015. Responses were received from NHS Forth Valley, Glasgow and Clyde, Highland, Lanarkshire and Lothian all of whom indicated that they had no specific links and would use generic neurology or mental health services if need be. Some of the Health Board areas that did not respond are believed to have no specific NHS brain injury service (Borders, Orkney, Shetlands, Western Isles).

(ii) NHS Clinical Neuropsychology Services: The Heads of Neuropsychology Services in Scotland (HoNS): meet on a regular basis to discuss matters in relation to local and nationally relevant standards relating to neuroscience services. It comprises of the head of neuropsychology services from each NHS Board with an established neuropsychology service. An e-mail audit to the Heads of Neuropsychology Services in Scotland (HoNS) in 2015 indicated that specific service provision for offenders with a brain injury is sporadic and uncoordinated (Respondents: Glasgow, Lothian, Fife, Tayside, Highland, Grampian, State hospital, Ayrshire and Arran; Dumfries and Galloway. Forth Valley and Borders have no HoN).

(iii) Links with SPS Forensic Psychology Services: A questionnaire was sent to managers of SPS (forensic) psychology services in June 2015 regarding provision of services for brain injury and NHS links. Responses were received from MHP's Grampian, Dumfries, Greenock, Low Moss and Cornton Vale.

15.4 Consultation Methods and Details

The report was distributed for consultation electronically to those listed in the table below on 22 December 2015 with comments to be received by 31 January 2016.

Organisation	Contact Name
5 Nations Health & Justice Collaboration	Claire Hastie via The National Prisoner Healthcare Network
Brain Injury Rehabilitation Trust	Dr Brian O'Neill
British Psychological Society BPS Scottish Branch	Sue Northrop
British Society of Rehabilitation Medicine	Lynne Turner-Stokes - President
Care Inspectorate	Karen Reid, Chief Exec
Division of Clinical Psychology – Scotland	Dr Ruth Stocks
Division of Forensic Psychology Scotland - DFP-S	Michele Gilluley / Stephen Evans
Division of Neuropsychology - Scotland	Fiona Summers
The Forensic Network	Louise Byrne
Headway Scotland	Gaille Gray
Healthcare Improvement Scotland	John Porter
Her Majesty's Chief Inspector of Prisons	David Strang
Howard League for Penal Reform	Frances Crook, Chief Executive
Huntercombe Group	Jim Loudon
Integrated Joint Boards	Claire Hastie via The National Prisoner Healthcare Network
Law Society Scotland	Christine McLintock, President
National Prisoner Healthcare Network Advisory Board	Claire Hastie via The National Prisoner Healthcare Network
National Prisoner Healthcare Network Healthcare Managers	Claire Hastie via The National Prisoner Healthcare Network
National Prisoner Healthcare Network NHS Board Prison Leads	Claire Hastie via The National Prisoner Healthcare Network
The National Prisoner Healthcare Network	Claire Hastie – Note this includes the NPHN groups above plus all other workstreams within the network
NHS Education for Scotland	Jane Cantrell
NHS Health Scotland	Celia Gardiner
NHS National Services Scotland	Dr Lesley Graham
Police Custody Division	Sandra Stewart
Police Custody Network	Hannah Cornish
Royal College of Nursing Scotland	Kevin Bye

Royal College of Psychiatrists	Andrew Wells
Scottish Acquired Brain Injury Network	Dr Alan Carson
Scottish Government, Community Justice	Andy Bruce
Scottish Group of Forensic Clinical Psychologists	Mark Ramm
Scottish Head Injury Forum	Bob Ferguson
Scottish Human Rights Commission	Emma Hutton / Jenifer Johnstone
Scottish Police Service of Scotland	Andrew Allan
Scottish Prison Service	Ruth Parker
Social Work Scotland	Sean McKendrick – Vice Chair of Criminal Justice

