



UNESCO house - Paris

# WORLD CONGRESS ON JUSTICE FOR CHILDREN

28-30 MAY 2018

**STRENGTHENING JUSTICE SYSTEMS FOR CHILDREN**

## **Neuro-developmental Maturity, trauma and violence: Causal links and interventions**

Prof Huw Williams

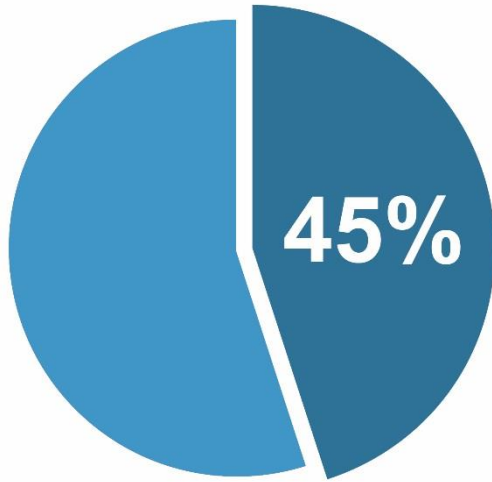
[w.h.williams@exeter.ac.uk](mailto:w.h.williams@exeter.ac.uk)



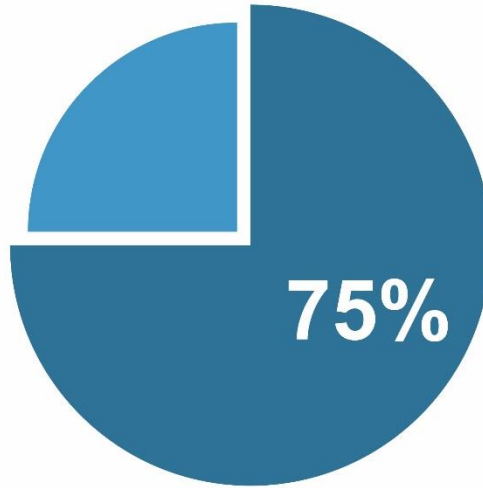
# Conflicts of Interest/ Funding

- GW4 Universities Funding
  - re: Neuroimaging of Concussion (Exeter, Cardiff, Bath & Bristol)
- Medical Research Council – Global Challenge TRACES
  - (TRAuma in Childhood ExperienceS)
- Policy Group – Division of Neuropsychology, British Psychological Society
- Contributor - All Party Parliamentary Group on TBI
  - <http://ukabif.org.uk/blog/2017/12/05/all-party-parliamentary-group-for-acquired-brain-injury-launch-meeting/>
- Contributor – Global Study on Children Deprived of Liberty – Medical Group
- Pink Concussions Board
  - <http://www.pinkconcussions.com/>

# Re-offending is very high in young, vulnerable people



1 year post  
release **45%**



2 years post  
release **75%**

**Prolific offenders** (PO)  
rates are closer to 80%  
(MOPAC)

PO tend to be **early  
starters & go on to  
commit 77% of crime**  
(see Farrington et al.  
2006)

LINKS

“Re-conviction rate for young offenders **discharged from  
custodial sentences** of less than 12 months was 71.9 per  
cent”

[www.gov.uk/government/news/adult-and-juvenile-reoffending-  
statistics-2009](http://www.gov.uk/government/news/adult-and-juvenile-reoffending-statistics-2009)

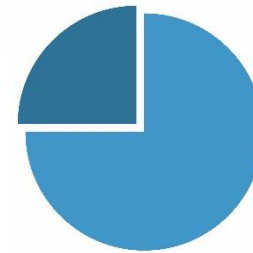
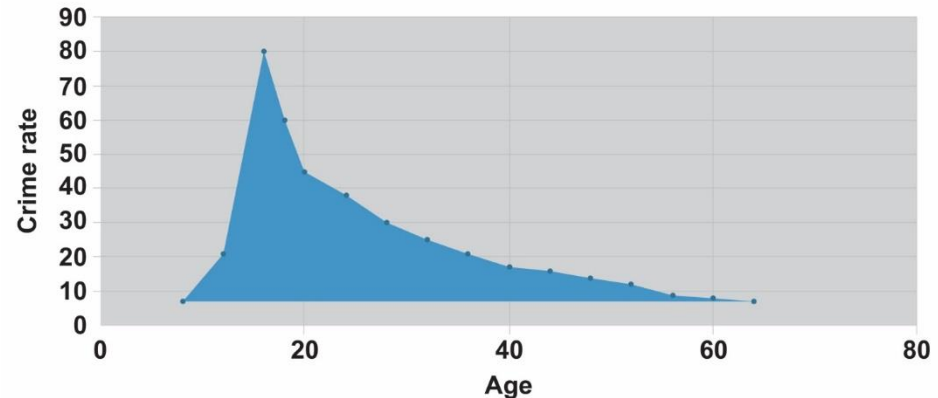
# Offenders often have “Thinking” problems

“Offenders cope poorly with life because they exhibit various ‘cognitive deficits’”

(Ross and Fabiano, 1985, cited in Home Office, 2002; Joliffe 2004).

- lack impulse control
  - poor at controlling emotions
  - poor problem solving
  - rigid and inflexible thinking
  - don't recognise consequences of behaviour \*
  - can't see another person's perspective
- **Perspective taking, ?empathy ?Theory of mind**

Longitudinal representative survey of 2,919 Young Adult offenders (violence, theft, burglary..serving community orders) over four-fifths of offenders had problems with recognising the consequences of their actions (Cattell et al, 2013)

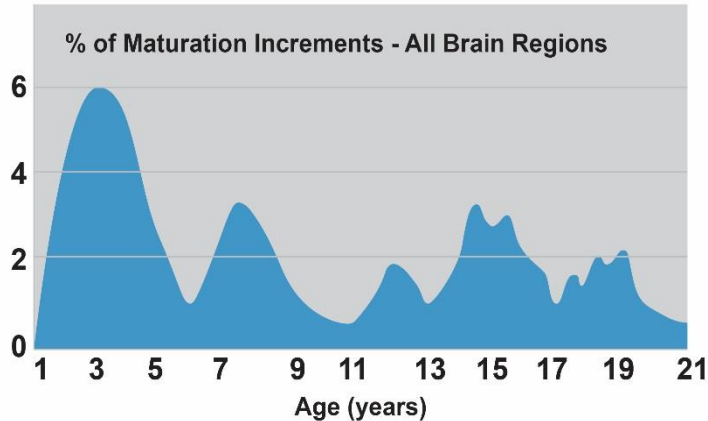


About a **quarter** of inmates are between: 15-24 yrs of age

[www.gov.uk/government/publications/prison-population-figures-2014](http://www.gov.uk/government/publications/prison-population-figures-2014)



