INJURY BULLETIN

Queensland Injury Surveillance Unit

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Identification of Intentional Injury in Emergency Departments

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Summary:

* More than 1000 children and adolescents present to Queensland Emergency Departments each year following an intentional injury.

* Intentional injury is under-estimated in Emergency Department injury surveillance systems as the true nature of an injury may only be apparent once further investigations are completed.

* During the study period, over 200 infants less than 12 months of age presented with significant head injuries but less than 10% of these presented with histories consistent with intentional injury at triage.

* Systems that remind Emergency Department staff about the possibility of intentional injury in young children and that track previous emergency presentations and diagnoses may help to improve the identification of intentional injury.

Introduction

This report is restricted to injury in children and adolescents where the injury is identified at Emergency Department triage as likely to have been due to deliberate maltreatment or assault (excluding self-harm). This report does not include all injury that raises child protection concerns. Though an injury may not be intentional, the circumstances that lead to an injury may still warrant child protection investigation. “Assault” is generally used when children are injured by an other who is not directly responsible for their care. The ED is a frequent site for presentation of children following intentional injury and provides an opportunity to identify child protection and forensic issues.

Method

The QISU database was searched for the eight year period, 1999 to 2007 for all paediatric ED presentations (age <18 years) where the injury was identified as being other than “accidental "and coded as one of the following: “sexual assault”, “maltreatment by parent”, “maltreatment by partner”, “unspecified assault”, “legal intervention (police)”.

Surveillance data is coded at triage, and triage nurses may be reluctant to assign a “non-accidental” code to the injury before a full assessment has occurred.

QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QISU publications and data are available on request for research, prevention and education activities.

HOSPITALS:

Mater Children’s, Mater Adult, Redland, Royal Children’s , Queen Elizabeth II , Mount Isa, Mackay Base, Mackay Mater, Proserpine Sarina, Clermont, Dysart , Moranbah, Mareeba

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Therefore, a text search was performed for words suggestive of non-accidental injury ("shaken", "police", and "assault", "abuse", "maltreatment", "harm"). Presentations relating to self-harm have been excluded from this analysis.

It is beyond the scope of surveillance data to identify cases of "intentional" injury, where the intentional nature of the injury was only identified subsequent to the triage presentation. In an attempt to explore the potential number of missed intentional cases, an additional search was made for injuries that are considered to be high risk for being intentional. The search was conducted for infants under 12 months of age presenting with severe head injuries, skull fractures and long bone fractures.

QISU data is collected from participating Queensland emergency departments representing approximately one quarter of the state population.

Death data was accessed through the National Coronial Information System (NCIS) (1) and the Commission for Children and Young People and Child Guardian annual reports. [2, 3]

Results:

Death Data

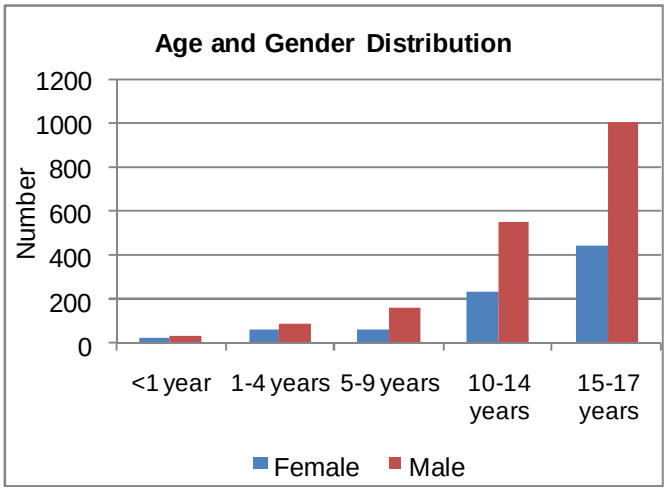
Searching the NCIS database identified 44 children aged 0 to 18 years of age who died as a result of an intentional injury between 2001 and 2006 in Queensland. Injury mechanisms ranged from intentional immersion and shaking in infants to hanging, stabbing, blunt trauma, fire/ smoke inhalation and carbon monoxide poisoning in older children [1]. In most instances, the perpetrator was related to or known to the child (2, 3). Relatively few intentional deaths occurred between the ages of 5 and 12 years. Children aged under 1 year and over 16 years accounting for the majority of intentional deaths.

