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Head injury from falls in children younger than 6 years of age

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ABSTRACT

The risk of serious head injury (HI) from a fall in a young child is ill defined. The relationship between the object fallen from and prevalence of intracranial injury (ICI) or skull fracture is described.

Method Cross-sectional study of HIs from falls in children (<6 years) admitted to UK hospitals, analysed according to the object fallen from and associated Glasgow Coma Score (GCS) or alert, voice, pain, unresponsive (AVPU) and CT scan results.

Results Of 1775 cases ascertained (median age 18 months, 54.7% boys), 87% (1552) had a GCS=15/AVPU=alert. 19.3% (342) had a CT scan: 32% (110/342) were abnormal; equivalent to 5.9% of the overall population, 16.9% (58) had isolated skull fractures and 13.7% (47) had ICI (49% (23/47) had an associated skull fracture). The prevalence of ICI increased with neurological compromise; however, 12% of children with a GCS=15/AVPU=alert had ICI. When compared to falls from standing, falls from a person's arms (233 children (mean age 1 year)) had a significant relative OR for a skull fracture/ICI of 6.94 (95% CI 3.54 to 13.6), falls from a building (eg, window or attic) (mean age 3 years) OR 6.84 (95% CI 2.65 to 17.6) and from an infant or child product (mean age 21 months) OR 2.75 (95% CI 1.36 to 5.65).

Conclusions Most HIs from a fall in these children admitted to hospital were minor. Infants, dropped from a carer's arms, those who fell from infant products, a window, wall or from an attic had the greatest chance of ICI or skull fracture. These data inform prevention and the assessment of the likelihood of serious injury when the object fallen from is known.

What is already known on this topic?

- Falls are a common mechanism in young children admitted to hospital with head injury.
- Most are minor head injuries but can be associated with morbidity from post-concussion syndrome.
- The likelihood of cranial or intracranial damage from different fall mechanisms is ill defined.

What this study adds?

- Abnormal CT scans were identified in 5.9% of the children who had sustained head injury from a fall.
- The highest risk mechanism of fall for acquiring skull fracture or intracranial injury is an infant who is dropped from a carer's arms.
- These data have the potential to inform prevention to reduce the number of infants and young children who sustain head injuries from falls.

INTRODUCTION

Head injury (HI) from a fall is a leading cause of hospital attendance for young children.[1] The majority of these head injuries are minor; however, a small proportion result in intracranial injury (ICI) to the brain or surrounding extra-axial structures.[1] In 2011, Hospital Episode Statistics recorded 50 719 finished hospital consultations for children age 0–14 who fell (International Classification of Diseases, 10th revision W00–W19).[2] Little is known about the characteristics of falls that have the potential to cause skull fractures or ICI and potential neuropsychological morbidity.[3]

The estimated proportion of childhood HIs caused by falls varies from 19%[4] to 89%[5] with many studies reporting figures between 50% and 70%.[6–8] The prevalence decreases with age, with infants (<12 months of age) and very young children at the greatest risk.[6 9] However, studies are based upon small sample sizes and broad age ranges. They often report falls from the 'same level' or from 'an estimated height'. Some studies with a biomechanical focus do highlight the objects and furniture types involved in falls;[10 11] however, small sample sizes prevent generalisation of these results.

There are two schools of thought about the significance of short falls:[12] first, they rarely cause fatal HI[13] and second, they have the potential to do so.[14]

The Confidential Enquiry into Head Injury in Childhood was the principal project within the Centre for Maternal and Child Enquires (CMACE) in 2009. Data were collected from 90% of hospitals in England, Wales, Northern Ireland and the Channel Islands on children treated or observed in hospital inpatient areas. This large dataset provided the opportunity to describe the object fallen from, the neurophysiological status and CT scan findings in children younger than 6 years.

METHODS

All cases described as falls were extracted from the CMACE dataset of children younger than 6 years of age, admitted to hospital or who died at the scene or en route to hospital as a direct result of an HI between September 2009 and February 2010. Children admitted because of superficial or facial

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injuries were not included in the original dataset. Cases with insufficient data regarding the mechanism of injury, readmissions and those that were referred to social services for suspected physical abuse where there was uncertainty around the mechanism of injury were excluded. Cases that met clinical guidelines for a CT scan[15] but where a CT scan had not been done were also excluded as we could not confirm the outcome.

Data were collected for this cross-sectional study monthly in each hospital using predefined proformas (see online supplementary file 1) by a designated local coordinator. Data from completed forms were entered onto a secure database and duplicate cases were excluded.

The child was classed as a hospital admission if they were admitted to a hospital inpatient setting for 4 h or more. The descriptions of falls were recoded using The European Union Injury Database Coding Manual.[16] *Incident place* was coded according to home/private address, school/nursery, public highway/road/street/motorway other, unknown. *Mechanism of injury:* Falls were recoded as 'Falls from standing or sitting' and 'Falls from a height' and subcategorised according to falls from building, building component or related fitting, from person's arms, downstairs, from furniture, infant or child product or other. *Object fallen from* were initially categorised in accordance with the coding manual. These categories were then condensed down into six larger categories (see online supplementary file 2) with relevant subdivisions.

The Glasgow Coma Score (GCS) recorded from the emergency department was the primary indicator of neurological status. When missing, the alert, voice, pain, unresponsive (AVPU) scores[17] were used. These data were combined to create four categories—'GCS=15/alert,' 'GCS=13–14' 'GCS=9–12/response to voice' and 'GCS ≤8/ response to pain or unresponsive'—as proposed by Mackay *et al*.[18] (While Mackay *et al* refer to children older than 5 years, this was the best equivalence study available.) CT scan results were categorised as normal (no abnormality reported on CT scan), isolated skull fracture or intracranial injury (ICI) (injury to the brain or extra-axial structures) with or without skull fracture. Structural anomalies congenital defects and soft tissue injuries were combined with CT normal group. Two coders independently reviewed CT scan results and agreed the categorisation of injury mechanism and objects fallen from.

HIs were classified as 'minor' if a CT scan was performed with a 'normal' result or no CT was performed but the GCS/AVPU score was GCS=15/alert.

Analysis of the dataset

A descriptive analysis used proportions with 95% CIs. The logistic regression analysis (IBM SPSS V.20) was used to calculate the relative odds of sustaining a skull fracture or ICI from each mechanism to a fall from sitting or standing. A general model, including possible influencing covariates, namely mechanism of injury gender, age in years, was applied to the data and by a stepwise approach the statistically non-significant factors were removed from the model. To compare the accuracy of fit of the models, the software calculated fit statistics were used: (model) χ^2, −2 log-likelihood, overall percentage—the overall per cent of cases that are correctly predicted by the model (IBM SPSS V.20). The best-fitting logistic model results are expressed as ORs, with 95% CIs.

RESULTS

The original dataset included 5700 children (ages of 0–15). Of these, 60% (3423) were <6 years, 76.9% (2634) of whom presented following a fall. In total, 153 cases referred to social services with suspected physical abuse, 11 cases that met criteria for a CT but CT scan was not done and 695 cases with insufficient data regarding the mechanism of injury were excluded. This latter group of cases had the same distribution of age, gender, GCS/AVPU and abnormal CT scan results as the remaining 1775 cases available for analysis (figure 1).