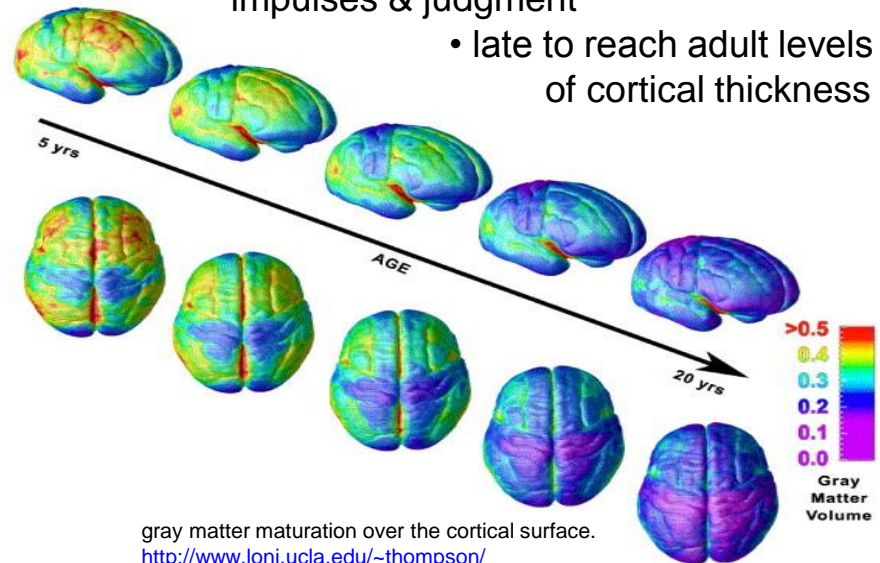
# Teenage brain – modules in a muddle



Savage, 2009

- **dorsolateral prefrontal cortex**

- circuitry sub-serving control of impulses & judgment
- late to reach adult levels of cortical thickness



gray matter maturation over the cortical surface.  
<http://www.loni.ucla.edu/~thompson/DEVEL/dynamic.html>

- “Such ‘peaks’ are – like iceberg tips – only a small indication of the complexity of the underlying changes happening in brain systems and their related cognitive and emotional functions.”

Williams 2012

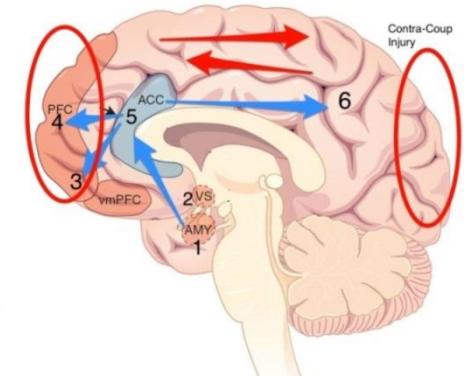
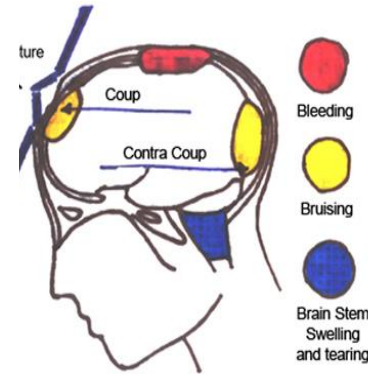
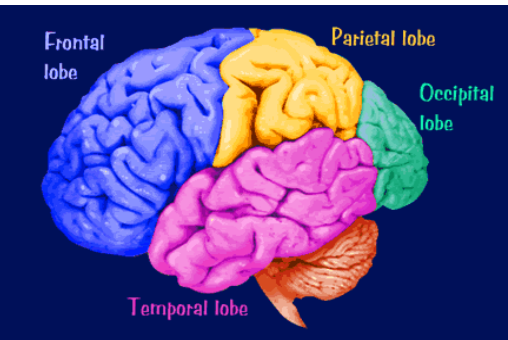
Teenage brain - adult-like ability to reason, but heightened need for reward (meso-limbic “reward sensitivity”)

lower capacity to buffer immediate influences

**POOR ON CONSIDERING CONSEQUENCES OF BEHAVIOUR & RISKY DECISION MAKING:**

‘starting the engines without a skilled driver behind the wheel’.

# Traumatic Brain Injury mechanism



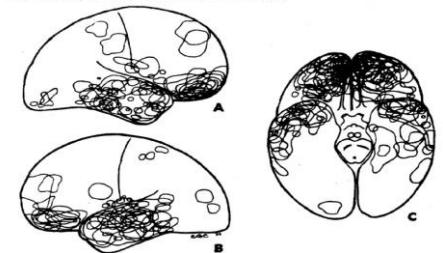
## Moderate-Severe TBI (30 mins Loss of Consciousness)

- insult to the brain from an external mechanical force.
- e.g. blow to the head - “fast-stop” in a crash, assault, fall. Leading to: Contusions, lacerations, diffuse injury (eg diffuse axonal shearing)
- frontal and temporal most common sites of injury

**MILD TBI – same mechanisms – with more “dosage” (e.g. repeated injury, 10-30 LOC) = more likely problems**



Figure 2.2 Composite drawing showing the size and location of contusions found in a series of forty consecutive cases of closed head injury



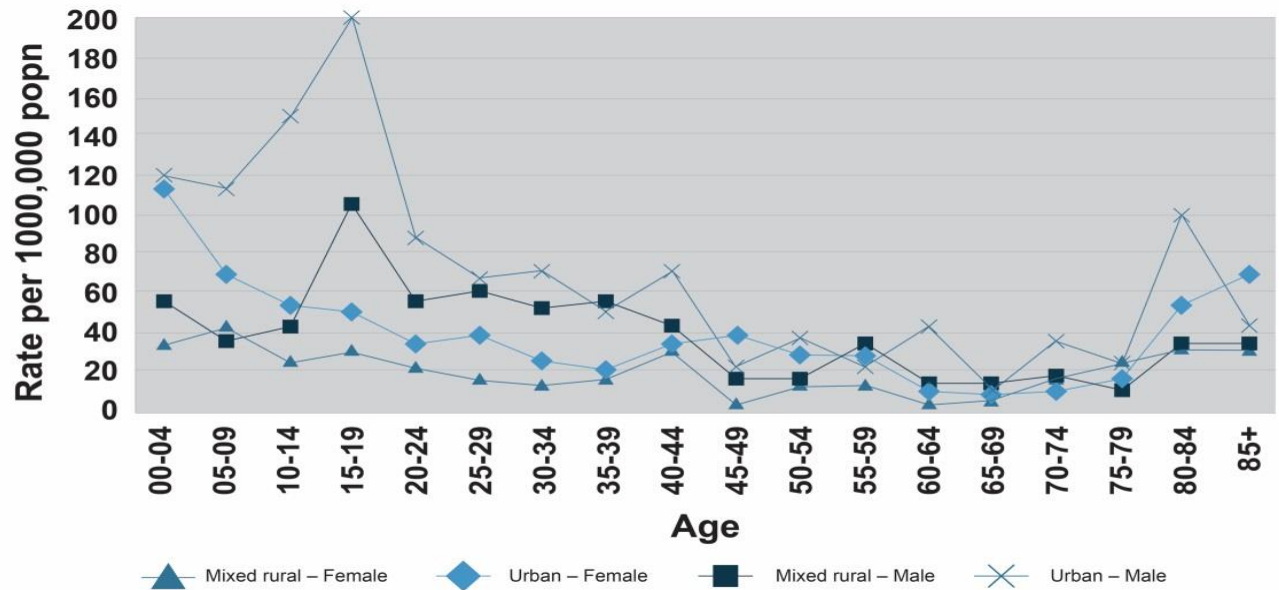
Source: Courville, C. B. (1950) Pathology of the Central Nervous System, 3rd ed., Mountain View, CA, Pacific Press Publishing Association. Reprinted with permission.