15.5 A Review of Screening Tools for Identifying Brain Injury

There is no established 'gold standard' screening tool for the detection of brain injury. A review of the published literature was therefore undertaken to identify a measure with good reliability and validity that is practical for use in busy institutional settings and has been used successfully in prison settings. The search of databases took place in April 2015 using the following search terms: ((criminal* OR inmate* OR prisoner* OR offender*)) AND (("Traumatic Brain Injury" OR "TBI" OR "Head Injur*")). From this, and reference lists of papers found, we listed measures that had been used. The primary article describing the development of each measure was then selected and each article was systematically reviewed using the Cochrane / QUADAS criteria and in terms of the groups generated criteria. Acceptable reference standards were considered to be (a) hospital record cross matching, (b) imaging data confirming brain injury, and (c) directly administered measures of cognitive function. Hand search of the reference list in these articles revealed a further 5 papers; of these, one was excluded because a later study reported the psychometric properties for this measure. Hence 14 papers in total were reviewed (see summary results table below). Ten studies used face to face interviews and four used self-report questionnaires.

Of the ten that used interviews, four designed interview schedules specifically for use in that study (Colantonio et al 2014; Morrell et al 1998; Perkes et al 2011; Slaughter et al 2003). The remaining six studies used the following three standardised interview measures:

- The Ohio State University Traumatic Brain Injury Identification Method (OSU-TBI-ID, full version) was used in its full form in 2 studies (Bogner et al 2009, Ferguson et al 2012) and in an alternative short form in one (Ray et al 2014).
- The Comprehensive Health Assessment Tool (CHAT) and was used in one study (Chitsabesan et al 2014).
- The Brain Injury Screening Index (BISI) (Pitman 2014).

The following self-report questionnaires were used in the remaining four studies:

- The Traumatic Brain Injury Questionnaire (TBIQ, Diamond et al 2007).
- The Head Injury Survey (Templer et al 1998)
- Study specific questionnaires were used in two studies (Barnfield et al 1992, Williams et al 2010).

The Quality Assessment of Diagnostic Accuracy Studies (QUADAS) was used to assess the quality of measures (Whiting et al 2003). To be mindful of the comparative 'costs' of potential false positive and false negative detection of brain injury a tabular format of the GRADE system (Schüemann et al 2008) was used.

The use of standardised interview schedules was associated with higher ratings of methodological quality and were typically used in Prison Reception studies. All of these measures asked about lifetime history of brain injury and in one study (Slaughter et al 2003) the occurrence of brain injury *in the past year* was included. Slaughter found differences in neuropsychological function between participants reporting brain injury in the past year and those reporting more long standing brain injuries, suggesting that this factor should be distinguished.

An administration time of ten minutes or less was reported in five studies (Colantonio et al 2014; Pitman et al 2014; Ray; Slaughter et al 2003; Templer et al 1992; Williams et al 2010), four of which used interview formats (Colantonio et al 2014; Pitman et al 2014; Ray et al 2014; Slaughter et al 2003). The briefest interview formats that also had high quality ratings using the QUADAS were the OSU-TBI-ID-Short form and the BISl. The remainder comprised one with a study specific interview (Slaughter) and two with study specific questionnaires (Templer et al 1992; Williams et al 2010).

Validity: Two independent reviewers each rated 10 of the 14 articles using the QUADAS and obtained a high concordance ($r=0.89$).

QUADAS scores were obtained twice; (i) with reference to objective evidence of brain injury in hospital records and (ii) with reference to evidence of neuropsychological or psychiatric 'caseness'.

(i) The primary reference standard was objective evidence for brain injury in hospital records. None of the 14 studies used this reference standard and therefore QUADAS ratings were relatively low (average rating= 5/14). The highest quality ratings were for the CHAT (9); BISl (8); Traumatic Brain Injury Questionnaire (6); and OSU-TBI-ID (rated 4, 6 and 6 in three studies).

(ii) Secondary reference standards comprised of evidence of neuropsychological or psychiatric caseness and were used in six studies (Bogner, Chitsabesan, Diamond, Perkes,

Pitman, Ray and Slaughter). With this as a reference standard, the QUADAS ratings (in descending order) were the BISI (score = 12, Pitman), TBIQ (10, Diamond), OSU-TBI-ID long form, (10, Bogner), and OSU-TBI-ID Short Form (9, Ray), CHAT (9, Chitsabesan) and study specific measure used in the Perkes study (9). 'Caseness' described in this way is an outcome that infers brain injury is the cause, but disability may result from other comorbidities (eg mental health). Future research should describe disability in addition to reporting objective evidence for brain injury from hospital records.