The median age of the children was 18 months (IQR 30 months). There was an inverse relationship between age and number of children who sustained HI from a fall (table 1). A slightly greater proportion of HIs occurred in boys (54.7%, n=971) than in girls.

Injury severity

A total of 1659 children had a GCS (1245) or an AVPU (414) recorded. Of the total population, 87% (1552/1775) had a GCS of 15 or were alert on AVPU. The length of stay was recorded for 1735 children. The median number of nights admitted was 1 (1005 children), 100 children were admitted for 2–4 nights, 8 for 5–7 days and 4 for more than a week, 616 were observed and sent home the same day. Two children died from their injuries.

CT scan was performed in 19.3% (342). A significantly greater proportion of children aged 3–5 years (26.6% (95% CI 22.9% to 30.6%)) than children younger than 3 years (16.5% (95% CI 14.5% to 18.6%)) had a CT scan (table 2). Overall 68% (233/342) had a normal CT, 16.9% (58) had isolated skull fractures, 13.7% (47) had ICI (49% (23) of whom had an associated skull fracture), and 4 were reported as abnormal but details were not given (tables 1 and 2). Children younger than a year had the greatest proportion of abnormal CT scans of 58% (58/100), 74.1% (43/58) of which were in children younger than 6 months of age. While the proportion of children with ICI increased with neurological compromise reflected by increased GCS/AVPU, ICI was identified in 12% (31/260) of children with a GCS=15/AVPU=alert who had a CT scan (table 2).

Also, 62 of the 81 skull fractures were simple linear fractures (41 parietal/temporal, 6 frontal, 11 occipital, 2 basal, 2 location not recorded), 13 were complex fractures (5 bilateral and 7 depressed fractures, 1 multiple). In six cases, neither the site nor type was specified. There was no difference between the distribution of fracture type or site between the children who had coexisting ICI. Twenty-three children had fractures with ICI, in 22 there were underlying extra-axial haemorrhage, contusions

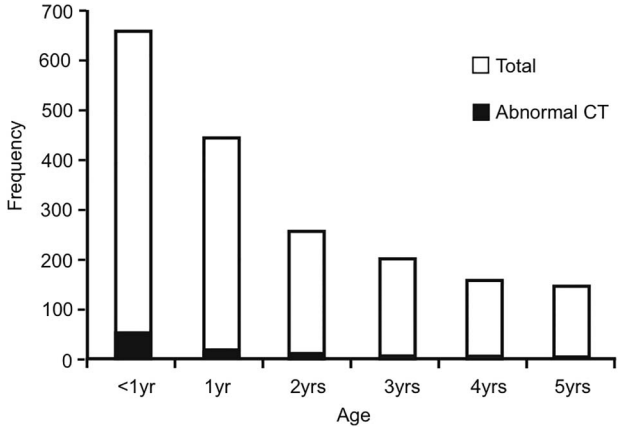

Figure 1 Age of 1775 children who were admitted to hospital after a head injury from a fall.

Table 1 Number and proportion of children who had a CT scan and CT findings by age

Children age (years)	No. children who had CT scan	Minor HI*	Isolated skull fracture	ICI with/without skull fracture	CT scan stated as abnormal but no results given	Total
<1	100 16.4%	545 90.4%	36 6.0%	20 3.3%	2 0.3%	603 34%
1	69 16.1%	408 95.1%	14 3.3%	5† 1.2%	1 0.2%	429† 24.2%
2	42 16.8%	239 95.6%	3 1.2%	7 2.8%	1 0.4%	250 14.1%%
3	50 25.1%	192 96.5%	2 1.0%	5 2.5%	0 0.0%	199 11.2%
4	41 27.0%	145 95.4%	3 2.0%	3 2.0%	1 0.7%	152 8.6%
5	40 28.2%	135 95.1%	0 0.0%	7 4.9%	0 0.0%	142 8.0%
Total	342 19.3%	1664 93.7%	58 3.3%	47 2.6%	4 0.3%	1775 100.0%

*Minor head injury defined when a CT scan was performed with a 'normal' result or no CT was performed but the GCS/AVPU score was GCS=15/alert.
†Two 1 year olds died, one died before having a CT scan and one had ICI on CT.
AVPU, alert, voice, pain, unresponsive; GCS, Glasgow Coma Score; HI, head injury; ICI, intracranial injury.

were described in 2 cases and cerebral oedema in 1. In the 24 children with ICI but no skull fractures, the ICI included contusions (5), intracranial haemorrhage (3), extra-axial haemorrhage (15) and cerebral oedema (1).

Characteristics of the causal event

The majority (74.1% (1316/1775)) of HIs occurred in the home. Falling from a height accounted for 74.5% (1322/1775). Children who fell from a height were more likely to sustain skull fractures or ICI than those who fell from standing (7.4% (98/1322) vs 2.7% (12/453)). The calculated relative OR of this relationship was 2.9 (95% CI 1.6 to 5.4). There was a relationship between the age of the children and the mechanism of injury; young babies fell or were dropped from a carer's arms, toddlers who fell down the stairs or from furniture had a median of 18 months, 1 year olds fell from an infant product while the older children fell from standing or from walls, windows, shopping trolleys, and so on (table 3).

The three mechanisms with the greatest proportions of abnormal CT were falls from (1) a person's arms, (2) building or building component (11 from a wall, 19 from window, 6 from attic, 6 balcony/banister/gallery/stage, 6 from bathroom furnishings or gate, 3 from patio) and (3) an infant or child product. Stepwise elimination of co-covariates in the logistic regression model resulted in only the mechanism of injury remaining in the model. The relative ORs for sustaining a skull fracture or ICI were significantly greater than a fall from standing or sitting, namely 6.94 (95% CI 3.54 to 13.6), 6.84 (95% CI 2.65 to 17.6) and 2.75 (95% CI 1.36 to 5.65), respectively (table 3). A child who fell from a carer's arms down the stairs had a greater chance (23.3% (95% CI 13.2% to 37.8%) (10/43)) of sustaining a skull fracture or ICI compared with those who were dropped on to the floor (14.2% (95% CI 10% to 19.9%) (27/190)).

Figure 2 outlines the reported objects that 1775 children had fallen from. With the exception of falls from a carer's arms, from a building or an infant child product, there were no significant statistical differences in the proportion of abnormal CT findings among any of the other categories.

DISCUSSION

The greatest proportion of the children who were admitted to hospital following an HI from a fall were younger than 1 year. One-fifth of the children had a CT scan to confirm or exclude ICI. One-third of which had an abnormality reported, equivalent to 5.9% of the overall population studied. The most

Table 2 CT outcome for 342 children according to GCS/AVPU score

	CT: normal	Isolated skull fracture	ICI with/without skull fracture	CT scan stated to be abnormal but no results given	Total
GCS 1 5/AVPU=A	180 69.2%	45 17.3%	31 11.9%	4 1.5%	260
GCS 13–14	29 69.0%	7 16.7%	6 14.3%	0 0.0%	42
GCS 9–12/AVPU=V	10 66.7%	1 6.7%	4 26.7%	0 0.0%	15
GCS 8 or less/AVPU P or U	4 40.0%	1 10.0%	5 50.0%	0 0.0%	10
Missing	10 66.7%	4 26.7%	1 6.7%	0 0.0%	15
Total	233 68.1%	58 17.0%	47 13.7%	4 1.2%	342

AVPU, alert, voice, pain, unresponsive; GCS, Glasgow Coma Score; ICI, intracranial injury.