# Rates of Traumatic Brain Injury:

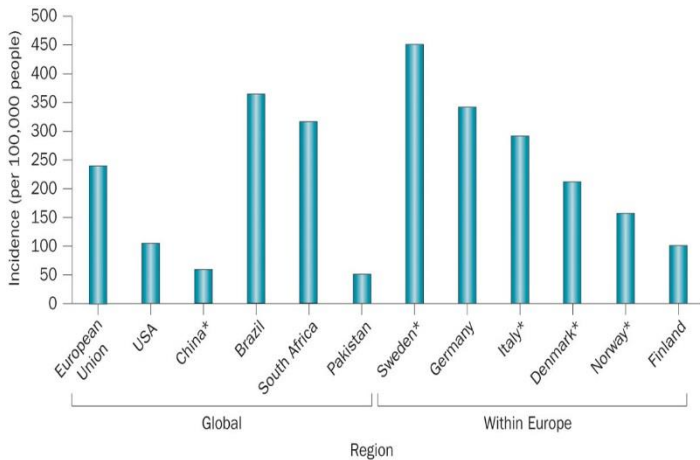
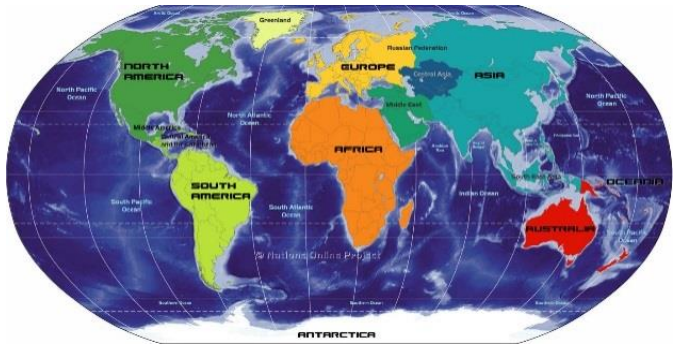
**12% (adults) may have had a TBI with a LOC at some point in their life**

\_(Frost et al, 2013)



Yates, Williams et al: Attendance rates for **moderate to severe head injury** per 100,000 population **Age, gender, urban location** and **social deprivation** as **key risk factors**

Traumatic brain injury (TBI) is a leading cause of disability in all regions of the globe. (Bryan-Hancock et al, 2010; Roozenbeek 2013)



**By 2020, 10 MILLION people affected PA worldwide (WHO)**  
(Hyder, 2007)

TBI estimated at 200 per 100 000 PA

In Mid & Low Income/Resource States (MILRS) Data scarce BUT there is a higher incidence rates from these regions\*.

EG incidence rate of TBI in South Africa has been estimated at 1.5 to 3.5 times that of the estimated global rate.

‘Silent epidemic’, as society is largely unaware of the magnitude of this problem – *especially in MLRS*

<http://www.nature.com/nrneurol/journal/v9/n4/full/nrneurol.2013.22.html>  
[https://www.thelancet.com/pdfs/journals/lanneur/PIIS1474-4422\(17\)30371-X.pdf](https://www.thelancet.com/pdfs/journals/lanneur/PIIS1474-4422(17)30371-X.pdf)



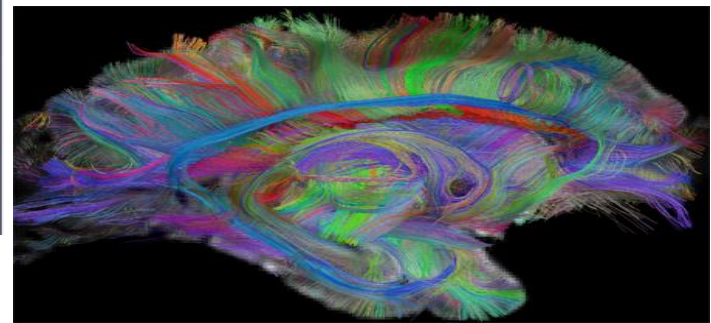
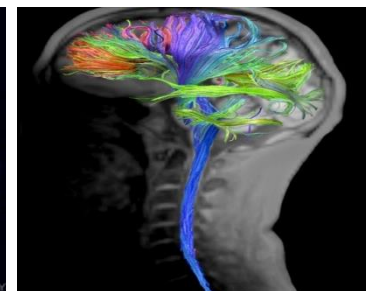
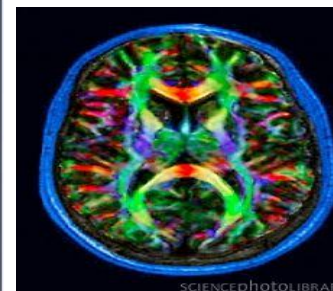
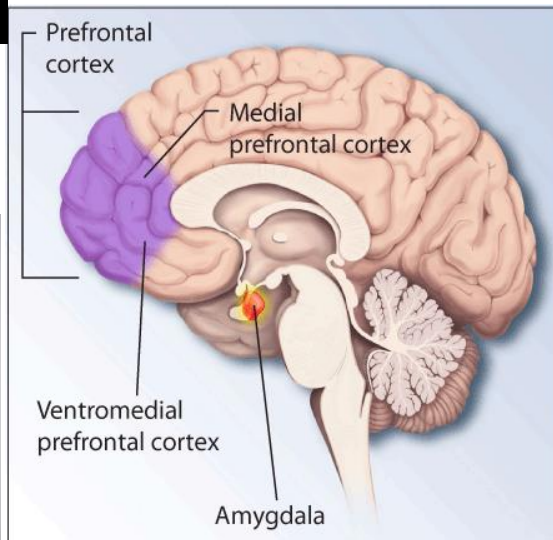
# TBI & the “Social-Brain”

TBI may have an impact on skills for emotional understanding of others see Tonks & Williams, 2008/09/10