Emergency Department Data

During the study period, 2682 patients aged less than 18 years presented to a participating ED with an injury identified as probably intentional. This represents 1.4% of all injuries during the study period. The majority (2314 or 86%) presented following an unspecified assault. Of the remaining children, 13 were brought in by police after an alleged assault in police custody, 212 presented following alleged maltreatment by a parent/ carer and 66 presented following assault by a

Age and Gender

Male predominance is seen in all age groups except under 12 months of age (33 males and 30 females). Male predominance peaked at 2.3:1 in the 15-17 year age group. This age group also represented the largest attendance accounting for more than half of all intentional injury presentations (1452).



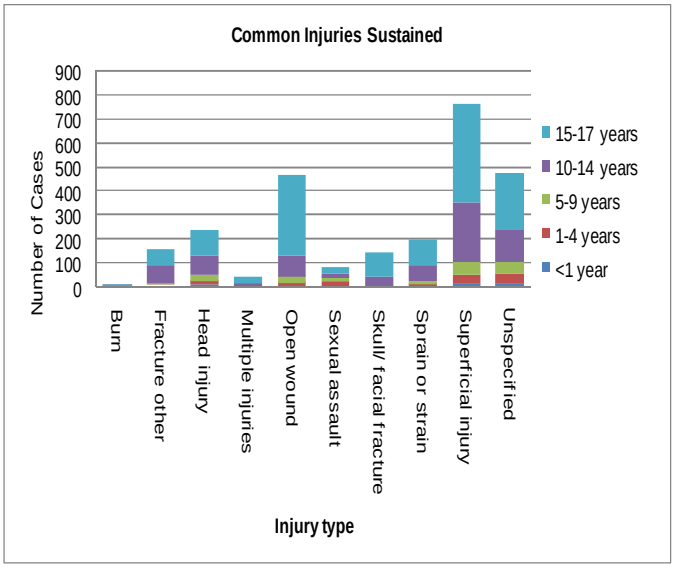
Graph 1: Age and gender distribution of children presenting with intentional injury.

Presentation

There was no significant variation in the day, month or time of presentation. In the majority of cases, the perpetrator of the injury was not identified in the injury surveillance system. In the cases where the perpetrator was identified (480 or 18%) injuries were alleged to be inflicted by other children (167), the child's father/ stepfather (101), the child's mother/ stepmother (67), a parent/ carer (10), brother (62), sister (12) other relative or friend (21), boyfriend (30) girlfriend (4) and other known to child (6).

Nature of Injury

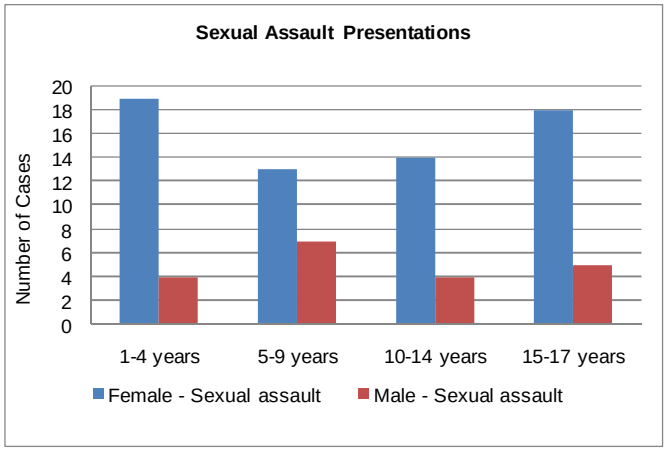
One quarter of children sustained superficial injuries (765) and 17% (468) sustained open wounds. Of the more serious injuries, 245 (9%) presented with unspecified head injuries, 150 with skull or facial fractures (6%), 162 with other fractures (6%) and 8 young children presented having allegedly been shaken. Eighty four children (3%) presented having allegedly been sexually assaulted.



Graph 2: Most Common type of intentional injury by age group: n = 2608 of 2862

Sexual Abuse

Sexual abuse cases were identified in all age groups except under 12 months of age. Overall, females were 3 times as likely to present due to an alleged sexual abuse with female predominance greatest in the 1 to 4 year age group (4:1).