Table 3 CT outcome by mechanism with relative 95% CI of sustaining a skull fracture or intracranial injury (ICI) from each mechanism compared with a fall from sitting or standing

Mechanism	Median age years (IQR)	CT: normal	CT: skull fracture	CT: ICI with/ without skull fracture	CT: abnormal scan/died	Total	Odds ratios of skull fracture or ICI to fall from standing/sitting	p Value
Persons arms	0.3 (1.1)	196 (84.1%)	21 (9%)	15 (6.4%)	1 (0.4%)	233	6.94 (3.54 to 13.6)	<0.001
Building, building component or related fitting	3.2 (2.6)	43 (84.3%)	2 (3.9%)	5 (9.8%)	1 (2%)	51	6.84 (2.65 to 17.6)	<0.001
Other	3.3 (2.5)	52 (92.9%)	2 (3.6%)	1 (1.8%)	1 (1.8%)	56	2.83 (0.89 to 9.09)	0.081
Infant or child product	0.9 (2.8)	334 (93%)	17 (4.7%)	8 (2.2%)	0	359	2.75 (1.36 to 5.56)	0.005
Furniture	1.5 (1.8)	388 (95.8%)	8 (2%)	7 (1.7%)	2 (0.5%)	405	1.61 (0.76 to 3.41)	0.214
Stairs	1.5 (1.3)	211 (96.8%)	2 (0.9%)	5 (2.3%)	0	218	1.22 (0.47 to 3.14)	0.682
Standing/sitting	2.4 (2.8)	441 (97.4%)	6 (1.3%)	6 (1.3%)	0	453		
Total		1665 (93.8%)	58 (3.3%)	47 (2.6%)	5 (0.3%)	1775		

Infant product included cot, Moses basket, high chair or pram.
Building or building component included wall, window attic, balcony/banister/gallery/stage, bathroom furnishings, gate, patio.

common abnormal finding was a skull fracture, most commonly a simple linear parietal fracture, a proportion (1 in 4) of these had an underlying extra-axial haemorrhage. Few children sustained an ICI without skull fracture. These findings are similar to those of Dietrich *et al*[19] and to a recent publication by Thomas *et al*[20] for children younger than 2 years old. The latter study identified 'isolated skull fractures' in 19.5% of children who had neuroimaging for head injuries and focal intracranial haemorrhage in 15.4%. Although the study included all mechanisms of injury, 82% of the series were from falls.

The highest rate of abnormal CT scans was evident in infants who fell from a parent's arms, a finding consistent with other studies.[5 21 22] The likelihood of an abnormal CT scan was greater for children dropped on the stairs compared with those dropped on to the floor. By contrast, falls down stairs, which were one of the most common reasons for hospital admission, resulted in a low prevalence of skull fracture or ICI.

The strength of this study is the large national dataset and representative sample. The data were limited to hospital admissions and are likely to be biased by injury severity, clinical decisions to admit cases and variation in admission policy and facilities across the UK. While there were clear national HI guidelines in place at the time of the study,[15] adherence to guidelines varied and results could only be based on the CT findings according to the level of investigations undertaken. The study does not include the many children who were assessed in the emergency department and discharged home. Children referred to social services were excluded due to uncertainty about mechanism, some of which may have been genuine falls once child protection investigations were completed, but this information was not available to us. Equally it is possible that the dataset includes unrecognised cases of physical abuse. Data were collected over a 6-month winter period and are likely to have missed the summer peak incidence or seasonal variation in injury type.[4]

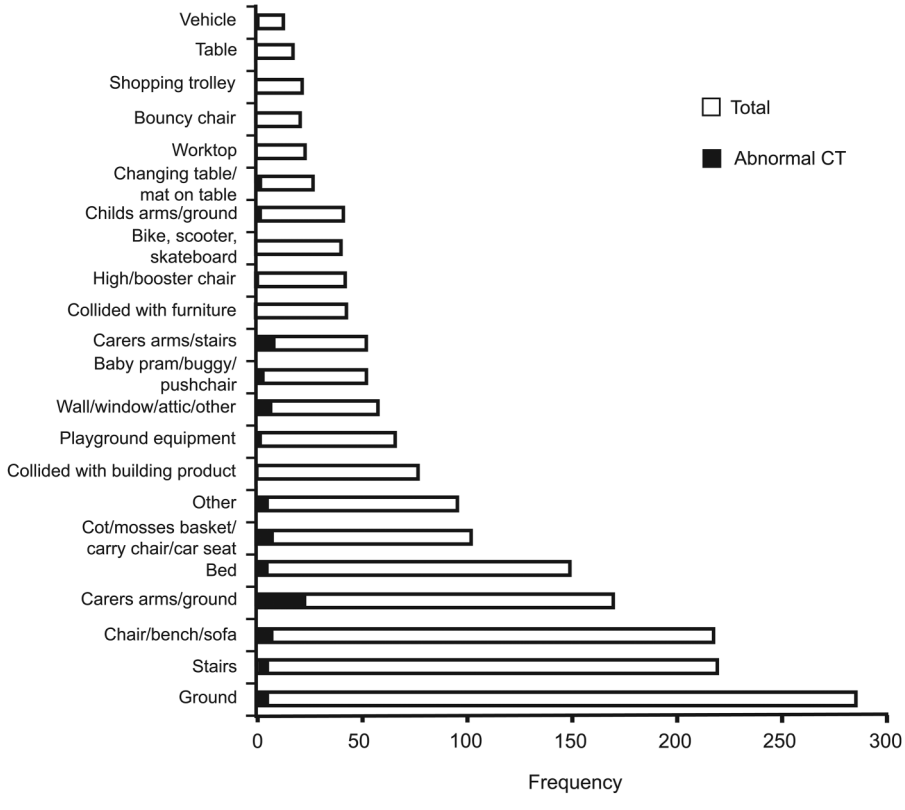

Figure 2 Object fallen from for 1775 children admitted to hospital with a head injury from a fall.

Much of the information processed and coded was written in free text, creating an element of subjectivity when categorising data. The data had been collected from >200 hospitals, and the quality of data entry varied. However, after exclusion of cases with poor data quality, we are confident that the dataset represents a cross section of falls in preschool children who were admitted to hospital. Although the Injury Database manual was used as a coding standard for consistency, the manual is not designed specifically for falls and was thus adapted for the population studied to include some of the emergent categories.

The increased likelihood of a skull fracture or ICI from a fall from height compared with falling from standing height was unsurprising. The height of a fall in this study was estimated in terms of the nature of the item fallen from, and this is frequently all that the clinician has to inform a clinical assessment when assessing the likelihood of cranial or intracranial structural damage.

Estimating a fall height threshold for serious HI is a debated topic.[10 13 23 24] In 1991, Williams described how infants who fell from <10 ft (3 m) were unlikely to sustain serious injuries (intracranial haemorrhages, cerebral oedema, depressed skull fractures and compound or comminuted fractures),[23] while in 2008 Chadwick *et al*[13] published a systematic review estimating a mortality rate of <0.48 deaths per one million children in the USA for children involved in short falls of <3 ft (<1 m). In 2012, Ibrahim *et al*[10] acknowledged that falls from a greater height could result in incrementally more serious injury but suggested that there are multiple factors to consider such as the angle of the fall, impact and landing position of the child (all beyond the scope of this study). Although we were unable to make height estimates, our results show a lower proportion of skull fractures or ICI after a fall from standing or from low-height furniture than from falls from windows and other building components, or from a carer's arms.