Reliability: Test-retest reliability was reported for the TBIQ (0.90); BISI (0.81) and OSU-TBI-ID (0.70-0.93 across key indices of frequency and duration of LOC). These are all within the acceptable range for test-retest reliability. Inter-rater reliability was not reported for any measure.

Sensitivity and Specificity: Given the absence of objective evidence from hospital records no study reported the sensitivity or specificity of their measure. Some have challenged the validity of hospital records as a reference standard (Perkes et al 2011; Templer et al. 1992) on the basis of a high frequency of self-report of hospital non-attendance after a head injury in their samples and the difficulty in recognising head injury in Accident and Emergency (Bogner et al 2009; Corrigan 2009). However, the majority of those who do not attend hospital are likely to have mild head injury from which a good recovery is expected (Carroll et al 2004). Establishing the sensitivity and specificity of brain injury screening measures against the reference standard of a clinically diagnosed / hospitalised head injury remains an outstanding research issue in this population.

Psychiatric Caseness / Cognitive Impairment: Self-report of brain injury was associated with objective assessment of cognitive deficit in six studies (Bogner; Chitsabesan; Diamond; Perkes; Pitman; Ray; Slaughter). Our review of these studies describes a replicable methodology:

Bogner found an association between self-reported brain injury and objectively measured working memory, cognitive symptoms, disinhibition, anger problems and risk taking. The authors comment that: "Given the complicated medical and social history of the population studied, it is perhaps remarkable that among multiple influences on cognitive and behavioral functioning, the extent of their exposure to TBI is still significantly associated."

Chitsabesan report that the neurodisability section of the CHAT demonstrates good diagnostic accuracy (82%) in identifying those categorised as moderate or severe brain

injury on the Rivermead Post-Concussion Symptoms Questionnaire, a self-report measure of ‘post-concussion’ symptom severity.

Pitman noted that although differences in premorbid functioning between prisoners who self-report a history of brain injury and prisoners who do not were not significant, those reporting a higher number and/or more severe brain injuries had greater cognitive impairment on the Repeatable Battery for Assessment of Neuropsychological Status and the Behavioural Assessment of Dysexecutive Syndrome.

Ray found statistically significant associations between self-report of TBI and current psychiatric morbidity (as identified by prison health staff). This study also identified a strong association with multiple offending that was not associated with psychiatric morbidity. Thus, self-reported brain injury was found statistically to be an independent mediating factor for both current psychiatric symptoms and recidivism.

Diagnostic sensitivity and specificity were reported for two measures, the BISI and the CHAT. The sensitivity (0.95) and specificity (0.56) of the BISI to impairment of executive function was reported by Pitman (personal communication), who compared prisoners with self-reported brain injury and prisoners without. The authors of the CHAT report a sensitivity of 0.78 and specificity of 0.82 for its ability to identify traumatic brain injury symptoms on the Rivermead Post-Concussion Symptoms Questionnaire.