Graph 3: Gender and age distribution in alleged sexual abuse cases

Location

Home was the most common location for intentional injury (848 or 32%), followed by public locations (shops, transport sites, 643 or 24%) and unspecified locations (472 or 18%).In addition, 450 cases (17%) were said to have occurred at school, 179 (7%) in parks/ bushland. Forty six cases occurred in bars/ drinking establishments and 10 in childcare centres. For children under the age of 5 years, 61% of intentional injuries occurred at home.

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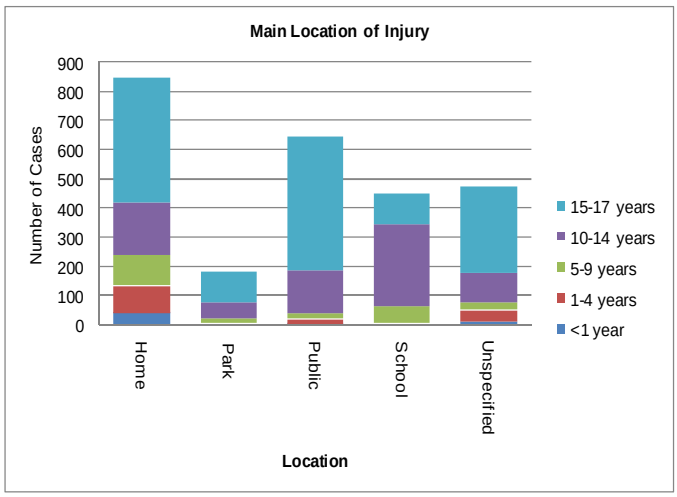
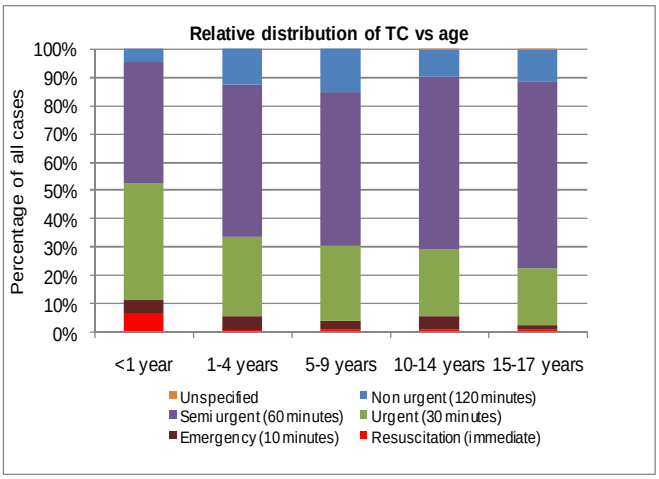


Graph 4: Main locations of intentional injury by age:
n = 2592 of 2682 cases.

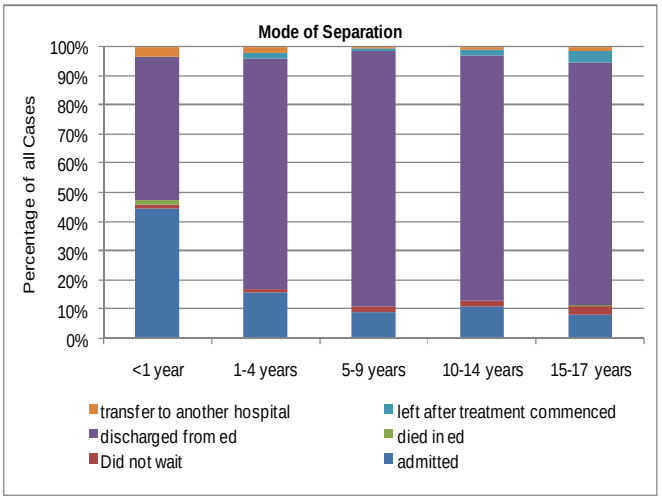
Severity

Eleven per cent of presentations (7/ 63) under 12 months of age presented as triage category 1 or 2 requiring emergency / resuscitation treatment. This is compared to 5% or less in all other age categories presenting as triage category 1 or 2.



Graph 5: Triage category by age group.

The increased acuity in infants under 12 months of age is consistent with the mode of separation data with a significant proportion of children under the age of 12 months admitted or transferred for further treatment or investigation (49%). This compared to less than 20% in all other age groups requiring admission. Two children died in ED, one child under the age of 12 months and one child aged 15 to 17 years.