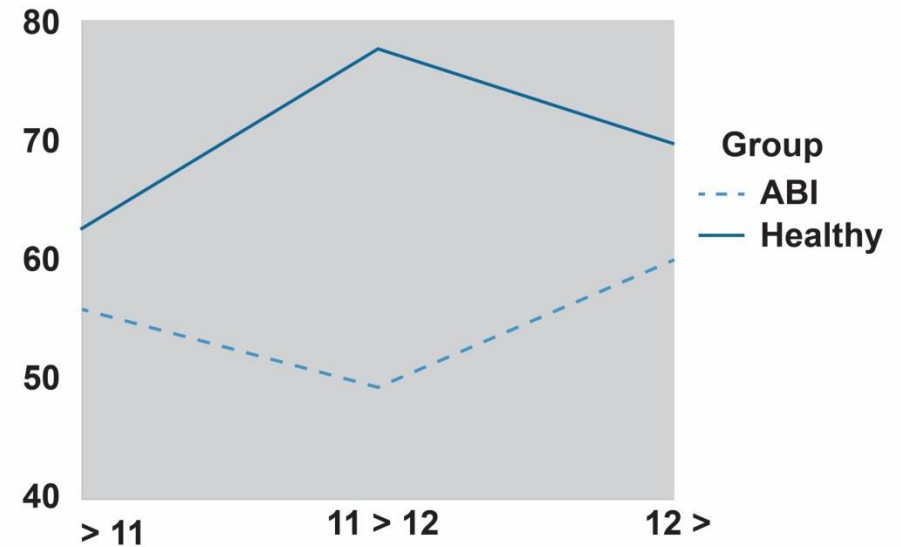
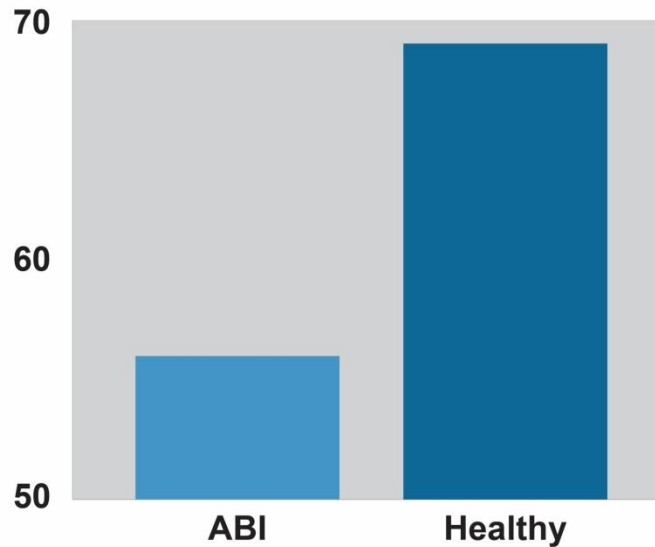


TBI commonly involves pathology to anterior brain regions implicated in social cognition (Tasker et al., 2005; Wilde et al., 2005), as well as diffuse axonal injury (DAI) which may disrupt formation of white matter connections between regions that contribute to the distributed ‘social brain’ network, including the superior temporal sulcus, fusiform gyrus, temporal pole, medial prefrontal cortex, orbitofrontal cortex, amygdala, temporoparietal junction and inferior parietal cortex (Beauchamp and Anderson, 2010; Johnson et al., 2005; Yeates et al., 2007).

Ryan et al, 2013



# How ABI children perform on Theory Of Mind compared to non-injured children?



Tonks, Williams, Frampton et al.

# TBI & “Personality Change” in children and young people

## Moderate to Severe TBI: (20% approx)

**Cognition** – attention, memory, executive, social cognition

**Behaviour** – dis-inhibition, anger, etc

**Mood** – depression, anxiety...

(Hawley, 2003; Anderson et al 2006; Max, 2001; Tonks et al, 2010)



94 children with TBI aged 9 at time of injury:

**Organic Personality Change (OPC)**

In 57% of severe & 5% mTBI

labile and aggressive OPC subtypes most common – 3-4 x more.

141 kids, **22% (6 months)** had PC – assoc. w. dorsal prefrontal lobe injury (Max, 2005)



**Therefore 3 or 4 in 10 affected**

NOTE: EFFECTS MAY BE DELAYED

## Mild TBI: (80% approx)

“complicated”, or cumulative, injury may be linked to: problems in attention and inhibitory control

(Williams, Potter & Ryland, 2010; Wall, Williams et al, 2006; Williams et al, 2012)

**Difficulties considering alternative behaviours & controlling impulses**

(Fishbein 2009 et al; Pontifex 2009)<sup>1</sup>



**Novel Psychiatric disorders (NPD)**

- 70 children with MTBI
- 6 months post injury
- 36% : NPD

**ADHD, PC, Oppositional Defiant**  
(Max et al, 2013)

***Injury = impulsivity, poor social skills, and externalising behaviours – therefore:***

- ***disrupt development of prosocial life role***
- ***underlie drift from classroom to the courtroom.***

# Risk of Crime after TBI:

Fazel S, Lichtenstein P, Grann M, Langstrom N (2011) Risk of violent crime in individuals with epilepsy and traumatic brain injury: A 35-Year Swedish Population Study. PLoS Med 8: e1001150



- Swedish population registers from 1973 to 2009, and examined associations of epilepsy ( $n = 22,947$ ) and traumatic brain injury ( $n = 22,914$ ) with subsequent violent crime (convictions for homicide, assault, robbery, arson, any sexual offense, or illegal threats or intimidation)”
  - “Among the major strengths of the study are..very large sample size...entire population of Sweden, and the follow-up of 35 years...findings are of major public health importance and provide inspiration for further research” J Volavka (Commentary)
- traumatic brain injury cases, 2,011 individuals (**8.8%**) committed violent crime after diagnosis
- compared with population controls ( $n = 229,118$  (5,504 controls – **2.5%**)),
- corresponded to a substantially increased risk (adjusted odds ratio [aOR] = 3.3, 95% CI: 3.1–3.5)
- Risk was attenuated when cases were compared with unaffected siblings (aOR = 2.0, 1.8–2.3)

# “Are children who experience TBI more likely to engage in criminal behaviour?”

McKinlay. A; et al (2010). Brain impairment

- Longitudinal epidemiological study of birth cohort of 1265 children born in Christchurch (New Zealand) urban region in mid-1977.
  - **Groups:** 1) MTBI “hospitalised”  
2) MTBI “Not hospitalised”  
3) “No- Injury”
- **Outcomes:** Ages 15-21: self-reported arrests, violent offences and property offences
- compared to non-injured individuals, *both TBI groups were more likely to be arrested (relative risk (RR)=2.03 and RR=1.68), involved in property offences (RR=2.08 and RR=1.54) and violent offences (RR=1.35 and RR=2.29) (all  $p<0.01$ ).*
- **Nb. Evidence of problems at school within 2 years, and exclusion in teenage years**