Most infant falls are short vertical falls;[22] however, being dropped may result in a child being released at an angle causing a non-linear fall and rapid angular deceleration on impact with the ground.[25] The biomechanics involved when a child that is dropped down the stairs is complex. We hypothesise that the height of the initial fall before contact with the stairs increases the momentum with which the child continues to tumble down the stairs, increasing the complexity of the fall and the likelihood of sustaining a skull fracture or ICI. The proportion of children who sustain a skull fracture or ICI after falling down the stairs without being dropped was considerably lower (3.4% vs 26.2%). This mechanism has been described as a series of short falls between each individual step.[26] There is a culture of anxiety concerning children falling down stairs. A retrospective study estimates that a child under the age of 5 is seen every six minutes for a stair-related fall in US emergency departments.[27]

This study extends our understanding of HI from falls and the risk of skull fracture or ICI given the age of the child and item fallen from. It identifies the dangers of dropping children while confirming that low height falls, including simple stair falls, rarely cause impaired consciousness, skull fractures or ICI. The findings have the potential to inform HI clinical decision rules about falls that warrant a CT scan. Currently, this varies from a fall of 3 ft or more or five stairs (Canadian Assessment of Tomography for Childhood Head Injury),[28] falls that exceed 0.9 m for children younger than 2 years or >1.5 m (5 ft) for older children (Pediatric Emergency Care Applied Research Network)[1] to falls that exceed 3 m (Children's Head Injury Algorithm for the Prediction of Important Clinical Events).[29] Child protection specialists can apply the findings to inform decisions about the plausibility of injury explanations when assessing infants and young children with suspected physical abuse. Prevention initiatives should stress the importance of carrying children safely, particularly while going up and downstairs.

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Collaborators Additional members of the original CMACE Head Injury External advisory group: Professor Robert Tasker, Paediatrics, University of Cambridge, Dr Rosemary Arthur Consultant Paediatric Radiologist Leeds (British Society Paediatric Radiology), Dr Fiona Lecky: Research Director TARN, Senior Lecturer, Honorary Consultant Emergency Medicine Manchester, Dr Fiona Moore: Medical Director London Ambulance Service, Dr Kevin Moore: Director PICU Birmingham Children's Hospital. Lisa Turan: Chief Executive Child Brain Injury Trust, Girkamal Virdi: Assistant Head of Clinical and Audit Research London Ambulance Service, Mark Woolcock: Emergency Medical Practitioner and Emergency Specialist Service South Western Ambulance Service NHS Foundation Trust, UK.

Contributors PB undertook this project as an intercalated medical student when completing his BSc in Public Health. LT undertook and advised upon the statistical analysis. RH designed the original data collection tools, supervised data collection, cleaning and data entry of the data collected within the original confidential enquiry of head injury (CMACE). JH gave supervisory advice to PB, advised on biomechanics and participated in study design and analysis. GP was the director of the CMACE confidential enquiry and supervised the design and running of the project and has been involved in editing his manuscript. RJE, PH, IM and RCP were all members of the project Independent Advisory Board and gave advice and editorial supervision at regular intervals during the study analysis. AMK supervised the student project, coordinated the study writing, checked and edited the manuscript, agreed the concept and methodology of this particular analysis.

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Competing interests IM is supported by the National Institute for Health Research (NIHR) Biomedical Research Centre based at Imperial College Healthcare NHS Trust and Imperial College London.

Patient consent CMACE obtained Section 251 approval to gather patient information without consent.

Ethics approval The project was approved by the Central Manchester Research Ethics Committee. R&D or clinical governance approvals were obtained from all participating hospitals. These approvals were renewed when the project was transferred to Cardiff University for analysis (Ref 09/H1008/74) July 2012.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement The data that informs this study is an anonymised national dataset and is available upon request for individuals who have a worthy cause to analyse as long as the rationale fits with the ethical approval and Section 251 requirements. We would consult with such bodies as necessary.

REFERENCES

1 Kuppermann N, Holmes JF, Dayan PS, *et al*. Identification of children at very low risk of clinically-important brain injuries after head trauma: a prospective cohort study. *Lancet* 2009;374:1160–70.

2 Statistics HE. Admitted Patient Care, England, 2011–12: External causes 1 November 2012 ed. 2012.
3 Ewing-Cobbs L, Fletcher JM, Levin HS, *et al*. Longitudinal neuropsychological outcome in infants and preschoolers with traumatic brain injury. *J Int Neuropsychol Soc* 1997;3:581–91.
4 Parslow RC, Morris KP, Tasker RC, *et al*, Group UPTBISS. Epidemiology of traumatic brain injury in children receiving intensive care in the UK. *Arch Dis Child* 2005;90:1182–7.
5 Crowe LM, Catroppa C, Anderson V, *et al*. Head injuries in children under 3 years. *Injury* 2012;43:2141–5.
6 Kraus JF, Rock A, Hemyari P. Brain injuries among infants, children, adolescents, and young adults. *Am J Dis Child* 1990;144:684–91.
7 John SM, Kelly P, Vincent A. Patterns of structural head injury in children younger than 3 years: a ten-year review of 519 patients. *J Trauma Acute Care Surg* 2013;74:276–81.
8 Pickett W, Streight S, Simpson K, *et al*. Injuries experienced by infant children: a population-based epidemiological analysis. *Pediatrics* 2003;111(4 Pt 1):e365–70.
9 Warrington SA, Wright CM, Team AS. Accidents and resulting injuries in premobile infants: data from the ALSPAC study. *Arch Dis Child* 2001;85:104–7.
10 Ibrahim NG, Wood J, Margulies SS, *et al*. Influence of age and fall type on head injuries in infants and toddlers. *Int J Dev Neurosci* 2012;30:201–6.
11 Thompson AK, Bertocci G, Rice W, *et al*. Pediatric short-distance household falls: biomechanics and associated injury severity. *Accid Anal Prev* 2011;43:143–50.
12 Reiber GD. Fatal falls in childhood. How far must children fall to sustain fatal head injury? Report of cases and review of the literature. *Am J Forensic Med Pathol* 1993;14:201–7.
13 Chadwick DL, Bertocci G, Castillo E, *et al*. Annual risk of death resulting from short falls among young children: less than 1 in 1 million. *Pediatrics* 2008;121:1213–24.
14 Plunkett J. Fatal pediatric head injuries caused by short-distance falls. *Am J Forensic Med Pathol* 2001;22:1–12.
15 NICE. *Triage, assessment, investigation and early management of head injury in infants, children and adults*. National Institute for Health and Clinical Excellence, 2007.
16 European-Union. *The Injury Database (IDB) coding manual: data dictionary*. Amsterdam, The Netherlands: Consumer Safety Institute, 2005.
17 Trauma ACoSCo. *Advanced life support manual*. Chicago: American College of Surgeons, 1993.
18 Mackay CA, Burke DP, Burke JA, *et al*. Association between the assessment of conscious level using the AVPU system and the Glasgow Coma Scale. *Pre-Hos Immediate Care* 2000;4:17–19.
19 Dietrich AM, Bowman MJ, Ginn-Pease ME, *et al*. Pediatric head injuries: can clinical factors reliably predict an abnormality on computed tomography? *Ann Emerg Med* 1993;22:1535–40.
20 Thomas AG, Hegde SV, Dineen RA, *et al*. Patterns of accidental craniocerebral injury occurring in early childhood. *Arch Dis Child* 2013;98:787–92.
21 Settle F, Lawrence D, Kummerow M. Pre-ambulatory infants with head trauma: a three-year retrospective study. *J Paediatr Child Health* 2005;41:130–5.
22 Tarantino CA, Dowd MD, Murdock TC. Short vertical falls in infants. *Pediatr Emerg Care* 1999;15:5–8.
23 Williams RA. Injuries in infants and small children resulting from witnessed and corroborated free falls. *J Trauma* 1991;31:1350–2.
24 Chadwick DL, Chin S, Salerno C, *et al*. Deaths from falls in children: how far is fatal? *J Trauma* 1991;31:1353–5.
25 Duhaime AC, Alario AJ, Lewander WJ, *et al*. Head injury in very young children: mechanisms, injury types, and ophthalmologic findings in 100 hospitalized patients younger than 2 years of age. *Pediatrics* 1992;90(2 Pt 1):179–85.
26 Joffe M, Ludwig S. Stairway injuries in children. *Pediatrics* 1988;82(3 Pt 2):457–61.
27 Zielinski AE, Rochette LM, Smith GA. Stair-related injuries to young children treated in US emergency departments, 1999–2008. *Pediatrics* 2012;129:721–7.
28 Osmond MH, Klassen TP, Wells GA, *et al*. CATCH: a clinical decision rule for the use of computed tomography in children with minor head injury. *CMAJ* 2010;182:341–8.
29 Dunning J, Daly JP, Lomas JP, *et al*. Derivation of the children's head injury algorithm for the prediction of important clinical events decision rule for head injury in children. *Arch Dis Child* 2006;91:885–91.