Graph 6: Mode of separation by age group

Children under 12 months of age

There were a total of 430 ED presentations of infants under the age of 12 months with severe head injury, skull fracture or long bone fracture, irrespective of the intent code. Of these, 230 infants sustained a significant head injury (skull fracture, intracerebral haemorrhage or head injury with triage category 1 or 2) and 200 infants had long bone fractures (41 humeral

fractures, 46 forearm fractures, 64 femoral fractures and 49 lower leg fractures).

Of the 430 ED presentations under 12 months with severe injuries, only 63 were identified as intentional injury at triage. Of these, 32 (51%) had head injuries of which 20 were significant. Six infants presented with intracranial injury, 5 with skull fracture, 4 with concussion and 5 having allegedly been shaken. In addition, one child sustained multiple injuries, 3 sustained a fractured humerus, one sustained a fractured wrist and 3 sustained femoral fractures.

Discussion

QISU data shows an increasing number of presentations due to intentional injury with age, with the lowest number of intentional presentations in children under 12 months of age. Severity of injury and need for admission was significantly greater in infants aged under 12 months of age (nearly half were admitted). This age distribution contrasts to that of all injury presentations which shows a bimodal peak at 1 to 4 years and again at 15 to 17 years. There is a male predominance except in sexual abuse/ assault where overrepresentation of females may represent either a true gender bias or a difference in reporting of suspected sexual abuse/ assault in females.

It is likely that particularly in infants under 12 months of age, only the more severe cases of intentional injury have been identified in the Emergency Department. Only 20 of 230 significant head injuries under 12 months were identified as intentional at triage. This likely reflects problems with identification of intentional injury in younger age groups, particularly children under the age of 5 years. Children in this age group largely reside at home, and intentional injury is unlikely to be identified by people outside the family unless a child care facility is suspicious or medical care is sought.

Children who sustain intentional injuries are likely to present to EDs for care due to multiple factors, such as the acute nature of the injury, lack of a general practitioner and timing of the injury [(4)]. Some families present in crisis and identify child protection concerns at triage. Other families present with seemingly unrelated issues, and the child protection concerns are identified during the ED visit. Several authors have reported on strategies to improve identification of non-intentional injury in emergency departments. Strategies investigated have included access to data on child protection registers [(5)], programmes of staff education about intentional injury and use of standard injury questionnaires that ask relevant child protection questions in order to trigger child protection referrals [(6,7)]
Several consistent risk factors for abuse have been reported in the literature and can help to identify children at risk when they present to the ED. These include: inconsistency in the history, incompatibility of the stated mechanism with the injury or child's developmental ability, undue delay in presentation, unusual interactions between child and carers, previous presentations with injury. [(6, 7, and 8)]

Reliable identification and interpretation of these risk factors requires considerable knowledge, expertise and experience. Whilst few injuries are considered to be specific for child abuse, some injuries and situations are considered to be high risk[(9, 10)] and rapid access to a history of previous attendances in the ED has been cited as useful in identifying child abuse risk [(6, 8)]

Many hospitals in Queensland utilise Emergency Department Information System (EDIS) to track and store clinical and demographic information. With this system, a rapid search can be performed by name or date of birth or case number, and previous attendances and diagnoses are shown. Whilst it has been suggested that only previous injury attendances are significant for child abuse risk, previous medical attendance and diagnoses may also be important in identifying families who are under financial or emotional stress.

Documentation of the emergency attendance is often lacking in even basic information, such as the time of injury, mechanism of injury, whether the injury was witnessed and whether the injury was consistent with the stated mechanism and child's developmental ability. [(7,9)] EDIS can be adapted to print a standard clinical record sheet for young patients presenting with injuries where a diagnosis of intentional injury should be considered by junior and less experienced medical staff. Prompts and specific questions can be incorporated in the clinical sheet that may assist ED staff identify intentional injury.