Table A5.1: Summary of Studies Included in Review

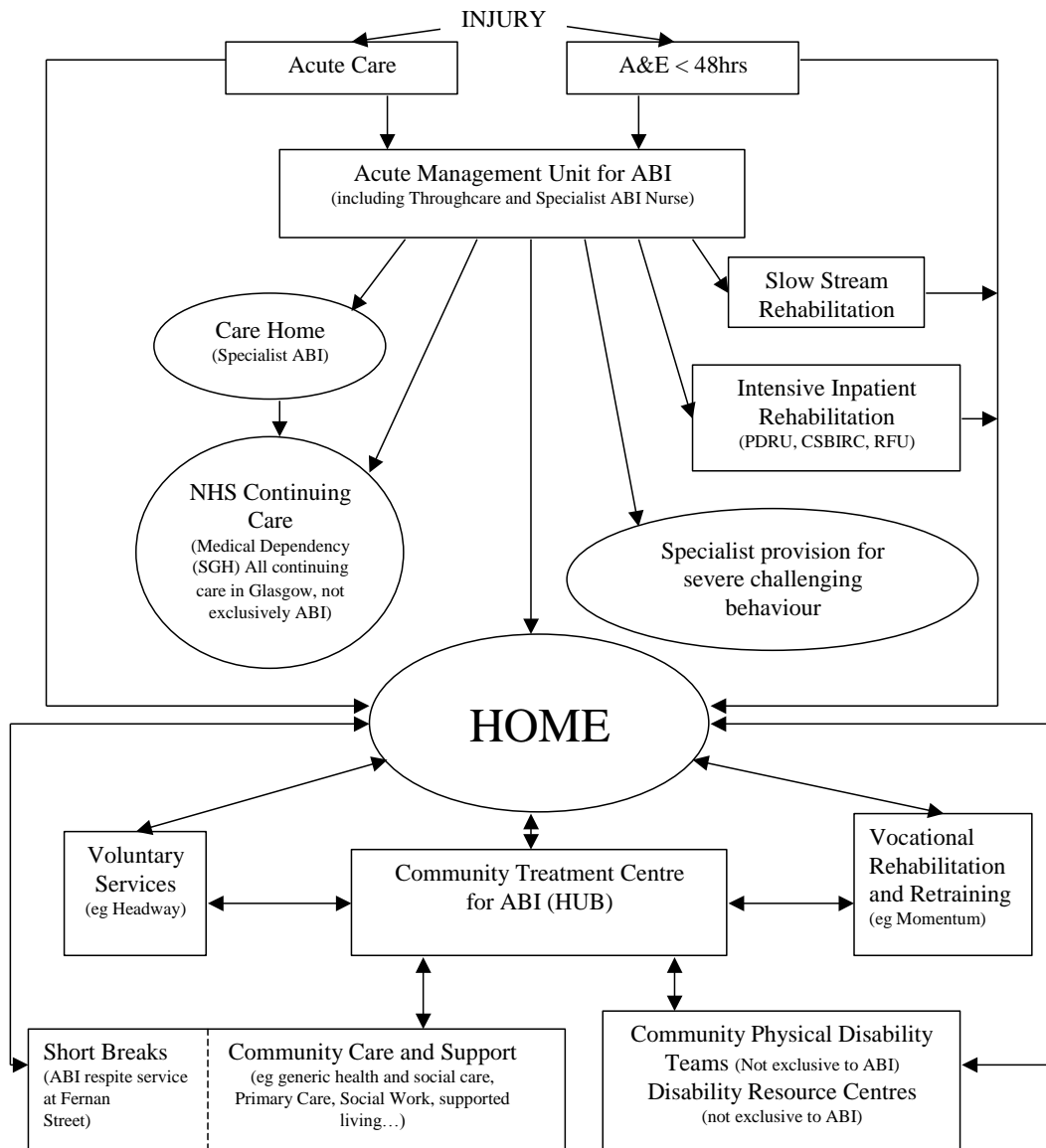
Study	Measure	QUAD AS Validity rating	Re-test Rel.	Inter-rater Rel.	% TBI (n)	% Mod-Severe	% “severe”	Sensitivity	Specificity	Admin. without Training	Admin time (items)	Subj. rep. of lasting effect	Graded severity	Assn. with obj. deficits
Barnfield	Study specific questionnaire	2	No report (-) ¹ .	-	86.4% (118)	-	5.9% (Teasdale and Jennett 74)	-	-	Y	-(46)	N	Y	N
Bogner	OSU-TBI-ID ²	6 (10) ³	0.7-0.93	-	78% (210)	14% (LOC 30min+)	-	-	-	Y	20 min	Y	Y	Y
Chitsabesan	Comprehensive Health Assessment Tool	9			82% (76)	18%	5%	78%	82%	N ⁴		Y	Y	
Colantoni	Study specific interview	4	-	-	43.4% (227)	15.1% (LOC 30min+)	-	-	-	Y	2-10 (7)	N	Y	N