Supplementary file 1. Classification of objects fallen from

Furniture/furnishing	Object fallen from
Building, building component, or related fitting	1. Wall, window, attic 2. Other building component or related fitting
Infant or child product	1. Changing table/changing mat on table 2. Pram/buggy/pushchair 3. Cot, moses basket, carry chair, carseat 4. Playground Equipment 5. High chair, booster chair 6. Bike, scooter and skateboard 7. Other infant or child product
Stairs*	1. Stairs
Persons arms	1. Parent's arms to ground 2. Child's arms to ground 3. Parent's arms down stairs
Other	1. Shopping trolley 2. Other specified object

** Due to the large number of cases, stairs were removed from the group 'Building, building component, or related fitting' and made into a separate category*

For office use only: ☐☐ HI ☐☐☐☐

Centre for Maternal and Child Enquiries

Improving the health of mothers, babies and children

HEAD INJURY IN CHILDREN

NOTIFICATION FORM (A)

Please complete this form for a child or young person *up to* 15 years old *(14 yrs + 365 days)* who as a result of a head injury* or a head injury as part of a pattern of injuries meets ONE of the following criteria between 1st SEPTEMBER 2009 and 28th FEBRUARY 2010 inclusive:

Please tick type of case: ***(Select one option only)***

☐ Seen in your Emergency Department and admitted* to your hospital for secondary or tertiary care OR

☐ Seen in your Emergency Department but transferred for admission* to secondary or tertiary care at another hospital (within or out of your trust) OR

☐ Seen in your Emergency Department but died *before* admission* or transfer* to secondary care OR

☐ Died at the scene or died between the scene and attendance at the first hospital.

Instructions for completing and returning the notification form

1. Certain sections may not be applicable to all children. Please read the guidance manual before completing.
2. Please complete the form using the information available in the child's notes. Complete all dates in the format DD/MM/YY and times using the 24hr clock *e.g. 18:50*.
3. **Please keep a copy of this form for your records. Return hardcopies of completed forms to your local CMACE regional office. See back of form for local contact details.**
4. If you have any queries about completing or returning this form please contact your CMACE regional office.

Date form completed: D D / M M / Y Y **Date form returned:** D D / M M / Y Y

DETAILS OF PERSON COMPLETING FORM	
Name:	**Trust:**
Job title/Role:	**Telephone:**
Unit:	**Email:**
Hospital:	

* ***Head injury:*** *Examples of head injuries to include or exclude can be found on the back of this form.*

* ***Admission:*** *Hospital admission is defined as occurring when the patient is in receipt of treatment or observation in an inpatient area. This includes short term assessment units associated with wards or emergency departments, short stay units, general or specialist wards, PICUs, Neurosurgical unit, or other inpatient unit. This may only be for a matter of hours beyond the first four hours from arrival at hospital.*

* ***Transfer:*** *Refers to the transport of a patient by ambulance (land or air) from one hospital to another hospital facility. Also referred to as an 'inter-hospital transfer' between two hospitals either within or out of the same trust.*

Is this the first hospital the child attended following the incident? ☐ Yes ☐ No

→ ***If no, hospital child transferred from*** _____

SECTION 1: DETAILS OF CHILD *(Affix patient label if preferred)*

1.1 Hospital Number ☐☐☐☐☐☐☐☐☐☐

1.2 NHS Number/Healthcare Number ☐☐☐ / ☐☐☐ / ☐☐☐☐

1.3 Surname/family name _____

1.4 First name _____

1.5 Sex ☐ Male ☐ Female ☐ Not known

1.6 Date of birth and/or estimated age

If no full date of birth is known enter month and year. If no full or short DOB, enter their estimated age.

DD/MM/YY ☐ Not known

☐☐ **years** ☐☐ **months**

1.7 Address of patient's normal residence _____ ☐ Not known

Postcode of patient's normal residence ☐☐☐☐ / ☐☐☐

1.8 Ethnic group ☐ Not known

White	***Mixed:***	***Asian or Asian British***	***Black or Black British:***	***Other ethnic groups:***
☐ English	☐ White & Black Caribbean	☐ Indian	☐ Caribbean	☐ Arab
☐ Other British	☐ White & Black African	☐ Pakistani	☐ African	☐ Gypsy/ Romany/ Irish Traveller
☐ Irish	☐ White & Asian	☐ Bangladeshi	☐ Other Black background	☐ Other ethnic group
☐ Any other white background	☐ Any other Mixed background	☐ Chinese		
		☐ Any other Asian background		

If other, please specify _____

1.9 Child known to Social Services ☐ Yes ☐ No ☐ Not known

If answering this question is not indicated as part of the admission process and you are unaware of whether the child is or is not known to Social Services, tick 'Not known'. i.e. you are not required to call Social Services to answer this question.