An act of violence by another person not directly involved in a child's care may be a random act by person's unknown to the child, the perpetrator may also be an acquaintance/ relative. Whether known or unknown, there is a significant correlation between drug and alcohol use and assault. The Matthew Stanley Foundation was created after the bashing death of Matthew outside of an adolescent's party in Brisbane, 2006. The foundation has focussed on safe partying strategies (see violence prevention links below). Government policies affecting licensing laws, pricing and availability of alcohol have the potential to influence adolescent drinking behaviours and reduce assault related injury. As in Matthew's case, many of the assaults in the QISU series were by other children/ adolescents. Overall, seventeen percent of intentional injuries in this series occurred at school. Local school policies that relate to bullying and violence in school can influence adolescent behaviour and reduce intentional injury in this setting.

Prevention

The complexity of issues involved in prevention of intentional injury precludes a full discussion in this bulletin. However, some general points need to be made.

Identification of intentional injury

Authorities are providing systems and processes that better identify and report intentional injury in order to break the cycle of child maltreatment and prevent further injury occurring in individual children.

Emergency Departments are ideally placed to report suspected child maltreatment both in children presenting with injury and with other unrelated concerns. Ideally, systems that identify families at risk before the injury occurs have greater potential to effect change. It has been demonstrated both locally and internationally, that offering support and practical assistance to families under stress can alter patterns of abuse and change a child's and family's life course.[11,12,13,14,15,16]

Reporting of intentional injury

Doctors are mandated to report child protection concerns to the Department of Child Safety (DChS). However, in some instances, ED staff may not be sure that their concerns warrant a formal notification. Child protection paediatricians and DChS/ Child-Safety-after-hours staff are available to provide advice by phone. Such discussions may raise new information or other aspects for consideration and may give sufficient cause for the emergency staff member to subsequently make a formal referral.

Environment

Environmental changes have been implemented both in Queensland and nationally in order to reduce many types of childhood injury. These changes include setting of minimal safety standards for nursery products, new national child restraint laws and building codes requiring use of safety glass and regulated hot water temperatures in new houses. Whilst these changes are not specifically intended to benefit children at risk of intentional injuries, they have the potential to set minimal safe standards for housing and nursery products. In families who are constrained in their ability to care for or provide for their children, minimal safety standards offer some protection from injury.
With regard to assault, strategies have been employed to create safer public spaces using the crime prevention through environmental design (CPTED) principles (see links below):

- ***Natural access control (controls access)***
- ***Natural Surveillance (increases visibility)***
- ***Territoriality (promotes a sense of ownership)***
- ***Activity Support (fosters community interaction)***
- ***Maintenance (deters offenders)***

These design principles are intended to inform the design of safer public spaces through improved community participation and surveillance and by denying criminals access to potential targets and creating a perception of risk for would-be offenders.

Summary

Clinicians usually require a series of indicators to be triggered before they feel warranted in contacting child protection services. Indicators of child abuse are often subtle requiring many years of experience and training for reliable detection. Even the most experienced medical and nursing staff miss some intentional injury in the ED. Computerisation in the ED can assist clinicians to identify intentional injury by providing a history of previous attendances and prompting structured relevant history taking.

Recommendations:

- Development and utilisation of a standard proforma to be incorporated in the EDIS system and completed by Queensland ED staff for all children presenting with injuries. Hospitals without EDIS can do the same using a paper form. (see page 6)
- Structured educational programme/ module for junior Queensland Health staff to improve documentation and recognition of intentional injury risk factors
- Utilisation of EDIS or similar system across Queensland to allow rapid identification of previous ED attendance history.
- Adapting CPTED design principles and improve access to community based strategies such as the safe party program.

Links:

Safe Communities:
http://www.safecommunitiesqld.org

Crime Prevention through Environmental Design:
http://www.cpted.net/
http://www.aic.gov.au/research/cvp/topics/cpted.html

Violence Prevention:
www.matthewstanleyfoundation.com.au
www.police.qld.gov.au/programs/personalSafety/situationalAdvice/partySafe.htm

Reference:

1. National Coronial Information System, accessed electronically at http://www.ncis.org.au (accessed June 2008)

2. Commission for Children and Young People and Child Guardian, Annual Report: Deaths of children and young people, Queensland, 2004–05, Com mission for Children and Young People and Child Guardian Queensland, Brisbane.

3. Commission for Children and Young People and Child Guardian, Annual Report: Deaths of children and young people, Queensland, 2005–06, Com mission for Children and Young People and Child Guardian Queensland, Brisbane.

4. Keshavarz R, Kawashima R, Low C. Child abuse and neglect presentations to a pediatric emergency de partment. J Emerg Med, 2002. 23(4): p. 341-345.