## Related study:

Injury pre 5 years =  
drug & alcohol  
problems mediates  
crime

Injury at 5 yr and later =  
direct relationship to  
crime

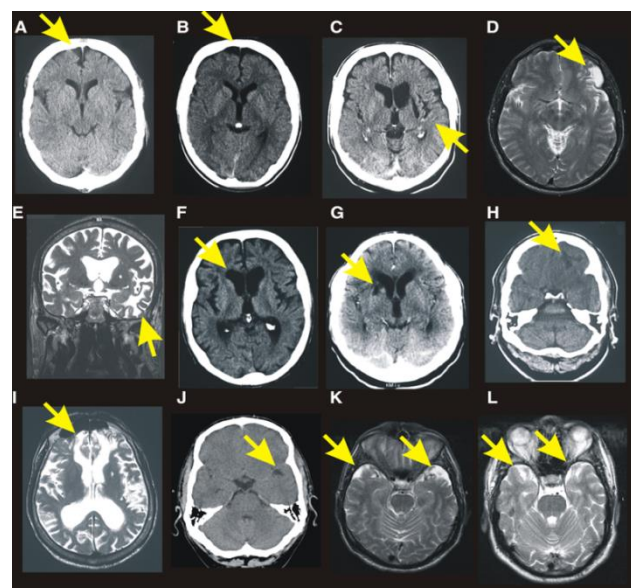
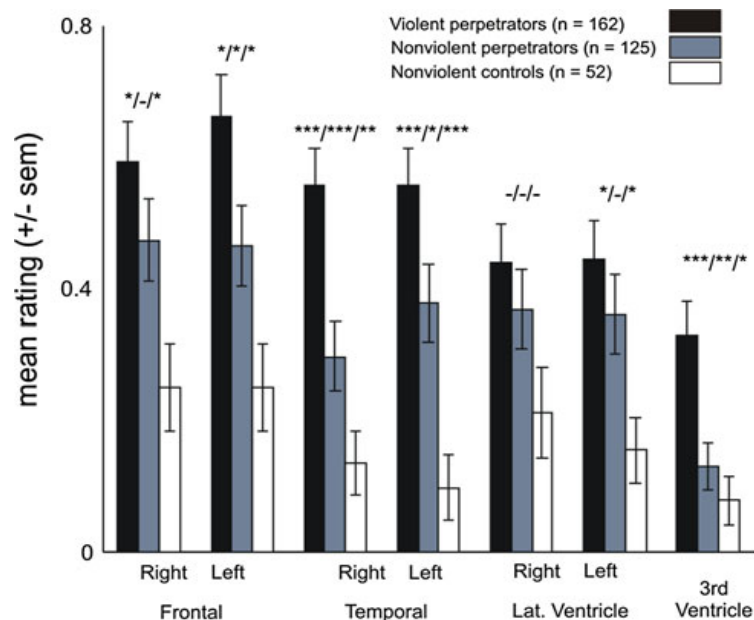
**“clear evidence of ongoing problems for [those who] had  
...a TBI compared to their non injured counterparts”.**

(McKinlay, 2013. JHTR)



# High prevalence of brain pathology in violent prisoners: a qualitative CT and MRI scan study

Kolja Schiltz · Joachim G. Witzel · Josef Bausch-Hölterhoff · Bernhard Roerts



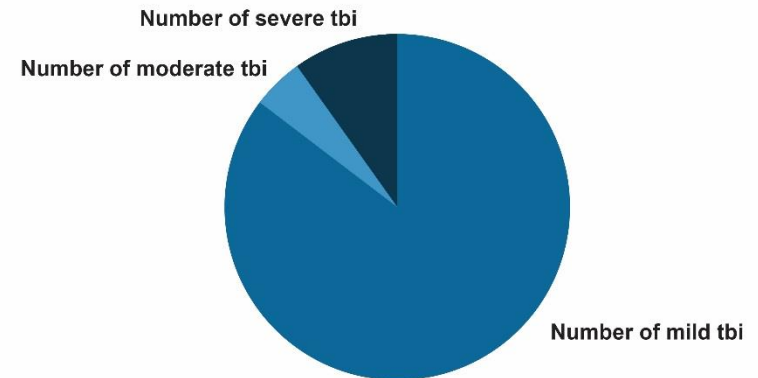
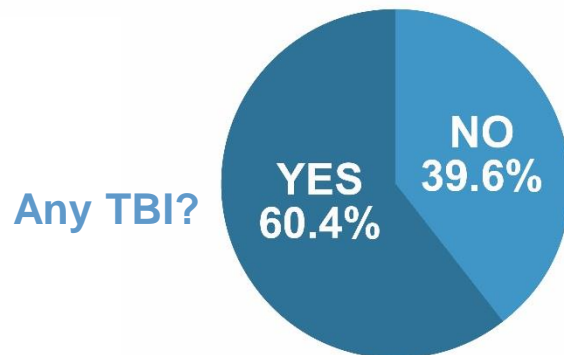
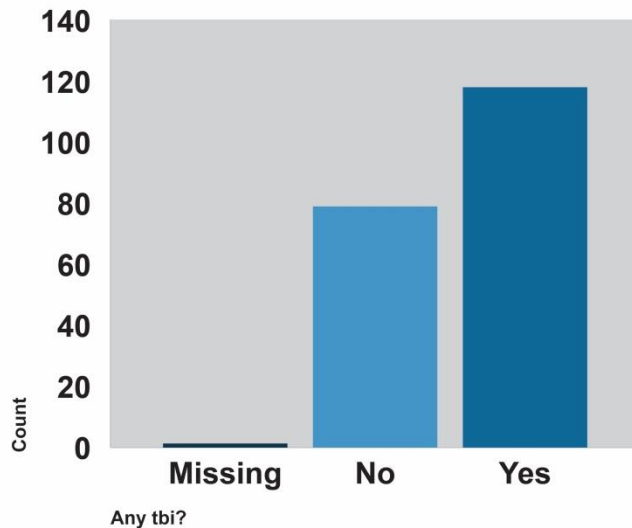
Qualitative study of violent offenders, with routine CT and MRI scanning, showed that violent offenders had significantly greater number of neurological abnormalities, particularly involving the frontal lobes, compared to non-violent and non-offending controls

# % of Adult (Male) Prison Population Reporting TBI and Type and Time of Injury

Williams et al (2010) Brain Injury.