1.10 Child subject of *existing* child protection plan ☐ Yes ☐ No ☐ Not known

SECTION 2: DETAILS OF INCIDENT

2.1 Date of incident DD/MM/YY ☐ *Not recorded*

2.2 Time of incident HH:MM *(24 hr clock)* ☐ *Not recorded*

2.3 Postcode of incident location ☐☐☐☐ / ☐☐☐ ☐ Not known

If postcode is not known indicate area/first line of address _____ ☐ Not known

2.4 Place of incident

☐ Home/private address ☐ Road/ Street/Motorway ☐ School/ Nursery ☐ Other, *specify* _____ ☐ Not known

2.5 Cause of injury

☐ Struck by car *(i.e. child was pedestrian)*
☐ Motor vehicle accident (not pedestrian)
☐ Cycling
☐ Fall from > 1m or > 5 stairs
☐ Fall < 1m or < 5 stairs
☐ Fall, height unknown
☐ Sport, *please specify* _____
☐ Other recreational *(e.g. skateboard) specify* _____
☐ Assault
☐ Other, *please specify* _____
☐ Not known

2.6 Additional incident details, if known *(e.g. Fall from trampoline, speed, not in age appropriate car seat, etc)*

Please use the additional space provided on page 7 if there is not enough room to complete your answer

2.7 Suspicion of Non Accidental Injury (NAI) ☐ Yes ☐ No ☐ Not known

2.8 Seatbelt worn ☐ Yes ☐ No ☐ Not known ☐ *N/A*

2.9 Helmet worn ☐ Yes ☐ No ☐ Not known ☐ *N/A*

SECTION 2: DETAILS OF INCIDENT *continued*

2.10 **Did the child sustain any other injury to other area(s) of their body?** *(e.g. bruises, fractures)* ☐ Yes *→ Go to 2.11* ☐ No *→ Go to 2.12* ☐ Not known *→ Go to 2.12*

2.11 **If yes, please indicate whether the child sustained any other injuries to the following areas**
(If an injury is 'Not recorded' then tick 'Minor/None')

	Major - requiring hospital admission itself	Minor/None	Not Known
a. Head	☐	☐	☐
b. Face	☐	☐	☐
c. Neck	☐	☐	☐
d. Chest	☐	☐	☐
e. Abdomen (including pelvic contents)	☐	☐	☐
f. Spine	☐	☐	☐
g. Limbs (excluding pelvic girdle)	☐	☐	☐
h. Bone pelvis	☐	☐	☐
i. Body surface (penetrating)	☐	☐	☐
j. Body surface (blunt)	☐	☐	☐
k. Burns	☐	☐	☐
l. Other, *specify* _____	☐	☐	☐

Please use the additional space on page 7 to provide additional details on these other injuries, if information available

2.12 **Child experienced a period of loss of consciousness** *(at any time)* ☐ Yes ☐ No ☐ Not known

2.13 **Route of referral to this Emergency Department**

☐ 999 Ambulance Service
☐ Minor Injury Unit, *(specify)* _____
☐ Other hospital, *(specify)* _____
☐ Self/Parental referral
☐ Telephone advice – NHS Direct
☐ GP assessment unit
☐ GP surgery
☐ Not known
☐ Other *(specify)* _____

2.14 **Mode of arrival to the first hospital**

☐ Road ambulance *→ Go to Section 3*
☐ Air ambulance *→ Go to Section 3*
☐ Private/public transport *→ Go to Section 4*
☐ Other, *specify* _____ *→ Go to Section 4*

SECTION 3: PRE HOSPITAL – AT SCENE/EN ROUTE

Please complete the following details as fully as possible from the child's notes. This will help us to be able to obtain records from the ambulance services. Referring to the guidance manual will help you.

3.1 **Name of Ambulance Service involved** _____ ☐ *Not recorded*

3.2 **Ambulance notes in the child's hospital records** ☐ Yes ☐ No

3.3 **Patient Report Form number** ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ Not known

3.4 **Incident number/CAD number (or equivalent)** ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ Not known

3.5 **On arrival of emergency services at the scene child was found to be:**
☐ Alive *→ Continue completing this section*
☐ Dead *→ Go to Section 6*

3.6 **Child's neurological status at scene**
Document the worst score before intubation/intervention. If no intubation/intervention occurred, document the worst score.

3.6.1 **Glasgow Coma Scale Score** ☐ *Not recorded*

Eye opening	
Verbal response	
Motor response	
TOTAL (out of 15)	

Time GCS recorded:
HH:MM *(24 hr clock)* ☐ *Not recorded*

3.6.2 **AVPU Score** ☐ *Not recorded*

***A**lert*	
*Respond to **V**oice*	
*Respond to **P**ain*	
***U**nresponsive*	

Time AVPU recorded:
HH:MM *(24 hr clock)* ☐ *Not recorded*

3.7 **Child intubated at scene/en-route** ☐ Yes ☐ No ☐ Not known

3.8 **Other mechanical airway/breathing assistance employed at scene/en-route** *(e.g. Bagging/BVM)* ☐ Yes ☐ No ☐ Not known ☐ *Not recorded*

SECTION 4: EMERGENCY DEPARTMENT

4.1 Name of Hospital _____

4.2 Date of arrival at the Emergency Department D D / M M / Y Y ☐ *Not recorded*

4.3 Time of arrival at the Emergency Department H H : M M *(24 hr clock)* ☐ *Not recorded*

Previous attendance/s

4.4 Was this current visit a re-attendance in relation to a previous injury? ☐ Yes *→ Go to 4.4.1* ☐ No *→ Go to 4.5* ☐ Not known *→ Go to 4.5*
(that occurred within 72 hours of this attendance)

4.4.1 Name of hospital first attended _____ ☐ Not known

4.4.2 Date attended that hospital D D / M M / Y Y ☐ *Not recorded*

4.4.3 Time of review at previous attendance H H : M M *(24 hr clock)* ☐ *Not recorded*

4.4.4 Grade of clinician who discharged child ☐☐☐☐ ☐ Not known
(see codes on page 7)

4.4.5 Head CT scan at previous attendance ☐ Yes ☐ No ☐ Not known

This attendance

4.5 Details of first clinical assessment for this attendance *(please refer to codes on page 7)*
This refers to the first clinical assessment (i.e. not included assessment by the triage nurse)

4.5.1 Grade of clinician *(see codes on page 7)* ☐☐☐☐ ☐ *Not recorded*

4.5.2 Speciality of clinician *(see codes on page 7)* ☐☐☐ ☐ *Not recorded*

4.5.3 Time of first *clinical* assessment H H : M M *(24 hr clock)* ☐ *Not recorded*
(i.e. not assessment by the triage nurse)

4.6 Following first clinical assessment *(i.e. not assessment by triage nurse)* **was the child referred for consideration by:**

4.6.1 A more senior member of medical team ☐ Yes ☐ No ☐ Not known

4.6.2 Another speciality ☐ Yes ☐ No ☐ Not known

4.7 Child's neurological status in the Emergency Department
Document the worst score before intubation/intervention in the Emergency Department. If no intubation/intervention occurred in the Emergency Department, document the worst score.