⁴ Requires administration by an RMN or an RLDN

Diamond	Traumatic Brain Injury Questionnaire	6 (10)	0.90	-	88% (225)	10.9% (LOC 1hr+)	-	-	-	N	-(27)	Y	Y	Y
Ferguson	OSU-TBI-ID	4	0.7-0.93	-	65% (542)	-	-	-	-	N	60-120 min	Y	Y	Y
Morrell	Study specific interview	4.5	-	-	24.9% (1000)	6.4%(LOC 30min+)	-	-	-	-	-	Y	Y	N
Perkes	Study specific interview	4 (8)	-	-	65% TBI with LOC	-	-	-	-	-	-	Y	N	Y
Pitman	Brain Injury Screening Index	8 (12)	0.81	Study in progress	47% TBI with LOC	37% (LOC 10 mins-6 hours)	21% (LOC >6 hours)	0.85 to 0.95 (to psychiatric/DysExecScaseness)	0.39-0.56	Y	5-20	Y	Y	Y
Ray	Short OSU-TBI-ID	6 (9)	-but 0.7-9.93 for full OSU	-	23.8% LOC	10.7% (LOC 30 mins+)	-	-	-	Y	3-10	N	Y	Y
Slaughter	Study specific interview	6 (9)	-	-	87%	29% (LOC 30 mins+)	-	-	-	-	5 mins	N	Y	Y
Schofield	Study specific interview	4	-	-	65%	-	-	-	-	-	-	N	N	N
Templer	Head Injury Survey	4	-	-	35.7%	16.8 (lasting effects)	-	-	-	Y	5-10	Y	N	Y
Williams	Study specific questionnaire	2.5	-	-	60.7% (196)	15.8% (LOC 10 mins+)	10.2% (LOC 6hr+)	-	-	Y	2-10	Y	Y	N

¹ Not reported in the paper or accessible by reviewer. ² Ohio State University Traumatic Brain Injury Identification Method ³ First rating is for medical diagnosis of brain injury as reference standard. Rating in brackets indicates rating for use of secondary reference standard such as neuropsychological or psychiatric caseness.

15.6 Brain Injury Service Pathway (illustrative example from NHS GGC Service Acquired Brain Injury Strategy 2004-2014)



15.7: Further Information on Educational Materials

15.7.1 Web links for information sources and booklets

Headway (38 booklets): <https://www.headway.org.uk/factsheets-for-professionals.aspx>

Stroke Association: <https://www.stroke.org.uk/resources>

Encephalitis Society: <http://www.encephalitis.info/information/>

Epilepsy Society: <http://www.epilepsysociety.org.uk/recommended-information#.VjJnoTZOdUQ>

15.7.2 Examples of links to training courses available in 2015

The following courses are worthy of consideration.

Headway offer 5 courses on aspects of brain injury at an average cost of £90 per delegate:

- Challenging behaviour following acquired brain injury
- Cognitive rehabilitation issues
- Communication difficulties after brain injury
- Sex and sexuality following acquired brain injury
- Understanding brain Injury

They also offer bespoke 'in-house' one-day interactive workshop on understanding and gaining insight into acquired brain injury and its physical, cognitive, behavioural and emotional effects for social service departments, health professionals, care agencies and other interested organisations: <https://www.headway.org.uk/training.aspx>

The Disabilities Trust Foundation offer training courses for professionals working with offenders with brain injury (costs unknown): 'Designed to increase awareness and understanding of the impact a brain injury has for professionals working with offenders. The main aim is to increase understanding and prepare staff to work with brain injured individuals. Programmes are tailored to the specific service audience and designed for frontline staff within the Criminal Justice System'.

<http://www.thedtgroup.org/media/511474/Brain%20Injury%20Training%20Programme%20-%20Offending%20150115.pdf>

Further examples of training courses for other conditions can be found on the above web pages

Figure 1: Brain Injury & Offending Pathway – Criminal Justice System

Key	
MT	Strategic points when Mental Health Act could be considered.
*	Opportunity for Agency to explore the possibility of Brain Injury being present.
ACTIONS.docx	See table 6.1 for summary