## We estimate that:

65% may have had TBI...  
10% Severe  
5.6% Moderate  
49.4% Mild



## Average age of first imprisonment:

16 Years – TBI  
21 Years – non-TBI

# TBI in Young Offenders in UK

**Williams, Cordan et al (2010) :**

Youth offenders (YOI) (n = 192; 16 years of age)

- 65% history of “head injury”
- MTBI with LOC up to 10 minutes & moderate-severe TBI = **46% of overall sample**
- **16.6% moderate to severe injury**

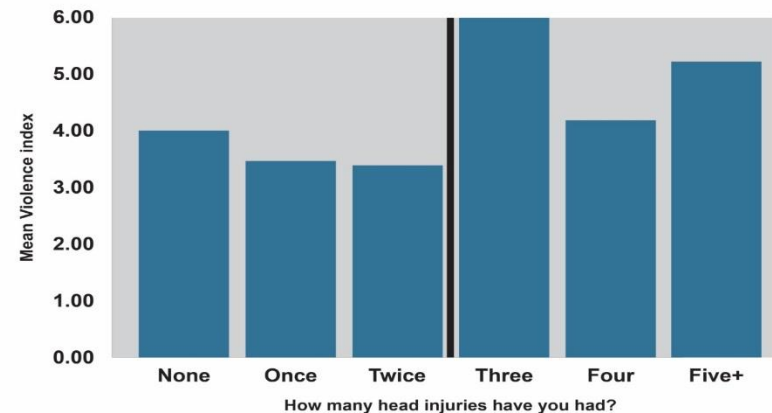
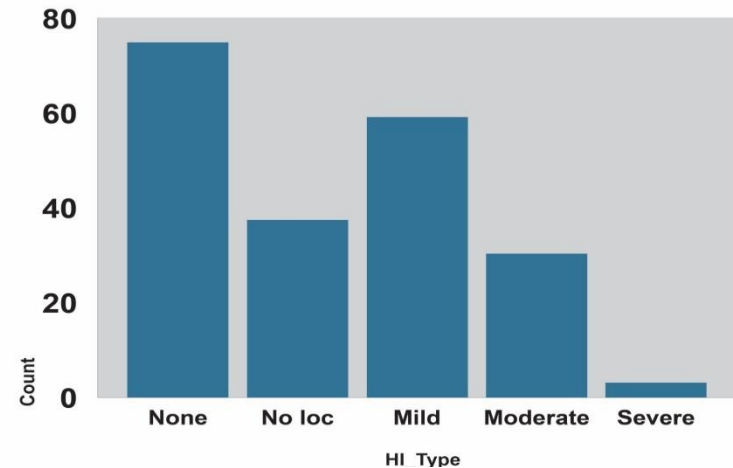
(LOC over 10 minutes)

**Those with TBI = more convictions**

**3+ TBIs = more violence**

**TABLE 2 Causes of TBI**

Source of injury	Number of participants	% of total sample	% of head injury sample
Joyriding	9	4.8	7.44
Falls on drugs	12	6.4	9.92
Falls sober	3	1.6	2.48
Sports injuries	3	1.6	2.48
Fights	70	37.2	57.85
Other crimes	3	1.6	2.48
Other (non-crime related)	21	11.2	17.36
<b>Total</b>	<b>121</b>	<b>65.05%</b>	<b>100%</b>



# TBI in offenders typically leads to...

- Poorer engagement in treatment
- Greater levels of infraction
- Higher level of re-conviction
- Often in areas of **violence**

## Pitman:

139 w TBI v 50 non-TBI  
60% vs 38% violent crime

## Fishbein:

224 (71 TBI) pps  
TBI = early dropout & aggressive

## Ray & Richardson

151 inmates  
Post release 1.6 higher rate of recidivism

Pitman I, Haddlesey C, Ramos SDS, Oddy M, Fortescue D. The association between neuropsychological performance and self-reported traumatic brain injury in a sample of adult male prisoners in the UK. *Neuropsychol Rehabil* 2015; 25: 763–79.

Fishbein D, Sheppard M, Hyde C, et al. Deficits in behavioral inhibition predict treatment engagement in prison inmates. *Law Hum Behav* 2009; 33: 419–35.

Fishbein D and Sheppard M. Assessing the role of neuropsychological functioning in inmates' treatment response. Grant Award Report: 2002-MU-BX0013, document: 216303. <https://www.ncjrs.gov/pdffiles1/nij/grants/216303.pdf> (accessed Feb 15, 2018).

Shiroma EJ, Pickelsimer EE, Ferguson PL, et al. Association of medically attended traumatic brain injury and in-prison behavioral infractions: a statewide longitudinal study. *J Correct Health Care* 2010; 16: 273–86.

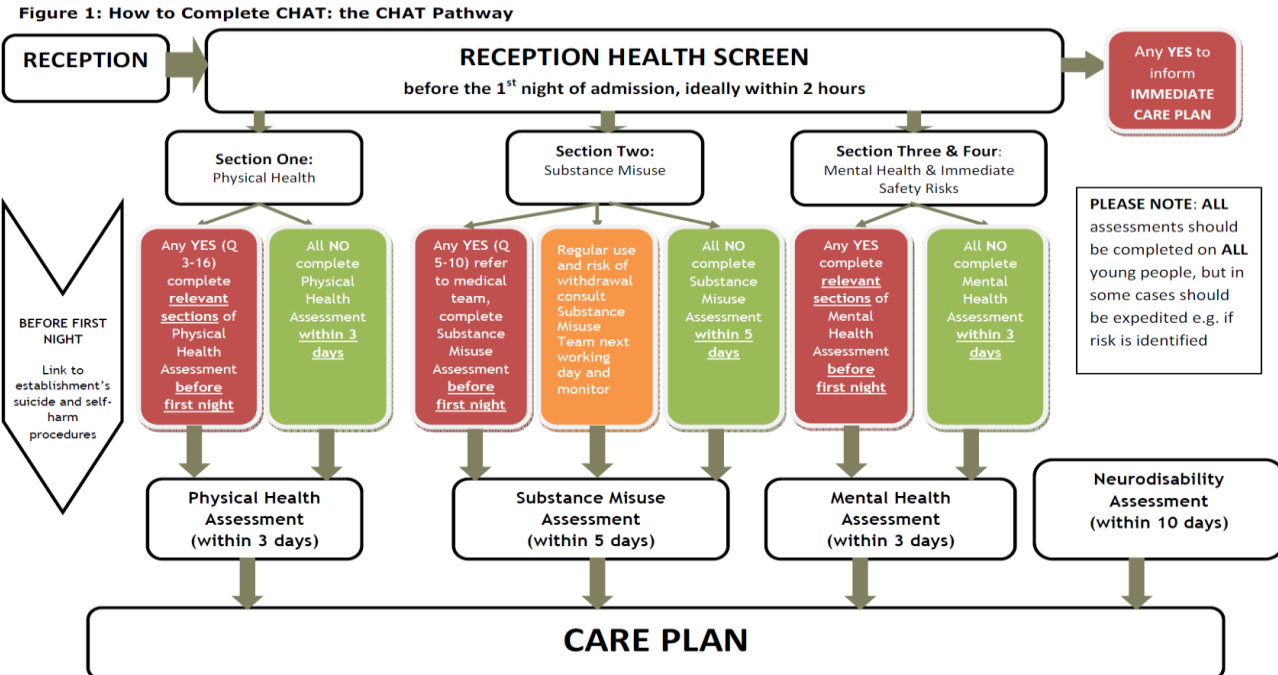
Ray B, Richardson NJ. Traumatic brain injury and recidivism among returning inmates. *Crim Justice Behav* 2017; 44: 472–86.

