National Prisoner Healthcare Network

Brain Injury and Offending

Draft Report for Consultation
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 (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.

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.

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 and as part of NHS interview at prison reception. 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. 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 clear need for 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 head injury in prisoners with disability

**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 and neuropsychology 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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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 29th July 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 injury\(^2\) 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 form of brain injury in the typical offender age range and second it is more much more frequently associated with antisocial behaviour than other conditions such as stroke. Although the report comments on prevention, and especially in relation to repeated brain injury, the topic

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\(^1\) 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 is 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 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. So 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.
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 Brain 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 (Faxel 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. 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 Heads of Neuropsychology Service 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 and pilot study on Glasgow 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

4.1 A brief summary of the literature on the prevalence of head injury in 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 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 of 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 37%. However no study on prevalence has directly assessed the impact of brain injury on day to day life clearly (Moynan and McMillan in preparation). A recent systematic review also indicates that (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 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 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 funded the University of Glasgow to carry out this work. This study looks at hospitalisations with head injury and is not therefore dependent on self-report, and aims to provide a prevalence estimate of the entirety of the 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?

These questions will be considered in relation to age, gender, social deprivation, health board area and estimated severity of injury. A second, 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.

**Progress:** Permission was obtained from the Caldicott Guardians and from the Privacy Advisory Committee to link computerised data that will indicate the numbers of people in Scottish prisons on a census date in August 2015 with Scottish Morbidity Records-01 to indicate how many have been admitted to hospital with a head injury and to consider this in relation to demographic factors, numbers of head injuries, an estimate of severity of head injury (and clinical data collected in the prison Vision IT system if available). This is being compared to control data from the general population that is matched for age, gender and social deprivation. The data linkage is carried out in the National Safe Haven by the eDRIS team of the Information Services Division and the data analysed there remotely. There have been delays in this information being provided and currently, the University of Glasgow is awaiting access to the data. It is anticipated that analysis of prevalence information will be included in the final version of this report. However an earlier pilot study is described below pro tem.

**Pilot Study on Glasgow Prisons:** In this pilot study (McMillan personal communication, below), the NHS Community Health Index numbers of prisoners who were formerly residents in NHS Greater Glasgow and Clyde (NHSGGC) area and who were currently resident in Barlinnie, Low Moss or Greenock prisons on 17 April 2014 were linked to Scottish Morbidity Records-01 (SMR01) by NHS Information Services. Permission was obtained from the Caldicott Guardian. The NHS Prison Vision database provided information on age and gender. SMR-01 provided data on any admission to hospital with a HI. Prevalence of head injury in the prison population was compared approximately to that in the general population in NHSGGC over the same time period.
Of 1135 prisoners who were NHSGGC residents prior to incarceration and who were linked to SMR-01, almost all were male, (97%) reflecting the admission policy/function of these prisons. Given the small number of females, the analyses in the pilot describes males only.

Admission to hospital with head injury was recorded on SMR-01 in 327/1096 (30%). More than one head injury admission was recorded in 134/327 (41%) and 48 had three or more admissions. The prevalence of hospitalised head injury in males in the general population in NHSGGC who were in the same age range as the prison population at the census date and over the same exposure period (1981-2014) was 12%. Hence the prevalence of head injury in the prison population (30%) was 2.5 times higher than in the general population. The duration of hospital admission (which is likely to be associated with severity of with HI) was less than 3 days in 232/327 (54%), 3 or more days in 95 (30%; 6% were admitted for more than a week). Of those admitted to hospital for less than three days, 27 had three or more hospitalised head injuries. Hence in the prison population overall, 8.7% had been admitted to hospital for three days of more with a head injury and a further 2.5% had been admitted with three or more head injuries for less than three days.

This overall estimate of prevalence of head injury in these Scottish prisons (30%) is half the estimate from self-report of prisoners from a meta-analysis of international published data (Shiroma et al 2010). Overall however the prevalence estimated in the Glasgow pilot study remains high compared to that in the general population. This high prevalence is likely in part to reflect a history of a single mild hospitalised head injury from which a good recovery might be expected. However, the high proportion of those with more than one head injury and of those admitted to hospital for more than one day with a head injury indicates a need for potential concern given that they are not screened for this type of injury in the current reception interview and it supports the need for the national (Scotland) study on prevalence that is underway. The indications from the pilot study suggest that around 11% of those seen in prison reception for a routine NHS health interview would be triaged to head injury screening. 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 could be multiple head injuries which would be of concern, 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 further research is required (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).
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. Dumfries and Galloway have a link with Headway which is a community based voluntary 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 HI. 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. Needs 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 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.
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).