5. Flanagan N M, MacLeod C, Jenkins M G, Wylie R. The Child Protection Register: A tool in the accident and emergency department? Emerg Med J. 2002;19:229-30.

6. McKinney A, Lane G, Hickey F. Detection of non-acci dental injuries presenting at emergency departments. Emerg Med J. 2004;21:562-4

7 Benger J R, McCabe S E. Burns and scalds in pre-school children attending accident and emergency: ac cident or abuse? EmergMedJ. 2001;18:172-4.

8 Rosenberg N M, Marino D. Frequency of suspected abuse/neglect in burn patients. Pediatric Emegency Care, 1989.5(4): p. 219-221

9 Taitz J, Moran K, O'Meara M. Long bone fractures in chil dren under 3 years of age: Is abuse being missed in Emergency Department presentations? J Paediatr Child Health. 2004;40:170-4

10 Bandyopadhyay S, Yen K. Non-accidental fractures in child maltreatment syndrome.Clinical Pediatric Emergency Medicine, 2002.**3**(2): p. 145-152.

11 Armstrong KL, Fraser JA, Dadds MR, Morris J. A ran domized, controlled trial of nurse home visiting to vul nable families with newborns. J Paediatric Child Health. 1999 Jun;35(3):237-44.

12 Armstrong KL, Fraser JA, Dadds MR, Morris J. A randomized, controlled trial of nurse home visiting to vulnerable families with newborns. J Paediatric Child Health. 1999 Jun;35(3):237-

13 Cadzow SP, Armstrong KL, Fraser JA. Stressed parents with infants: reassessing physical abuse risk factors. Child Abuse Negl. 1999 Sep;23 (9):845-53.

14. Fraser JA, Armstrong KL, Morris JP, Dadds MR. Home visiting intervention for vulnerable families with newborns: follow-up results of a randomized Child Abuse Negl. 2000 Nov;24(11):1399-429.

15. Olds DL, Eckenrode J, Henderson CR Jr, Kitzman H, Powers J, Cole R, Sidora K, Morris P, Pettitt LM, Luckey D. Long-term effects of home visitation on maternal life course and child abuse and neglect. Fifteen-year follow-up of a randomized trial. JAMA. 1997 Aug 27;278(8):637-43

16. Kitzman H, Olds DL, Henderson CR Jr, Hanks C, Cole R, Tatelbaum R, McConnochie KM, Sidora K, Luckey DW, Shaver D, Engelhardt K, James D, Bar nard K. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing. A randomized controlled trial. JAMA. 1997 Aug 27;278(8):644-52.

Suggested Emergency Department Form

Hospital ID DEPARTMENT OF EMERGENCY MEDICINE **INJURY PROFORMA**	(Affix patient identification label here) URN: Family Name: Given Names: Date of Birth: Sex: ☐ M ☐ F

PURPOSES:

To improve the quality of documentation of children who present to the Emergency Department with an injury or ingestion.

To raise the level of awareness of non-accidental injury as a diagnostic possibility

The following 10 points must be documented for all children who present to the Emergency Department with an injury or ingestion.

1. When did the injury occur?	Date: / /	Time: am / pm
2. Where did the injury occur?		
3. Were witnesses present? ☐ Yes ☐ No If yes, who were they?		
4. What actually went wrong to cause the injury? (*include caregiver description of mechanism*)		
5. Is there a history or record of previous injury? ☐ Yes ☐ No		
6. What is the age of the child?	————-years	————months
(Be very cautious re physical injuries in children <1 year old)		
7. What is the developmental level of the child? ☐ Normal ☐ Abnormal		
8. What is the interaction between the child and caregiver? ☐ Normal ☐ Abnormal		
9. Is the child's immunisation status up-to-date? ☐ Yes ☐ No *(record details over page)*		
10. Examination findings: *(record over page) USE BODY CHART IF POSSIBLE*		
CONCLUSIONS ABOUT INJURY:		
Are the examination findings consistent with the history given?	☐ Yes ☐ No	
Do you have any concerns re non-accidental injury?	☐ Yes ☐ No	
If INFLICTED OR UNCLEAR involve ED consultant If advised by the ED consultant contact CPU in hours on ext XXXX or CPU consultant on call after hours via switch		