4.7.1 Glasgow Coma Scale Score ☐ *Not recorded*

Eye opening	
Verbal response	
Motor response	
TOTAL (out of 15)	

Time GCS recorded:
H H : M M *(24 hr clock)* ☐ *Not recorded*

4.7.2 AVPU Score ☐ *Not recorded*

***A**lert*	
*Respond to **V**oice*	
*Respond to **P**ain*	
***U**nresponsive*	

Time AVPU recorded:
H H : M M *(24 hr clock)* ☐ *Not recorded*

4.8 Child intubated in the Emergency Department ☐ Yes ☐ No ☐ Not known

IMAGING *(At any time following attendance)*

4.8 Head CT scan performed ☐ Yes *→ Go to 4.8.1* ☐ No *→ Go to 4.8.4* ☐ Not known *→ Go to 4.9*

4.8.1 Date first head CT scan performed D D / M M / Y Y ☐ *Not recorded*

4.8.2 Time first head CT scan performed H H : M M *(24 hr clock)* ☐ *Not recorded*

4.8.3 Was the first head CT scan reported as normal on provisional report? ☐ Yes *→ Go to 4.9* ☐ No *→ Specify abnormality:* ☐ Not known *→ Go to 4.9*

4.8.4 If no head CT performed, please indicate reason/reasons why: *(tick all that apply)*

☐ CT scan already done at first hospital
☐ Not considered to be clinically indicated
☐ Child not stable
☐ No CT available
☐ Other, *please specify* _____
☐ Not known

IMAGING *continued* *(At any time following attendance)*

4.9 Complete cervical spine CT performed ☐ Yes → *Go to 4.9.1.* ☐ No→ *Go to 4.9.2* ☐ Not known → *Go to 4.10*

4.9.1 Was the first spine CT scan reported as normal on provisional report? ☐ Yes → *Go to 4.10* ☐ No → *Specify abnormality:* ☐ Not known → *Go to 4.10*

4.9.2 If no spine CT scan performed please indicate reason/reasons why: *(tick all that apply)*

☐ CT scan already done at first hospital
☐ Not considered to be clinically indicated
☐ Child not stable
☐ No CT available
☐ Other, *please specify* _____
☐ Not known

4.10 Was the child 'admitted' to your hospital? (*see cover for definition of admission*) ☐ Yes → *Go to 5.1* ☐ No → *Go to 4.10.1*

4.10.1 If no, where did child go following discharge from the Emergency Department

☐ Transferred to another hospital → *Go to 6.2*
☐ Deceased → *Go to 6.4*
☐ Other, *please specify* _____ → *Go to 6.1*

SECTION 5: ADMISSION

5.1 Area child <u>first</u> admitted to:

☐ General children's ward
☐ Paediatric Intensive Care Unit (PICU)
☐ Paediatric Neurosurgical unit
☐ Paediatric High Dependency Unit (PHDU)
☐ Specialist children's ward, *specify* _____
☐ General/Adult ICU
☐ Adult Neurosurgical unit
☐ Adult High Dependency Unit (HDU)
☐ Other, *specify* _____
☐ Theatre
☐ Short stay Unit
☐ Observation unit
☐ Not known

5.2 Date admitted to area D D / M M / Y Y ☐ *Not recorded*

5.3 Time admitted to area H H : M M *(24 hr clock)* ☐ *Not recorded*

5.4 Designated lead team for this admission *(If joint care tick all that apply)*

☐ General Paediatrics
☐ Paediatric Emergency Medicine
☐ Paediatric Intensive Care
☐ Paediatric Neurosurgery
☐ Paediatric Surgery
☐ General/Adult Emergency Medicine
☐ General/Adult Intensive Care
☐ Adult Neurosurgery
☐ General/Adult Surgery
☐ Orthopaedic Surgery
☐ Not known
☐ Other, *specify* _____

5.5 Indication for admission *(Please tick all that apply)*

☐ Severity of the head injury
☐ Severity of other injuries
☐ Severity of mechanism of injury
☐ Continuing worrying signs in relation to head injury
☐ Abnormality identified on CT scan
☐ Base of skull fracture
☐ Meningism
☐ CSF leak
☐ Drug or Alcohol intoxication
☐ Recovery from GA or sedation used for CT scan
☐ Child fulfils criteria for CT scanning but this cannot be done within the appropriate period
☐ Not sufficiently cooperative to allow scanning
☐ Admitted for GA to have a CT scan
☐ Shock
☐ Suspected Non Accidental Injury (NAI)
☐ Other, *please specify (e.g. not related to head injury, gastroenteritis)* _____

5.6 Consultant paediatrician involved in care of child *(i.e. Discussed with at time of care delivered)* ☐ Yes ☐ No ☐ Not known

5.7 Neurosurgeon involved in care of child *(This includes liaison over telephone, or other means)* ☐ Yes ☐ No ☐ Not known

5.8 Specialist in Child Protection with level 3 training or above involved *(i.e. Discussed with at time of care delivered)* ☐ Yes ☐ No ☐ Not known

5.9 Child Protection referral made to external body *(e.g. Social Services or Police)* ☐ Yes ☐ No ☐ Not known

5.10 Skeletal survey undertaken *(i.e. as part of a child protection assessment)* ☐ Yes ☐ No ☐ Not known

5.11 Review by ophthalmology undertaken *(i.e. as part of a child protection assessment)* ☐ Yes ☐ No ☐ Not known

SECTION 5: ADMISSION *continued*

5.12 IN ADDITION to the first area of admission, was the child *at any time during the first 72 hours post injury* admitted to any of the following areas?

Area	Yes	No	Date admitted	Time admitted *(24 hr clock)*	Date discharged	Time discharged *(24 hr clock)*
a. PICU	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
b. PHDU	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
c. General ICU	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
d. General HDU	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
e. Neurosurgical unit	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
f. Ward	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
g. Theatre	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M
h. Other, *specify* _____	☐	☐	D D/M M/Y Y	H H:M M	D D/M M/Y Y	H H:M M

SECTION 6: CHILD'S OUTCOME - Complete at ***whichever occurs first***: at transfer, at death in hospital, or at the end of the first 72 hours post injury.

6.1 Please indicate the status or location of the child at whichever occurs first
(i.e. at transfer, at death in hospital, or at the end of the first 72 hours post injury)

- ☐ Transferred → *Go to 6.2*
- ☐ Discharged → *Go to 6.3*
- ☐ Deceased → *Go to 6.4*
- ☐ General children's ward
- ☐ Specialist children's ward, *specify* _____
- ☐ Paediatric Intensive Care Unit (PICU)
- ☐ Paediatric High Dependency Unit (PHDU)
- ☐ Paediatric Neurosurgical unit
- ☐ General/Adult ICU
- ☐ Adult Neurosurgical unit
- ☐ Adult/General HDU
- ☐ Not known
- ☐ Other, *specify* _____

6.2 Transferred

6.2.1 Was this a transfer or retrieval? ☐ Transfer ☐ Retrieval ☐ Not known

6.2.2 Name of hospital and trust child transferred *to*

(Hospital) _____

(Trust) _____

6.2.3 Date and time first *referral* made for transfer D D/M M/Y Y H H:M M *(24 hr clock)* ☐ *Not recorded*

6.2.4 First referral request for transfer accepted ☐ Yes ☐ No

6.2.5 Date and time *departure* for transfer D D/M M/Y Y H H:M M *(24 hr clock)* ☐ *Not recorded*

6.2.6 Reason for transfer *(please tick all that apply)*

- ☐ No paediatric facilities
- ☐ No ICU facilities in hospital
- ☐ No PICU bed available in hospital
- ☐ No general ICU bed available in hospital
- ☐ Access to paediatric neuroscience facilities
- ☐ Paediatric surgery
- ☐ Receiving hospital close to child's home
- ☐ Other, *please specify* _____
- ☐ Not recorded
- ☐ Not known