# TBI in Young Offenders:

## CHAT (Comprehensive Health Assessment Tool) study

Chitsabesan et al. (2015)

- Consecutive admissions to Young Offender Institution (YOI)
- 93 adolescent males (15-18yrs)
  - Mean Age 16.5 years and 78% White-British
- Assessed:
  - Demographic and offending information
  - CHAT screens for TBI “event” and chronic TBI problems



### Findings:

82% had a TBI

44% with “ongoing” symptoms



	No-Mild TBI	Moderate- Severe TBI (PCS based)	Odds Ratio	P Value	95% CI
Total language score below average (<84) <sup>a</sup>	33 (41%)	5 (36%)	0.74	P=0.67	0.28-2.52
IQ below average (<69) <sup>b</sup>	8 (10%)	1 (7%)	0.68	P= 0.72	0.07-5.92
ADHD <sup>c</sup>	<b>15 (20%)</b>	<b>4 (29%)</b>	1.62	P=0.45	0.45-5.90
Depression <sup>c</sup>	5 (7%)	1 (7%)	1.09	P= 0.94	0.12-10.13
Self Harm <sup>c</sup>	<b>6 (43%)</b>	<b>8 (57%)</b>	<b>3.73</b>	<b>P=0.02*</b>	1.1-12.09
Suicide risk factors <sup>c</sup>	<b>18 (24%)</b>	<b>7 (50%)</b>	<b>3.22</b>	<b>P=0.04*</b>	0.99-10.41
Alcohol Misuse <sup>c</sup>	44 (58%)	10 (71%)	1.81	P=0.34	0.52-6.31
Cannabis Misuse <sup>c</sup>	64 (84%)	12 (86%)	1.12	P=0.89	0.22-5.67
Been in Care <sup>d</sup>	<b>26 (34%)</b>	<b>9 (64%)</b>	<b>3.46</b>	<b>P=0.03*</b>	1.05-11.39
Violent offences <sup>d</sup>	49 (64%)	9 (64%)	0.92	P=0.98	0.30-3.26
Previous history of custodial sentences <sup>d</sup>	32 (42%)	6 (43%)	1.03	P=0.95	0.32-3.26

# The prevalence of neurodevelopmental disorders in YP in custody

Hughes, Williams & Chitsabesan (2012)

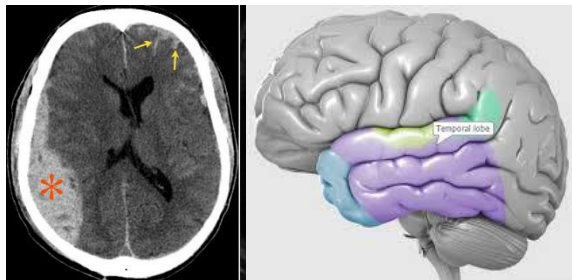
Neurodevelopmental disorder	Reported prevalence rates amongst young people in the general population	Reported prevalence rates amongst young people in custody
Learning disabilities <sup>3</sup>	2 - 4% <sup>4</sup>	23 - 32% <sup>5</sup>
Dyslexia	10% <sup>6</sup>	43 - 57% <sup>7</sup>
Communication disorders	5 - 7% <sup>8</sup>	60 - 90% <sup>9</sup>
Attention deficit hyperactive disorder	1.7 - 9% <sup>10</sup>	12% <sup>11</sup>
Autistic spectrum disorder	0.6 - 1.2% <sup>12</sup>	15% <sup>13</sup>
Traumatic brain injury	24 - 31.6% <sup>14</sup>	65.1 - 72.1% <sup>15</sup>
Epilepsy	0.45 - 1% <sup>16</sup>	0.7 - 0.8% <sup>17</sup>
Foetal alcohol syndrome	0.1 - 5% <sup>18</sup>	10.9 - 11.7% <sup>19</sup>

# Case illustration...

## Young Person in YOI - England

### “John 17, Assault = ?TBI”

- Notes = **fractured skull, left side**
- Impulsive, poor concentrating, not engaging in regime, threatening & abusive to staff, other inmates  
lowest privilege level due to poor pattern of behaviour
- NPsych Tested:
  - eg poor verbal memory (5%) – visual intact
  - co morbid ADHD, dyslexia, communication disorders



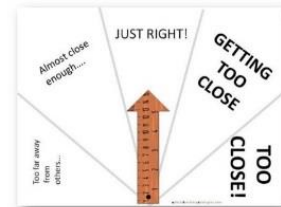
### Explore & Manage effects of brain injury - **AMNESTIC**

- develop self-control & consequential thinking
- use visual **CUES** to remind of time spent/ rewards
- written guidelines and accessible reports for staff
- Liaise with substance misuse worker, caseworker, mental health nurse etc
- Enable to engage in education
- Behaviour “reversed”
- on track for release
- REMINDERS needed

### Self-control meters



...for voice volume



...for personal space

## Young people with Traumatic Brain Injury in custody

An evaluation of a Linkworker Service for Barrow Cadbury Trust and The Disabilities Trust



[https://www.barrowcadbury.org.uk/wp-content/uploads/2016/07/Disability\\_Trust\\_linkworker\\_2016Lores.pdf](https://www.barrowcadbury.org.uk/wp-content/uploads/2016/07/Disability_Trust_linkworker_2016Lores.pdf)

# Reforming & Reframing Rehabilitation –



- [https://www.publications.parliament.uk/pa/cm201617/cmselect/cmjust/169/16905.htm#\\_idTextAnchor014](https://www.publications.parliament.uk/pa/cm201617/cmselect/cmjust/169/16905.htm#_idTextAnchor014)

“We received compelling evidence that another important consideration for young adults in the criminal justice system is the potential presence of atypical brain development.. those who persist in criminal behaviour into adulthood are more likely to have neuro-psychological deficits, including cognitive difficulties with thinking, acting, and solving problems, emotional literacy and regulation, learning difficulties and language problems associated [often due to] traumatic brain injury”

- Scottish Parliament –  
Justice Committee report on TBI & Prisons  
(Tom McMillan)
- UK Parliament
  - **Justice Comm. Report –  
helpful MoJ response – BUT  
No Prison and Courts Bill...**

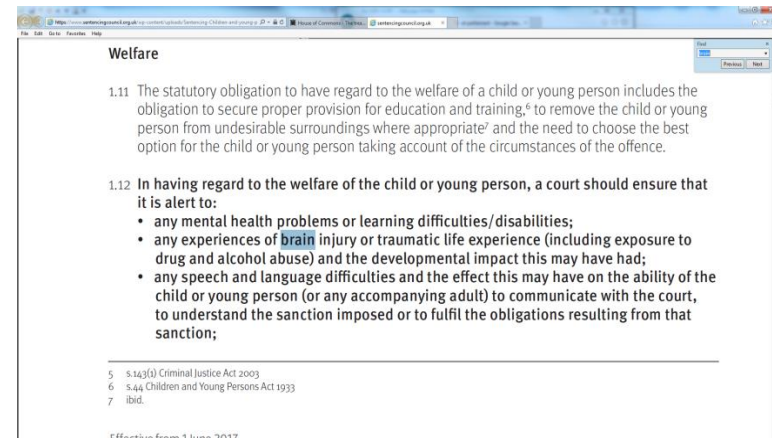
The screenshot shows the UK Parliament website with the Commons Select Committee page for 'Young adults in criminal justice system: change in policy needed'. The page includes a navigation bar, a sidebar with links to various committees and documents, and a main content area with a 'Read the report' button and a list of related news items. The report title is 'Young adults in criminal justice system: change in policy needed'. The date is 26 October 2016. The report is by the Justice Committee. The main text discusses the need for a step change in policy and practice, highlighting the importance of addressing the needs of young adults in the criminal justice system. The report is available for download as a PDF (1.39 MB).