2. BI – If aware, notify Bar Sergeant. |
|-----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Action 3. | Police Custody Health Care Professional | 1. BI: Clinical assessment and refer to A&E if appropriate.  
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 on how BI can affect offending and inform proceedings and disposal. |
| Action 5. | Social Work                 | 1. Consider that BI may have contributed to offending. Training to be available  
2. Obtain specialist BI report if needed |
| Action 6. | Prison                      | Reception/Operational Staff:  
1. All 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 clinical assessment and NHS acute care referral if appropriate  
3. BI: Refer to Health Care Professional  
4. Health Care Professionals receive awareness and training |
| 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 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). 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 who 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 ten 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 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).

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.
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' 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 possible screening measures, it is recommended that the same tool is used throughout the Criminal Justice System in Scotland to facilitate audit and comparison in the same individual across time.

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 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.

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 between 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 brain injury: Following a mild brain 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 (McMillan et al 2012; Hammond et al 2004). A small number (5-10%) require care and the majority live independently but are socially disabled. Recent evidence also indicates greater risk of death late 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 recognized 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 (Cattelani 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; Cattelani 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 and may also predate the brain injury, as would be restrictions under the Mental Health (Care & Treatment) (Scotland) Act 2003. 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.

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 young 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 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 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. 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 140 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 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.

9.7 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.

9.8 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.

9.9 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.

9.10 An Overview of the Need for Secure Provision: 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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Staff Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Custody</td>
<td>Police custody officers; NHS staff</td>
</tr>
<tr>
<td>Prison</td>
<td>Prison officers; healthcare staff; clinical psychologists; forensic psychologists</td>
</tr>
<tr>
<td>Transport</td>
<td>G4S staff</td>
</tr>
<tr>
<td>Court services</td>
<td>Criminal Justice Social Workers; court staff</td>
</tr>
<tr>
<td>Other partners</td>
<td>3rd sector</td>
</tr>
</tbody>
</table>

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 15.6 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 15.6).

**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

<table>
<thead>
<tr>
<th>Facility</th>
<th>Initial Triage</th>
<th>Initial Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custody</td>
<td>Brief HI question</td>
<td>Attend Accident and Emergency Advice/ assessment from custody nurse/medic</td>
<td>Make information available to NHS prison reception</td>
</tr>
<tr>
<td>CJSW</td>
<td>Brief HI question and screening if appropriate</td>
<td>Referral for neuropsychological report and/or to BI services to assess neurorehabilitation potential and/or to third sector for support</td>
<td>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</td>
</tr>
<tr>
<td>Prison Reception</td>
<td>Brief HI question and screening if appropriate</td>
<td>Referral for neuropsychological report and/or to BI services to assess neurorehabilitation potential and/or to third sector for support</td>
<td>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</td>
</tr>
</tbody>
</table>
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 (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): To 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; to explore making CJSW reports
available on the NHS VISION system to prevent duplication of resources should the subject 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 9.10).

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 March/April 2016.
14. References


McMillan (personal communication). The prevalence of head injury in Glasgow prisons; a preliminary study


Williams WH (2012). Repairing Shattered Lives. Transition to Adult Alliance, Barrow Cadbury Trust


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 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

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

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


Existing Standards and Best Practice Guidance

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

Useful Links

- Headway: https://www.headway.org.uk/home.aspx
- Howard League for Penal Reform: http://www.howardleague.org/
- NHS Scotland Information Services Division (ISD): http://www.isdscotland.org/
- SBRAIN INJURYN: http://www.sbrain injuryn.scot.nhs.uk/

15.2: Workstream Subgroups

<table>
<thead>
<tr>
<th>Sub Group</th>
<th>Some key bullet points</th>
<th>Justice Committee Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiology</td>
<td>Nature and scale of head injury</td>
<td>1: that a comprehensive epidemiological study be</td>
</tr>
<tr>
<td>2. Screening, triage and assessment</td>
<td>Acute head injury</td>
<td>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</td>
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<tr>
<td></td>
<td>Disability from head injury Decision making re need for further assessment Decision making re referral to brain injury services</td>
<td>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</td>
</tr>
<tr>
<td>3. Treatment and support; service linkage</td>
<td>NHS specialist services and SPS settings Forensic mental health cases with BI Rehabilitation on release</td>
<td>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</td>
</tr>
<tr>
<td>4. Awareness and education of staff who work with offenders</td>
<td>Police custody; HCPs; SPS; NHS</td>
<td>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</td>
</tr>
<tr>
<td>5. Medium/high secure provision</td>
<td>Plan for severe challenging behaviour not suitable for low secure provision</td>
<td>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</td>
</tr>
<tr>
<td>(All members) Prevention and risk of offending after BI</td>
<td>To refer to Guidelines/literature in report</td>
<td>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</td>
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</table>