6.2.7 Means of transfer

- ☐ Specialist PICU transport team
- ☐ Local team
- ☐ Paramedic Ambulance
- ☐ Ambulance (Non paramedic)
- ☐ Private/public transport
- ☐ Other land, *please specify* _____
- ☐ Helicopter (Paramedic/medic)
- ☐ Other airborne, *please specify* _____
- ☐ Not recorded
- ☐ Not known

6.2.8 Additional transfer information *(e.g. reason for delay)*

Please use the additional sheet provided on page 7 if there is not enough room to complete your answer

SECTION 6: CHILD'S OUTCOME *continued*

6.3 Discharged

6.3.1 Place child discharged to

☐ Home ☐ Rehab centre
☐ Other, *specify* _____ ☐ Not known

6.3.2 Date of discharge D D / M M / Y Y ☐ *Not recorded*

6.3.3 Time of discharge H H : M M *(24 hr clock)* ☐ *Not recorded*

6.3.4 Diagnosis on discharge _____

6.4 Death *(if a diagnosis of brain stem death is made then the date and time of this diagnosis equals the date and time of death)*

6.4.1 Date of death D D / M M / Y Y ☐ *Not recorded*

6.4.2 Time of death H H : M M *(24 hr clock)* ☐ *Not recorded*

6.4.3 Place of death

☐ General children's ward
☐ Paediatric Intensive Care Unit (PICU)
☐ Paediatric Neurosurgical unit
☐ Paediatric High Dependency Unit (PHDU)
☐ Specialist children's ward, *specify* _____
☐ General/Adult ICU
☐ Adult Neurosurgical unit
☐ Adult High Dependency Unit (HDU)
☐ Emergency Department
☐ Other, *specify* _____
☐ Theatre
☐ Short stay Unit
☐ Observation unit
☐ Home
☐ Not known

6.4.4 Death certificate issued ☐ Yes ☐ No ☐ Not known

6.4.5 Coroner's referral made ☐ Yes ☐ No ☐ Not known

6.4.6 Cause of death *(as stated on death certificate. If no certificate issued state cause of death as in notes)*

For children who died <28 days old

1 _____
2a. _____
2b. _____
2c. _____
2d. _____

For deaths of a child (> 28 days old)

1a. _____
1b. _____
1c. _____
2. _____

Additional space for further information *(please indicate question number you are referring to)*

PLEASE PHOTOCOPY THIS FORM AND KEEP A COPY FOR YOUR RECORDS BEFORE RETURNING TO YOUR CMACE REGIONAL OFFICE

Speciality & Clinician Codes

CODE	SPECIALITY	CODE	SPECIALITY
100	General Surgery	302	Endocrinology
110	Trauma & Orthopaediacs	303	Clinical Haematology
120	Ear Nose Throat (ENT)	400	Neurology
145	Oral & Maxillo Facial Surgery	401	Clinical Neuro-Physiology
150	Neurosurgery	420	Paediatrics
170	Cardiothoracic Surgery	421	Paediatric Neurology
171	Paediatric Surgery	450	Dental Medicine Specialities
180	Emergency Medicine	460	Medical Opthamology
190	Anaesthetics	600	General Medical Practice
192	Critical Care Medicine	601	General Dental Practice
193	Paediatric Intensive Care	810	Radiology
300	General Medicine	823	Haematology
301	Gastroenterology	000	Other (Surgical or Medical)

CODE	CLINICIAN
CONS	Consultant
SG	Staff Grade
CF	Clinical Fellow
AS	Associate Specialist
ST *+ 1-8*	Single Training *e.g. ST4*
SpR *+ year*	Specialist Registrar *e.g. SpR2*
FY *+ year*	Foundation year *e.g. if year 1, enter FY1*
ENP	Emergency Nurse Practitioner
APNP	Advanced Paediatric Nurse Practitioner
ATNC	Nurse - Advance Trauma Cert
RSCN	Nurse - RSCN
NURS	Nurse - General
GP	General Practitioner

Inclusion & exclusion criteria

Please include:

- **Children up to 15 years old (14 years and 364 days) who between 00:00 on the 1st September 09 and 23:59 on the 28th February 2010 have a brain or skull injury (trauma to the head) as a result of blunt or penetrating trauma or acceleration or deceleration force *(e.g. road traffic accident, fall, shaking)* *OR* who have experienced a head injury as part of a pattern of injuries or multi trauma *AND* fulfill the following length of stay criteria:**

⇒ Admitted to an area of inpatient care *(regardless of length of stay)* ***OR***
⇒ Died in the hospital, including the Emergency Department ***OR***
⇒ Transferred to other hospital for specialist care or for an ICU/HDU bed ***OR***
⇒ Died at the scene or en route to the receiving hospital ***OR***
⇒ Transferred in to your hospital *(regardless of length of stay)*

Definition of **'admission'** can be found on the front of this form

Please exclude:

- Children who have experienced primarily superficial or facial injuries which are *unlikely to be associated with a brain injury (e.g. isolated or trivial facial (nose, ear, lip etc), scalp or auricular injuries)*
- Children who do not meet the above inclusion criteria (i.e. children who do not die that are not admitted; children who have reached their 15th birthday at the time of injury).

Examples of types of head injuries to be INCLUDED	
S02	**Fracture of skull and facial bones, *e.g.***
	Fracture of vault of skull
	Fracture of base of skull
	Multiple fractures involving skull and facial bones
	Fractures of other skull and facial bones
S04	**Injury of cranial nerves, *e.g.***
	Injury of optic nerve and pathways
	Injury of oculomotor nerve
S06	**Intracranial injury, *e.g.***
	Concussion
	Traumatic cerebral oedema
	Diffuse brain injury
	Focal brain injury
	EDH (Extra Dural Haematoma)
	Traumatic subdural/subarachnoid haemorrhage
	Intracranial injury with prolonged coma
	Other intracranial injuries
	Intracranial injuries - unspecified
S07	**Crushing injury of head, *e.g.***
	Crushing injury of the face
	Crushing injury of the skull
S08	**Traumatic amputation of part of head, *e.g.***
	Traumatic amputations
	Multiple injuries of head

Examples of types of head injuries to be EXCLUDED	
S00	**Superficial Injuries, *e.g.***
	Superficial injury of scalp
	Contusion of eyelid and periocular area
	Other superficial injuries of eyelid and periocular area
	Superficial injury of nose, ear, lip, or oral cavity
S01	**Open wound of head, *e.g.***
	Scalp, eyelid and periocular area, nose, ear, cheek & temporomandibular area, lip & oral cavity.
S02	**Fracture of skull and facial bones, *e.g.***
	Fracture of tooth, mandible, nasal bones, orbital floor, malar & maxillary bones.
S03	**Dislocation, sprain & strain of joints & ligaments of head,**
	Dislocation of jaw, septal cartilage of nose, septal cartilage of nose, or tooth. Sprain and strain of jaw.
S04	**Injury of cranial nerves, *e.g.***
	Injury of trochlear nerve, trigeminal nerve, abducent nerve, facial nerve
S05	**Injury of eye and orbit, *e.g.***
	Injury of conjunctiva and corneal abrasion
	Contusion of eyeball and orbital tissues
	Ocular laceration and rupture with prolapse
	Penetrating wound of orbit, or eyeball
	Avulsion of eye
S08	**Traumatic amputation of part of head, *e.g.***
	Avulsion of scalp
	Traumatic amputation of ear

If you have any queries regarding the inclusion/exclusion criteria, please contact your CMACE regional office.

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