# Actions...some in progress

- **PREVENTATIVE Interagency working**
  - Education, Health, Social & Justice
- **SENTENCING –**
  - Identify ND in **youth & young people justice systems**
    - » **NEW ZEALAND model** see: UN Convention on Rights of People with Disability – Judge Becroft
    - » **Sentencing Council UK** – need to take account of maturity – and TBI issues – *effective June 2017*
- **NEURO-REHAB that's TRAUMA INFORMED (Probation/Prison)**
  - **Identify ND in youth justice systems**
    - » **Brain Injury Link-workers**
    - » **Train staff to be AWARE etc.**
  - **Develop Trauma & ND informed approaches**
    - » **Welsh Youth Justice Board – Clinical Psych/Neuro Formulation approach**
    - » **NHS England & MoJ**  
**“Secure Stairs” model for YOJ**
    - » **Ministry of Justice:**  
**Pilots...re:**  
**TBI to be screened for**  
**6 Prison Pilot linkworker projects funded**  
**& Training of court staff to consider alternative rehabilitation pathway**



<http://neurodisabilitiesforum.org.nz/wp-content/uploads/2016/05/Neurodisabilities-Forum-2016-Report-1.pdf>



[https://www.sentencingcouncil.org.uk/wp-content/uploads/Sentencing-Children-and-young-people-Definitive-Guide\\_FINAL\\_WEB.pdf](https://www.sentencingcouncil.org.uk/wp-content/uploads/Sentencing-Children-and-young-people-Definitive-Guide_FINAL_WEB.pdf)



# Investing in development: (Spending to save)



- Children and young people MOST likely for TBI least likely to get support
  - They do NOT grow out of their problems, BUT probably into them...especially when in adverse environments
- School inclusion & diversion/liaison processes vital
- Parent/Care-giver support important
- Screening for TBI (Neuro-disability) is possible
  - sentencing, custody, sentencing, entry to secure estate, re-settlement)
- Neuro-rehabilitation can be done within prisons & probation...

<https://www.cdc.gov/traumaticbraininjury/pdf/reportstocongress/managementoftbiinchildren/TBI-ReporttoCongress-508.pdf>

Browser window showing the CDC report titled "REPORT TO CONGRESS: The Management of Traumatic Brain Injury in Children: Opportunities for Action". The browser address bar displays the URL: <https://www.cdc.gov/traumaticbraininjury/pdf/reportstocongr...>

**REPORT TO CONGRESS**

# The Management of Traumatic Brain Injury in Children: Opportunities for Action

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Images: A group of diverse children running outdoors, and a close-up of a young girl with pigtails laughing.

Search bar: Find  
Young girl with pigtails laughing.

### Journal Articles:

Williams WH, Mewse AJ, Tonks J, Mills S, CNW B, Cordan G (2010) *Traumatic Brain injury in a Prison Population: Prevalence, and Risk for Re-Offending*, *Brain Injury* 24(10), 1184-1188.

Davies , R, Williams, H et al. (2012). *Self-reported Traumatic Brain Injury and Post Concussion Symptoms in incarcerated youth: A dose response relationship* *Journal of Head Trauma Rehabilitation*

Chitsabesan, Prathiba; Lennox, Charlotte; Williams, Huw; Tariq, Omar; Shaw, Jenny, W. H. (2015). *Traumatic Brain Injury in Juvenile Offenders: Findings From the Comprehensive Health Assessment Tool Study and the Development of a Specialist Linkworker Service*. *J Head Trauma Rehabil*, 30(2),

Hughes, N., Williams, W. H., Chitsabesan, P., Walesby, R. C., Mounce, L. T., & Clasby, B. (2015). *The prevalence of traumatic brain injury among young offenders in custody: a systematic review.. J Head Trauma Rehabil*, 30(2), 94-105. doi:[10.1097/HTR.0000000000000124](https://doi.org/10.1097/HTR.0000000000000124)

Williams, W. H., McAuliffe, K. A., Cohen, M. H., Parsonage, M., Ramsbotham, J., & General The Lord David. (2015). *Traumatic brain injury and juvenile offending: complex causal links offer multiple targets to reduce crime.. J Head Trauma Rehabil*, 30(2), 69-74. doi:[10.1097/HTR.0000000000000134](https://doi.org/10.1097/HTR.0000000000000134)

Hughes, N., Clasby, B., Chitsabesan, P., & Williams, H. (2016). *A systematic review of the prevalence of foetal alcohol syndrome disorders among young people in the criminal justice system*. *Cogent Psychology*, 3(1). doi:[10.1080/23311908.2016.1214213](https://doi.org/10.1080/23311908.2016.1214213)

Maas AIR, Menon DK, Adelson PD, Andelic N, Bell MJ, Belli A, Bragge P, Brazinova A, Buerki A, Chesnut RM, et al. [Traumatic brain injury: integrated approaches to improve prevention, clinical care, and research](#) LANCET NEUROLOGY 16(12):987-1048 Dec 2017

Williams WH, Chitsabesan P, Fazel S, McMillan T, Hughes N, Parsonage M, Tonks J. [Traumatic brain injury: A potential cause of violent crime?](#) The Lancet Psychiatry 01 Jan 2018

### Policy Reports etc. CLICK LINK FOR REPORT:

Overview for practitioners and policy makers and practitioners on TBI & Crime, [Repairing shattered lives](#) (French version also available);

British Psychological Society (BPS) working group on [Neuro-Disability in children and young people in custody](#);

Nathan Hughes a report on Neuro-disability and [TBI in young offenders](#) in children in custody for the Office of the Children's Commissioner [infographic](#) to illustrate the links between TBI and crime;

Dr Prathiba Chitasabesan, a [report on the use of linkworkers for young offenders to manage TBI in custody](#),

Centre for mental health in producing a [report on the economic costs of crime due to TBI](#).

[Journal of Head Trauma Rehabilitation on TBI & Crime in young people](#)

[Lancet Neurology - Traumatic Brain Injury: Integrated approaches to improve prevention, clinical care, and research](#)

<http://www.thelancet.com/commissions/traumatic-brain-injury>