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 21 December 2015 with comments to be received by 31 January 2016.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Contact Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Nations Health &amp; Justice Collaboration</td>
<td>Claire Hastie via The National Prisoner Healthcare Network</td>
</tr>
<tr>
<td>Brain Injury Rehabilitation Trust</td>
<td>Dr Brian O’Neill</td>
</tr>
<tr>
<td>British Psychological Society BPS Scottish Branch</td>
<td>Sue Northrop</td>
</tr>
<tr>
<td>British Society of Rehabilitation Medicine</td>
<td>Lynne Turner-Stokes - President</td>
</tr>
<tr>
<td>Care Inspectorate</td>
<td>Karen Reid, Chief Exec</td>
</tr>
<tr>
<td>Division of Clinical Psychology – Scotland</td>
<td>Dr Ruth Stocks</td>
</tr>
<tr>
<td>Organisation</td>
<td>Contact Person</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Division of Forensic Psychology Scotland - DFP-S</td>
<td>Michele Gilluley / Stephen Evans</td>
</tr>
<tr>
<td>Division of Neuropsychology - Scotland</td>
<td>Fiona Summers</td>
</tr>
<tr>
<td>The Forensic Network</td>
<td>Louise Byrne</td>
</tr>
<tr>
<td>Headway Scotland</td>
<td>Gailie Gray</td>
</tr>
<tr>
<td>Healthcare Improvement Scotland</td>
<td>John Porter</td>
</tr>
<tr>
<td>Her Majesty’s Chief Inspector of Prisons</td>
<td>David Strang</td>
</tr>
<tr>
<td>Howard League for Penal Reform</td>
<td>Frances Crook, Chief Executive</td>
</tr>
<tr>
<td>Huntercombe Group</td>
<td>Jim Loudon</td>
</tr>
<tr>
<td>Integrated Joint Boards</td>
<td>Claire Hastie via The National Prisoner Healthcare Network</td>
</tr>
<tr>
<td>Law Society Scotland</td>
<td>Christine McLintock, President</td>
</tr>
<tr>
<td>National Prisoner Healthcare Network Advisory Board</td>
<td>Claire Hastie via The National Prisoner Healthcare Network</td>
</tr>
<tr>
<td>The National Prisoner Healthcare Network</td>
<td>Claire Hastie – Note this includes the NPHN groups above plus all other workstreams within the network</td>
</tr>
<tr>
<td>NHS Education for Scotland</td>
<td>Jane Cantrell</td>
</tr>
<tr>
<td>NHS Health Scotland</td>
<td>Celia Gardiner</td>
</tr>
<tr>
<td>NHS National Services Scotland</td>
<td>Dr Lesley Graham</td>
</tr>
<tr>
<td>Police Custody Division</td>
<td>Sandra Stewart</td>
</tr>
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<td>Police Custody Network</td>
<td>Hannah Cornish</td>
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<tr>
<td>Royal College of Nursing Scotland</td>
<td>Kevin Bye</td>
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<tr>
<td>Royal College of Psychiatrists</td>
<td>Andrew Wells</td>
</tr>
<tr>
<td>Scottish Acquired Brain Injury Network</td>
<td>Dr Alan Carson</td>
</tr>
<tr>
<td>Scottish Government, Community Justice</td>
<td>Andy Bruce</td>
</tr>
<tr>
<td>Scottish Group of Forensic Clinical Psychologists</td>
<td>Mark Ramm</td>
</tr>
<tr>
<td>Scottish Head Injury Forum</td>
<td>Bob Ferguson</td>
</tr>
<tr>
<td>Scottish Human Rights Commission</td>
<td>Emma Hutton / Jenifer Johnstone</td>
</tr>
<tr>
<td>Scottish Police Service of Scotland</td>
<td>Andrew Allan</td>
</tr>
<tr>
<td>Scottish Prison Service</td>
<td>Ruth Parker</td>
</tr>
<tr>
<td>Social Work Scotland</td>
<td>Sean McKendrick – Vice Chair of Criminal Justice</td>
</tr>
</tbody>
</table>
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. Hence, the literature was search and review of published articles was 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 BISI. 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); BISI (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

<table>
<thead>
<tr>
<th>Study</th>
<th>Measure</th>
<th>QUAD AS Validity rating</th>
<th>Re-test Rel.</th>
<th>Inter-rater Rel.</th>
<th>% TBI (n)</th>
<th>% Mod-Severe</th>
<th>% &quot;severe&quot;</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Admin. with out Training</th>
<th>Adm. time (items)</th>
<th>Subj. rep. of lasti ng effec t</th>
<th>Grad ed severity</th>
<th>Assn. with obj. defici ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnfield</td>
<td>Study specific questionnaire</td>
<td>2</td>
<td>No report (?)</td>
<td>-</td>
<td>86.4% (118)</td>
<td>-</td>
<td>5.9% (Teasdale and Jennett 74)</td>
<td>-</td>
<td>-</td>
<td>Y</td>
<td>-</td>
<td>-(46)</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Bogner</td>
<td>OSU-TBI-ID *</td>
<td>6 (10) *</td>
<td>0.7-0.93</td>
<td>78% (210)</td>
<td>14% (LOC 30min+)</td>
<td>-</td>
<td>-</td>
<td>Y</td>
<td>20 min</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Chitsabe</td>
<td>Comprehen</td>
<td>9</td>
<td>82%</td>
<td>18%</td>
<td>5%</td>
<td>78%</td>
<td>82%</td>
<td>N *</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

* Requires administration by an RMN or an RLDN
<table>
<thead>
<tr>
<th>Author</th>
<th>Study specific interview</th>
<th>Rating (for medical diagnosis of brain injury as reference standard)</th>
<th>Rating (for use of secondary reference standard such as neuropsychological or psychiatric caseness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colantonio</td>
<td>4</td>
<td>43.4% (227)</td>
<td>15.1% (LOC 30min+)</td>
</tr>
<tr>
<td>Diamond</td>
<td>6 (10)</td>
<td>88% (225)</td>
<td>10.9% (LOC 1hr+)</td>
</tr>
<tr>
<td>Ferguson</td>
<td>4</td>
<td>65% (542)</td>
<td>6.4% (LOC 30min+)</td>
</tr>
<tr>
<td>Morrell</td>
<td>4.5</td>
<td>24.9% (100)</td>
<td>6.4% (LOC 30min+)</td>
</tr>
<tr>
<td>Perkes</td>
<td>4 (8)</td>
<td>65% TBI with LOC</td>
<td></td>
</tr>
<tr>
<td>Pitman</td>
<td>8 (12)</td>
<td>47% TBI with LOC</td>
<td>37% (LOC 10 mins-6 hours)</td>
</tr>
<tr>
<td>Ray</td>
<td>6 (9)</td>
<td>23.8% LOC</td>
<td>10.7% (LOC 30 mins+)</td>
</tr>
<tr>
<td>Slaughter</td>
<td>6 (9)</td>
<td>87%</td>
<td>29% (LOC 30 mins+)</td>
</tr>
<tr>
<td>Schofield</td>
<td>4</td>
<td>65%</td>
<td></td>
</tr>
<tr>
<td>Templer</td>
<td>4</td>
<td>35.7%</td>
<td>16.8% (lasting effects)</td>
</tr>
<tr>
<td>Williams</td>
<td>2.5</td>
<td>60.7% (196)</td>
<td>15.8% (LOC 10 mins+)</td>
</tr>
</tbody>
</table>

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)

[Diagram showing the service pathway for brain injury, with labels for each stage and service provided.]

- Acute Care
- A&E < 48hrs
- Acute Management Unit for ABI (including Throughcare and Specialist ABI Nurse)
- Care Home (Specialist ABI)
- NHS Continuing Care (Medical Dependency, SGH; All continuing care in Glasgow, not exclusively ABI)
- Intensive Inpatient Rehabilitation (PDRU, CSBIRC, RFU)
- Specialist provision for severe challenging behaviour
- Slow Stream Rehabilitation
- Voluntary Services (eg Headway)
- Community Treatment Centre for ABI (HUB)
- Community Care and Support (eg generic health and social care, Primary Care, Social Work, supported living…)
- Vocational Rehabilitation and Retraining (eg Momentum)
- Community Physical Disability Teams (Not exclusive to ABI)
- Disability Resource Centres (not exclusive to ABI)
- Short Breaks (ABI respite service at Fernan Street)

HOME
15.7: Further Information on Educational Materials

15.7.1 Web links for information sources and booklets

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’.

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